NAT SPG/57

INTERNATIONAL CIVIL AVIATION ORGANIZATION

FINAL

SUMMARY OF DISCUSSIONS AND CONCLUSIONS OF

THE FIFTY-SEVENTH MEETING OF

THE NORTH ATLANTIC SYSTEMS PLANNING GROUP

Virtual Meeting, 21 to 24 June 2021

PREPARED BY THE EUROPEAN AND NORTH ATLANTIC OFFICE OF ICAO

JUNE 2021

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF CONCLUSIONS

INTRODUCTION

0.1 The Fifty-Seventh Meeting of the North Atlantic Systems Planning Group (NAT SPG/57) was held from 21 to 24 June 2021 via Webex.

0.2 The Meeting was chaired by Mrs. Hlin Holm (Iceland). Capt. Denis Guindon, Acting ICAO Regional Director of the European and North Atlantic (EUR/NAT) Office, was Secretary of the Meeting, assisted by ICAO staff as listed in **Appendix A**.

0.3 The list of meeting participants and contacts is provided at **Appendix A**. The list of meeting documentation is included in **Appendix B**. Due to time and virtual meeting limitations, it was agreed that information papers would not be presented, but made available on the NAT SPG portal.

0.4 In the opening session, the following agenda was agreed:

Agenda Item 1: Review of significant international aviation developments;

Agenda Item 2: NAT planning and implementation programmes;

Agenda Item 3: NAT safety performance and oversight issues;

Agenda Item 4: NAT economic, financial and forecast issues;

Agenda Item 5: NAT Documentation updates;

Agenda Item 6: Work programme, including sub-groups; and

Agenda Item 7: Any Other Business.

1. REVIEW OF SIGNIFICANT INTERNATIONAL AVIATION DEVELOPMENTS

1.1 STATUS OF FOLLOW UP ACTIONS ON NAT SPG CONCLUSIONS

1.1.1 The Meeting reviewed the progress of follow up actions on the outstanding NAT SPG Conclusions and noted that most of them were either closed or addressed and documented in the current summary of discussions. The updated list is provided in **Appendix C**.

1.1.2 In addition, the Meeting noted that the following NAT SPG/57 Conclusions had been approved by correspondence prior to the present meeting:

NAT SPG Conclusion 57/1 (CORR) – Development of a new NAT Height Monitoring System (HMS)

That, in order to provide an ADS-B height monitoring system for the NAT Region which meets the current safety requirements,

a) the lower cost option to develop a new Height Monitoring System (HMS) in collaboration with NAT ANSPs utilising existing ADS-B data within the NAT is preferred and should be pursued; and

b) the NAT Safety Oversight Group further develop implementation activities and provide a progress report at the next NAT SPG.

NAT SPG Conclusion 57/2 (CORR) – Financial mechanism for funding the new NAT HMS

That, in order for an appropriate financing mechanism for funding of the new NAT HMS be developed, the NAT Economic, Financial and Forecast Group:

a) examine current joint financing arrangements of the NAT Height Monitoring System (HMS);

b) suggest appropriate financial measures during the transition period from the current HMU system to the new HMS;

c) develop a new Regional financing mechanism/new HMS Arrangement for the new NAT HMS; and

d) present the new HMS Arrangement for the approval of NAT SPG.

2. NAT PLANNING AND IMPLEMENTATION PROGRAMMES

2.1 NAT 2030 VISION

2.1.1 The Meeting was provided with information on the work conducted in follow up to NAT SPG Conclusion 55/24 (*NAT 2030 Vision high-level principles, goals and objectives and potential improvement areas*). It was noted, that with regard to 55/24 b) assigning a task to the North Atlantic Implementation Management Group (NAT IMG) to further refine the NAT 2030 Vision high-level principles and list of potential improvements, in order to prioritise them by their practical implementation feasibility by 2030 and update the NAT documents as appropriate, the NAT IMG agreed to a NAT 2030 Vision Matrix template which was circulated to the NAT IMG members for reply by 1 February 2021. The purpose of the matrix was to assist in determining the priorities and feasibility of the NAT SPG agreed potential improvements. Based on the responses received, an updated NAT Vision 2030 matrix of goals, objectives and prioritised potential improvements was prepared, categorised by feasibility and timeline.

2.1.2 Therefore, the following was endorsed:

NAT SPG Conclusion 57/3 – NAT 2030 Vision high-level principles, goals and objectives and potential improvement areas

That, the NAT SPG:

a) endorse the prioritization and feasibility of the NAT 2030 Vision goals, objectives and improvements as provided in **Appendix D**;

b) task the NAT IMG, in coordination with the NAT SOG and NAT EFFG, to:

i) implement the identified list of potential improvements by their practical implementation feasibility by 2030; and

ii) update the relevant NAT documentation (i.e. *Future ATM Concept of Operations for the North Atlantic Region* (NAT Doc 005) and the NAT Service Development Roadmap as contained in the *Air Navigation Plan – North Atlantic Region* (NAT eANP, Vol III, Doc 9634) and work programmes in accordance with the endorsed NAT 2030 Vision high-level principles, goals and objectives.

2.1.3 In connection with the foregoing, the Meeting noted that the United States have established the Federal Aviation Administration's (FAA) Future of the Ocean 2035 (FOTO35) programme which was fully aligned with the NAT 2030 Vision and its strategic goals to enhance seamless global oceanic ATM operations. The Meeting also noted an information paper provided by the International Air Transport Association (IATA) on the IATA NAT Operational Strategy.

2.1.4 The Meeting was provided with information about the increasing number of requests for use of airspace in the NAT from the new entrants' category, including commercial rocket launches. It was noted that these requests were expected to grow substantially in the coming years, particularly with the acceleration observed in the pace of development of commercial rocket launch spaceports and similar entities. The current and anticipated increase in new entrant requests from multiple operators in multiple locations has potential to also increase the scope and complexity of operations, particularly when such requests overlap and transit multiple oceanic control area (OCA) boundaries and the airspace of neighbouring Planning and Implementation Regional Groups (PIRGs), and in a relatively short timescale.

2.1.5 In this regard, it was noted that the NAT Region provisions should evolve to enable operations without unduly impacting the wider range of civil and military airspace users, meeting the expectations of the NAT 2030 Vision. This needs to be done while maintaining aviation safety and environmental sustainability. Since operations by new entrants have already begun, there was a need to ensure the pragmatic and timely implementation of new entrant traffic management, matched to user needs, capabilities, and the anticipated volume of future activities.

2.1.6 The Meeting agreed that this evolution needed to be closely monitored to maintain awareness and ensure sufficient and timely adaptation of NAT programmes and procedures to account for these activities in the NAT Region. In this respect the Meeting agreed that the establishment of a Project Team could be a pragmatic way forward and invited the NAT IMG and North Atlantic Safety Oversight Group (NAT SOG) Chairs to further discuss this matter and identify a way forward.

2.1.7 The Meeting was informed about the NAT Economic, Financial and Forecast Group discussions (NAT EFFG/40, May 2021) about the NAT 2030 Vision prioritisation and their proposal to modify the NAT SPG Conclusion above to include the conduct of a financial review of the potential improvement areas.

2.1.8 In this regard, the Meeting acknowledged the importance of conducting appropriate financial, as well as safety, assessments in support of the NAT 2030 Vision improvements' implementation. This work would be done once the works on the development of individual implementation programmes started and when the need for those assessments was determined by the NAT SPG.

3. NAT SAFETY PERFORMANCE AND OVERSIGHT ISSUES

3.1 RVSM MONITORING FOR STATE AIRCRAFT

3.1.1 The Meeting was provided with the results of discussions related to reduced vertical separation minimum (RVSM) monitoring for State aircraft and agreed to encourage States to liaise with their military authorities to ensure that, where applicable, RVSM approval data for State aircraft was regularly passed to the relevant Regional Monitoring Agency (RMA). It was also agreed that, in order to avoid State aircraft being incorrectly included in any publication of RVSM non-approved aircraft, States should be encouraged to agree a process with their military authorities to handle reports of RVSM non-approved State aircraft operating within RVSM airspace. Where observed State aircraft do have the necessary RVSM approval, confirmation should be forwarded to the requesting RMA within the notified timeframe.

3.1.2 Based on the above, the Meeting endorsed the following:

NAT SPG Conclusion 57/4 – RVSM Monitoring of State Aircraft

That the ICAO Regional Director, Europe and North Atlantic, urge States to ensure a closer cooperation between civilian and military authorities so that all RVSM operational requirements are clearly understood and complied with for State aircraft, in particular:

a) ensure that RVSM approval data for State aircraft is regularly passed to the relevant RMA;

b) agree a process for handling reports of RVSM non-approved State aircraft detected operating within RVSM airspace; and

c) where applicable, forward RVSM approval confirmation to the requesting RMA within the notified timeframe.

3.2 CHANGES IN TERMS OF REFERENCE OF NAT SOG AND ITS CONTRIBUTORY GROUPS: NAT SG AND NAT MWG

3.2.1 The Meeting was informed that the NAT SOG agreed to add two tasks in the North Atlantic Mathematicians Working Group (NAT MWG) Terms of Reference (ToRs) to ensure that the NAT MWG:

a) calculates the longitudinal Collision Risk Estimate (CRE) in accordance with longitudinal monitoring requirements; and

b) collects annual NAT traffic data in order to estimate flying hours, number of flight operations, and aircraft size parameters for the assessment of annual lateral, longitudinal and vertical risks.

3.2.2 The Meeting also recalled that the *NAT SPG Handbook* (NAT Doc 001) assigned the review of the NAT Oceanic Error Safety Bulletin (OESB) and Sample Oceanic Checklists to the North Atlantic Scrutiny Group (NAT SG). However, no indication in the *NAT SPG Handbook* detailed the frequency at which such reviews should occur. Therefore, the Meeting agreed that the NAT SG ToRs be amended to add the annual review, in collaboration with the North Atlantic Procedures and Operations Group (NAT POG) and in coordination with the NAT Document Management Office (NAT DMO), to ensure the continued validity and relevance of the NAT OESB and Sample Oceanic Checklists.

3.2.3 Furthermore, the Meeting was informed about the results of the NAT SOG Working Methods Project Team (WMPT). It was noted with appreciation that the WMPT had met its objectives and was disbanded. The outcomes of the WMPT included proposed amendments to the NAT SOG ToRs, as well as updates to NAT Doc 001 "Definition and Components of Safety Cases in support of changes to the NAT air navigation systems requiring NAT SPG approval" and "NAT REGIONAL SAFETY CASE TEMPLATE", Section 3 "NAT Safety Case Terms and Definitions".

3.2.4 The Meeting agreed with the foregoing proposed amendments to NAT Doc 001 that are included in NAT SPG Conclusion 57/12 (paragraphs 5.3.1 and 5.3.2 refer).

3.3 NAT ANNUAL SAFETY REPORT (NAT ASR) FOR 2020

3.3.1 The Meeting was presented with a draft *NAT Annual Safety Report* (NAT ASR) for the year 2020 which was developed with the support of the NAT SOG Chairman and in coordination with NAT SG and NAT MWG Rapporteurs as well as the NAT Central Monitoring Agency (NAT CMA). It was noted that the reports of the preliminary scrutiny performed on January-June 2020 events (SG23 period) and on July-December 2020 events (SG24 period), as well as the outcomes of the NAT MWG/57 meeting allowed for the development of this draft *NAT Annual Safety Report* with the 2020 values of the Safety Key Performance Indicators (SKPIs) and Collision Risk Estimates (CREs). However, because the scrutiny of NAT events for the year 2020 was not formally reviewed by a full face-to-face NAT SG meeting due to the restrictions imposed by the COVID-19 pandemic, a note was introduced to mention that the values for safety performance presented could be revisited when full face-to-face NAT SG meetings can be reconvened.

3.3.2 The Meeting noted that the draft NAT ASR 2020, presented at **Appendix E**, contains information on:

a) Safety Policy, as stipulated in NAT Doc 001 and its alignment with the ICAO Global Aviation Safety Plan (GASP, Doc 10004);

b) The North Atlantic Scenario, which includes the traffic levels for 2020;

c) Vertical and lateral Collision Risk Estimates (CRE) for 2020. The Vertical risk estimate was reported to be 19.7x10-9 for the whole NAT High Level Airspace (HLA) which was reduced to 5.5x10-9 with the actual Strategic Lateral Offset Procedures (SLOP)adjustment applied. There were still some improvements that could be made in the application of SLOP and the meeting was informed that a perfect 33/33/33 allocation would have reduced the adjusted CRE estimate to 3.4x10-9 and been below the Target Level of Safety (TLS). The lateral risk estimate for 2020 was 3.6x10-9 which was a reduction from 13.6x10-9 in 2019. Although both figures were weighted per flight hour and therefore took into account the traffic volumes, there was not a perfect linear relationship between the levels of safety and the levels of traffic;

d) Safety Key Performance Indicators (SKPI), showing the set of 12 SKPIs with targets based on three years of rolling data: 8 of the SKPIs have met their target in 2020, versus 6 achieved in 2019;

e) Results of the scrutiny of events of year 2020, including the identified contributing issues, and the mitigations that were used for preventions; and

f) NAT Regional Priorities, including the benefits of the implementation of Space-based Automatic Dependent Surveillance – Broadcast (SB ADS-B), the temporary accommodation of non-datalink equipped aircraft within the NAT HLA to allow more flexibility for NAT airspace users and the NAT 2030 Vision, which remained a relevant pathway to prioritize and deliver a proportionate series of improvements.

3.3.3 In view of the above the Meeting endorsed the following:

NAT SPG Conclusion 57/5 – NAT Annual Safety Report 2020

That:

a) the NAT Annual Safety Report (NAT ASR 2020) be endorsed; and

b) the ICAO Regional Director, Europe and North Atlantic take appropriate action to publish the NAT SPG-endorsed NAT ASR 2020 (**Appendix E** refers).

3.4 DATA IN SUPPORT OF A NEW NAT HEIGHT MONITORING SYSTEM (HMS)

3.4.1 The Meeting recalled that the following was agreed by correspondence based on the extensive work carried out by the NAT Height Monitoring System (HMS) Financial Assessment Project Team (NAT HMS/FA PT):

"NAT SPG Conclusion 57/1 (CORR) – Development of a new NAT Height Monitoring System (HMS)

That, in order to provide an ADS-B height monitoring system for the NAT Region which meets the current safety requirements,

a) the lower cost option to develop a new Height Monitoring System (HMS) in collaboration with NAT ANSPs utilising existing ADS-B data within the NAT is preferred and should be pursued; and

b) the NAT Safety Oversight Group further develop implementation activities and provide a progress report at the next NAT SPG."

3.4.2 In order to address b) above and ensure the continuation of the development of a new HMS in collaboration with NAT Air Navigation Service Providers (ANSPs) utilising existing Automatic Dependent Surveillance – Broadcast (ADS-B) data, the Meeting noted that the NAT SOG tasked the NAT CMA with (NAT SOG follow-up action 24-02 refers):

a) developing a plan for the implementation of the Height Monitoring System (HMS) in line with NAT SPG Conclusion 57/1 (CORR) sub-paragraph (a), and

b) reporting on the progress of the implementation to subsequent NAT SOG meetings.

3.4.3 In conjunction with the above, the Meeting endorsed the following:

NAT SPG Conclusion 57/6 – Provision and transmission of data in support of a new NAT Height Monitoring System (HMS)

That the NAT provider States, subject to adequate financial arrangements being in place:

a) ensure they have the necessary processes in place to support the implementation of the HMS in line with NAT SPG Conclusion 57/1 (CORR) sub-paragraph (a), and

b) ensure that the State ANSPs have mechanisms in place to allow for the provision and transmission of the ADS-B dataset to the NAT CMA to support the new HMS.

3.4.4 Concerning (NAT SPG Conclusion 56-2/5 - *Minimum Height Monitoring Requirements for the NAT Region*), the Meeting agreed that the future NAT Minimum Height Monitoring Requirements listed in the foregoing Conclusion remained valid and should be included in the *NAT SPG Handbook*.

3.4.5 Based on the above, the following was endorsed for inclusion into the *NAT SPG Handbook* (NAT Doc 001), NAT Safety Policies Section:

"*NAT SPG Conclusion 56-2/5 – Minimum Height Monitoring Requirements for the NAT Region*

That,

in order to provide an ADS-B height monitoring system for the NAT Region which meets the current safety requirements, with consideration of available manpower in the NAT Central Monitoring Agency (NAT CMA) and currently available resources, the following shall apply in the NAT Region:

i) initially, the minimum height monitoring requirement be set at one 24-hour period of all available NAT Regional ADS-B data on a rolling eight day schedule allowing for at least 60% of the NAT traffic population to be monitored on a regular basis;

ii) the monitoring be rolled over an eight-day period, ensuring the capture of more individual aircraft frames and those which operate on a fixed schedule; and

iii) *this recommended minimum height monitoring requirement be reviewed at regular intervals to assess the workload impact on the NAT CMA and to take advantage of technological improvements which could accommodate an increase in the monitoring rates.*"

3.5 PBCS Monitoring and Reporting Guidance

3.5.1 The Meeting noted that the NAT SOG PBCS (Performance Based Communications and Surveillance) Non-Performance Report Harmonization Project Team (NAT PBCS NPRH PT) completed its work and was disbanded at NAT SOG/24. The NAT PBCS NPRH PT developed a *PBCS Monitoring and Reporting Guidance* for the reporting of PBCS non-compliance which was intended to be included in the updated version of *Performance-based Communication and Surveillance Manual* (ICAO Doc 9869) estimated for publication in 2023.

3.5.2 The Meeting recognised the importance of making available the information contained in the guidance as a NAT Document and publishing on the ICAO dedicated PBCS web pages until such time as it could be incorporated into the ICAO PBCS Manual. In this regard, the Meeting was informed that the ICAO dedicated PBCS webpages at **https://www.icao.int/airnavigation/pbcs/Pages/default.aspx** was still under construction.

3.5.3 The Meeting noted that application of guidance related to the number of data points (below 100) could lead to an increase in the workload for the NAT CMA and other RMAs. To that end, it was noted that the NAT SOG had tasked the NAT CMA with analysing the impact and reporting to the next NAT SOG (NAT SOG follow up action 24-03 refers).

3.5.4 Although the NAT SOG agreed to disband the PT on the basis that it had met, as far as practicable, its objectives, the Meeting noted IATA's concerns over issues deemed either "partially met" or "not met" by the work of the PBCS NPRH PT. Of greatest concern for "not met," although outside the remit of the PT, was globally agreed guidance language on a "recovery action plan" allowing an operator to again either file a P2 code or have a PBCS approval re-instated after being determined to be PBCS non-compliant. Regarding the need for global harmonization on the number of data points necessary for an aircraft's performance to be deemed non-compliant by a particular State, IATA iterated that there were some States and Original Equipment Manufacturers (OEMs) currently using 300 data points as the minimal number required to begin performance non-compliance analysis.

3.5.5 In view of the above, the Meeting endorsed the following:

NAT SPG Conclusion 57/7 – PBCS Monitoring and Reporting Guidance

That:

a) the *PBCS Monitoring and Reporting Guidance* in **Appendix F** and its publication be endorsed; and

b) the ICAO Regional Director, Europe and North Atlantic take appropriate action to publish the *PBCS Monitoring and Reporting Guidance* as a NAT Document and coordinate with ICAO in Montreal to arrange for the guidance to be published on the PBCS web pages as soon as possible and make it available for the use of the ICAO Operational Data Link Specific Working Group (OPDLWG).

3.5.6 The Meeting noted that the ICAO EUR/NAT Office would ensure liaison on the foregoing with the OPDLWG and coordinate with the NAT if any updates to the NAT guidance would be needed until the proposed guidance was fully incorporated in the ICAO PBCS Manual.

3.6 FILING OF RNAV 10 OR RNP 4 IN ADDITION TO MNPS/HLA

3.6.1 The Meeting noted the information provided on the Isavia ANS study on filing of RNAV 10 or RNP 4 data in flight plans (FPL). The Meeting agreed that the issuance of a State Letter would be useful, in order to remind aircraft operators that there was a requirement to file either RNAV 10 or RNP 4 in addition to Minimum Navigation Performance Specifications (MNPS)/HLA and to encourage operators to seek the necessary approvals.

3.6.2 Therefore, the Meeting endorsed the following:

NAT SPG Conclusion 57/8 – Filing of RNAV 10 or RNP 4 in addition to MNPS/HLA

That the ICAO Regional Director, Europe and North Atlantic issue a State Letter to:

a) remind aircraft operators that there was a requirement to file either RNAV 10 (A1) or RNP 4 (L1) in addition to MNPS/HLA (X); and

b) encourage operators to seek the necessary approvals.

4. NAT ECONOMIC, FINANCIAL AND FORECAST ISSUES

4.1 NAT TRAFFIC FORECAST

4.1.1 The Meeting noted the information paper about the NAT traffic forecast for the period 2020-2025 that was sent to the NAT SPG for approval by correspondence on 25 February 2021. Also, per its work programme, the NAT EFFG would send traffic figures by mid-August 2021 in order for the preliminary forecast to be finalised to meet the timeline for calculations of user charges for the DENICE (Danish and Icelandic Joint Financing) Agreement.

4.2 OUTCOME OF THE NAT EFFG HMS/FA PT

4.2.1 The Meeting recalled the two NAT SPG/57-approved by correspondence Conclusions, following the outcomes of the NAT EFFG HMS/FA PT, namely NAT SPG Conclusion 57/1 (CORR) [*Development of a new NAT Height Monitoring System (HMS)*] and NAT SPG Conclusion 57/2 (CORR) [*Financial mechanism for funding the new NAT HMS*]. The Meeting noted the excellent work done by the project team and thanked its Rapporteur Mr. Jeff Miller (IATA) for his leadership on this activity.

4.2.2 The Meeting was informed that in follow-up to NAT SPG Conclusion 57/2 (CORR), the NAT EFFG established the New HMS Arrangement Project Team (NAT EFFG NHMSA PT) which planned to complete its work by the end of 2021.

5. NAT DOCUMENTATION UPDATES

5.1 NAT DOCUMENTATION MANAGEMENT PROCESS

5.1.1 The Meeting was informed that in follow up to the NAT SPG approval of the NAT OPS Bulletin 2018_003 Rev01 [Waypoint Insertion / Verification Special Emphasis Items], subsequent discussions took place in various NAT contributory bodies, in particular the NAT IMG, on how the current NAT documentation approval process could be improved.

5.1.2 The following were the potential areas of improvement that were identified concerning the management of NAT documents:

a) the approval/amendment/removal of some NAT documents could be delegated from the NAT SPG to the NAT IMG/NAT SOG level;

b) the ToRs of the NAT DMO could be reviewed to optimise the use of resources; and

c) the need for, or the reduced use of, NAT OPS bulletins should be considered.

5.1.3 With regard to a) above, it was noted that in recent years, significant delays in updates to the NAT OPS Bulletins have been observed. This was, in many cases, due to repetitive cycles of review and approval by NAT SPG contributory bodies and misunderstandings on the role of NAT OPS Bulletins. To address this issue, it was recommended that the approval of NAT OPS Bulletins be delegated to the NAT IMG and NAT SOG, as appropriate. This would allow faster and more efficient processing of updates.

5.1.4 With regard to b), it was agreed that the DMO ToRs could be modified as proposed.

5.1.5 Concerning c), the Meeting agreed that NAT contributory bodies should be tasked to review on a regular basis the contents of the existing NAT OPS Bulletins with the following objectives in mind:

a) the content of NAT OPS Bulletins should, as far as possible, be moved to other NAT documents, e.g. NAT Doc 007.

b) OPS Bulletins should, as far as practicable, be used for specific issues of temporary nature, e.g. support ongoing implementation projects. As far as possible, OPS Bulletins should indicate their validity dates and the appropriate NAT contributory bodies would periodically review the validity of the OPS Bulletins as part of their work programme.

c) NAT OPS Bulletins are reference documents only and should not be seen to be equivalent to Standards and Recommended Practices (SARPS), Procedures for Air Navigation Services (PANS) or Regional Supplementary Procedures (SUPPs, Doc 7030).

5.1.6 In this regard, the Meeting was informed that this work had been conducted and its results were presented to the present Meeting and documented in this summary of discussions.

5.1.7 Therefore, the following was endorsed:

NAT SPG Conclusion 57/9 – Maintenance of NAT documents

That:

a) the approval/amendment/removal of NAT OPS Bulletins be delegated to the NAT IMG and NAT SOG as appropriate;

b) the ToRs of the NAT DMO be revised to optimise the use of resources;

c) the NAT IMG and NAT SOG, through the NAT contributory bodies, ensure the currency and maintenace of the NAT OPS bulletins on a regular basis; and

d) the ICAO Regional Director, Europe and North Atlantic process the proposed amendment to the *NAT SPG Handbook* as indicated in **Appendix G**.

5.2 PFA OF NAT SUPPS (ICAO DOC 7030)

5.2.1 The NAT SPG was presented with the report of the NAT Doc 7030 Review Project Team that was established by NAT IMG Decision 57/03. The Meeting agreed that the proposal for amendment to the *NAT Regional Supplementary Procedures* (SUPPs, Doc 7030), as provided in **Appendix H**, be submitted for further processing within ICAO.

5.2.2 In addition, it was reported that there were the following two issues where a conclusion was not reached by the project team:

a) Minimum Navigation Performance Specifications (MNPS)/High Level Airspace (HLA) approval: Based on the NAT SPG statement in NAT SPG/51 (June 2015) report, that "*the ultimate goal of the NAT MNPS to PBN plan would be to eliminate the need for specific MNPS airspace approvals after 2020, also taking into account the new ICAO provisions on PBN and PBCS requirements for aircraft operators*", the NAT SPG should formally decide on the future of the requirement for a specific approval for operation in the NAT HLA; and

b) Performance Based Navigation (PBN) approvals: review the need to retain the Doc 7030 provision on PBN-related approvals by the State of the Operator or the State of Registry in view of Annex 6 provisions and States' practices.

5.2.3 Therefore, the following was endorsed:

NAT SPG Conclusion 57/10 – PfA to NAT SUPPs (Doc 7030/5)

That the ICAO Regional Director, Europe and North Atlantic process the proposed amendment to the NAT *Regional Supplementary Procedures* (NAT SUPPs, Doc 7030/5) as detailed in **Appendix H**.

5.2.4 The Meeting expressed their appreciation to Mr. Bjarni Stefansson (Iceland) for the very efficient management of the PT and excellent results, given the huge amount of work that was completed in a very limited timeframe.

5.2.5 Concerning the 2 issues listed in para 5.2.2, it was agreed that further work was required to reach a conclusion on those issues. It was therefore agreed that the best avenue of facilitating this work would be to form the NAT MNPS/HLA and PBN Approval Project Team (NAT MHP PT) with the ToRs as provided at **Appendix I**.

5.2.6 Therefore, the following was endorsed:

NAT SPG Conclusion 57/11 – Establishment of the NAT MHP PT

That the ICAO Regional Director, Europe and North Atlantic, take appropriate measures to establish the NAT MNPS/HLA and PBN Approval Project Team (NAT MHP PT) with the ToRs as provided in **Appendix I**.

5.3 NAT DOC 001 – NAT SPG HANDBOOK

5.3.1 The Meeting was presented with a summary of all amendments to the *North Atlantic Systems Planning Group* (NAT SPG) *Handbook* (NAT Doc 001) presented at this meeting:

a) Updates to Section 1: #13 – NAT SPG representatives of Canada, Denmark, Norway and United Kingdom;

b) Update to Section 4:C — NAT DMO Terms of Reference (paragraphs 5.1.4 and 5.1.7 refer);

c) Update to Section 6:A — Documents promulgated by the NAT SPG concerning clarifications on NAT OPS bulletins in headings: “Kept under review by” and “Amendments approved by” and Remarks” column in order to streamline maintenance of these documents (paragraphs 5.1.3 and 5.1.7 refer);

d) Updates to the status of the following documents that were approved at the present meeting:

   i) NAT Doc 001 – *NAT SPG Handbook* – July 2021;

   ii) NAT Doc 006, Part II – *Volcanic Ash Contingency Plan (VACP), Europe and North Atlantic Regions* – Version 2.0.1 (NAT Doc 006, Part II, VACP) – July 2021;

   iii) NAT Doc 007 – *North Atlantic Operations and Airspace Manual* – Version V2021-2 – July 2021;

   iv) New NAT Doc 011 - *PBCS Monitoring and Reporting Guidance*– Version 2021 – July 2021 (paragraphs 3.5.2 and 3.5.5 refer);

e) Updates resulting from the NAT SOG Working Methods Project Team (WMPT):

   i) Update to Section 3:A – NAT SOG Terms of Reference (paragraph 3.2.3 refers);

   ii) Update to Section 5:A, paragraph [04] – “Definition and Components of Safety Cases in support of changes to the NAT air navigation systems requiring NAT SPG approval” (paragraph 3.2.3 refers);

   iii) Update to Appendix A “NAT REGIONAL SAFETY CASE TEMPLATE”, Section 3 “NAT Safety Case Terms and Definitions” (paragraph 3.2.3 refers);

f) Update to Section 3:C – NAT MWG Terms of Reference (paragraph 3.2.1 refers);

g) Update to Section 3:D – NAT SG Terms of Reference (paragraph 3.2.2 refers).

h) Insert in Section 5:A, new paragraph [05] “Minimum Height Monitoring Requirements” (ref. NAT SPG Conclusion 56-2/5) (paragraph 3.4.5 refers).

5.3.2 Based on the above, the following was endorsed:

NAT SPG Conclusion 57/12 – Update of NAT SPG Handbook, NAT Doc 001, v2.6.0

That,

a) the *North Atlantic Systems Planning Group (NAT SPG) Handbook* (NAT Doc 001) be amended as presented at **Appendix G**; and

b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish and promulgate the updated NAT Doc 001, v2.6.0.

5.4 NAT DOC 006, PART II – VOLCANIC ASH CONTINGENCY PLAN - NORTH ATLANTIC REGION

5.4.1 The Meeting was presented with proposed amendments to the *Volcanic Ash Contingency Plan* (VACP), *Europe and North Atlantic Regions* (EUR Doc 019, NAT Doc 006, Part II).

5.4.2 It was noted that of relevance to the NAT Region was the removal of paragraph 8 of Attachment X3 that reflected the current Volcanic Ash Advisory Centres' (VAAC) practices as the trial 24-hour forecast of volcanic ash advisory information in graphical form (VAG) and volcanic ash advisory (VAA) product were discontinued (Meteorology Panel MET Operations Group (METP MOG5) Decision 5/5 refers). Furthermore, paragraphs 13 and 14 of Attachment X3 for the NAT Region was updated to provide the correct CSV (comma-separated values) format description and example provided to EUROCONTROL.

5.4.3 The Meeting also noted that the amendment included changes related to the EUR Region that were reviewed and approved by the European Aviation System Planning Group (EASPG) Programme Coordination Group (PCG) .

5.4.4 Therefore, the following was endorsed:

NAT SPG Conclusion 57/13 – Update to EUR and NAT VACP (NAT Doc 006 Part II/EUR Doc 019)

That the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish the revised *Volcanic Ash Contingency Plan, Europe and North Atlantic Regions* (EUR Doc 019, NAT Doc 006, Part II) as provided at **Appendix J**.

5.5 NAT DOC 007 - NAT OPERATIONS AND AIRSPACE MANUAL

5.5.1 The Meeting was presented with a proposal to amend the *North Atlantic Operations and Airspace Manual* (NAT Doc 007) related to the inclusion of a diagram to further support the currently published weather contingency procedures guidance as well as a consolidated proposal for amendment, which included updates and corrections made based on a review of all currently published NAT OPS Bulletins.

5.5.2 The following was therefore endorsed:

NAT SPG Conclusion 57/14 – PfA to NAT Doc 007

That,

a) the proposal for amendment to the *North Atlantic Operations and Airspace Manual* (NAT Doc 007, v2021-2) be endorsed (**Appendix K** refers); and

b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to promulgate the updated NAT Doc 007.

5.6 NAT OPS BULLETINS

5.6.1 The Meeting was presented with the results of the NAT POG review of all 14 currently published NAT OPS Bulletins. Following the discussions from the NAT SPG/56-2 meeting, it was highlighted that this type of publication (additional guidance material) should be as up-to-date as possible, and should not have outdated or contain wrong information disseminated to NAT airspace users. The review of all NAT OPS Bulletins was done by applying the criteria of relevance of the guidance material and applicability timeframe.

5.6.2 The review concluded with a recommendation for deletion of several OPS Bulletins. Several other Bulletins, such as 2018_004 (Implementation of Performance Based Separation Minima-Expanded

Publication of PBCS OTS), 2019_001 (Operations Without an Assigned Fixed Speed in the NAT (OWAFS) Special Emphasis Items (SEI)), 2020_002 (Surveillance Service in the NAT / Flight Crew Operating Procedures) were agreed to remain valid for another year and be revisited in 2022.

5.6.3 In view of the above, the following was endorsed:

NAT SPG Conclusion 57/15 – Update of NAT OPS Bulletins

That the ICAO Regional Director, Europe and North Atlantic take appropriate action to delete NAT OPS Bulletins Serial No.: 2013_002, 2013_005, 2017_001, 2018_002, and 2018_005.

Amendment to NAT OPS Bulletin 2019_003 Rev 2 (Data Link Performance Improvement Options)

5.6.4 The Meeting was presented with a proposal for amendment to the NAT OPS Bulletin 2019_003 Rev 2 (Data Link Performance Improvement Options, issued on 8 July 2020). It was noted that the amendment was proposed following the discussion at the North Atlantic Technology and Interoperability Group ()NAT TIG/11, March 2021) where Airbus, Boeing and the International Business Aviation Council (IBAC) provided updates on the List of data link performance improvement options and the Recommended Avionics Data Link Software Versions.

5.6.5 In view of the above, the following was endorsed:

NAT SPG Conclusion 57/16 – Update to NAT OPS Bulletin 2019_003

That the:

a) NAT OPS Bulletin - *Data Link Performance Improvement Options* (Serial no: 2019_003) be updated as provided in **Appendix L**;

b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish the updated NAT OPS Bulletin 2019_003 Rev 3.

6. WORK PROGRAMME

6.1 Alignment Of NAT SPG Working Structure With PIRGS/RASGS' Terms Of Reference

6.1.1 The Meeting was informed about the need to review the alignment of the NAT SOG and NAT IMG ToRs with the generic Terms of Reference for Planning and Implementation Groups and Regional Aviation Safety Groups (PIRGs/RASGs) that were approved by the ICAO Council on 21 August 2020.

6.1.2 In view of the above, the Meeting endorsed the following:

NAT SPG Conclusion 57/17 – Alignment of NAT SOG and NAT IMG ToRs with the ICAO Council approved generic ToRs for PIRGs/RASGs

That, in order to align the NAT SOG and NAT IMG Terms of Reference (ToR) with the Generic Terms of reference for Planning and Implementation Groups and Regional Aviation Safety Groups (PIRGs/RASGs), as approved by the ICAO Council on 21 August 2020, the NAT IMG and NAT SOG Chairmen with the support of the Secretariat, conduct an initial review and provide proposals to the next NAT IMG and NAT SOG meetings, for further presentation to the NAT SPG for review.

7. ANY OTHER BUSINESS

7.1 ORGANISATION OF NAT MEETINGS IN 2021

7.1.1 The Meeting reviewed the list of planned NAT Meetings for 2021. It was noted that although the public health situation was improving and travel restrictions were being lifted, there were still challenges and uncertainties ahead due to both pandemic imposed and fiscal constraints. At the same time, the Meeting noted the difficulties reported and limitations of virtual meetings that were not seen as most productive, especially for discussing complex issues requiring close and dynamic collaboration.

7.1.2 The Meeting noted the willingness and readiness of some NAT members to host face-to-face meetings as planned. Therefore, it was agreed that the Fall 2021 NAT meetings would be held in a hybrid mode. The host States would take appropriate measures to ensure that the meeting facilities were appropriately equipped to hold such hybrid meetings. It was noted that the hybrid arrangement also represented some challenges, such as the need to take into account time differences. It was agreed that the NAT regular Chair Team meetings would discuss these challenges and closely monitor the outcomes of the first hybrid meetings in September 2021 and keep the NAT SPG members informed.

7.1.3 The Meeting discussed the possibility of organising another NAT SPG ad-hoc meeting in January 2022. It was agreed that the NAT Chair Team, through its regular meetings, would closely monitor the evolving situation and coordinate with the NAT SPG members, should the need for such a meeting be determined during the Fall 2021 meetings.

7.2 COORDINATION WITH SAT

7.2.1 The Meeting noted with satisfaction the improving coordination with the South Atlantic (SAT) . It was discussed how exchange of information between the NAT and SAT could be further formalised. It was agreed that these considerations would be taken onboard as part of the planned work on revision and alignment of the NAT IMG and NAT SOG ToRs with the generic PIRG/RASG ToRs.

7.3 FAREWELLS

7.3.1 The Meeting noted that Ms. Carolyn Read (NAT CMA) and Mr. Roald Larsen (Norway and NAT SOG vice-chair) would be retiring. The Meeting thanked them for their valuable contributions to the NAT work and wished them all the best in their future endeavours.

7.4 NEXT MEETING

7.4.1 It was agreed that the NAT SPG/58 be conducted on 28 June - 1 July 2022.

APPENDIX A — LIST OF PARTICIPANTS

(Paragraphs 0.2 and 0.3 refer)

CANADA

Jeff DAWSON*

Vanessa ROBERTSON

Pierre RUEL

Jean-Pierre COTÉ

Noel DWYER

DENMARK

Anna Eva VILLEFRANCE

FRANCE

Christophe GUILPAIN*

ICELAND

Hlin HOLM* (NAT SPG Chair)

Thordis SIGURDARDOTTIR

Bjarni K. STEFANSSON

Kjartan BRIEM

Arni GUDBRANDSSON

Pall S. PALSSON

Trausti MAGNUSSON

IRELAND

Sean PATRICK (NAT IMG Chair)

Joe RYAN

John O'SULLIVAN

Paul KENNEDY

NORWAY

Roald LARSEN*

Baard LARSEN*

PORTUGAL

Antonio Francisco Espada RITA*

Carlos ALVES

Alda MIRANDA (NAT EFFG Chair)

Luis Miguel Silva RIBEIRO

Marta MARCOS

Luis Miguel Castanhas TOJAIS

UNITED KINGDOM

Stuart LINDSEY*

Martin DONNAN

Thomas KIRKHOPE (NAT SOG Chair)

UNITED STATES

Jeffrey SZCZYGIELSKI*

Jennifer KILEO

Jim WEBB

Travis FIEBELKORN

Meghan CURRIER

SPAIN

Lorena Abad MIRANDA

RUSSIAN FEDERATION

Yury FENYUK

Petr SHIPIL

Sergey USIKOV

EUROCONTROL

Rob PETERS

International Air Transport Association (IATA)

Jeffrey MILLER

Rich STARK

International Federation of Airline Dispatchers' Associations (IFALDA)

Sergey VAKHRUSHEV

International Federation of Air Line Pilots Association (IFALPA)

Carlos RODRIGUEZ

NAT Central Monitoring Agency (NAT CMA)

Carolyn READ

David LUNAN

OBSERVERS FROM SOUTH ATLANTIC STATES

ANGOLA

Antonio Pascoal DOMINGOS

Ivan VALENTE

Marcelina SAPALO

Francisco DOMBALA

Pedro GOMES

Lucas ERNESTO

Aguinaldo MADUREIRA

Wilson IMPERIAL

BRAZIL

Roberto Carlos Lins de ALBUQUERQUE

Marcelo Moreira de ANDRADE

Ricardson Alexandre Pereira FEITOZA

Júlio César Norberto FERREIRA

Monique Garcia VELTEN

CABO VERDE

Joao CABRAL

Paulo COSTA

Rui JESUS

Daniel LIMA

Margarett MARQUES

Aristides MARTINS

Micael MORENO

Alberto SILVA

GHANA

Kofi KPODJI

Ken BLEGE

Paa Richard HOMIAH

John KWOFIE

Ben MOKWAH

Dan NARTEY

Sam Atta OWUSU

SOUTH AFRICA

Sandile MAPHANGA
James DAVIS
Simon ZWANE

TRINIDAD & TOBAGO

Rohan GARIB
Alexis BRATHWAITE
Ann Marie Plaza HOSEIN
Ian R GOMEZ
Meera RAGOO
Krishna INGRAHAM II
Anton RAMDASS
Vijanti BALROOP
Siddiqa ALI
Kevin BROWN
Vivikananda PERSAD
Shorrey BLAKE
Paula MARK
Vishan MANOO

ICAO HEADQUARTERS

Herman PRETORIUS

ICAO EUR/NAT

Denis GUINDON (Secretary)
Elkhan NAHMADOV
Abbas NIKNEJAD
Arnaud DESJARDIN
Christopher KEOHAN
Sarantis POULIMENAKOS
Sven HALLE
Ulas SAHIN
Leyla SULEYMANOVA
Patricia CUFF

* NAT SPG Member

Participants and Members Contact List

(Paragraph 0.3 refers)

To be included only on Restricted Website of NAT SPG

APPENDIX B — LIST OF MEETING DOCUMENTATION

(paragraph 0.3 refers)

WP / IP# FL /PPT	***Ag item***	***Title***	***Presented by***
WP01	0	Draft Agenda	Secretariat
WP02	1	Status of NAT SPG Conclusions	Secretariat
WP03	5	NAT Documentation Approval Process For NAT OPS Bulletins	Secretariat
WP04	5	Updates to NAT SPG Handbook (NAT Doc 001)	Secretariat
WP05	6	NAT 2030 Vision	Secretariat
WP06	5	PfA to NAT SUPPS (ICAO Doc 7030)	Secretariat
WP07 REV	5	PfAs to NAT Doc 007 and NAT Doc 006, Part II *(Revision made to WP/07 and Appendix C related to NAT Doc 006, Part II VACP)*	Secretariat
WP08	5	Updates to NAT OPS Bulletins	Secretariat
WP09 REV	3	NAT SOG/24 outcomes *(Revision to WP/09: Appendix B Generic PIRG/RASG ToRs added)*	Secretariat
IP01 REV	0	Meeting schedule	Secretariat
IP02 REV	0	Meeting documentation	Secretariat
IP03	1	ICAO Update	Secretariat
IP04	1	PIRG/RASG Report to Council	Secretariat
IP05	1	Status of NAT Project Teams	Secretariat
IP06	5	Progress on PfA on FIRs of NAT eANP	Secretariat
IP07	5	NAT IMG/58 outcomes	Secretariat
IP08	3	VOLCEX Events	Secretariat
IP09	4	NAT EFFG/40 outcomes	Secretariat
IP10	1	ICAO EUR/NAT Environmental Activities	Secretariat
IP11	1	Restructuring of the Irish Aviation Authority	Ireland
IP12	1	IATA NAT Operational Strategy	IATA
IP13	7	Consideration of increased use of NAT airspace for new entrants	United Kingdom, Canada and Ireland
FL01	5	In support of WP/06 PfA to NAT SUPPs (Doc 7030)	Iceland
FL02	-	In support of WP/09 & FL01 Conclusion on ToRs and merged Project Definition of MNPS/HLA/PBN PT	Secretariat

APPENDIX C — UPDATED NAT SPG CONCLUSIONS

(paragraph 1.1.1 refers)

STATUS OF EXTANT NAT SPG CONCLUSIONS

Reference/Title	Description	Comments	Status
C 54/23 - Incorporation of Cybersecurity into NAT Planning	That, the NAT SOG and NAT IMG undertake a review of the ICAO EUR/NAT GASeP implementation Roadmap to propose NAT Region coordinated follow up actions related to cybersecurity.		On-going
C 55/05 - Monthly PBCS reports to NAT CMA by the NAT ANSPs	That: a) the NAT air navigation service providers (ANSPs) establish monthly Performance-based Communication and Surveillance (PBCS) reports to the NAT Central Monitoring Agency (CMA), by 1 July 2019, to identify fleets and aircraft that filed PBCS indicators at least once during the reporting period and were not meeting the 95% performance criteria for Required Communication Performance (RCP) 240 and Required Surveillance Performance (RSP) 180, and report to the NAT CMA using a standardized format as provided in Appendix D; b) the NAT SOG investigate ways and means to assist the NAT Data Link Monitoring Agency (DLMA) in receiving log-files for the purpose of investigating problem reports where aircraft operators have refused to provide them; and c) the NAT IMG and NAT SOG review the NAT TIG and NAT CMA Terms of Reference (ToRs) with a view to allow direct communication between them on technical exchange concerning the relevant data on the PBCS reports.	a) ICAO Letter ref: EUR/NAT 19-0333 of 2 August 2019 sent to NAT provider States and international organisations refers.	~~On-going~~ ~~a) closed~~ ~~b) SOG input? Closed?~~ ~~c) closed~~ Closed

Reference/Title	Description	Comments	Status
C 55/08 - Implementation of the uplink latency timer function by NAT ANSPs	That: a) NAT air navigation service providers (ANSP) implement the message "SET MAX UPLINK DELAY VALUE TO [seconds] SEC" on or after 24 May 2018 to give aircraft operators two AIRAC (Aeronautical Information Regulation And Control) cycles to distribute guidance material to flight crews; b) the value in the uplink message in a) above be 300 seconds on a trial basis and the NAT IMG monitor the trial and report findings and proposals on the way forward to the NAT SPG; and c) the NAT OPS Bulletin with guidance material concerning the CPDLC Uplink Message Latency Monitor Function (NAT OPS Bulletin 2018_002) be published.	c) Published - email: "180604 - NAT OPS Bulletin 2018_002_Rev01 - CPDLC Uplink Message Latency Monitor Function" refers.	On-going Iceland, Canada, UK and Portugal implemented Further update to be provided by United States.
C 55/17 - PfA to NAT SUPPs (Doc 7030/5)	That the ICAO Regional Director, Europe and North Atlantic process the proposed amendment to the NAT Regional Supplementary Procedures (NAT SUPPs, Doc 7030/5) in order to: a) publish corrections to the identified inaccuracies known and forecasted by January and November 2020, for the update of NAT SUPPs (Doc 7030/5) as provided in Appendix N; b) coordinate and clarify ICAO expectations for the NAT SUPPs (Doc 7030) and if necessary, propose changes to the NAT IMG/48 principles; and c) carry out a review of the remaining proposed changes to the NAT SUPPs (Doc 7030).	a) Circulation to States completed, awaiting approval of Council b) & c) On hold pending outcome of Doc 7030 Review PT	~~a) and b) closed.~~ ~~c) On-going thru POG PT~~ Closed
C 55/24 - NAT 2030 Vision high-level principles, goals and objectives and potential improvement areas	That, the NAT SPG: a) endorse the initial NAT 2030 Vision high-level principles, goals and objectives, and the list of potential improvement areas in Appendix U; and b) task the NAT IMG, in coordination with NAT SOG and NAT EFFG as required: i) to further refine the NAT 2030 Vision high-level principles and list of potential improvements in order to prioritise them by their practical implementation feasibility by 2030; and ii) to update the relevant NAT documentation (i.e. Future ATM Concept of Operations for the North Atlantic Region (NAT Doc 005) and the NAT Service Development Roadmap as contained in the Air Navigation Plan – North Atlantic Region (NAT eANP, Vol III, Doc 9634) and work programmes in accordance with the endorsed NAT 2030 Vision high-level principles, goals and objectives.		~~On-going~~ Closed

STATUS OF NAT SPG/56 CONCLUSIONS

Reference/Title	Description	Comments	Status
NATSPG Conclusion 56-1/01 Procedure for third party data link test facilities	That, the ICAO Regional Director, Europe and North Atlantic, take appropriate actions to urge ARINC (Collins) and SITA on Air, through a State letter, to follow the procedure for third party data link test facilities as presented in Appendix C to the Report.		Closed
NATSPG Conclusion 56-1/02 Update to NAT OPS Bulletin 2019_003 to include Inmarsat SATCOM terminal configuration guidance	That, the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish the updated NAT OPS Bulletin 2019_003 Rev 1. - Data Link Performance Improvement Options (Serial no: 2019_003 Rev 1) as presented at Appendix D to the Report.	Email 200130 Publication of NAT documentation (cup) refers.	Closed
NATSPG Conclusion 56-1/03 Amendments to NAT Doc 006	That, the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish and promulgate the updated NAT Air Traffic Management Operational Contingency Plan - North Atlantic Region (NAT Doc 006, Part I, v1.13), to include the approved amendments as detailed in Appendix E to the Report.	Email 200130 Publication of NAT documentation (cup) refers.	Closed
NATSPG Conclusion 56-1/04 Amendments to NAT Doc 007	That, the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish and promulgate the updated the North Atlantic Operations and Airspace Manual (NAT Doc 007) to include the approved amendments as detailed in Appendix F to the Report.	Email 200130 Publication of NAT Documentation (cup) refers.	Closed
NATSPG Conclusion 56-1/05 Proposed consolidation of current NAT OPS Bulletins describing ACARS Data Link Oceanic Clearance Procedures	That the ICAO Regional Director, Europe and North Atlantic, take appropriate action to delete the current NAT OPS Bulletins (Serial no: 2010_006, 2013_001, 2015_002, and 2015_004) and publish the new NAT OPS Bulletin - ACARS Data Link Oceanic Clearance Flight Crew Procedures (Serial no: 2020_001) as provided at Appendix G to the Report.	200406 - NAT SPG Conclusion 56-05-NAT OPS Bulletin published (DJA/SUL) refers.	Closed

Reference/Title	Description	Comments	Status
NATSPG Conclusion 56-1/06 Update to NAT OPS Bulletin 2019_003 Section 2 on VHF to SATCOM Transitions	That the: a) NAT OPS Bulletin - Data Link Performance Improvement Options (Serial no: 2019_003) be updated as provided in Appendix H; b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish the updated NAT OPS Bulletin 2019_003 Rev 2.	Issued - 200608 Publication of NAT Documentation (SUL)	Closed
NATSPG Conclusion 56-1/07 NAT OPS Bulletin on Surveillance Service in the NAT / Flight Crew Operating Procedures	That the: a) NAT OPS Bulletin on Surveillance Service in the NAT / Flight Crew Operating Procedures in Appendix I be endorsed, and b) ICAO Regional Director, Europe and North Atlantic to take appropriate action to publish the NAT OPS Bulletin, as shown in Appendix I.	Issued - 200708 Publication of NAT Documentation (SUL)	Closed
NATSPG Conclusion 56-1/08 NAT DLM Temporary Accommodation Project Team	That the ICAO Regional Director, Europe and North Atlantic, take appropriate measures to establish a NAT Project Team on the Reinstatement of the NAT DLM with the project definition as provided in Appendix J.	200630 Invitation for Nominations for NAT DLMTA PT (CUP)	Closed
NATSPG Conclusion 56-1/09 Extension of NAT ADS-B Height Monitoring System Project Team	That the NAT SPG: a) endorse the extension of the NAT ADS-B Height Monitoring System Project Team to NAT SOG/24 (June 2021); and b) task the project team to coordinate with the NAT EFFG, regarding a financial assessment of the proposed technical options and report to the NAT SPG.	NAT EFFG established NAT HMS Financial Assessment PT in September 2020.	Closed
NATSPG Conclusion 56-1/10 Completion of the 2019 NAT Annual Safety Report (NAT ASR 2019)	That the NAT SPG, recognizing the impact of the COVID-19 pandemic on timely delivery of validated information necessary for the production of the NAT ASR 2019, agree to endorse via correspondence and make publicly available the NAT ASR 2019 as soon as practicably possible.	Approved at NAT SPG 56-2 (C 56-2/03 refers).	Closed

Reference/Title	Description	Comments	Status
NATSPG Conclusion 56-1/11 PfA to NAT Doc 006, Part I, Detailed Procedures, Scottish FIR	That the: a) proposal for amendment (PfA) to the Air Traffic Management Operational Contingency Plan - North Atlantic Region (NAT Doc 006, Part I), provided in Appendix K, related to Chapter 1 - Scottish FIR be endorsed; and; b) ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish and promulgate the NAT Doc 006, Part I, v1.14.	Issued 200703 Publication of updated NAT Documentation (NAT Doc 006 and NAT Doc 007) (cup)	Closed
NATSPG Conclusion 56-1/12 PfA to NAT Doc 007 related to Operation of Transponders and HLA approvals in the Shanwick OCA South East Corner	That the: a) proposed amendment to the North Atlantic Operations and Airspace Manual V.2020-1 (NAT Doc 007) section 6.8.1 and section 3.2.1.b be endorsed (Appendix L refers); and b) ICAO Regional Director, Europe and North Atlantic, take appropriate action to include the proposed changes in the next NAT Doc 007 update (v2020-2).	Issued 200703 Publication of updated NAT Documentation (NAT Doc 006 and NAT Doc 007) (cup)	Closed
NATSPG Conclusion 56-1/13 Review of NAT regional crisis response processes	That: a) the NAT SPG initiate a review of the NAT SPG crisis response processes based on experience from the COVID-19 pandemic; b) task the NAT IMG and NAT SOG to establish a specific project team led by the NAT IMG/NAT SOG Chairs; c) the NAT IMG and NAT SOG Chairs, in consultation with the Groups' members, to prepare a draft ToR and report to the NAT SPG.		On-going
NATSPG Conclusion 56-2/01 Re-instatement of the NAT DLM	That, in accordance with the previously defined criteria, the NAT Data Link Mandate be re-instated, as currently published, from the AIRAC date 25 FEB 2021 onwards.	State letter EUR/NAT 21-0026.TEC of 3 February 2021 refers.	Closed

Reference/Title	Description	Comments	Status
NATSPG Conclusion 56-2/02 Update to NAT OPS Bulletin 2018_003 Waypoint Insertion/Verification SEI	That, a) the NAT OPS Bulletin 2018_003 - Waypoint Insertion/Verification SEI be updated as provided in Appendix D; and b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish the updated NAT OPS Bulletin 2018_003 Rev 1.	Email: 210223-NAT SPG56 follow-up - NAT OPS bulletin 2018_003_Rev01 published (NAE/SUL) of 23/02/2021 refers.	Closed
NATSPG Conclusion 56-2/03 2019 NAT Annual Safety Report (NAT ASR)	That, a) the 2019 NAT Annual Safety Report (NAT ASR) be endorsed; and b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish the NAT ASR 2019 (Appendix E refers).	Email: 210217 - NAT SPG56-2 followup - 2019 North Atlantic Annual Safety Report (NAT ASR 2019) (NAE/SUL) of 17/02/2021 refers.	Closed
NATSPG Conclusion 56-2/04 Use of CPDLC Route Clearance Uplinks to reduce Gross Navigational Errors (GNEs)	That, in order to help further reduce the number of GNEs and improve the collision risk in the NAT: a) the NAT ANSPs examine their use of CPDLC route clearance uplinks after oceanic entry with the aim of maximizing their use as far as operationally practicable; and b) report outcome of the review to NAT POG/12 (North Atlantic Procedures and Operations Group) and NAT IMG/59.		On-going

Reference/Title	Description	Comments	Status
NATSPG Conclusion 56-2/05 Minimum Height Monitoring Requirements for the NAT Region	That, a) in order to provide an ADS-B height monitoring system for the NAT Region which meets the current safety requirements, with consideration of available manpower in the NAT Central Monitoring Agency (NAT CMA) and currently available resources, the following shall apply in the NAT Region: i) initially, the minimum height monitoring requirement be set at one 24-hour period of all available NAT Regional ADS-B data on a rolling eight day schedule allowing for at least 60% of the NAT traffic population to be monitored on a regular basis; ii) the monitoring be rolled over an eight-day period, ensuring the capture of more individual aircraft frames and those which operate on a fixed schedule; and iii) this recommended minimum height monitoring requirement be reviewed at regular intervals to assess the workload impact on the NAT CMA and to take advantage of technological improvements which could accommodate an increase in the monitoring rates; b) the above minimum height monitoring requirements be reconfirmed at the NAT SPG/57-1.	Confirmed at NAT SPG/57. To be inserted in Section 5A: NAT Safety Policies in NAT Doc 001.	~~On-going~~ Closed
NATSPG Conclusion 56-2/06 2019 GANP/ASBU Implementation Status Report – NAT Region	That, a) the 2019 GANP/ASBU Implementation Status Report – NAT Region as provided in Appendix G be endorsed; and b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish and promulgate the 2019 NAT GANP/ASBU Implementation Status Report.	Email: 210223 Publication of NAT Documentation (cup) of 23/02/2021 refers.	Closed
NATSPG Conclusion 56-2/07 Update of NAT SPG Handbook, NAT Doc 001, v2.5.0	That, a) the North Atlantic Systems Planning Group (NAT SPG) Handbook (NAT Doc 001) be amended as presented at Appendix H; and b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish and promulgate the updated NAT Doc 001, v2.5.0.	Email: 210223 Publication of NAT Documentation (cup) of 23/02/2021 refers.	Closed

Reference/Title	Description	Comments	Status
NATSPG Conclusion 56-2/08 PfA to NAT Doc 006, Part I, Detailed Procedures – Gander OACC	That, a) the proposal for amendment to the Air Traffic Management Operational Contingency Plan - North Atlantic Region (NAT Doc 006, Part I), related to Chapter 2 - Gander OACC be endorsed (Appendix I refers); and; b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish and promulgate the updated NAT Doc 006, Part I.	Email: 210223 Publication of NAT Documentation (cup) of 23/02/2021 refers.	Closed
NATSPG Conclusion 56-2/09 PfA to NAT Doc 007 addressing the removal of the HO NDB (Hopedale Non-directional Beacon), NOROTS (Northern Organized Track Structure) and NCA (Northern Control Area) and the upcoming elimination of “turbojet” in PANS-ATM with reference to Mach number technique	That, a) the proposal for amendment to the North Atlantic Operations and Airspace Manual (NAT Doc 007) be endorsed (Appendix J refers); and b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to promulgate the updated NAT Doc 007.	Email: 210223 Publication of NAT Documentation (cup) of 23/02/2021 refers.	Closed
NATSPG Conclusion 56-2/10 PfA to Doc 007 to clarify the NAT Region HF requirements	That, a) the proposal for amendment to the North Atlantic Operations and Airspace Manual (NAT Doc 007) be endorsed (Appendix K refers); b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to promulgate the updated NAT Doc 007.	Email: 210223 Publication of NAT Documentation (cup) of 23/02/2021 refers.	Closed
NATSPG Conclusion 56-2/11 NAT Consolidated Reporting Responsibilities Handbook (NAT Doc 010)	That, a) the proposal for amendment to the NAT Consolidated Reporting Responsibilities Handbook (NAT Doc 010) be endorsed (Appendix L refers); and b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to promulgate the amended NAT Doc 010.	Email: 210223 Publication of NAT Documentation (cup) of 23/02/2021 refers.	Closed

Reference/Title	Description	Comments	Status
NATSPG Conclusion 56-2/12 Revision of NAT OPS Bulletin 2017_004 - NAT Data Link Special Emphasis Items (SEI) to Include CPDLC Route Uplink Messages	That, a) the proposed revisions to NAT OPS Bulletin 2017_004 - NAT Data Link Special Emphasis Items (SEI) be endorsed (Appendix M refers); and b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to update and publish NAT OPS Bulletin 2017_004 Rev 1.	Email: 210223-NAT SPG56 follow-up - NAT OPS bulletin 2017_004_Rev01 published (NAE/SUL) of 23/02/2021 refers.	Closed
NATSPG Conclusion 56-2/13 Deletion of NAT OPS Bulletin 2016_001	That the ICAO Regional Director, Europe and North Atlantic, take immediate action to remove the NAT OPS Bulletin 2016_001 - Re-Naming of the NAT MNPSA to NAT HLA from the ICAO EUR/NAT public website.	Email: 210223-NAT SPG56 follow-up - NAT OPS bulletin 2016_001 removed (DJA/SUL) of 23/02/2021 refers.	Closed

APPENDIX D — NAT 2030 VISION HIGH-LEVEL PRINCIPLES, GOALS AND OBJECTIVES AND POTENTIAL IMPROVEMENT AREAS

(*paragraph 2.1.2 refers*)

NAT 2030 Vision Matrix					
	• Prioritisation: (1 to 5): One (Essential/Benefit); Two (Preferred) Three (Enhancement) Four (New); Five (Desirable but not 1 - 4) • Feasibility/Timeline: (1-3): One (2021 -2023), Two (2023 – 2026), Three (2026 – 2031) • Sub-Group: (IMG, SOG, POG, TIG etc.).				
Goal-1	Ensure as far as possible that all NAT developments are implemented in the context of "seamless boundaries."				
Objective	Take full account of the other regional environments such that we have seamless operational boundaries.				
	Potential Improvement	**Prioritisation**	**Feasibility Timeline**	**NAT Sub-Group**	**Linked to Goal**
1-1	Ensure optimal use of the currently available technology as this will continue to be in use by 2030. Pursue further improvements to FANS 1/A.	2	2023-2026	TIG/IMG	(Goal 4)
1-2	Prepare for ATN B2	4	2026-2031	TIG	(Goal 4)
1-3	Reduce the footprint of the OTS (lateral, vertical and time period)	2	2023-2026	POG/TIG IMG/SOG	(Goal 4)
1-4	Consider the use of User Preferred Routings (UPR)	2	2023-2026	POG/TIG IMG/SOG	(Goal 4)
1-5	Only apply speed restrictions when needed for separation (OWAFS) (work already in progress);	1	2021-2023	POG/SOG/IMG	(Goal 4)
1-6	Discontinue oceanic clearances;	1	2021-2023	POG/SOG/IMG	(Goal 4)
1-7	Strategic vs Tactical control/Reduced conflict probe horizon (The use of reliable communications and surveillance to eliminate the need for clearances to define conflict-free profiles which extend all the way to landfall. Rather, conflicts will be progressively resolved over the duration of the flight.);	2	2021-2023	POG/IMG	(Goal 4)
1-8	Dynamic Airborne Rerouting Procedure DARP;	1	2021-2023	POG/TIG/IMG	(Goal 4)
1-9	Consider RVSM above FL410;	3	2021-2023	OPDLWG ATMOPS POG/TIG IMG/SOG/SASP	(Goal 4)
1-10	Consider formation flights;	5	2026-2031	POG/TIG IMG/SOG	(Goal 4)

NAT 2030 Vision Matrix					
	• Prioritisation: (1 to 5): One (Essential/Benefit); Two (Preferred) Three (Enhancement) Four (New); Five (Desirable but not 1 - 4) • Feasibility/Timeline: (1-3): One (2021 -2023), Two (2023 – 2026), Three (2026 – 2031) • Sub-Group: (IMG, SOG, POG, TIG etc.).				
Goal-1	Ensure as far as possible that all NAT developments are implemented in the context of "seamless boundaries."				
Objective	Take full account of the other regional environments such that we have seamless operational boundaries.				
	Potential Improvement	**Prioritisation**	**Feasibility Timeline**	**NAT Sub-Group**	**Linked to Goal**
1-11	Self-Separation	4	2026-2031	POG	(Goal 4)
1-12	Accommodation of new entrants – supersonic aircraft	3	2026-2031	POG/IMG/SOG	(Goal 4)
1-13	Accommodation of new entrants – UAS, UTM and balloons,	3	2026-2031	POG/IMG/SOG	(Goal 4)
1-14	Accommodation of new entrants - operations above FL460).	3	2026-2031	POG/IMG/SOG	(Goal 4)

<table>
<tr><td colspan="6">NAT 2030 Vision Matrix</td></tr>
<tr><td colspan="6">• Prioritisation: (1 to 5): One (Essential/Benefit); Two (Preferred) Three (Enhancement) Four (New); Five (Desirable but not 1 - 4)
• Feasibility/Timeline: (1-3): One (2021 -2023), Two (2023 – 2026), Three (2026 – 2031)
• Sub-Group: (IMG, SOG, POG, TIG etc.).</td></tr>
<tr><td>Goal-2</td><td colspan="5">Enhanced resilience and predictability of the NAT wide operations.</td></tr>
<tr><td>Objective</td><td colspan="5">1. Weather and other operational impacting events are managed through appropriate and agreed plans with minimum of operational impact.
2. We consistently adopt across the NAT, new advanced tools to enhance our proactive management of potentially operational impacting events.
3. The NAT Contingency procedures shall be continually reviewed to take account of the developing understanding of advancements in aircraft/new entrants technical resilience.
4. Resilience of communications infrastructure is ensured.</td></tr>
<tr><td></td><td>Potential Improvement</td><td>Prioritisation</td><td>Feasibility Timeline</td><td>NAT Sub-Group</td><td>Linked to Goal</td></tr>
<tr><td>2-1</td><td>Communication systems resilience – SATVOICE Migration from HF Voice to SATVOICE as backup to FANS</td><td>2</td><td>2023-2026</td><td>POG/TIG/IMG</td><td>(Goal 4)</td></tr>
<tr><td>2-2</td><td>Communication systems resilience – Digital HF developments</td><td>3</td><td>2026-2031</td><td>POG/TIG/IMG</td><td>(Goal 4)</td></tr>
<tr><td>2-3</td><td>Communication systems resilience – Space Based VHF</td><td>3</td><td>2021-2023</td><td>POG/TIG/IMG</td><td>(Goal 4)</td></tr>
<tr><td>2-4</td><td>Improvements to end-to-end performance to meet at least RCP 240 and including their associated SRs</td><td>1</td><td>2021-2023</td><td>POG</td><td>(Goal 4)</td></tr>
<tr><td>2-5</td><td>Improvements to end-to-end performance to meet at least RSP 180, including their associated SRs</td><td>1</td><td>2021-2031</td><td>TIG</td><td>(Goal 4)</td></tr>
<tr><td>2-6</td><td>NAT Contingency procedures shall be continually reviewed (every Spring).</td><td>1</td><td>2021-2031</td><td>POG</td><td>(Goal 4)</td></tr>
<tr><td>2-7</td><td>Ensure systems cybersecurity and resilience.</td><td>1</td><td>2021-2031</td><td>POG/TIG/IMG/SOG</td><td>(Goal 4)</td></tr>
<tr><td>2-8</td><td>Consider space weather factors as part of contingency procedures.</td><td>2</td><td>2021-2023</td><td>POG</td><td>(Goal 4)</td></tr>
</table>

NAT 2030 Vision Matrix					
• Prioritisation: (1 to 5): One (Essential/Benefit); Two (Preferred) Three (Enhancement) Four (New); Five (Desirable but not 1 - 4) • Feasibility/Timeline: (1-3): One (2021 -2023), Two (2023 – 2026), Three (2026 – 2031) • Sub-Group: (IMG, SOG, POG, TIG etc.).					
Goal-3	Continued cooperation with all adjacent regions and industry wide stakeholders to achieve seamless boundaries.				
Objective	All stakeholders will be engaged in the development and implementation of the Development Roadmap to ensure all operational and technical capabilities are appropriately exploited.				
	Potential Improvement	**Prioritisation**	**Feasibility Timeline**	**NAT Sub-Group**	**Linked to Goal**
3-1	The ICAO Aviation System Block Upgrades (ASBU) document will be reviewed at every Spring IMG.	1	2021-2031	IMG	(Goal 4) & (Goal 5)

NAT 2030 Vision Matrix					
• Prioritisation: (1 to 5): One (Essential/Benefit); Two (Preferred) Three (Enhancement) Four (New); Five (Desirable but not 1 - 4) • Feasibility/Timeline: (1-3): One (2021 -2023), Two (2023 – 2026), Three (2026 – 2031) • Sub-Group: (IMG, SOG, POG, TIG etc.).					
Goal-4	The NAT operations takes account of both the prevailing and forecast operational and stakeholders' capabilities and implements proportionate performance-based outcomes.				
Objective	1. New technology will be supported by an agreed Concept of Operations and a safe and cost-effective solution. 2. We will optimise utilisation of current capabilities whilst ensure all new developments do not inadvertently impact prevailing capabilities. 3. The development roadmap will be continually validated to ensure it remains relevant.				
	Potential Improvement	**Prioritisation**	**Feasibility Timeline**	**NAT Sub-Group**	**Linked to Goal**
4-1	Space-based ADS-B surveillance (work already in progress);	1	2021-2023	POG/TIG	(Goal 1)
4-2	Use of aircraft downlink parameters (i.e. pilot selected level);	2	2023-2026	POG / TIG/IMG	(Goal 1)
4-3	Implement SWIM and FF-ICE;	3	2026-2031	ALL	(Goal 1)
4-4	Address the regulatory oversight of CSPs and SSPs;	1	2021-2023	TIG OPDLWG IMG/SOG	(Goal 1)

NAT 2030 Vision Matrix					
• Prioritisation: (1 to 5): One (Essential/Benefit); Two (Preferred) Three (Enhancement) Four (New); Five (Desirable but not 1 - 4) • Feasibility/Timeline: (1-3): One (2021 -2023), Two (2023 – 2026), Three (2026 – 2031) • Sub-Group: (IMG, SOG, POG, TIG etc.).					
Goal-5	Our technology roadmap is aligned to the practical capabilities that will exist to 2030.				
Objective	Maximised benefits from available technologies.				
	Potential Improvement	**Prioritisation**	**Feasibility Timeline**	**NAT Sub-Group**	**Linked to Goal**
5-1	The ICAO Aviation System Block Upgrades (ASBU) document will be reviewed at every Spring IMG.	1	2021-2023	All Groups	(Goal 3) and (Goal 4)

NAT 2030 Vision Matrix					
• Prioritisation: (1 to 5): One (Essential/Benefit); Two (Preferred) Three (Enhancement) Four (New); Five (Desirable but not 1 - 4) • Feasibility/Timeline: (1-3): One (2021 -2023), Two (2023 – 2026), Three (2026 – 2031) • Sub-Group: (IMG, SOG, POG, TIG etc.).					
Goal-6	Safety, Service, Value and Environment benefits are measurable using representative metrics and are part of not only the business case for all developments but are used to monitor the NAT performance.				
Objective	Performance based metrics and meeting the NAT safety targets, including TLS, as well as any other future performance targets.				
	Potential Improvement	**Prioritisation**	**Feasibility Timeline**	**NAT Sub-Group**	**Linked to Goal**
6-1	NAT Safety Targets;	1	2021-2023	All Groups	
6-2	Horizontal Flight Efficiency;	1	2021-2023	All Groups New Group Required	
6-3	Vertical Flight Efficiency;	1	2021-2023	All Groups New Group Required	
6-4	Cost per 100KM ($);	1	2021-2023	All Groups New Group	
6-5	Monitoring, reporting and verification of CO^2 emissions in accordance with Annex 16, Volume IV, and the Environmental Technical Manual (Doc 9501), Volume IV.	1	2021-2023	All Groups New Group	

APPENDIX E — *2020 NORTH ATLANTIC ANNUAL SAFETY REPORT*

(*paragraphs 3.3.2 and 3.3.3 refer*)

Starts on next page

SAFETY

NORTH ATLANTIC SYSTEMS PLANNING GROUP (NAT SPG)

2020 Annual Safety Report

2021 Edition

International Civil Aviation Organization (ICAO) North Atlantic Region

2020 Annual Safety Report

Safety Policy

Safety is the NAT SPG's core business function. The NAT SPG is committed to developing, implementing, maintaining and constantly improving strategies and processes to ensure that all our aviation activities take place under a balanced allocation of organizational resources. The NAT SPG will aim to achieve the highest level of safety performance and meet regional safety objectives in line with national and international standards, the Global Aviation Safety Plan (GASP), and the Global Air Navigation Plan (GANP).

Objective

The objective of the NAT SPG member States is to maintain and, where possible, improve the agreed safety standards in all activities supporting the provision of air navigation services in the NAT Region:

- All involved States are accountable for the delivery of the agreed level of safety performance in the provision of air navigation services in the North Atlantic Region.
- All involved States are accountable for the delivery of the agreed level of safety performance in aircraft operations in the North Atlantic Region.
- Safety in the NAT Region is managed through the organization and activities of the relevant implementation and oversight groups established by the NAT SPG, in coordination with the non-member States and observers, to achieve its Safety Objective.

Guiding Principles

The NAT SPG will act to:

- **Clearly** define all accountabilities and responsibilities for the delivery of safety performance with respect to the provision of air navigation services and participation in the NAT SPG and its contributory bodies;
- **Support** the safety management activities that will result in an organizational culture that fosters safe practices, encourages effective safety reporting and communication, and actively manages safety within the NAT Region;
- **Share** safety related data, knowledge and expertise with concerned stakeholders;
- **Disseminate** safety information and NAT operating requirements to stakeholders;
- **Establish and implement** hazard identification and risk management processes in order to eliminate or mitigate the safety risks associated with air navigation services supporting aircraft operations in the North Atlantic Region;
- **Establish and measure** NAT Region safety performance against agreed safety standards; and
- **Continually improve** our safety performance through safety management processes.

All of the NAT member States contribute experts to the NAT SPG, or one or more of its various subgroups, and so support the overall management of safety in the Region. The NAT safety policy is enhanced by the agreement of member States to use the information shared at NAT SOG meetings for the purposes of education and for making safety improvements within the Region. This has paved the way for members to discuss and share information and act upon it within the framework of the NAT SPG.

Executive Summary

The North Atlantic Region's eighth Annual Safety Report (ASR) is issued by ICAO's North Atlantic (NAT) Systems Planning Group (SPG) and presented in the following pages. This report covers calendar year 2020 which, as a result of the global health crisis, has posed our industry with an unprecedented challenge. In 2020 and into 2021 the traditional methods for data analysis and validation have not been available. The data has been cross-checked to ensure the highest possible level of fidelity, but the data presented may require verification when the crisis allows and those reading this report should consider the results presented in that context.

The NAT SPG structure is established to study, monitor and evaluate the air navigation system in the NAT region taking into account changes to technology, changing traffic characteristics and traffic forecasts. The number of flight hours in the NAT HLA in 2020 was 892,137 a significant reduction on that reported in 2019. Until the onset of COVID-19, traffic had predicted to grow at a rate of 2.4% annually between 2020 and 2024. Despite some positive medical developments, it is unlikely that a return to pre-COVID19 levels will be seen for several years.

Safety Performance in the NAT HLA continues to be monitored by the measures and targets associated with a set of 12 Safety Key Performance Indicators (SKPIs) with targets based on three years of rolling data. Eight (8) of the SKPIs have met their target in 2020 (six (6) were achieved in 2019). Improvements were seen in the following SKPIs:

- Steady improvements in the number of Large Height Deviations (LHDs) where datalink was <u>not</u> in use.
- A reduction in the number of minutes that aircraft <u>with</u> datalink spent at the wrong flight level, and
- A reduction in the number of GNE events involving operations <u>with</u> datalink

A significant reduction was also witnessed in the rates of losses of separation in the vertical and lateral dimension, but these measures are more sensitive to traffic density than other measures might be. Performance levels in some SKPIs appears degraded where datalink is not in use, specifically in the rate of minutes spent at the wrong flight level or the rate of GNEs. These are attributable to a number of long duration non-datalink flights that occurred during the temporary relaxation of the datalink mandate (DLM).

The Vertical collision risk estimate (CRE) for 2020 was calculated to be 19.7×10^{-9} fapfh (52.6×10^{-9} in 2019) which reduces by 72% to 5.5×10^{-9} fapfh with Strategic Lateral Offset Procedure (SLOP). This represents the lowest level since 2000 and the second lowest level since the widespread introduction of Reduced vertical Separation Minima (RVSM) in the NAT in 1997. The Lateral Collision Risk for the year 2020 is estimated to be 3.6×10^{-9} fapfh, which represents a decrease of 74% compared to 2019.

The Scrutiny Group were presented with half of the number of events to scrutinize in 2020 as they were for 2019 (133 vs 266). The top 10 contributing factors in 2020 based on LHD or Lateral event data largely remained the same as 2019 with some minor differences. "ATC coordination" errors have risen to the top (11% of all scrutinized events in 2019 vs 18% in 2020), "messages not actioned by ATC" and "equipment" have dropped from the list to be replaced by "crew other" (8% of all scrutinized events) and "incorrect application of contingency (other than weather)" (6% % of all scrutinized events).

The North Atlantic Scenario

The airspace of the North Atlantic, which links Europe and North America, is the busiest oceanic airspace in the world. The NAT Region is a pioneer in the implementation of advanced procedures and technology supporting the progress of the global air navigation and aviation safety plans.

Traffic mainly flows in a broadly East-West orientation in a twice daily pattern where a daily organized track system takes account of airspace users' needs and weather patterns. NAT core traffic flow is almost exclusively jet transport aircraft that operate in the upper airspace in the en-route phase of flight.

Since March 2019, approximately 70% of the core NAT traffic has been able to make use of the surveillance capability offered by space based Automatic Dependent Surveillance-Broadcast (ADS-B) augmenting an increasing use of Automatic Dependent Surveillance-Contract (ADS-C). The number of flights eligible for the separation standards enabled by ADS-B has increased steadily since the capability was introduced.

Communication is, to a large extent, based on satellite-based data link, also referred to as Controller-Pilot Data Link Communications (CPDLC) with High Frequency radio being utilized less often. This leads to air traffic management and operation that is fundamentally different in concept to typical domestic operations, with a greater focus on strategic rather than tactical techniques although, as the NAT embraces new technologies this balance has begun to change.

The number of flight hours in the NAT HLA in 2020 was 892,137, which is a significant decrease from the 2,063,908 flight hours in 2019. This was expected due to the COVID-19 pandemic and the associated reduction in air travel during 2020. The NAT Economic, Financial and Forecast Group (NAT EFFG) estimates that in 2020, during the peak week of July 15 to July 21, approximately 5,621 flights crossed the North Atlantic. This figure was 13,733 for that same week in 2019.

Safety Performance Monitoring and Measurement

Note 1: In 2020 and 2021, the organization and conduct of all meetings of NAT SPG and its contributing bodies were heavily impacted by the consequences of the COVID-19 pandemic. Because of this, the events that occurred in the NAT HLA between January and December 2020, even though scrutinized in 2020 and 2021 by a small group of experts, could not be reviewed by the usual full NAT Scrutiny Group (NAT SG) membership during a face-to-face meeting. The values for safety performance presented in this report for 2019 and 2020 could therefore be revisited when full face-to-face NAT SG meetings can be reconvened, and are subject to change.

Collision Risk Estimates

The estimated risk of a mid-air collision, referred to as Collision Risk Estimate (CRE), is reported in terms of fatal accidents per flight-hour (fapfh) and is calculated in the lateral and vertical planes. The model used for computation essentially assumes each aircraft is a box having a fixed x, y, and z orientation and approximates the risk of collision by integrating the crossing rate over the period when two boxes are close to each other in each dimension.

Estimates of Vertical and Lateral Collision Risk for 2020 in the NAT HLA are based on risk bearing events reported to the NAT Central Monitoring Agency (CMA) for the period January to December 2020. Flight activity data from five NAT Oceanic Control Areas (OCAs) was used in deriving an estimate of Vertical and Lateral Collision Risk. The risk estimates were calculated for the Middle zone (Gander and Shanwick OCAs), the North zone (the Reykjavik OCA), and the South zone (the New York East and Santa Maria OCAs) and then combined to derive a risk estimate for NAT HLA.

The Vertical Collision Risk Estimate for 2020 was estimated to be 19.7 x 10^{-9} fapfh for all NAT HLA. Figure 1 shows that this reduces by 72% to 5.5 x 10^{-9} fapfh with SLOP. The Vertical Collision Risk Estimates in 2020 both with the SLOP effect incorporated and without SLOP are lower in comparison to 2019 estimates.

Figure 1 also presents the Lateral Collision Risk for the year 2020, estimated to be 3.6 x 10^{-9} fapfh, which represents a decrease of 74% compared to 2019. This result is a significant decrease in the lateral collision risk estimate compared to 2019.

The reduction in air travel caused by the COVID-19 pandemic is considered the reason for the significant decrease in estimated collision risks.

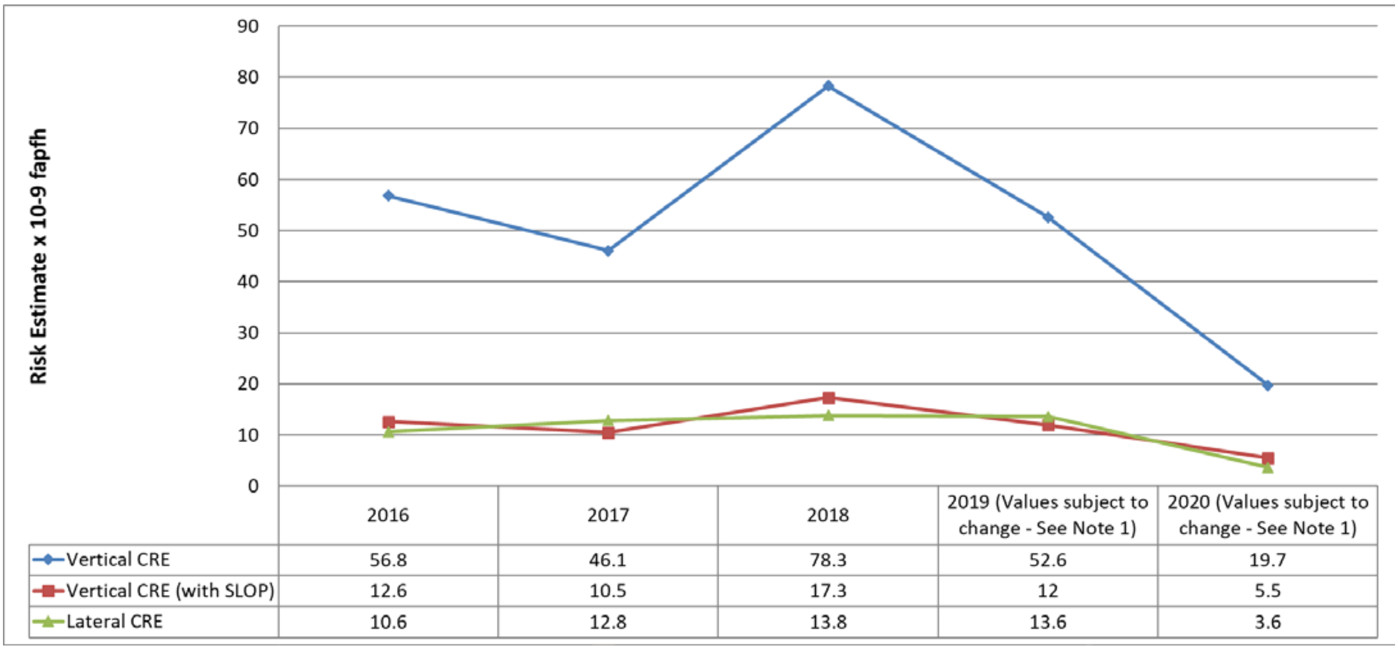


Figure 1 - Collision Risk Estimates in the NAT HLA (2016-2020)

Safety Key Performance Indicators (KPIs)

The NAT SPG has established Safety KPIs and associated targets for the NAT HLA. The NAT HLA performance in 2020 is shown the table below[1]. The 2020 figures are shown in green where the performance meets the targets and red otherwise.

Safety KPI		Target		2017 Performance	2018 Performance	2019 Performance	2020 Performance
i	Number of accidents	0		0	0	0	0
ii	Number of fatal accidents	0		0	0	0	0
iii	Number of fatalities related to aviation fatal accidents	0		0	0	0	0

[1] The flight hours flown value calculations use the actual flight hours since 2018, whereas, for the previous years, the figures were calculated using the estimated flight hours of 3.25 hours per aircraft

Safety KPI		Target	Previous rolling three-year period of performance (2017-2018-2019)	2017 Performance	2018 Performance	2019 Performance (Values subject to change – See Note 1)	2020 Performance (Values subject to change – See Note 1
iv	Rate of LHD events (No of LHD events divided by No of flight hours flown in the NAT region), involving operations with Data Link in use	Reduction over previous rolling three-year period of performance	3.04×10^{-5}	2.67×10^{-5}	2.87×10^{-5}	3.59×10^{-5}	**4.71×10^{-5}**
v	Rate of LHD events (No of LHD events divided by No of flight hours flown in the NAT region), involving operations with Data Link not in use	Reduction over previous rolling three-year period of performance	7.52×10^{-6}	1.20×10^{-5}	7.18×10^{-6}	3.39×10^{-6}	**5.60×10^{-6}**
vi	Percent of Long Duration[2] LHD events	Reduction over previous rolling three-year period of performance	1.71%	0.00%	2.67%	2.47%	**4.26%**
vii	Rate of minutes that aircraft, with Data Link in use, spent at the wrong flight level (Amount of minutes spent at the wrong flight level divided by total duration of flights in minutes)	Reduction over previous rolling three-year period of performance	8.34×10^{-7}	8.63×10^{-7}	6.95×10^{-7}	9.45×10^{-7}	**5.23×10^{-7}**
viii	Rate of minutes that aircraft, with Data Link not in use, spent at the wrong flight level (Amount of minutes spent at the wrong flight level divided by total duration of flights in minutes)	Reduction over previous rolling three-year period of performance	5.90×10^{-7}	4.91×10^{-7}	1.05×10^{-6}	2.34×10^{-7}	**8.21×10^{-7}**
ix	Rate of GNE events (No of GNE events divided by No of flight hours flown in the NAT region) , involving operations with Data Link in use	Reduction over previous rolling three-year period of performance	1.16×10^{-5}	6.54×10^{-6}	1.72×10^{-5}	1.11×10^{-5}	**8.97×10^{-6}**
x	Rate of GNE events (No of GNE events divided by No of flight hours flown in the NAT region), involving operations with Data Link not in use	Reduction over previous rolling three-year period of performance	5.67×10^{-6}	5.45×10^{-6}	4.79×10^{-6}	6.78×10^{-6}	**7.85×10^{-6}**
xi	Rate of losses of separation (vertical) (No of losses of separation events divided by No of flight hours flown in the NAT region)	Reduction over previous rolling three-year period of performance	1.04×10^{-5}	1.14×10^{-5}	9.58×10^{-6}	1.02×10^{-5}	**4.48×10^{-6}**
xii	Rates of losses of separation (lateral) (No of losses of separation events divided by No of flight hours flown in the NAT region)	Reduction over previous rolling three-year period of performance	5.82×10^{-6}	4.91×10^{-6}	3.83×10^{-6}	8.72×10^{-6}	**0**

Table 1 – Safety Key Performance Indicators (SKPIs) and associated targets (2017-2020)

[2] Long Duration LHD event means an event unprotected by ATC for 20 minutes or more, based on a threshold established after review of historical data reported to the NAT CMA

Scrutiny of events

A small team made up of the NAT SG Rapporteur, NAT CMA and NAT MWG members carried out a provisional scrutiny of 133 events which were reported to the NAT CMA as occurring in the NAT High Level Airspace (HLA) of the Oceanic Control Area (OCA) of Shanwick, Santa Maria, Reykjavik, New York East, Gander and Bodo during the year 2020. These events were categorized as follows:

- 47 Large Height Deviations (LHDs)
- 57 actual lateral deviations, including:
    - 15 GNEs and
    - 13 ATC Interventions where when the Air Traffic Controller (ATCO) caught and corrected a lateral deviation before it developed into a GNE
- 26 coordination events, where coordination between two Units has not been correctly carried out, leading to a vertical, lateral or time event.
- One (1) longitudinal loss of separation event
- 30 prevented events where the ATCO prevented a deviation or an uncoordinated flight profile entering the airspace of another ANSP.

Note 2: It is important to note that the sum of the values will not equal to the number of events as one event can be counted in one or more dimensions.

It is worth noting that ATC interventions and preventions are positive indicators that the ATC system has recognized an error, often through data link equipage capabilities, warning the controllers in sufficient time to take pre-emptive action. Underlying causes of all lateral deviations (incipient or actual) are often identical – the magnitude depends upon the timeliness of identification and corrective action.

The review of these 133 events of 2020 showed that the top 10 contributing issues allocated to LHD and lateral events were:

1. *ATC coordination* where an error occurring during the coordination between two ATC sectors or ANSPs contributed in 24 (18%) of the events of 2020.
2. *Flight Plan vs. Clearance* where flying, or intending to fly the planned route instead of the cleared route contributed in 24 (18%) of the events of 2020. In most cases (19 out of the 24), deviations did not actually occur as they were prevented by an ATCO.
3. *Did not adhere to ATC clearances* in either the vertical or the lateral dimension where a crew, for no identifiable reason, operated a flight profile different to the ATC clearance (e.g. changed vertical profile or routed to a different waypoint which was not contained in the clearance or the filed flight plan or due to contingency) contributed to 22 (17%) of the 2020 events.
4. *Weather* where weather conditions experienced during the flight contributed in 15 (11%) of the events of 2020.
5. *Dispatch*, where a flight plan issue contributed in 11 (8%) of the 2020 events. This can for example be an arrival route into an FIR or airport not filed as per the national AIP of flight plans filed incorrectly, causing the existence of multiple flight plans with different routes for one flight.

6. *Crew-Other*, where a crew action contributed to 10 (8%) of the 2020 events but there is insufficient information or evidence to allocate any of the currently scrutinized causal factors.

7. *Waypoint updating* involving waypoint entry or deletion errors by flight crews contributed to 9 (7%) of the events of 2020.

8. *Incorrect Application of Contingency Other than for Weather,* where crew deviated from their assigned clearance due to an emergency situation but did not follow the correct procedure for in-flight contingencies in Oceanic Airspace, contributed to 8 (6%) of the events in 2020. This can for example correspond to crew changing altitude due to a reduction in aircraft performance caused by severe turbulence but without starting to turn to offset laterally.

9. *Readback/Hearback,* where incorrect read back or hear back of a clearance contributed in 7 (5%) of the 2020 events. This can for example be when crew readback an incorrect clearance which was not picked up by the receiving ATC Unit.

10. *CPDLC Uplink messages*, where crew misunderstood or misread a CPDLC uplink message, or indicated an issue with their CPDLC contributed in 7 (5%) of the 2020 events.

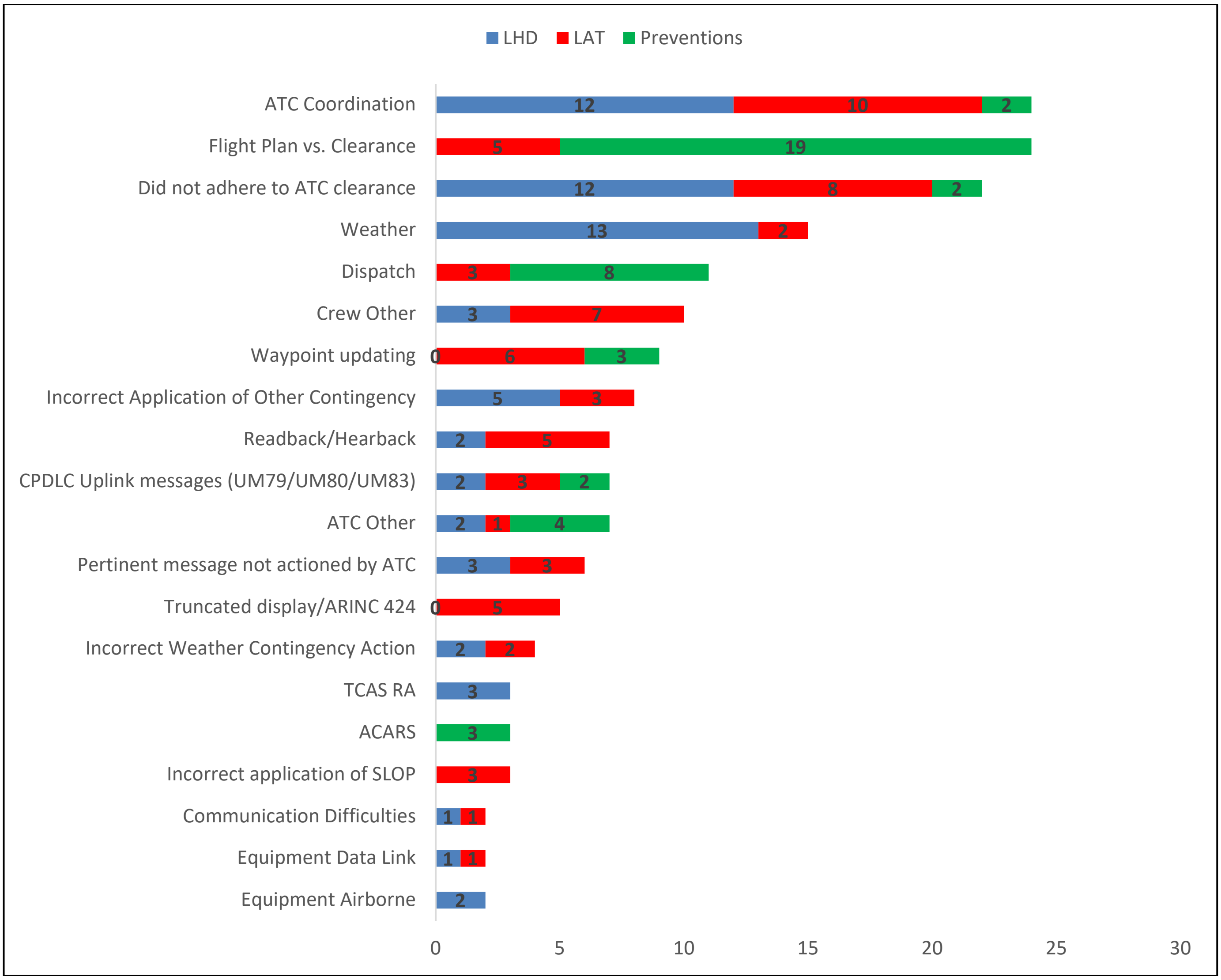


Figure 2: Contributing issues to events in the NAT HLA in 2020 (subject to change – see Note 1)

Prevented deviations for all event types were classified according to the implemented mitigations used to avert a deviation. The results of this classification are presented in Figure 4, demonstrating that the practice of requiring position reporting of "NEXT and NEXT +1" and the "CONFIRM ASSIGNED ROUTE" CPDLC message sets (UM137/DM40) are proving to be of benefit.

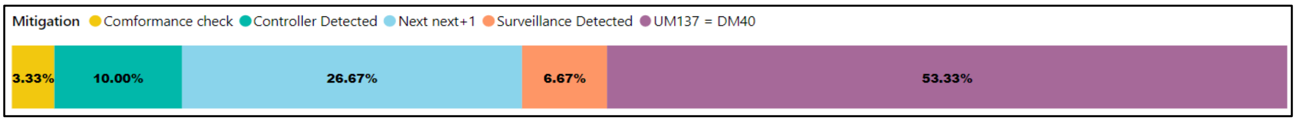


Figure 3: Mitigations used for prevented deviation events in 2020 (subject to change – see Note 1)

NAT regional priorities

Following the implementation of Space-Based Automatic Dependent Surveillance-Broadcast (SB ADS-B) in 2019, 2020 was a year to begin realising the real benefits of this implementation, even though the COVID-19 pandemic has, in some part, reduced the positive impact that the deployment could have realised. In accordance with NAT SPG conclusion 54/9, the trial of separations by SB ADS-B concluded in late 2020 enabled the provisions for the separation standard published in Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc4444).

In 2018, the NAT SOG was presented with information declaring the intent to deliver VHF communications in the Shanwick South East Corner and this change was successfully transitioned in January 2020. The changes were introduced in response to the datalink mandate (DLM) which had the potential to exclude many of the airframes operating in that area following the full implementation of the DLM. The separations (established in PANS ATM) are based on GNSS or RNP2 standards and enable a reduction in lateral and longitudinal separation standards.

As the COVID19 crisis deepened in the first half of 2020, an adhoc meeting of the NAT SPG agreed a temporary accommodation of non-datalink equipped aircraft within the NAT HLA to allow more flexibility for NAT airspace users. Initially the accommodation was planned for three months but quickly extended to six months before ultimately remaining in place until being withdrawn on the 23rd February 2021. The temporary accommodation was well managed within the reduced overall capacity of the ANSPs.

In late 2019, support had been gathered to improve coordination and establish possible means of collaboration with the Southern Atlantic (SAT) representatives. The remote nature of meetings held in 2020 gave rise to the opportunity for wider attendance at many of the NAT groups and some groups were attended by multiple SAT representatives as observers. It allowed the teams to look and think across regions and collaboration in this manner will be supported in coming years.

In 2019, the ASR included the NAT 2030 vision among its priorities and although it is appropriate to review and amend the plans that sit below that Vision in light of the events in 2020, it remains a relevant pathway to prioritize and deliver a proportionate series of improvements. The global and industry context and environment will drive the deliverables, but:

- It will seek to improve operational flexibility, by reducing the OTS footprint, discontinue the use of oceanic clearances and introduce procedures for the "dynamic airborne rerouting".

- It will strive to improve operational resilience through the development of its contingency procedures and improvements in communication performance all within the context of a developing cyber threat.
- It will embrace emerging technologies and techniques such as formation flights or self-separation and ready itself for new market entrants such as unmanned flight, supersonic or space flight and balloon operations.

____

Appendix A

ADS-B	Automatic Dependent Surveillance - Broadcast
ADS-C	Automatic Dependent Surveillance – Contract
ANS	Air Navigation Service
ATC	Air Traffic Control
ATS	Air Traffic Service
CPDLC	Controller-pilot data link communications (data link)
EFFG	Economic, Financial and Forecast Group
fapfh	Fatal Accidents per Flight Hour
GASP	Global Aviation Safety Plan
GNE	Gross Navigation Error
HLA	High Level Airspace
ICAO	International Civil Aviation Organization
KPI	Key Performance Indicator
LD LHD	Long Duration LHD
LHD	Large Height Deviation
NAT	North Atlantic
NAT CMA	North Atlantic Central Monitoring Agency
NAT EFFG	North Atlantic Economic, Financial and Forecast Group
NAT MWG	North Atlantic Mathematicians Working Group
NAT SG	North Atlantic Scrutiny Group
NAT SOG	North Atlantic Safety Oversight Group
NAT SPG	North Atlantic Systems Planning Group
OCA	Oceanic Control Area
OTS	Oceanic Track System
RVSM	Reduced Vertical Separation Minimum
SKPI	Safety Key Performance Indicator
SLOP	Strategic Lateral Offset Procedure

— END —

International Civil Aviation Organization (ICAO)
European and North Atlantic (EUR/NAT) Office

3 bis villa Émile Bergerat
92522 Neuilly-sur-Seine Cedex, France
Tel.: +33 1 46 41 85 85
Fax: +33 1 46 41 85 00
E-mail: icaoeurnat@icao.int

APPENDIX F — PBCS MONITORING AND REPORTING GUIDANCE
(as of 5 May 2021, for new NAT DOC 011)

(paragraph 3.5.5 refers)

PBCS Monitoring and Reporting

Introduction.

PBCS monitoring programmes not only require available infrastructure to function, but also a set of interlinking policies and procedures for smooth operations between the participating organisations. Those organisations also need the competence and capability to participate in a successful monitoring program and to ensure that the data drives the appropriate actions. The transmission of data between the participating organisations and the response to the data provided are fundamental to a successful monitoring program which should be built on coordination and cooperation between all parties. It is advisable to establish the process ahead of the implementation of performance-based operations reliant on surveillance or communications standards.

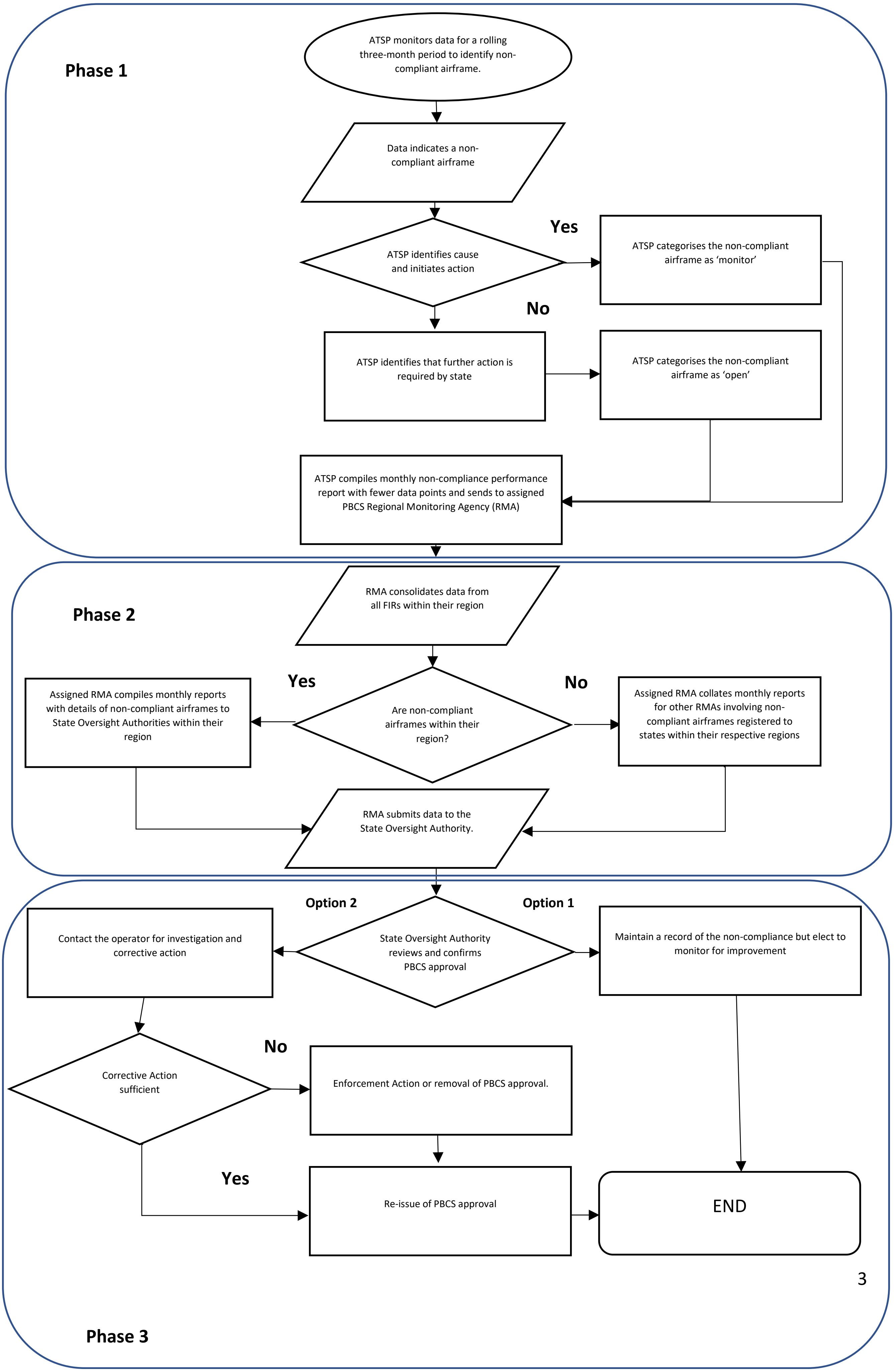
Regional monitoring systems will require detailed procedures for the analysis and processing of the available data and this guidance is not meant to replace those regional processes. This guidance is proposed as a means by which a common set of parameters may be applied either regionally or globally to give all of those involved in the monitoring programmes a means to ensure a consistent and repeatable process for the transmission and response to PBCS non-compliant performance data. It will also allow airspace users who fly in multiple FIRs and regions to gain confidence that any identified non-compliance will be managed consistently, transparently, and proportionately.

ICAO Doc. 9869 *Performance-based Communication and Surveillance Manual* offers the reader guidance on the establishment of a PBCS monitoring program, with detailed guidance in Appendix D for compilation and handling of the data to support monitoring. Significant revisions are being coordinated to provide clarification in Appendix D for Edition 3, scheduled for publication in the second half of 2022. This guidance document focusses on the reporting and filtering of non-compliant airframes as well as guidance for State Oversight Authorities. To support the reporting process outlined in the following pages, the flow diagram below represents the flow of reporting that enables the monitoring system to function. For ease, the process described is divided into three phases:

- **Phase 1;** ATSP: This phase covers initial monitoring and reporting by the Air Traffic Service Provider (ATSP) at a local level. The ATSP is responsible for the collection, analysis and classification of non-compliant performance data as well as the transmission of that data, in the agreed format, to the Regional Monitoring Agency (RMA).
- **Phase 2;** RMA: This phase captures the administration of the regional monitoring requirements and the mechanism to achieve global reporting. The RMA is

responsible for the collection and collation of the data reported by ATSPs for transmission to, either, the States within their region of responsibility, or to other RMAs for transmission to States within their own regions of responsibility.

- **Phase 3;** State Oversight Authority: This phase covers the State Oversight Authority's role in the management of reports of non-compliance. The State Oversight Authority is responsible for the oversight of all airframes registered in their respective states and ensuring that the performance of those airframes meets the required standards.


Phase 1
ATSP monitors data for a rolling three-month period to identify non-compliant airframe.
Data indicates a non-compliant airframe
ATSP identifies cause and initiates action
Yes
ATSP categorises the non-compliant airframe as 'monitor'
No
ATSP identifies that further action is required by state
ATSP categorises the non-compliant airframe as 'open'
ATSP compiles monthly non-compliance performance report with fewer data points and sends to assigned PBCS Regional Monitoring Agency (RMA)
Phase 2
RMA consolidates data from all FIRs within their region
Yes
Assigned RMA compiles monthly reports with details of non-compliant airframes to State Oversight Authorities within their region
Are non-compliant airframes within their region?
No
Assigned RMA collates monthly reports for other RMAs involving non-compliant airframes registered to states within their respective regions
RMA submits data to the State Oversight Authority.
Option 2
Option 1
Contact the operator for investigation and corrective action
State Oversight Authority reviews and confirms PBCS approval
Maintain a record of the non-compliance but elect to monitor for improvement
No
Corrective Action sufficient
Enforcement Action or removal of PBCS approval.
Yes
Re-issue of PBCS approval
END
Phase 3

1. Phase 1 – Local PBCS monitoring and Reporting

1.1. Every ATSP responsible for the local monitoring program should develop and document a process to compile and analyse data measuring Actual Surveillance Performance (ASP) and Actual Communication Performance (ACP) and prepare reports with non-compliant airframes monthly. ATSPs should consider using data sets that include the data from the current month and previous two months (a rolling three-month sample) with an aim to increase the number of data points for airframes that do not operate frequently. In addition, this data will be used in the construction of regional biannual PBCS performance reports that are made available at www.fans-cra.com

1.2. The non-compliance data that is transmitted to the RMA can be classified into one of the following three categories. This classification is further explained later in this section:

1.2.1. **Insufficient data:** Where the number of data points are ≥25 and <100, which would be inconclusive in isolation. No specific action would be expected from the State Oversight Authority.

1.2.2. **Monitor**: Where ≥100 data points are available and the data indicates non-compliance, but the airframe operator is known to be taking action to rectify the non-compliance, and

1.2.3. **Open**: Where ≥100 data points are available, and the data indicates non-compliance, and further action is required by the State Oversight Authority. (See phase 3 below)

1.3. The monthly data sets should be filtered with consideration for the documented regional agreements, which should include filtering out data during periods where network outage or degradation is detected.

1.4. The ATSP will first prepare a list of all airframes observed with ASP and/or ACP performance below the 95% benchmarks for RSP180 and RCP240, respectively.

1.5. The airframes that have not filed the identifiers corresponding to the appropriate RCP and RSP specifications (for example, P2 in item 10 for RCP240) and SUR/RSP180 in item 18 for RSP180) should be removed and handled separately from the non-compliance process

1.6. There are known statistical challenges with the size of data sets, hence it is recommended, where possible, to concentrate on non-compliance observed based on 100 or more data points for either ASP or ACP.

1.6.1. Where data sets available are below 100 data points, e.g. airframes that do not operate frequently, these airframes should be observed over a longer period to accurately identify performance issues.

1.6.2. Another known challenge that exists for most airframes is the size of data sets used to assess ACP when using a monthly reporting process. During a typical flight, most airframes will not have a large number of CPDLC transactions with ATC. Except in the case of problems related to the regular occurrence of abnormally long Pilot Operational Response Times (PORT), it is expected that the CPDLC engineered system will not underperform without a corresponding underperformance in the ADS-C engineered systems.

1.7. Even when 100 or more data points are available, further analysis should be done on airframes determined to be statistically non-compliant to ensure there is an actual performance issue. One commonly observed issue is when an airframe has a SATCOM problem during one flight, that does not repeat for the rest of the flights in the monitoring period. Statistical anomalies such as this may impact the calculated performance, but do not indicate a problem requiring corrective action, unless the same problem is observed in subsequent monitoring periods.

1.8. When reporting non-compliance, an agreed standard template should be used. The template should include:

1.8.1. important identification details, such as where the non-compliant performance was observed, the airframe type and registration number and presumed State of Operator.

1.8.2. the number of data points used to measure the ASP and ACP and the corresponding performance value at the 95% benchmarks for the appropriate RSP and RCP, respectively.

1.8.3. where possible, an "issue code" that provides details of the root cause and recommendation for corrective action (see 1.12 for details).

1.8.4. A column used to define the category as per paragraph 1.2 above

1.9. For ASP, filter out all airframes with fewer than 25 data points. Achieving a similar number of data points for ACP is problematic. It is expected that communications will not underperform without a corresponding underperformance in surveillance. Conclusions cannot, typically, be drawn from airframes offering a small set of data related to communications performance but operating within tolerance for ASP.

1.10. For the remaining data filter out all airframes that are achieving 95% in ASP or ACP for example, **95% RCP240 Benchmark**: percentage of CPDLC transactions that have ACP less than 180 seconds or **95% RSP180 Benchmark**: percentage of ADS-C messages that have ASP less than 90 seconds

1.11. Following the filtering process, the remaining data is made up from airframes that are identified and reportable as non-compliant to the agency responsible for the collation or analysis of the regional data. The list of non-compliant airframes requires classification to identify, where possible, the root cause and necessary, subsequent action. Where a non-compliant airframe presents equal to or more than 100 ASP data points, the agreed non-compliance performance report for should be used.

1.12. The most observed causes for poor performance are detailed in NAT OPS Bulletin 2019_003 as revised: Data Link Performance Improvement Options. The "issue codes" provided in the non-compliant reports map to the following common causes:

1.12.1. Delayed reports around VHF/SAT transitions - This note is used when ADS-C or CPDLC messages are observed with delays when there is mixed media usage in the sequence of messages before, at or after the delayed messages (ex.: VHF-VHF-SAT-VHF-SAT).

1.12.2. Delayed reports via HF media - This note is used when delayed ADS-C or CPDLC reports are observed to be delivered via HF data link (HFDL) or near reports delivered via HFDL. Check whether this appears to be a SATCOM failure with one flight or a period during the flight, or more continuous, intermittent use of HFDL. Potential issue with airframe media priority settings.

1.12.3. Delayed reports due to Inmarsat satellite to satellite transition or satellite network problems - This note is used when ADS-C or CPDLC messages are observed with delays and its noticed that there is a switch sequence between different or same Inmarsat satellite paths (Ex.: XXF/XXH/XXF/XXH). One known area where this occurs in the NAT is at 30W longitude. If multiple airframes are observed with this same issue around the same time, there may be a network-related issue and the ATSP may want to file a report to the FANS-CRA/DLMA.

1.12.4. Delayed reports due to Iridium avionics (airframe) or satellite network problems - This note is used when ADS-C or CPDLC messages are observed with delays via Iridium satellite paths (IG1, IGW1). If multiple airframes are observed with this same issue around the same time, there may be a network-related issue and the ATSP may want to file a report to the FANS-CRA/DLMA.

1.12.5. Reported on only VHF and/or HF -This note is used when delayed ADS-C reports or CPDLC messages are observed via VHF and/or HF only (no SATCOM). This might indicate that SATCOM unit is defective or became unavailable during flight. Check if this issue is observed during one flight or part of one flight only, or whether it is an ongoing problem. If the problem is not observed on subsequent flights, the issue may have been addressed.

1.12.6. Poor ACP due to high PORT - This note is used when it's found that the delayed CPDLC transactions are caused by long Pilot Operational Response Time (PORT).

1.12.7. Airframe data link connection problems detected - This note is used when it can be identified that delays happened during periods when disconnections and reconnections have been performed. Check whether this appears to be a problem with one flight or a period during one flight, or whether it is an ongoing problem. If the problem is not observed on later flights, the issue may have been addressed.

1.12.8. Delays related to a specific VHF station - This note is used when the delayed ADS-C reports and CPDLC messages are observed via a specific VHF ground station. If multiple airframes are observed with same issue, the ATSP should file a report to the FANS-CRA/DLMA as a VHF station issue.

1.12.9. FMS time before ATC uplink time. Clock setting not synchronized with GPS - This note is used when it's found that the FMS response time is earlier than the ATC uplink time. According to airframe manufacturers this happens when the aircraft clock is set manually and is not being synchronized with a GPS source.

1.13. Each month the standard PBCS ATSP Non-Compliance Report form should be completed for each airframe determined to be non-compliant, organised by operator and submitted to the agency responsible for gathering and collating the regional data. Each report form should clearly indicate whether the issue for aircraft with equal to or more than 100 data points is "monitor" or "open". (see 1.2). Aircraft with ≥25 data points, but <100 data points available for analysis are categorized as "insufficient data" and included in a simplified report (see 1.15 below)

1.14. In addition to the reporting performed in 1.13 above, the ATSP responsible for the local monitoring program may choose to take additional courses of action as described below, to follow up on non-compliance.

1.14.1. Where the non-compliance can be attributed to a known issue and is not causing operational impact, the ATSP may choose to continue to monitor the airframe. In this event the issue should be identified as "monitor" in the monthly PBCS ATSP Non-Compliance Report

1.14.2. Where the ATSP has established a point of contact from the airframe operator either through their own list of contacts or through a regional contact list, the ATSP may contact and report directly to the operator. In this event the issue should be identified as "monitor" in the monthly PBCS ATSP Non-Compliance Report

1.14.3. Exceptionally, where the cause of the under-performance is not known, the ATSP may choose to contact the Data Link Monitoring Agency (DLMA). In these circumstances, it is likely that larger volumes of data may be required to support the investigation to identify the cause. In this event the issue should be identified as "monitor" in the monthly PBCS ATSP Non-Compliance Report

1.14.4. Following extended periods of unexplained under-performance or where an operator chooses not to engage, the ATSP may choose to escalate and highlight the non-compliance directly with their own state, or the state of the operator. In this event the issue should be identified as "open" in the monthly PBCS ATSP Non-Compliance Report and action would subsequently be expected from the State Oversight Authority.

1.15. Airframes with ≥25 data points, but <100 data points available for analysis should be categorised as "insufficient data" and included in a simplified report as single line items on one 'tab' in csv format which should include:

FIR	4 letter ICAO Aircraft type	Registration	ADS-C downlink message counts	95% RSP 180 benchmark ASP <=90secs	CPDLC Transaction counts	95% RCP240 Benchmark ACP <=180secs

1.16. Whichever action the ATSP determines, the report submitted to the agency responsible for regional monitoring should still contain details of that airframe and the status of the issue (i.e. insufficient data, monitor or open) to allow the states to take action or monitor trends.

2. Phase 2: Regional Monitoring Agencies (RMA) and reporting

2.1. The agency assigned the task of facilitating the transmission of the non-compliance performance reports shall routinely be the RMA responsible for the ICAO region where the non-compliance has been observed. The RMA will have established a centralised mailbox that can be used for this purpose.

2.2. It is not a requirement for the RMA to also administer the regional monitoring program, however, Planning and Implementation Regional Groups (PIRG) may choose to enlist the help of sub-groups within their organisational structure to carry out the monitoring function at a regional level and include the task in their respective work programs.

2.3. The RMA should establish agreements with ATSPs within the ICAO region they have responsibly for in order to detail the practical aspects of data collation and transmission including among other things timelines for delivery.

2.4. RMAs responsible for the receipt and collation of the supplied performance data will ensure that either a State of Operator or State of Registry as applicable is assigned to each reported airframe.

2.5. Documented processes should be in place between RMAs to allow for the streamlining of the collation and onward transmission of the non-compliance data to other RMA or State Oversight Authorities as applicable.

3. Phase 3: Actions and guidance for State Oversight Authorities

3.1. State oversight authorities should designate a point of contact for any required follow up action, make those contact details available to RMAs and create an email inbox for the purposes of receiving and processing the PBCS non-compliance performance data received from the RMA.

3.2. The State Oversight Authorities should maintain a list of contacts from the operators registered in their respective states. The contacts should have specific responsibility for PBCS operations.

3.3. It is recommended that an airframe that is not performing to the required PBCS standard should not continue to file PBCS identifiers for an extended period. Oversight Authorities recognise the benefits of working in partnership with industry to identify and rectify PBCS compliance issues. This facilitates a cooperative working arrangement between the operator and the State Oversight Authority. Enforcement should be an action of last resort

3.4. On receiving a non-compliance performance report, the State Authority should ensure that the operator is approved to file PBCS identifiers for the subject airframe. If no approval has been granted, then the state should require that the operator does not file PBCS identifiers in their flight plan.

3.5. The data transmitted to the State Oversight Authority by the RMA will be categorised as follows:

3.5.1. **Insufficient data:** Where the number of data points are ≥25 and <100, which would be inconclusive in isolation. No specific action would be expected from the State Oversight Authority.

3.5.1. **Monitor**: Where ≥100 data points are available and the data indicates non-compliance, but the airframe operator is known to be taking action to rectify the non-compliance, and

3.5.2. **Open**: Where ≥100 data points are available, and the data indicates non-compliance, and further action is required by the State Oversight Authority.

3.6. Depending on the data, the State Oversight Authority may engage in a choice of actions:

3.6.1. They may choose to monitor the data provided and retain the data for trend analysis.

3.6.2. They may choose to contact the operator directly to understand the actions being undertaken to improve performance. Exceptionally, they may choose to take formal enforcement action for the operator. Although this remains a tool within their toolbox, it should be fully justified.

3.7. The path that the State Oversight Authority decides to take in each instance will depend to a large degree on what the data is guiding them to do. To aid their decision making a State Oversight Authority may choose to contact the agency responsible for the provision of the PBCS non-compliance performance data or investigate PBCS performance for that airframe in multiple FIRs in support of their own performance-based oversight processes. In addition, states should make use of regional PBCS monitoring report data readily available on www.fans-cra.com produced biannually.

3.7.1. For all airframes reported with ≥25 data points, but < 100 data points, no action is required based solely on this PBCS non-compliance performance data. The data is identified as "insufficient" and is presented to allow the State Oversight Authority to take a wider view on the performance of airframe registered in their state. The State Oversight Authority may see data from other RMAs for the same airframe or may have a picture of other unrelated performance issues that might assist in the oversight of airframes that, for operational reasons, do not achieve 100 surveillance data points.

3.7.2. For all airframes where the report indicates that the cause has been identified and suitable recommendations made, the report would indicate "monitor". No action is required for such cases, unless intelligence from other sources available to the State Oversight Authority indicates there is a wider issue of non-compliance with the operator that the data supports. The data is provided for the oversight authority to monitor.

3.7.3. For airframes where the report indicates non-compliance, and the report is still "open", contact with the operator should be required. If the performance presented suggests that ASP or ACP are both greater than 85%, the state may choose to monitor the recovery action plan of the operator. Depending on the response from the operator, the State Oversight Authority may recommend that the airframe does not file PBCS identifiers in their flight plan until a satisfactory recovery action plan has been accomplished by the operator.

3.7.4. Where a state identifies performance between 85% and 95% for three contiguous reporting periods, the state should require that the operator does not file PBCS identifiers in their flight plan until completion of a satisfactory recovery action plan.

3.7.5. Where the data suggests that the performance of an airframe is variable and no specific trend in its performance can be ascertained, the States can use the data provided with less than 100 data points to investigate further. Where performance between 85% and 95% is reported for six non-contiguous months in a rolling twelve-month period then the state should require that the operator does not file PBCS identifiers in their flight plan until completion of a satisfactory recovery action plan.

3.7.6. Where performance of an airframe is reported to be less than 85% for any reporting period, the State Oversight Authority should require that the operator does not file PBCS identifiers in their flight plan until completion of a recovery action plan acceptable to the State Authority.

3.7.7. If, once the recovery action plan is complete, performance is not seen to improve to the required levels, then further investigation will be required by the operator and further recovery actions should be agreed between the State Oversight Authority and the operator of the non-compliant airframe.

3.7.8. If the recovery action plans do not improve the performance to the required level following 12 months of substandard performance, the State Oversight Authorities may choose to revoke the approval for that airframe and the operator will need to seek reapproval for that airframe to be able to file PBCS identifiers in their flight plan again. This formal enforcement action should be a last resort.

4. Conclusion

4.1. Regional monitoring systems will devise detailed procedures for the analysis and processing of the available data and this guidance is not meant to replace or embellish those regional processes. This guidance is proposed as a means by which a common set of parameters may be applied either regionally or globally to give all of those involved in the monitoring programmes a means to ensure a consistent and repeatable process for the transmission and response to PBCS non-compliant performance data. It will also allow airspace users who fly in multiple FIRs and regions to gain confidence that any identified non-compliance will be managed consistently, transparently, and proportionately.

4.2. The success of a monitoring program, whether it be local, regional or global, relies on confidence that those contributing to it are applying a similar set of rules and triggers for action. This guidance has sought to document or formalise good practices in existence today which make best use of experiences and positive relationships with all stakeholders. Actions by all of those involved in the process should be proportionate.

APPENDIX G — UPDATES TO NAT SPG HANDBOOK

(*paragraphs 5.1.7 and 5.3.2 refer*)

European and North Atlantic Office

NAT Doc 001

NAT SPG HANDBOOK

Second Edition

~~Version 2.5.0 – 2021~~Version 2.6.0 – 2021

~~Approved by NAT SPG/56-2~~Approved by NAT SPG/57

Prepared by the ICAO European and North Atlantic Office

on behalf of the North Atlantic Systems Planning Group (NAT SPG)

EUROPEAN AND NORTH ATLANTIC OFFICE OF ICAO

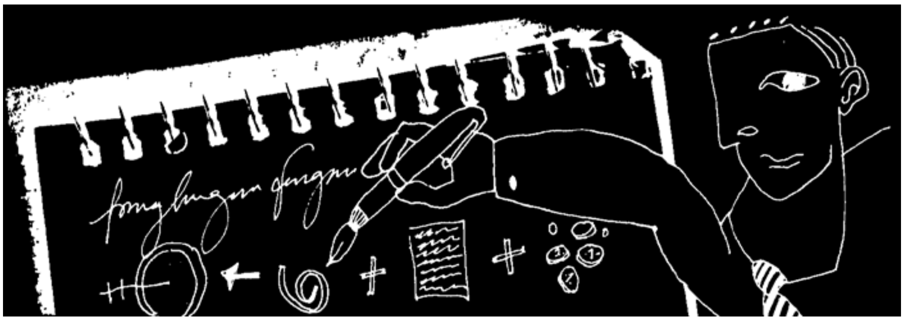
International Civil Aviation Organization (ICAO)
European and North Atlantic (EUR/NAT) Office
3 bis, Villa Emile Bergerat
92522, Neuilly-sur-Seine CEDEX
FRANCE

e-mail	:	icaoeurnat@~~paris.~~icao.int
Tel	:	+33 1 46 41 85 85
Fax	:	+33 1 46 41 85 00
Web	:	http://www.icao.int/EURNAT/

TABLE OF CONTENTS

5 — NAT SPG POLICIES~~NAT SPG POLICIES~~

6 — REFERENCE DOCUMENTATION~~REFERENCE DOCUMENTATION~~



And so while the great ones depart for their dinner
The secretary stays, growing thinner and thinner
Racking his brain to record and report
What he thinks that they think that they ought to have thought.

(Anstey)

Blank Page

RECORD OF AMENDMENTS

As of December 2015, the *NAT SPG Handbook* is published as

2nd Edition, V2.0.0, December 2015, introduced the following changes*

- Update to Canada's representatives
- Updates to Terms of Reference (ToR):
  - NAT IMG (*NAT SPG Conclusion 51/01* & *NATSPG/51 Report*, Appendix B refer*);*
  - NAT EFFG (*NAT SPG Conclusion 51/02* & *NATSPG/51 Report*, Appendix E refer);
  - NAT MWG (*NAT SPG Conclusion 51/03* & *NATSPG/51 Report*, Appendix F refer).
- Removal of mention of NAT TFG, replaced by NAT EFFG where referenced (*NAT SPG Conclusion 51/02* & *NATSPG/51 Report*, Appendix E refer);
- Update to NAT Document configuration management (*NAT SPG Conclusion 51/17* & *NATSPG/51 Report*, Appendix N and Appendix O refer);
- Update to NAT SPG policies (*NAT SPG Conclusion 51/18* & *NATSPG/51 Report*, Appendix P refer);
- Inclusion of NAT Doc 010 (*NAT SPG Conclusion 51/24* & *NATSPG/51 Report*, Appendix R refer);
- Insertion of a new section *Projects and Project Teams for the NAT SPG Working Structure* , starting at page 22, from NAT SPG agreement (*NAT SPG/52 report*, paragraphs 1.1.12 refers), and adapted from NAT IMG text (*NAT IMG47 Summary of Discussions*, paragraphs 3.7 and 3.8), (approved by NAT SPG by correspondence, silence procedure – EUR/NAT SL 15-0590.TEC refers);
- Updates to the NAT IMG working structure (*NAT IMG Decision 47/01*, with approval from NAT SPG by correspondence, silence procedure – EUR/NAT SL 15-0590.TEC refers):
  - Removal of NAT ATMG, NAT CNSG, NAT SARSIG, their contributory groups (NAT ACSG and NAT OPS/AIR), and NICE ToRs;
  - Insertion of NAT POG and NAT TIG ToRs;
  - Reference made to NAT POG instead of NAT ATMG, and NAT TIG instead of NAT CNSG, and to POG and/or TIG, as appropriate, in replacement of reference to NAT ACSG, NAT OPS/AIR, and NAT SARSIG.
- Regrouping of NAT CMA, NAT DMO, and NAT DLMA as "NAT SPG Services", starting at page 38;
- Correction to NAT CMA ToRs: the text have been corrected to be that endorsed by NAT SPG Conclusion 50/30;
- Update to the NAT SPG Working Structure, at page 13;
- Update to the following, due to NAT Doc 002 having been superseded by the "*Pan-Regional (APAC and NAT) Interface Control Document for ATS Inter-facility Data Communication (PAN ICD AIDC)*" (*NAT IMG Decision 45/6* refers, approved by correspondence):
  - *Documents promulgated by the NAT SPG* at page 52; and
  - *Status of Documents* (Appendix A).
- Editorial corrections:
  - Change of EUR/NAT Office public website: www.icao..int/EURNAT

* *The numbering scheme (*NAT SPG Conclusion 51/19 *refers), being mostly editorial, will be inserted in a future revision*

Amendment 1, V2.1.0, July 2016, introduced the following changes

- Numbering of paragraphs (*NAT SPG Conclusion 51/19* refers);
- Inclusion of IFAIMA (International Federation of Aeronautical Information Management Association) in section 1 — 3 (*NAT SPG Conclusion 52/21* refers);
- Update to Portugal's representatives, in section 1 — 15;
- Precision that project leads should be members of project supervisory body and are to report to parent group, in section1 — 14, 14.1 (*NAT SPG Conclusion 52/13* refers);
- Correction that the parent group is the one that agrees on its contributory groups' programmes, in in section 1 — 14, 14.2 a) (*NAT SPG Conclusion 52/13* refers);
- Updates to *Documents promulgated by the NAT SPG*, in section 6:A (*NAT SPG Conclusion 52/13* refers):
    - section title changed to reflect that not all documents in the section have a NAT reference;;
    - maintenance of NAT Doc 003 under NAT POG responsibility, in coordination with NAT TIG;
    - inclusion of NAT eANP volume III in the list, for future reference; and
    - precision that NAT SDR (NAT Doc 009) to eventually be discontinued once NAT eANP Volume III approved.
- As a consequence of Proposal for Amendment (PfA) EUR/NAT-S 16/02:
    - Replaced MNPS by HLA in the Terms of Reference (ToR) of the NAT SG, in section 3 — 3:D;
    - Mention of "MNPS" completed to become "MNPS / NAT HLA in Detailed Oceanic Event Reports Content, in Section 6 — 6:B; and
    - Mention of "MNPS airspace" completed to become "MNPS airspace (NAT HLA)" in Occurrence Classification Codes, in section 6 — 6:C.
- Updates to the *Status of documents promulgated by the NAT SPG*, in Appendix A (*NAT SPG Conclusion 52/13* refers);
- Inclusion of a list of acronyms.

Amendment 2, V2.2.0, June 2017, introduced the following changes [C 53/23]

- Updates in section 1 — 13: Representatives of Canada, Denmark and Portugal;
- Editorial update in section 2:A — Terms of Reference of the NAT IMG: deletion of reference to NAT SDR (NAT Doc 009) in paragraph 1, taking account of the incorporation of the NAT SDR in the ICAO NAT eANP Volume III (*NAT SPG Conclusion 53/21* refers);
- Updates in section 4:A — Terms of Reference of the CMA (*NAT SPG Conclusion 53/9* refers);
- Updates in section 5:A — *Safety Related Policies*:
    - Updates to 5:A — [02] *List of safety key performance indicators for the ICAO NAT Region* (*NAT SPG Conclusion 53/15* refers); and
    - Insertion of 5:A — [04] *Definition and Components of safety cases in support of changes to the NAT air navigation system requiring NAT SPG approval* (*NAT SPG Conclusion 53/16* refers);
- In section 5:B — *Implementation Planning Policies*: deletion of *[17] Mapping of the NAT SDR with the ICAO GANP/ASBU (C 49/10)*, taking account of the incorporation of the NAT SDR in the ICAO NAT eANP Volume III (*NAT SPG Conclusion 53/21* refers);
- In section 6:A — *Documents promulgated by the NAT SPG* (*NAT SPG Conclusion 53/22* refers):
    - change to format of table and deletion of Appendix A *Status of documents*;
    - clarifications on definition of NAT bulletins (NAT OPS bulletins and NAT OESB) in “Remarks” column in order to avoid duplication with provisions in NAT Doc 007;
    - updates to the status of the following documents:
        - NAT Doc 001 – *NAT SPG Handbook* – to be issued in June 2017 (*NAT SPG Conclusion 53/22* refers);
        - NAT Doc 008 – *NAT Application of Separation Minima* (ASM) – approved by NAT IMG (NAT IMG Decision 50/6 refers) and supported by the NAT SOG/16 (NAT SOG/16 SoD, paragraph 4.32 refers) and issued in June 2017;
        - NAT Doc 009 – NAT Service Development Roadmap (SDR) – discontinued as it has been integrated into the NAT eANP Volume III Companion Document, *NAT Global Air Navigation Plan (GANP) Aviation System Block Upgrades (ASBU) Report* (*NAT SPG Conclusion 53/21* refers), and
        - NAT OPS Bulletin 2017_002 – OESB – *NAT Oceanic Errors Safety Bulletin* – approved by NAT SOG/15 (NAT SOG Decision 15/4 refers) and issued in January 2017; and
- New Appendix A: ICAO High Seas Coordination Procedure (*NAT SPG Conclusion 53/23* refers).

Amendment 3, V2.3.0, June 2018, introduced the following changes [C 54/12 & 54/19]

- Section 1: #7 – NAT SPG duration and suggested Agenda – deleted;
- Section 1: #8 – Meeting Documentation – updated;
- Section 1: #11 – Guidelines for basic requirements for Chairpersons/ vice-Chairpersons/Rapporteurs – deleted;
- Section 1: #13 – NAT SPG representatives – updated;
- Section 2:B: #5 – Formulation of recommendations to the NAT IMG – updated;
- Section 3:B: #1 – Formulation of recommendations to the NAT SOG – updated;
- Section 3:C – Working Methods of NAT MWG – updated;
- Section 4:C – Terms of Reference of NAT DMO – updated;
- Section 5:A, 5:B, 5:C – NAT SPG Policies – updated;
- Section 6:A – Documents promulgated by the NAT SPG– updated;
- Section 6:B – Detailed Oceanic Event Reports Content – deleted;
- Section 6:C – Occurrence Classification Codes – deleted;
- Appendix A – High Seas Coordination Procedure – deleted; and
- Editorial and consequential updates to paragraph numbering and footnotes.

Amendment 4, V2.4.0, July 2019, introduced the following changes [C 55/19]

- Section 1: #3 – Observers – updated to include Trinidad and Tobago, EUROCONTROL and IFALDA;
- Section 1: #13 – NAT SPG representatives – updated;
- Section 2:C – Composition of NAT POG – updated to include EUROCONTROL and IFALDA;
- Section 2:D – Composition of NAT TIG – updated to include ARINC, EUROCONTROL, IFALDA, Inmarsat, Iridium and Sitaonair;
- Section 3:A – Terms of Reference of NAT SOG – updated;
- Section 3:D – Composition and Working Methods of NAT SG – updated;
- Section 4:A – Terms of Reference of NAT CMA – updated;
- Section 5:A – Safety Related Policies [02] Safety KPIs and [04] Definition and Components of Safety Cases – amended;
- Section 5:B – Implementation Planning Policies [07] NAT PBCS Requirements (*C 55/06* refers) and [08] ASEPS phraseology and definitions (*C 55/11* refers) inserted;
- In section 6:A — *Documents promulgated by the NAT SPG*, updates to the status of the following documents:
  - NAT Doc 001 – *NAT SPG Handbook* – to be issued in July 2019 (*C 55/19* refers);
  - NAT Doc 006 – *Air Traffic Management Operational Contingency Plan – North Atlantic Region – Version 1.12* – to be issued in July 2019 (*C 55/20* refers);
  - NAT Doc 007 – *North Atlantic Operations and Airspace Manual* – Version V 2019-3 – to be issued in July 2019 (*C 55/21* refers);
  - NAT Doc 008 – *Application of Separation Minima – North Atlantic Region* (NAT ASM) Version 1.8 – approved by NAT IMG (NAT IMG Decision 53/7 refers) and supported by the NAT SOG/19 (NAT SOG Decision 19/07 refers) and issued in December 2018; and
  - NAT Doc 010 – *Consolidated Reporting Responsibilities Handbook – North Atlantic Region* Version June 2019 – to be issued in July 2019 (*C 55/23* refers).
- Appendix A: NAT Safety Case Template inserted.

Amendment 5, V2.5.0, February 2021, introduced the following changes [C 56-2/7]

- Section 1: #13 – NAT SPG representatives of Norway and United States – updated;
- Section 5:B: Implementation Planning Policies – [08] ASEPS phraseology and definition (C 55/11) – deleted;
- Section 6:A — *Documents promulgated by the NAT SPG*, updates to the status of the following documents:
    - NAT Doc 001 – *NAT SPG Handbook* – February 2021 (*C 56-2/7* refers);
    - NAT Doc 006 – *Air Traffic Management Operational Contingency Plan – North Atlantic Region – Version 1.15* – February 2021 (*C 56-2/8* refers);
    - NAT Doc 007 – *North Atlantic Operations and Airspace Manual* – Version V2021-1 – February 2021 (*C 56-2/9 & C 56-2/10* refer);
    - NAT Doc 008 – *Application of Separation Minima – North Atlantic Region* (NAT ASM) Version 1.10 – approved by NAT IMG (NAT IMG Decision 57/4 refers) and supported by the NAT SOG/23 (NAT SOG/23 SoD para. 4.34 refers) – December 2020;
    - NAT Doc 010 – *Consolidated Reporting Responsibilities Handbook – North Atlantic Region* – December 2020 (*C 56-2/11* refers);
    - 2019 GANP ASBU Implementation Status Report – NAT Region – February 2021 (*C 56-2/6* refers); and
    - NAT OESB – NAT Oceanic Errors Safety Bulletin NAT OPS Bulletin 2017_002_rev3 – December 2020 (NAT SOG Decision 23/03 refers).
- Appendix A: Section 2, part D, Regional Safety Case Checklist – inserted (*C 56-2/7* refers).

Amendment 6, V2.6.0, June 2021, introduced the following changes [C 57/12]

- Section 1: #13 – NAT SPG representatives of Canada, Denmark, Norway and United Kingdom - updated;
- Section 3:A – NAT SOG Terms of Reference - updates resulting from the NAT SOG Working Methods Project Team (WMPT);
- Section 3:C – NAT MWG Terms of Reference - updates resulting from the NAT SOG Working Methods Project Team (WMPT);
- Section 3:D – NAT SG Terms of Reference - updates resulting from the NAT SOG Working Methods Project Team (WMPT);
- Section 4:C — NAT DMO Terms of Reference (*C 57/9* refers) - updated;
- Section 5:A, paragraph [04] – "Definition and Components of Safety Cases in support of changes to the NAT air navigation systems requiring NAT SPG approval" - updates resulting from the NAT SOG Working Methods Project Team (WMPT);
- Section 5:A, paragraph [05] – Minimum Height Monitoring Requirements (*C 56-2/05* refers) - new;
- Section 6:A — *Documents promulgated by the NAT SPG:*
    - clarifications on NAT OPS bulletins in headings: "Kept under review by" and "Amendments approved by" and "Remarks" column in order to streamline maintenance of these documents (*C 57/9* refers);
    - updates to the status of the following documents:
        - NAT Doc 001 – *NAT SPG Handbook* – July 2021 (*C 57/12* refers);
        - NAT Doc 006, Part II – *Volcanic Ash Contingency Plan (VACP), Europe and North Atlantic Regions – Version 2.0.1 (NAT Doc 006, Part II, VACP)* – July 2021 (*C 57/13* refers);

   - NAT Doc 007 – *North Atlantic Operations and Airspace Manual* – Version V2021-2 – July 2021 (*C 57/14* refers); and
   - NAT Doc 011 - *PBCS Monitoring and Reporting Guidance* – July 2021 (*C 57/7* refers).

- Appendix A “NAT REGIONAL SAFETY CASE TEMPLATE”, Section 3 “NAT Safety Case Terms and Definitions” - updates resulting from the NAT SOG Working Methods Project Team (WMPT).

0 — INTRODUCTION

The North Atlantic Systems Planning Group (NAT SPG) was established in 1965 by the Council of ICAO as the first regional planning group. From its Terms of Reference the NAT SPG shall continuously study, monitor and evaluate the Air Navigation system in the light of changing traffic characteristics, technological advances and updated traffic forecasts.

At the 10th Air Navigation Conference, Montreal 5 - 20 September 1991, the ICAO Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM) System was endorsed, and at the Limited North Atlantic Regional Air Navigation (LIM NAT RAN) Meeting, held in Cascais, Portugal 3 - 18 November 1992, the NAT SPG was tasked to develop proposals for CNS/ATM systems implementation actions as well as proposals for institutional arrangements.

In order to meet these new challenges, a Meeting of North Atlantic High Level Managers, held in Paris 20 - 21 January 1994, created a North Atlantic Implementation Management Group (NAT IMG) to co-ordinate and manage - on behalf of the NAT SPG itself - the NAT Implementation Plan. This led the NAT SPG to review and revise its organization and working methods.

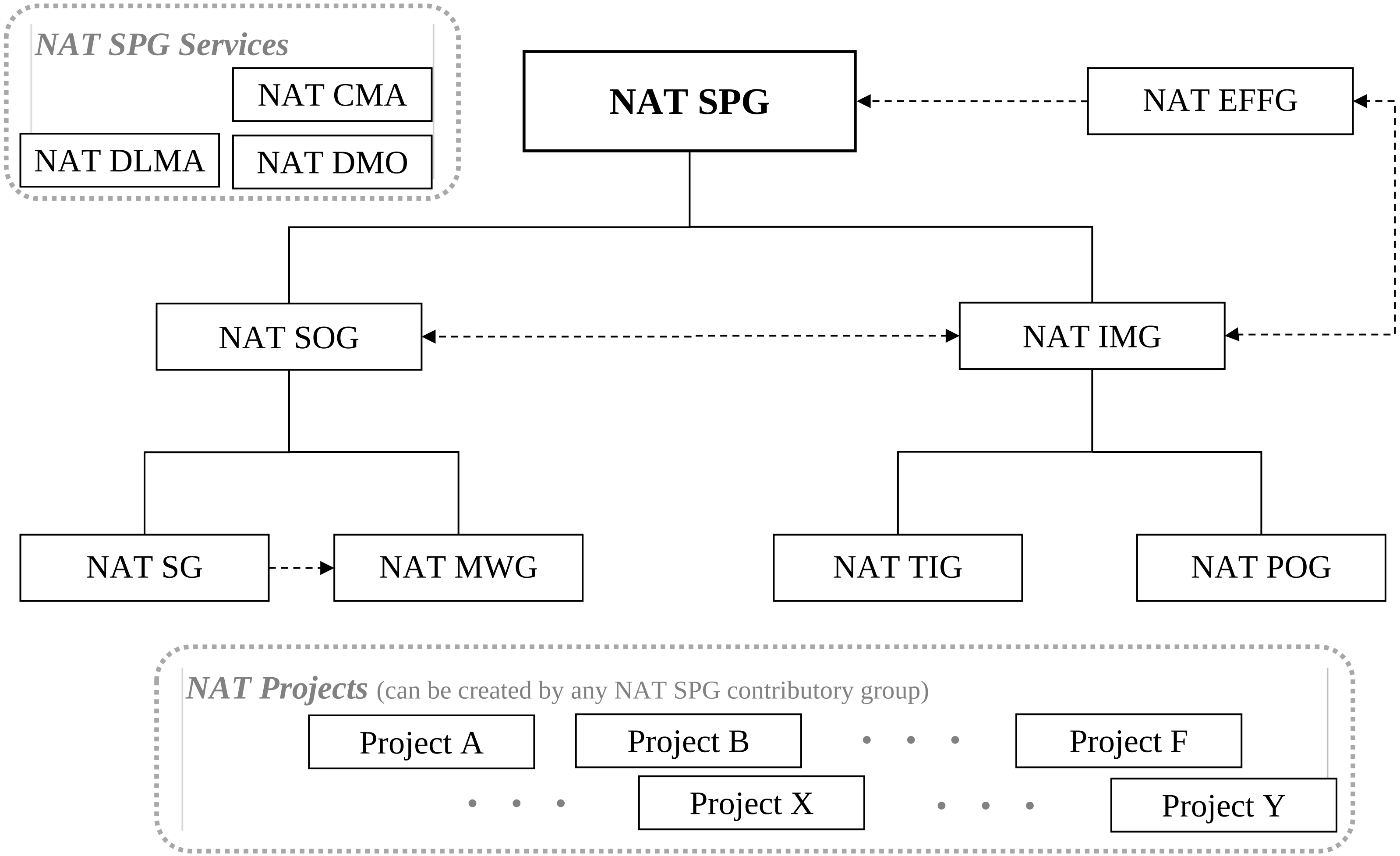
At NAT SPG/45, Paris, 23-26 June 2009, it was agreed to make adjustments to the NAT SPG working structure and to the terms of reference of its contributory bodies to accommodate the change in emphasis to performance based requirements, as driven by the Global ANP, and to take account of the Global Aviation Safety Plan (GASP). At the same time, the NAT SPG approved a high level safety policy which would be applicable to its work.

The purpose of the NAT SPG Handbook is to give an overview of the organization of the NAT SPG and its different groups, including terms of reference, working methods, participation, allocated Lines of Action from the NAT Implementation Plan and relevant Points of Contact. The handbook will be helpful to States and international organizations when planning and managing the resources for participation in the work.

The NAT SPG Handbook is published by the ICAO European and North Atlantic Office on behalf of the Chairperson of the NAT SPG and distributed to all identified Points of Contact in the NAT SPG organization.

Hlin HOLM
Chairperson of the NAT SPG

0:A — NAT SPG WORKING STRUCTURE



0:B — SAFETY POLICY STATEMENT

(As endorsed by NAT SPG/45 in June 2009, NAT SPG Conclusion 45/1 refers)

Safety is one of the NAT SPG's core business functions. The NAT SPG is committed to developing, implementing, maintaining and constantly improving strategies and processes to ensure that all our aviation activities take place under a balanced allocation of organizational resources. The NAT SPG will aim to achieve the highest level of safety performance and meet regional safety objectives in line with national and international standards, the Global Aviation Safety Plan (GASP) and the Global Air Navigation Plan.

OBJECTIVE

The objective of the NAT SPG member States is to maintain and, where possible, improve the agreed safety standards in all activities supporting the provision of air navigation services in the North Atlantic Region:

- All involved States are accountable for the delivery of the agreed level of safety performance in the provision of air navigation services in the North Atlantic Region.
- All involved States are accountable for the delivery of the agreed level of safety performance in aircraft operations in the North Atlantic Region.
- Safety in the NAT Region is managed through the organization and activities of the relevant implementation and oversight groups established by the NAT SPG, in coordination with the non-member States and observers, to achieve its Safety Objective.

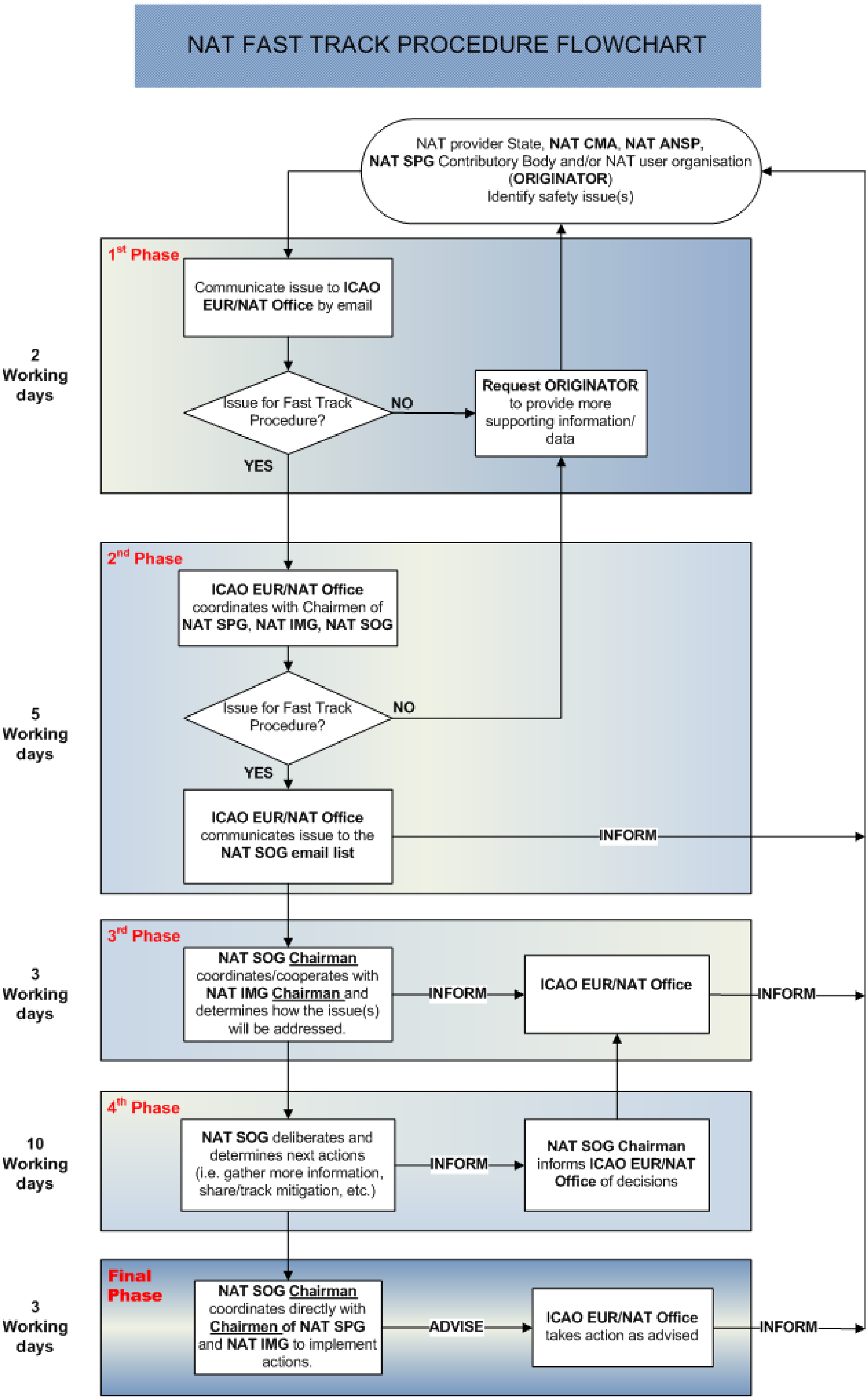
Guiding Principles

The NAT SPG will act to:

- **Clearly define** all accountabilities and responsibilities for the delivery of safety performance with respect to the provision of air navigation services and participation in the NAT SPG and its contributory bodies;
- **Support** the safety management activities that will result in an organizational culture that fosters safe practices, encourages effective safety reporting and communication, and actively manages safety within the NAT Region;
- **Share** safety related data, knowledge and expertise with concerned stakeholders;
- **Disseminate** safety information and NAT operating requirements to stakeholders;
- **Establish and implement** hazard identification and risk management processes in order to eliminate or mitigate the safety risks associated with air navigation services supporting aircraft operations in the North Atlantic Region;
- **Establish and measure** NAT Region safety performance against agreed safety standards; and
- **Continually improve** our safety performance through safety management processes

0:C — NAT FAST TRACK PROCEDURE FOR SAFETY OCCURRENCES

(As endorsed by NAT SPG/50 in June 2014, NAT SPG Conclusion 50/16 refers)



NAT FAST Track Procedure for Safety Occurrences Reporting Form

ORIGINATOR: (NAT Provider State, NAT CMA, NAT ANSP, NAT SPG Contributory Body and/or NAT user organisation)	*[Indicate here who is at the origin of the NAT Fast Track Procedure (NFTP) request]*
Contact Point: name, email, phone number	*[Provide here contact details on who to ask for further information on the safety issue that triggered this NFTP request, and who to report to on the progress of this NFTP request]*
Domain(s) affected	*[Indicate here the operational domains/activities affected by the safety issue that triggered this NFTP request, for example: flight plan processing, phraseology etc.]*
Geographical area affected	*[Indicate here the geographical area affected by the issue]*
Description of the case	*[Describe here the safety issue that triggered this NFTP request, in full detail, including: extensive description of the safety issue and its effect, an assessment on why this is a safety issue* (e.g. *what is the impact on safety). This is basically the rationale for this NFTP]*
Supporting data	*[Provide here, or in an attachment, all data/elements collected to support the case described above, (domain(s),geographical area, description, safety impact) covering all aspects listed in this form]*
Evaluated safety impact	*[Provide here, in an explicit, and if possible, in a detailed and comprehensive manner, an evaluation of the safety impact of the issue that triggered this NTFP]*
Proposed solution(s) or corrective/mitigation action(s)	*[Provide here one or several solution(s) or corrective/mitigation action(s)]*

1 — NORTH ATLANTIC SYSTEMS PLANNING GROUP

(NAT SPG)

(Revised to reflect C-WP/13135, C 183/9 on 18 March 2008 and PRES RK/1560 dated 30 June 2008)

1. Terms of Reference (ToR)

The NAT SPG was established by the approval of the ICAO Council on 15 April 1965 (54/20) of Recommendation 4/1 - reproduced below - of the special North Atlantic Meeting, Montreal, 23 February - 20 March 1965, which specified within its sub-paragraphs the composition, terms of reference and method of operation of the Group.

Recommendation 4/1: North Atlantic Systems Planning Group

That, in order to ensure continuity in systems planning in the North Atlantic Region between successive North Atlantic Regional Meetings:

a) The governments of Canada, Ireland, France, the Netherlands, the United Kingdom and the United States be invited to designate suitably qualified experts to participate on their behalf in the work of a North Atlantic Systems Planning Group with the following terms of reference:

"To continuously study, monitor and evaluate the system in the light of changing traffic characteristics, technological advances and updated traffic forecasts, to the end that the North Atlantic Regional Plan may be adjusted on a timely, evolutionary basis. Throughout this work the group shall give close attention to the effectiveness of any suggested changes in relation to their costs."

b) Proposals by States for amendment of the North Atlantic Regional Plan that may be developed as a result of studies undertaken by the Group, be submitted for consideration by other North Atlantic States, either at ICAO North Atlantic Regional Meetings convened for the purpose, or by correspondence in accordance with established procedures.

c) The Group work with the flexibility and informality required to reduce to a minimum the administrative burden imposed on States and on ICAO.

d) The Group may invite, as and when it considers necessary or desirable, the co-operation and participation of other States and of public or private international organizations.

e) The Group meet approximately once a year and at least once every eighteen months either at the ICAO Paris Office, the ICAO Headquarters or elsewhere at the invitation of a State and pursue its work by correspondence between successive meetings.

f) All States of the North Atlantic Region be kept informed of the progress of work in the Group and be encouraged, as well as the international organizations concerned, to submit suggestions to assist the Group in its task.

2. Members

All ICAO Contracting States, who are service providers in an air navigation region and part of that region's ANP, should be included in the membership of that region's PIRG. Furthermore, user States are entitled to participate in any other PIRG meetings as a non-member.

Representatives of Canada, Denmark, France, Iceland, Ireland, Norway, Portugal, the United Kingdom and the United States are Members of the NAT SPG.

3. Observers

International organizations recognized by the Council may be invited as necessary to attend PIRG meetings as observers.

Representatives from the Russian Federation, Spain and Trinidad and Tobago as well as Observers from EUROCONTROL, IAOPA, IATA, IBAC, IFAIMA, IFALDA, IFALPA, IFATCA, Iridium and Inmarsat are invited to participate in the work of the NAT SPG.

Requests from any other ICAO Contracting State or an international organization to attend the NAT SPG meetings will be reviewed on a case-by-case basis and decided by the NAT SPG Chairperson. Such requests must be supported by the appropriate rationale to attend the meeting[1].

4. Chairperson

The Chairpersonship of the NAT SPG will be reviewed by an election every four years[1].

5. Vice-Chairperson

In accordance with NAT SPG Conclusion 49/27, the NAT IMG and NAT SOG Chairpersons will serve as NAT SPG Vice-Chairpersons[1].

6. Secretary

The ICAO Regional Director, European and North Atlantic Office, serves as the Secretary of the NAT SPG.

7. Meeting Documentation

The following documentation, including proposed action as required, may be presented by States, International Organizations or the Secretariat:

- Working Papers normally contain material with a draft decision, conclusion or inviting action by the meeting. Working papers are submitted at least 2 weeks prior to the meeting,

- Information Papers are submitted in order to provide the meeting with information on which no action is required and will not necessarily be discussed at the meeting. Information papers are submitted at least 1 week prior to the meeting.

- Flimsies are documentation prepared on an ad hoc basis in the course of a meeting, normally in support of an existing working paper, and with the purpose to assist the meeting in the discussion on a specific matter or in the drafting of a text for a Conclusion or Decision.

8. Conduct of the meetings of the NAT SPG groups and sub-groups[2]

Rapporteur – The Rapporteur facilitates the work of the meeting so as to encourage consensus or clearly identify barriers to consensus. The tasks of the Rapporteur include ensuring the efficient conduct of the meeting, ensuring that the tasks associated with the work programme are addressed or reported upon during the course of the meeting and reporting the findings of

[1] NAT SPG Conclusion 49/27 refers
[2] NAT SPG Conclusion 45/3 refers

the meeting to the group(s) specified in the terms of reference. In the NAT SPG working structure, contributory groups to the NAT IMG and NAT SOG operate with Rapporteurs.

Chairperson – In addition to the duties of a Rapporteur, the Chairperson may make decisions regarding the conduct of the meeting and, in cases where it is not possible to reach consensus, determine the recommendation(s) that will be made by the meeting. In the NAT SPG working structure, the NAT SPG, NAT IMG, NAT SOG and NAT EFFG operate with a Chairperson.

Vice-Chairperson – The vice-Chairpersons will be called upon to preside over the meeting should circumstances prevent the Chairpersons from being present at the meeting. The vice-Chairpersons may also be requested to support the Chairpersons in his/her role, taking over some of the Chairpersons's work load whenever appropriate. The vice-Chairpersons do not automatically succeed as Chairpersons at the conclusion of the term of the incumbent Chairperson. In the NAT SPG working structure, the NAT SPG, NAT IMG and NAT SOG operate with a vice-Chairperson. The NAT IMG and NAT SOG Chairpersons will serve as NAT SPG vice-Chairpersons[1].

9. Election of Chairpersons/vice-Chairpersons/Rapporteurs of the NAT SPG and its Contributory Groups[2]

Review of Chairpersonship will be conducted by a routine process of elections for the NAT SPG, NAT EFFG, NAT IMG, and NAT SOG every four years. In the event that a Chairperson is unable to complete a term, another election would be held.

Review of vice Chairpersonship will be conducted by a routine process of elections for the NAT IMG and NAT SOG every four years, normally at the same time as the routine elections of the NAT IMG and NAT SOG Chairpersons.

Review of rapporteurship will be conducted by a routine process of elections for the Contributory Groups of the NAT IMG and NAT SOG every four years. Efforts will be made to avoid changes in rapporteurship for multiple groups during the same year.

Chairperson – Nominations and Election for the NAT SPG

1. Candidates for election to the post of Chairperson must be from a NAT SPG member State and nominated by a member State of the NAT SPG and seconded by another member State of the NAT SPG.

2. Nominations should be submitted to the EUR/NAT Office of ICAO and be promulgated by the EUR/NAT Office of ICAO to the NAT SPG member States by e-mail two months before the next meeting of the NAT SPG.

3. The NAT SPG will elect the Chairperson from the list of candidates by open vote at the NAT SPG meeting and the newly elected Chairperson will assume his functions at the conclusion of the meeting.

[1] *NAT SPG Conclusion 49/27 refers*
[2] *NAT SPG Conclusion 49/27 refers*

Chairperson – Nominations and Election for the NAT EFFG, NAT IMG, and NAT SOG

1. Candidates for election to the post of Chairperson must be from a NAT SPG member State and nominated by a member State of the Group concerned and seconded by another member State of the Group.

2. Nominations should be submitted to the EUR/NAT Office of ICAO and be promulgated by the EUR/NAT Office of ICAO to the NAT SPG member States by e-mail two months before the next meeting of the Group concerned.

3. The Group will elect the Chairperson from the list of candidates by open vote at its meeting.

4. The NAT SPG will confirm the election of the Chairperson at its meeting and agree that the newly elected Chairperson will assume his functions as Chairperson at the next meeting of the Contributory Group concerned.

Note: the election of vice-Chairpersons of the NAT IMG and NAT SOG will be conducted informally by open vote at the meeting of the Group concerned following the election of the Chairperson.

Rapporteur – Nominations and appointment of the NAT IMG and NAT SOG Contributory Groups (NAT MWG, NAT POG, NAT SG, and NAT TIG)

1. Candidates for election to the post of Rapporteur must be from a NAT SPG member State and nominated by a member State of the Group concerned and seconded by another member State of the Group.

2. Nominations should be submitted to the EUR/NAT Office of ICAO and be promulgated by the EUR/NAT Office of ICAO to the NAT SPG member States by e-mail two months before the next meeting of the Group concerned.

3. The Group will elect the Rapporteur from the list of candidates by open vote at its meeting.

4. The parent Group concerned will confirm the election of the Rapporteur and agree that the newly elected Rapporteur will assume his functions at the next meeting of the Contributory Group concerned.

Note: Parent Groups of the Contributory Groups:
NAT IMG – NAT POG, NAT TIG
NAT SOG – NAT SG, NAT MWG

10. Procedure for processing of Proposals for Amendment to the NAT SUPPs

10.1. Proposals for amendment (PfA) to the NAT *Regional Supplementary Procedures* (SUPPs, Doc 7030) should be reviewed and endorsed by the NAT SPG before further processing by the ICAO Secretariat.

10.2. The ICAO Secretariat will process the PfA in accordance with the formal procedures immediately after its endorsement by the NAT SPG.

10.3. In exceptional cases, if a PfA requires urgent processing between two NAT SPG meetings, the ICAO Secretariat will circulate the PfA to the NAT SPG member States and Observers by correspondence for approval.

11. Formulation of recommendations to the NAT SPG[1]

11.1. The NAT SPG contributory groups are to provide reports that are as concise as possible, whilst providing sufficient detail and supporting material for any recommendations which might be made. In

[1] *NAT SPG Conclusion 48/12 refers*

order to clarify the intent of contributory group recommendations they are to be formulated in the form of "draft NAT SPG Conclusions". Each draft Conclusion is to be accompanied by sufficient supporting justification, which is to include, at minimum:

a) a concise summary of the discussion of the group, including the reasons why particular options are or are not supported;

b) the full text of any material proposed for adoption by the NAT SPG into a NAT SPG or ICAO document;

c) the full text of proposed revisions to text of an existing NAT SPG or ICAO document, with insertions shown in grey highlight (text to be inserted) and deletions shown in strikethrough (~~text to be deleted~~); and

d) a clear description of why the NAT SPG should endorse the draft Conclusion, what is expected in order to fully address the conclusion, who should carry out the actions required and when the actions should be completed, using the tabular format described below.

11.2. The following Table 1~~Table 1~~ shall be used to summarize why the NAT SPG should endorse the draft Conclusion , what is expected to fully address the conclusion, who should carry out the actions required and when the actions should be completed:

Table 1:

Why	
What	
Who	
When	

11.3. Draft NAT SPG Conclusions shall be presented in the following format:

Draft NAT SPG Conclusion ##/NATXXXYY/Z – TITLE

That the NAT(Group designation)/ICAO Regional Director, Europe and North Atlantic:

a) AA;

b) BB; and

c) CC.

Where:

TITLE is a concise description of the subject addressed by the proposed draft Conclusion.
For a PfA to the SUPPs, this title shall start with “PfA to the SUPPs,”;

is the designation of the next NAT SPG meeting;

NATXXXYY is the designation and meeting number of the NAT SPG contributory group proposing the draft Conclusion; and

Z is a number indicating the sequence of the proposed draft Conclusion as it appears in the contributory group report.

11.4. When formulating each (draft) NAT SPG Conclusion, all acronyms except NAT SPG shall be decoded when they are initially used. This shall be true even for acronyms which have appeared in a previous draft Conclusion. It is acceptable to use an acronym in the title, so long as it is decoded in the body of the draft Conclusion.

12. Projects and Project Teams for the NAT SPG Working Structure

12.1. The general guiding principles to govern the establishment and the work of projects and projects teams are as follows:

a) A Project is defined as a specific activity that is finished over an agreed period of time and intended to achieve a specific outcome of the agreed SPG work programme;

b) The period of a Project is normally not greater than 6 months;

c) The NAT SPG contributory groups are responsible for the identification of the Projects that will deliver the work programme in the most efficient and effective way considering, for example, expert resource availability, dependencies of outcomes from other activities, meeting efficiency;

d) A Project Team consists of individuals/experts assembled to perform activities that contribute towards achieving the tasks related to the Project. For each Project Team a Project Lead shall be identified, responsible for the leadership of the team to deliver the required outcomes within the agreed timescales, and to report to the parent group. For practical reasons the appointed project lead should be a member of the project supervisory body; and

e) All NAT SPG contributory groups shall establish and maintain a Project Definition document for all projects that are under their ownership for the purpose of project initiation, supervision and closure. The following elements (Table 2~~Table 2~~ refers) shall be considered as a minimum in a Project.

Table 2: Project Definition Contents

Project Title	Unique and concise project title that relates to the outcomes of the project
Parent Group	The parent body that approves the project
Project Supervisory body	The SPG contributory body that supervises the project, e.g. IMG, POG, TIG, SOG, etc.
Project Period	Forecast period for which the project will be active (specific timeframe to be used: e.g. dates, time of a specific meeting etc).
Project Objective	What is the purpose of the project and how does it relate to the delivery of the NAT strategy and Roadmap
Project Outcomes:	What will be physically delivered by the project
Membership	Who are the project team members
Coordination Requirements	Which other bodies will the project need to coordinate with to achieve the outcomes
Project High level Tasks	At a summary level what are the key tasks that this project will perform to achieve the outcomes
Project Lead	Who, from the project supervisory body, will be responsible for the leadership of the project to achieve the outcomes, and for reporting to the parent group.
Project Secretariat Support	Who will be the support from the ICAO Secretariat

12.2. The general guiding principles to help the establishment and the governance of projects and projects teams are as follows:

a) The NAT SPG contributory groups shall identify projects that are required to deliver those aspects of the NAT SPG Work Programme that the parent group have agreed as being their responsibility;

b) The NAT SPG contributory groups shall form Project Teams as required to deliver the projects in the most efficient and effective manner. Project Teams are not required to have the parent group endorsement, unless they envisage physical meetings outside the NAT SPG contributory group regular meeting; when establishing a Project Team its work programme shall be established in the most efficient and effective way considering, for example, expert resource availability, dependencies of outcomes from other activities and meeting efficiency; it is expected that the Project Teams work mainly by correspondence.

c) The NAT SPG contributory groups are required to provide regular updates to their parent group meeting on the following:

   i. Summary on the progress of “active” projects, including justification of those projects with a life time greater than 6 months or the need for physical meetings outside the NAT SPG contributory group regular meetings;

   ii. Summary of those projects that have been completed; and

   iii. Proposal of projects required to deliver the next period of the NAT SPG Work Programme, including justification of those projects with a life time greater than 6 months, for endorsement by the parent group.

d) The NAT SPG contributory group *Rapporteurs*, or their delegate, should provide a report of their groups to the parent group by attending, as a minimum, the respective meeting agenda item by the most efficient and convenient means, i.e. in person, telephone conference, etc. coordinated with the Secretariat.

13. NAT SPG REPRESENTATIVES

(Kept up-to-date by the Secretariat upon reception of nomination to the NAT SPG)

NAT SPG Chairperson
Hlín HÓLM

CANADA
Jeff DAWSON
~~Standards and Procedures,~~
~~Director~~Assistant Vice President, Operational Support
NAV Canada
77 Metcalfe Street
K1P 5L6 Ottawa, ON
CANADA
✆: +1 613 563 7341
✉: jeff.dawson@navcanada.ca

DENMARK
Patrick Alexander LIEBGOTT
~~Head of Section~~Team Leader (ANS)
Danish ~~Transport and Construction Agency~~Civil Aviation and Railway Authority
~~Edvard Thomsens Vej 14~~Carsten Niebuhrs Gade 43
~~2300~~ 1577 Copenhagen
DENMARK
✆: +45 41 78 03 53
✉: pali@~~tbst~~trafikstyrelsen.dk

Alternate
~~**Anna Eva VILLEFRANCE**~~
~~Flight Information Services and AIS Operations, Director~~
~~NAVIAIR~~
~~Naviair Allé 1~~
~~DK 2770 Kastrup~~
~~DENMARK~~
Line Lykke RASMUSSEN
Head of Section
Danish Civil Aviation and Railway Authority
Carsten Niebuhrs Gade 43
1577 Copenhagen
DENMARK
✆: ~~+45 3247 7990~~
✉: ~~aev@naviair.dk~~
lras@trafikstyrelsen.dk
~~✉ (2): naviair@naviair.dk~~

FRANCE
Christophe GUILPAIN
International Cooperation
DSNA/SDPS
50, rue Henry Farman
75720 PARIS Cedex 15
FRANCE
✆: +33 158094716
📠: +33 1 58 09 44 21
✉: christophe.Guilpain@aviation-civile.gouv.fr

ICELAND	**Hlín HÓLM** ANS section, Head of ANS Section Icelandic Transport Authority Samgöngustofa Ármúla 2 108 Reykjavik ICELAND	✆: +354 480 6181 🖃: hlin.holm@icetra.is
IRELAND	**Peter KEARNEY** ATM Operations and Strategy, Director Irish Aviation Authority The Times Building 11-12 D'olier Street Dublin 2 IRELAND	✆: +353 1 603 1495 🖷: +353 1679 2935 🖃: peter.kearney@iaa.ie
NORWAY	**~~Roald A. LARSEN~~Baard LARSEN** Civil Aviation Authority Postboks 243 NO-8001 Bodo NORWAY	✆: +47 ~~934 40 568~~990 00 901 🖷: +47 755 85 005 🖃: ~~ral~~bla@caa.no.
PORTUGAL	**Antonio RITA** ATM Expert Air Navigation Department Autoridade Nacional de Aviaçao Civil - ANAC Rua B, Edificio 4 Aeroporto de Humberto Delgado PT-1749-034 Lisboa PORTUGAL	✆: +351 21 284 22 26 (Ext: 1660) 🖷: +351 21 841 06 14 🖃: antonio.rita@anac.pt
UNITED KINGDOM	**Stuart LINDSEY** Head, Airspace ~~Regulation~~Modernisation CAA Strategy and Policy Group UK CAA K6, CAA House 45-59 Kingsway WC2B 6TE London UNITED KINGDOM	✆: +44 20 7453 6510 🖷: +44 20 7453 6565 🖃: stuart.lindsey@caa.co.uk
UNITED STATES	**Jeffrey SZCZYGIELSKI** Director, Operational Policy and Implementation Air Traffic Organization Federal Aviation Administration 600 Independence Ave., SW Wilbur Wright Bldg (FOB10B), Room 5W32AN Washington, DC 20597 UNITED STATES	✆: +1 202 267-1104 🖃: jeff.szczygielski @faa.gov

Alternate **Jennifer KILEO**
International Strategies Specialist
Air Traffic Safety Oversight Service
Federal Aviation Administration
800 Independence Avenue, SW
Orville Wright Bldg (FOB10A)
Washington, DC 20591
UNITED STATES

✆: +1 202) 267-0315
✉:
jennifer.kileo @faa.gov

ICAO Secretary*:** ***The ICAO Regional Director
ICAO EUR/NAT Office
3 bis, Villa Emile Bergerat
92522 Neuilly-Sur-Seine Cedex
FRANCE

✆: +33 1 4641 8585
℡: +33 1 4641 8500
✉: icaoeurnat@~~paris.~~icao.int

1:A — NAT ECONOMIC, FINANCIAL AND FORECAST GROUP

(NAT EFFG)

Terms of Reference

The NAT EFFG is responsible to the NAT SPG for providing economic, financial and traffic forecasting advice to the NAT SPG in order to ensure the cost-effective management of the aviation system within the ICAO NAT Region and will:

1. Provide the NAT SPG with appropriate financial management expertise and advice in the areas of, inter alia, cost identification, cost allocation models, performance and productivity indicators, variance analyses and standardised financial reporting.
2. Provide advice to the NAT SPG as to best practice in the area of cost recovery and charging for the provision of air navigation services.
3. Develop proposals addressing financial and their related organisational aspects for implementing multinational facilities and services employed by provider States in the ICAO NAT region.
4. In coordination with the NAT IMG, develop and/or assess business-case analysis of planned implementations proposed under the NAT SPG work programme.
5. Provide NAT traffic forecasts.
6. Address other issues as directed by the NAT SPG.
7. Report to the NAT SPG.

Composition

The NAT EFFG is composed of Members from Canada, Denmark, Iceland, Ireland, Norway, Portugal, the United Kingdom and the United States, IATA and IBAC and with the participation of France as an observer.

The NAT EFFG may invite other participants as and when required in order to ensure that the relevant expertise is available when addressing specific tasks or issues.

The Chairpersonship of the NAT EFFG will be reviewed by an election every four years and confirmed by the NAT SPG[1].

---

[1] *NAT SPG Conclusion 49/27 refers.*

2 — *TERMS OF REFERENCE FOR THE NAT IMG AND ITS CONTRIBUTORY GROUPS*

2:A — NAT IMPLEMENTATION MANAGEMENT GROUP

(NAT IMG)

Terms of Reference

The NAT IMG is responsible to the NAT SPG for the identification, development and coordinated implementation of safe and efficient programmes supporting the aviation system within the ICAO NAT Region, and will:

1. In line with the *Global Air Navigation Plan* (GANP), *Global Aviation Safety Plan* (GASP) and Aviation System Block Upgrades (ASBU), including recommending implementation priorities and updating timetables and associated milestones for NAT SPG approval.
2. Identify, detail and recommend allocation of tasks and resources required to fulfil coordinated implementation of safety and efficiency improvements affecting operations in the ICAO NAT Region and as appropriate, approve or amend the terms of reference of NAT IMG contributory bodies and to direct their work programmes.
3. In coordination with the NAT Economic, Financial and Forecast Group (NAT EFFG), develop and/or assess business-case analysis of planned implementations proposed under the NAT SPG work programme.
4. In coordination with NAT Safety Oversight Group (NAT SOG), assess the safety performance of the aviation system within the ICAO NAT Region.
5. Ensure the necessary co-ordination and/or consultation with NAT Provider States, other States, NAT Users and appropriate international organizations.
6. Propose amendments to the *North Atlantic Air Navigation Plan*, the *North Atlantic Regional Supplementary Procedures* (Doc 7030), and all other relevant NAT-developed documents as directed by the NAT SPG.
7. Address other issues as directed by the NAT SPG.
8. Provide reports and recommendations concerning the above tasks to the NAT SPG.

Composition

The NAT IMG is composed of representatives of the NAT SPG member States. In order to ensure that NAT users' views are represented and to provide valuable operational experience, NAT IMG meetings are also attended by representatives from IATA, IBAC, IFALPA and IFATCA.

The NAT IMG might invite other participants as and when required in order to ensure that the relevant expertise is available when addressing specific tasks. The Rapporteurs of the new Contributory Bodies may also be invited to attend as per agenda items.

The Chairpersonship and vice-Chairpersonship of the NAT IMG will be reviewed by an election every four years and confirmed by the NAT SPG[1].

---

[1] *NAT SPG Conclusion 49/27 refers.*

2:B — THE NAT IMG CONTRIBUTORY GROUPS

1. General principles applicable to the NAT IMG working structure

The principles listed below apply to all NAT IMG contributory bodies. They should to the extent possible be applied to task forces that the NAT IMG may set up from time to time as well as to the sub groups that the contributory bodies may establish.

2. Safety management statement

All NAT IMG contributory bodies shall support the objective of, and abide by the guiding principles of, the NAT SPG Safety Policy whilst carrying out their activities. In order to facilitate the exchange of safety management information, all reports of NAT IMG contributory groups shall clearly identify safety management related issues.

3. Working methods

The NAT IMG working groups will meet face-to-face at least once a year and at other times as required by the work programme. Yearly meeting dates and the requirement for additional face-to-face meetings will be as approved by the NAT IMG.

The working groups will make every reasonable effort to use other means such as teleconference and electronic correspondence to reduce the frequency of face-to-face meetings. Work will be carried out as required using such other means between face-to-face meetings in order to expeditiously carry their business.

4. Rapporteurship

The Rapporteur of each NAT IMG working group will be nominated from amongst the NAT SPG member States by the NAT IMG. The rapporteurship of each group will be reviewed at least once every two years. Keeping in mind the need to support continuity, changes will be made only when necessary and efforts will be made to avoid changing multiple Rapporteurs in the same year.

5. Formulation of recommendations to the NAT IMG

5.1. Recommendations to the NAT IMG are to be formulated as draft NAT IMG Decisions.

5.2. If NAT SPG action will be required, the NAT IMG will take the necessary action to draft a proposed NAT SPG Conclusion as appropriate.

5.3. The guidance for drafting of NAT SPG Conclusions in Section 1 shall also apply for NAT IMG Decisions.

2:C — NAT PROCEDURES AND OPERATIONS GROUP

(NAT POG)

Terms of Reference

The Procedures and Operations Group develops proposals for new and amended procedures supporting air navigation services provision and aircraft operations in the ICAO NAT Region. This function is carried out under the direction, and to support the work programme, of the NAT IMG. The following on-going tasks are required to carry out this function:

1. Developing proposed procedures and guidance material to respond to planned technological changes and CNS/ATM implementations affecting operations in the ICAO NAT Region.
2. Developing proposed amendments so as to maintain the currency of the procedures and guidance detailed in: *ICAO Regional Supplementary Procedures - North Atlantic Region* (NAT SUPPs, Doc 7030), NAT Operations Bulletins and documents promulgated by the NAT SPG.
3. Developing proposals to respond to identified deficiencies in the safety or efficiency of NAT operations.
4. Commenting on the procedural and operational aspects of safety management material presented to support proposed changes affecting operations in the ICAO NAT Region.
5. Providing reports on, and recommendations arising from, the above tasks to the NAT IMG.
6. Addressing other tasks as directed by the NAT IMG.

Composition

Experts to address the foregoing tasks may be nominated by: NAT SPG member States, Spain, EUROCONTROL, IATA, IBAC, IFALDA and IFALPA.

Working methods

The group will meet face-to-face at least once a year and at other times as required by the work programme. Yearly meeting dates and the requirement for additional face-to-face meetings will be as approved by the NAT IMG.

The group will make every reasonable effort to use other means such as teleconference and electronic correspondence to reduce the frequency of face-to-face meetings. Work will be carried out as required using such other means between face-to-face meetings in order to expeditiously carry their business.

The Rapporteur of this group will be reviewed every four years by election and confirmed by the NAT IMG[1].

---

[1] *NAT SPG Conclusion 49/27 refers*

2:D — NAT TECHNOLOGY AND INTEROPERABILITY GROUP

(NAT TIG)

Terms of Reference

The Technology and Interoperability Group develops proposals to harmonise implementation and increase interoperability between systems supporting air navigation services provision and aircraft operations in the ICAO NAT Region. This function is carried out under the direction, and to support the work programme, of the NAT IMG. The following on-going tasks are required to carry out this function:

1. Developing proposed guidelines for harmonised implementation and interoperability to respond to planned technological changes and CNS/ATM implementations affecting operations in the ICAO NAT Region.
2. Developing proposed amendments so as to maintain the currency of the technical information detailed in: *ICAO Regional Supplementary Procedures - North Atlantic Region* (NAT SUPPs, Doc 7030), NAT Operations Bulletins and documents promulgated by the NAT SPG.
3. Developing proposed mechanisms for monitoring and reporting on the technical performance of CNS/ATM systems and automation supporting operations in the ICAO NAT Region.
4. Developing proposals to respond to identified deficiencies in the safety, efficiency or interoperability of CNS/ATM systems or automation supporting NAT operations.
5. Commenting on the technological aspects of safety management material presented to support proposed changes affecting operations in the ICAO NAT Region.
6. Providing reports on, and recommendations arising from, the above tasks to the NAT IMG.
7. Addressing other tasks as directed by the NAT IMG.

Composition

Experts to address the foregoing tasks may be nominated by: NAT SPG member States, ARINC, EUROCONTROL, IATA, IBAC, IFALDA, IFALPA, Inmarsat, Iridium and Sitaonair.

Working methods

The group will meet face-to-face at least once a year and at other times as required by the work programme. Yearly meeting dates and the requirement for additional face-to-face meetings will be as approved by the NAT IMG.

The group will make every reasonable effort to use other means such as teleconference and electronic correspondence to reduce the frequency of face-to-face meetings. Work will be carried out as required using such other means between face-to-face meetings in order to expeditiously carry their business.

The Rapporteur of this group will be reviewed every four years by election and confirmed by the NAT IMG[1].

---

[1] *NAT SPG Conclusion 49/27 refers*

3 — TERMS OF REFERENCE FOR THE NAT SOG AND ITS CONTRIBUTORY GROUPS

3:A — NAT SAFETY OVERSIGHT GROUP
(NAT SOG)

Terms of Reference

The NAT SOG is responsible to the NAT SPG for ~~safety oversight~~ the following activities ~~, including monitoring safety performance and verifying certain safety management activities~~ in the NAT Region, and will:

1. Review system safety performance in the NAT Region.
2. Share data on safety-related occurrences in the NAT Region.
3. Support the development of best practices in the management of safety in the NAT Region.
4. Keep under review and, when appropriate, propose revisions to the safety Key Performance Indicators (KPI) established for the ICAO NAT Region. SKPIs should be defined and where appropriate new SKPIs created for the region, that are more dynamic and translatable to the operations. SKPIs should be reviewed at least every three years.
5. Ensure safety-related occurrences in the NAT Region are analysed by the appropriate NAT SOG contributory groups to determine root causes.
6. Identify areas where mitigation is required and report to the NAT SPG and coordinate with NAT IMG. Assess the effectiveness of implemented mitigation measures.
7. Keep under review safety monitoring methods and analysis and recommend improvements to the process as appropriate.
8. Monitor regional safety cases ~~in progress~~under developmenyt and review completed regional safety cases prepared to support changes to the NAT air navigation system.
9. Collect data on and monitor safety KPIs.
10. ~~-~~Develop and present to the NAT SPG for approval the NAT Annual Safety Report in which the safety performance for the ICAO NAT Region, as well as the safety priorities and targets, consistent with the Global Aviation Safety Plan and the NAT Safety Policy, are consolidated.
11. Each State should present information of their oversight activities and local performance data annually to the NAT SOG to share best practices and lessons learnt for the benefit of other states who may be overseeing similar issues

~~11.~~12. Address other safety-related issues as necessary.

~~12.~~13. Use the fast track to advance safety concerns between formal meetings.

~~13.~~14. Report to the NAT SPG.

Composition

The NAT SOG is composed of representatives from the NAT SPG member States. State representatives should be in a position to address service delivery and flight operations regulatory issues in the NAT Region. ~~, and as necessary regulatory issues related to the conduct of flight operations in the NAT Region. In order to~~ To ensure that NAT stakeholders~~users~~' views are represented, ~~and to provide valuable operational experience, NAT SOG meetings are also attended by~~ representatives from Spain~~,~~ as well as Observers from IATA, IBAC, IFALPA and IFATCA are invited to participate in the work of the NAT SOG. ~~The NAT SOG may invite participants from other States or organisations as required. The Chairpersonship and vice-Chairpersonship of the NAT SOG will be reviewed by an election every four years and confirmed by the NAT SPG[1].~~

Working methods

To allow for the work programme to be conducted, the NAT SOG will convene at least twice a year. The NAT SOG may meet at other times as required by the work program.

~~[1] *NAT SPG Conclusion 49/27 refers*~~

3:B — THE NAT SOG CONTRIBUTORY GROUPS

1. Formulation of recommendations to the NAT SOG

1.1. Recommendations to the NAT SOG are to be formulated as draft NAT SOG Decisions.

1.2. If NAT SPG action will be required, the NAT SOG will take the necessary action to draft a proposed NAT SPG Conclusion as appropriate.

1.3. The guidance for drafting of NAT SPG Conclusions in Section 1 shall also apply in formulation of NAT SOG Decisions.

3:C — NAT MATHEMATICIANS' WORKING GROUP

(NAT MWG)

Terms of Reference

The NAT MWG reports to the NAT SOG and is responsible for providing mathematical and statistical advice relating to the on-going monitoring of safety through the assessment of collision risk and any other tasks as determined by the NAT SOG. It has the following terms of reference:

1. Estimate annually the lateral and vertical occupancies (traffic densities) in the NAT Region.
2. Estimate the current lateral, longitudinal and vertical collision risks to show whether the estimated risks meet the respective target levels of safety.
3. Identify trends that may not be identified within the NAT SG Report including component elements of the collision risk model and highlight where safety improvements could prove most effective.
4. To reflect changes in operating conditions within the NAT region, review the collision risk model.
5. ~~P~~Collect annual NAT traffic data in order to estimate flying hours, number of flight operations, and aircraft size parameters. In addition to the annual traffic data, periodically perform other data collections (e.g. core navigation studies) in order to ensure that the parameter values within the mathematical collision risk models remain current.
6. Review other mathematical aspects as directed by the NAT SOG and/or the NAT SPG.
7. Coordinate with the NAT SG.
8. ~~Report~~[DA1] ~~to the NAT SOG.~~

Composition

The NAT MWG is composed of experts from the NAT SPG member States, Spain, IATA and IFALPA. Representatives from EUROCONTROL may also be invited as observers in order to ensure consistency between related European and North Atlantic work programmes.

The Rapporteur of the NAT MWG will be chosen by the State having the risk calculation responsibility. The term limit for the MWG Rapporteur will be one calendar year from 1 July to 30 June.

Working Methods

The NAT MWG conducts its work in accordance to the NAT MWG Handbook and via correspondence to the extent possible.

3:D — NAT SCRUTINY GROUP

(NAT SG)

Terms of Reference

The NAT SG is responsible to the NAT SOG for ensuring the correct categorization of NAT Region reported occurrences for the purposes of mathematical analysis and other safety management activities. To that end, the NAT SG will:

1. For the purpose of mathematical analysis, and in close cooperation with the NAT MWG, categorise navigational errors and altitude deviations of 300ft or more occurring in NAT HLA (NAT High Level Airspace) airspace.

2. For the purpose of safety management activities, categorize reported occurrences in the NAT Region as directed by the NAT SOG.

3. Analyse occurrences in order to allow the study of trends and prevalent causes.

4. Evaluate the effect of, and provide advice and recommendations to the NAT SOG on the implemented mitigations in the NAT region.

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

6. Keep under review the procedures for collecting and categorising occurrence reports.

7. Address other related issues as directed by the NAT SOG.

8. Report at least twice per year to the NAT SOG; the reports should include findings from all tasks of the SG (vis-à-vis ToRs). Ensure that reports are sent to the SOG at least 2 weeks prior to SOG's biannual meetings.

9. Report once per year on the categorisation of occurrences for mathematical analysis to the NAT MWG.

~~9.~~10. Review annually, in collaboration with NAT POG and in coordination with NAT DMO, the validity and relevance of NAT OPS 2017_002 - Oceanic Error Safety Bulletin (OESB) and of NAT OPS Bulletin 2017_005 - Sample Oceanic Checklists.

Composition

The NAT SG is composed of nominated experts from the NAT SPG member States, Spain, NAT MWG, NAT CMA, IATA, IBAC, IFALDA, IFALPA and IFATCA.

The Rapporteur of the NAT SG will be reviewed by an election every four years and confirmed by the NAT SOG[1].

Working Methods

The NAT SG conducts its work in accordance to the NAT SG Handbook and via correspondence to the extent possible.

---

[1] *NAT SPG Conclusion 49/27 refers*

4 — *TERMS OF REFERENCE FOR* THE NAT SPG SERVICES

4:A — NAT CENTRAL MONITORING AGENCY

(NAT CMA)

Terms of Reference

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

1. Monitor the level of risk as a consequence of operational errors and in-flight contingencies as follows:

   a) Establish and maintain a mechanism for collation and analysis of all operational errors, including vertical deviations of 90m (300ft) or more, lateral deviations, and longitudinal losses of separations;

   b) Determine and analyse, wherever possible, the root cause of each deviation together with its magnitude and duration;

   c) Calculate the frequency of occurrences;

   d) Assess the overall risk (technical and operational) in the system against the overall safety objective (see Doc 9574 - *Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive*);

   e) Initiate follow-up action with State aviation authorities as required.

2. Circulate regular reports on all operational deviations, together with such graphs and tables necessary to relate the estimated system risk to the TLS, employing the criteria detailed in Doc 9574, for which formats are suggested in Appendix A to Doc 9574;

3. Produce a quarterly report on the operational performance in the NAT Region for distribution to the NAT SPG members and other interested parties, and submit an annual report to the PIRG (NAT SPG);

4. Act as the custodian of all aircraft technical height keeping performance data collected as part of the NAT Regional monitoring process.

5. Report height deviations of aircraft observed to be non-compliant, based on the following criteria:

   i. TVE ≥ 90m (300 ft);
   ii. ASE ≥ 75 m (245 ft);
   iii. AAD ≥ 90 m (300 ft);

   and take the necessary action with the relevant State and operator to determine:

   a) the likely cause of the height deviation;

   b) verify the approval status of the relevant operator;

   c) recommend, wherever possible, remedial action;

6. Analyse ASE data to detect height deviation trends and, hence, to take action as in the previous item;

   a) Investigate height-keeping performance of the aircraft in the core of the distribution:
      – the aircraft population
      – aircraft types or categories; and
      – individual airframes;

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

8. Liaise with other Regional Monitoring Agencies (RMA) in order to achieve an exchange of monitoring and RVSM approvals data amongst the regions;

9. Contribute to the amendment and publication of the "NAT Minimum Monitoring Requirements" table in co-ordination with the Mathematicians Working Group and RMA Coordination Group;

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

11. Establish and maintain a database of aircraft approved by the respective State authorities for operations within RVSM airspaces in that region;

12. Conduct checks of the approval status of aircraft operating in the relevant RVSM airspace, identify non-approved operators and aircraft using RVSM airspace and notify the appropriate State of Registry/State of the Operator accordingly.

13. Receive reports of non-compliance (*Performance-Based Communication and Surveillance (PBCS) Manual* (Doc 9869) refers) with RSP 180 and RCP 240 from NAT ANSPs and transmitting reports to the respective RMA associated with the State of the respective operator/aircraft;

14. Receive and maintain records of RCP and RSP approvals issued by States of Operator/Registry associated with current State responsibility and incorporating into expanded RVSM/PBCS approvals database and follow-up as appropriate instances of non-approved aircraft being identified in PBCS airspace. This would be determined by augmenting the existing monthly RVSM approvals check to incorporate a similar check against PBCS Approvals where these have been included in the flight plan but no approvals record is held by RMAs;

15. Share records of RCP and RSP approvals between RMAs in line with current sharing practices of RVSM approvals for the ability of States/ANSPs to verify that aircraft operators filing PBCS capabilities in the flight plan are authorized to do so. [1]

---

[1] *Points 13 to 15, NAT SPG Conclusion 53/9 refers*

4:B — NAT DATA LINK MONITORING AGENCY

(NAT DLMA)

Terms of Reference

The NAT Data Link Monitoring Agency (DLMA) will report to the NAT TIG with respect to data link implementation, trials and operations.

It will receive and process routine and ad-hoc data and problem reports from end users and interested parties

The main tasks of the NAT DLMA are:

1. Problem analysis and resolution per D.3 of the GOLD, which includes:

    a) A means for reporting, e.g. a web-based service;

    b) Diagnose problems and recommend resolutions;

    c) Co-ordinate problem reports and resolutions with other regional data link monitoring agencies.

Note 1: In the context of the ToR, provisions of D.3 and D.4 of the GOLD are mandatory.

Note 2: The entity must enter into a confidentiality agreement with those stakeholders who require it to provide problem reports. Except as authorized by individual stakeholders, all problem reports and associated documentation shall be de-identified prior to distribution to members to protect the name and/or company originating the problem report. The entity must implement and maintain a program to protect confidential and sensitive information provided by NAT stakeholders. No identified data shall be kept longer than is essential to the successful resolution of the associated problem.

Note 3: D.3 and D.4 of the GOLD Edition 2.0 are integral parts of this ToR.

4:C — NAT DOCUMENT MANAGEMENT OFFICE

(NAT DMO)

Terms of Reference

The NAT DMO supports the ICAO EUR/NAT for ensuring the currency and consistency of the documentation relating to NAT operations with the following terms of reference:

1. In coordination with the ICAO EUR/NAT Office and appropriate NAT contributory bodies, continuously review the NAT documentation to identify the need for updates, and develop amendment proposals for approval by appropriate groups, per the *NAT SPG Handbook* (NAT Doc 001). ~~Apprise the ICAO EUR/NAT Office in matters pertaining to the NAT Region of any need for changes to NAT documentation and seek approval for such work.~~

2. Support the ICAO EUR/NAT Office with the implementation of approved proposals and their publication.~~Under the ICAO EUR/NAT Office guidance and with expert contributions from the NAT contributory groups, ensure word editing and formatting of all ICAO NAT documents to timely incorporate the appropriately approved within the NAT working structure proposals for amendment to NAT documents~~.

Composition

The NAT DMO service will be provided by Iceland on behalf of the NAT SPG.

5 — NAT SPG POLICIES

Note: in the title of each policy "C ##/N" *stands for* "NAT SPG Conclusion ##/N"[1]

5:A — SAFETY RELATED POLICIES

[01] Establishment of a NAT Data Link Monitoring Agency (NAT DLMA) (C 45/17)

a) The United States established by 31 December 2009 a NAT DLMA; and

b) the NAT Implementation Management Group coordinates all safety related matters with the NAT Safety Oversight Group.

[02] Amendments to the list of safety key performance indicators for the ICAO NAT Region (C 48/18, C 49/02, C 51/11, C 53/15, C 55/19)

That the list of Key Performance Indicators (KPI) in the area of safety for the ICAO NAT HLA is as follows, with applicable targets:

Table 1 - Safety Key Performance Indicators and related targets

Key Performance Indicator		Target
i	Number of accidents	0
ii	Number of fatal accidents	0
iii	Number of fatalities related to aviation fatal accidents	0
iv	Rate of LHD events (No. of LHD events divided by No. of flight hours flown in the NAT region[2]), involving operations with Data Link in use	Reduction over previous rolling three-year period of performance
v	Rate of LHD events (No. of LHD events divided by No. of flight hours flown in the NAT region), involving operations with Data Link not in use	Reduction over previous rolling three-year period of performance
vi	Percent of Long Duration[3] LHD events	Reduction over previous rolling three-year period of performance
vii	Rate of minutes that aircraft, with Data Link in use, spent at the wrong flight level (Amount of minutes spent at the wrong flight level divided by total duration of flights in minutes)	Reduction over previous rolling three-year period of performance
viii	Rate of minutes that aircraft, with Data Link not in use, spent at the wrong flight level (Amount of minutes spent at the wrong flight level divided by total duration of flights in minutes)	Reduction over previous rolling three-year period of performance
ix	Rate of GNE events[4] (No. of GNE events divided by No. of flight hours flown in the NAT region) , involving operations with Data Link in use	Reduction over previous rolling three-year period of performance

[1] *e.g. C 47/01 means NAT SPG Conclusion 47/01, the NAT SPG Conclusion endorsing the policy*
[2] *Before getting the actual figures flight hour estimates can be used for calculation*
[3] *Long Duration LHD event means an event which is unprotected by ATC for a period exceeding 20 minutes, based on a threshold established after review of historical data reported to the NAT CMA*
[4] *GNE is a deviation of 10 NM or greater*

Key Performance Indicator		Target
x	Rate of GNE events (No. of GNE events divided by No. of flight hours flown in the NAT region), involving operations with Data Link not is use	Reduction over previous rolling three-year period of performance
xi	Rate of losses of separation (vertical) (No. of losses of separation events divided by No. of flight hours flown in the NAT region)	Reduction over previous rolling three-year period of performance
xii	Rates of losses of separation (lateral) (No. of losses of separation events divided by No. of flight hours flown in the NAT region)	Reduction over previous rolling three-year period of performance

Table 2 - Target Level Of Safety (TLS) for lateral and vertical domains to be performed and reported by NAT MWG to NAT SOG and NAT SPG

NAT safety performance		Target
xiii	Performance in the vertical dimension	5×10^{-9} fapfh[1]
xiv	Performance in the lateral dimension	5×10^{-9} fapfh

[03] Lateral deviation classifications (C 48/21)

a) The following definitions are used when classifying reports made to the NAT Central Monitoring Agency (NAT CMA):

i) a lateral deviation is any actual deviation from the cleared track other than those covered by the Strategic Lateral Offset Procedures (SLOP);

ii) a Gross Navigation Error (GNE) is a lateral deviation from a cleared track by 10 Nautical Miles (NM) or more;

iii) an ATC intervention is an event where the Air Traffic Controller (ATCO) caught and corrected a lateral deviation before it developed into a GNE; and

iv) an ATC prevention is an event where the ATCO intervention prevented a lateral deviation; and

b) the NAT CMA initiates GNE-related follow up actions in regard to GNEs of 25 NM or more.

[04] Definition and Components of Regional Safety Cases in support of changes to the NAT air navigation systems requiring NAT SPG approval (C 53/16, C 55/19)

That the definition and components of a regional safety case in support of changes to the NAT air navigation system requiring NAT SPG approval are as follows:

1) A regional safety case in support of changes to the NAT air navigation system documents safety arguments relating to a proposal for a change in a specific FIR or multiple FIRs affecting operations in more than one NAT FIR; it references evidence, and includes the assessment of safety risk associated with the proposed change and common to more than one FIR in the NAT, risk controls and/or mitigations, and a monitoring plan to ensure that the effectiveness of the risk controls and mitigations is verified. A change may relate to the introduction of new operational concepts, new or modified procedures, novel separation minima, or the introduction of new systems. A regional safety case may be prepared by NAT IMG and/or a designated sub-group or project team within the NAT IMG working structure, or by one or several NAT ANSPs, and is owned by the change advocate.

[1] *Fatal accidents per flight hour*

2) Proposed regional safety case(s) prepared to support changes within the NAT Region requiring NAT SPG approval should be presented to the NAT SOG for ~~review~~ endorsement by or through the NAT IMG, and include the following components:

a) Change advocate {the NAT IMG sub-group or ANSP(s) who propose the change(s)};

b) Description of and rationale for the proposed change(s);

c) Assurance that the proposed change will fit the NAT airspace system and all common aspects of the implementing FIRs have been addressed;

d) Regional safety assessment, including as a minimum:

i. identification of hazards common to the NAT region (or the FIRs affected by the change),

ii. risk assessment,

iii. proposed risk controls and/or mitigations applicable to the NAT region;

e) Conclusion showing that the evidence and argument demonstrate the proposed change(s) increases neither the overall risk associated with the NAT, nor increases the risks associated with any component part of the NAT system beyond acceptable levels and/or established NAT safety performance targets;

f) Required post-implementation monitoring and reversion plans;

g) Index or bibliography referencing supporting evidence; and

h) Identification of necessary State approvals and/or other State requirements necessary to accommodate the change and assurance that those will be in place prior to implementation.

Note: A template containing the full definitions and components of Safety Cases is in ***Appendix A****.*

3) The objective of a NAT SOG review of completed regional safety cases shall ~~be to assess the validity of given safety arguments, confer that applicable regional hazards were systematically identified and associated safety risks addressed, and~~ provide assurance to the NAT SPG that all the established components of a regional safety case were accomplished. For a NAT SOG ~~review~~endorsement, the following should be taken into account:

a) ~~the timely review of a completed safety case is dependent on information being provided in a timely manner to the NAT SOG;~~it is unlikely that a change would be implemented that allows for a timely review during routine NAT SOG meetings. In order to allow for a review without impacting the timelines for a project's deployment, the NAT SOG may choose to establish a project team to undertake the detailed review on behalf of the NAT SOG;

b) ~~the review should be conducted by a group of representatives affected by the change that have not been directly involved with the development of the safety case to ensure an objective assessment; and~~a proposed change will receive formal approvals or acceptance by the appropriate State Oversight Authority. The team established (optionally) to monitor regional safety cases under development and review completed regional safety cases is tasked with:

i. confirming the validity of given safety arguments;

ii. reviewing the completed assessment checklist to confirm the validity of the claims made and the efficacy of any proposed mitigations;

iii. determining whether additional data may be required to support post-implementation monitoring;

iv. confirming that all of the required elements of the regional safety case are completed, and

v. reporting back to the NAT SOG with a summary of the project team's review and their level of confidence in the proposed change

c) ~~the aim should be to monitor safety cases in progress and review completed safety cases at the biannual SOG meetings.~~the review should include representatives affected by the change that have not been directly involved with the development of the regional safety case to ensure an objective assessment. To assist with the review, the Project Team task list will involve discussions with representatives of the change agent and include the State Oversight Authority responsible for issuing the approval or acceptance

[05] Minimum Height Monitoring Requirements for the NAT Region (C 56-2/05)

That in order to provide an ADS-B height monitoring system for the NAT Region which meets the current safety requirements, with consideration of available manpower in the NAT Central Monitoring Agency (NAT CMA) and currently available resources, the following shall apply in the NAT Region:

i) initially, the minimum height monitoring requirement be set at one 24-hour period of all available NAT Regional ADS-B data on a rolling eight day schedule allowing for at least 60% of the NAT traffic population to be monitored on a regular basis;

ii) the monitoring be rolled over an eight-day period, ensuring the capture of more individual aircraft frames and those which operate on a fixed schedule; and

iii) this recommended minimum height monitoring requirement be reviewed at regular intervals to assess the workload impact on the NAT CMA and to take advantage of technological improvements which could accommodate an increase in the monitoring rates.

5:B — IMPLEMENTATION PLANNING POLICIES

~~[05]~~[06] Definition of Target Level of Safety (TLS) in the NAT Region (C 27/22, C 33/06, C 47/04)

The TLS is defined for the Implementation of the Reduced VSM in the NAT Region as follows:

a) the TLS for collision risk in the vertical dimension due to all causes be 5.0 x 10^{-9} fatal accidents per flight hour and that the overall collision risk in the vertical plane be assessed against this TLS; and

b) the TLS would not be partitioned into separate components for the different types of risk. However, assessments of height-keeping performance would need to be conducted with reference to a safety constraint of 2.5 X 10^{-9}, as this is the value which has been used to derive the Minimum Aircraft System Performance Specification.

A TLS of 5.0 x 10^{-9} fatal accidents per flight hour is used for planning purposes in carrying out the work required to sustain reductions in longitudinal separation minima.

A TLS of 5x10^{-9} fatal accidents per flight hour is used for planning purposes in carrying out the work required to sustain reductions in lateral separation minima in the ICAO NAT Region.

~~[06]~~[07] ADS-B Eligibility List for the ICAO NAT Region (C 47/06)

Canada shall maintain an eligibility list on behalf of the ICAO NAT Region detailing aircraft which, it has been confirmed, meet the requirements specified in the European Aviation Safety Agency (EASA) Acceptable Means of Compliance (AMC) 20-24 or equivalent.

~~[07]~~[08] NAT PBCS Requirements (C 55/06)

When separation minima predicated on Required Communication Performance (RCP) 240 and Required Surveillance Performance (RSP) 180 is applied in the NAT, the following additional provisos shall apply:

a) When the actual communication transaction time or surveillance data delivery time does not meet the 95% values, appropriate action should be taken to improve performance to an acceptable level before providing the air traffic service (ATS) function predicated on RCP/RSP;

b) The 99.9% values provide a target value for design changes to the overall system to improve performance;

Note 1 – Guidance concerning RCP and RSP specifications, application and performance requirements, including elements to be considered when calculating the 99.9% value, can be found in the Performance-based Communication and Surveillance (PBCS) Manual (ICAO Doc 9869);

Note 2 – With regards to the 99.9% criteria, if the performance is less than 99%, contact the data link monitoring agency (DLMA), operator and/or communications service provider (CSP) to determine any action that can improve the performance;

and

c) When the actual communication transaction time or surveillance data delivery time does not meet the 99.9% target value, the air navigation service provider (ANSP) should assess the effects of actual performance against local factors, such as increased controller workload, increases in fleet equipage and expanded use of the data link services and implement appropriate controls and mitigation measures as appropriate.

6 — REFERENCE DOCUMENTATION

6:A — DOCUMENTS PROMULGATED BY THE NAT SPG

These documents are intended as reference for operators and service providers in the ICAO NAT Region and for their respective regulators.

Number	Title	Current edition/version	Kept under review by	Approval/Amendments/removals approved by	Remarks
NAT Doc 001	NAT SPG Handbook	Version 2.~~5~~6.0 – ~~February~~ July 2021	ICAO Secretariat	NAT SPG*	Except for the following: * *1 — 13* – *NAT SPG Representatives*~~*NAT SPG Representatives*~~: kept up-to-date by the Secretariat upon reception of nomination to the NAT SPG. * 6 – Reference Documentation*:* kept up-to-date by the Secretariat, upon approval or revision of a NAT Document promulgated by the NAT SPG.
NAT Doc 002	*Discontinued*				*Superseded by the Pan-Regional (APAC and NAT) Interface Control Document for ATS Inter-facility Data Communication (PAN ICD AIDC)*
NAT Doc 003	High Frequency Management Guidance Material for the North Atlantic Region	Version 3.0 – June 2015	NAT POG in coordination with NAT TIG	NAT IMG	
NAT Doc 004	Common Aeradio Communications Interface Control Document	Version 1.4 – Nov. 2011	NAT TIG	NAT IMG	

Number	Title	Current edition/version	Kept under review by	Approval/Amendments/removals approved by	Remarks
NAT Doc 005	Future ATM Concept of Operations for the North Atlantic Region	2nd Edition,– Nov. 2012	NAT IMG	NAT SPG	
NAT Doc 006 - Part I	Air Traffic Management Operational Contingency Plan – North Atlantic Region	Version 1.15 – February 2021	NAT IMG	NAT SPG	
- Part II EUR/NAT VACP	Volcanic Ash Contingency Plan – Europe and North Atlantic Regions	Version 2.0.1~~0~~ – July 20~~16~~21	NAT IMG and EANPG COG in accordance with the process described in the body of the document –	Coordinated approval of main document body by both NAT SPG and EANPG	
NAT Doc 007	North Atlantic Operations and Airspace Manual	Version V-2021-2~~1~~ - ~~February~~ July 2021	NAT POG and NAT DMO, Except for the following: *Attachment 6 – Flight Level Allocation Scheme (FLAS)* : kept under review by the NAT POG	NAT SPG, Except for the following: *Attachment 6 – Flight Level Allocation Scheme (FLAS)*: revision approved by NAT IMG	Information in NAT Doc 007 complements and does not contradict, the information contained in the NAT Oceanic Errors Safety Bulletin (OESB).
NAT Doc 008 NAT ASM	Application of Separation Minima – North Atlantic Region (NAT ASM)	Version 1.10 – December 2020	NAT POG	NAT IMG after coordination with NAT SOG	

Number	Title	Current edition/version	Kept under review by	Approval/Amendments/removals approved by	Remarks
NAT Doc 009	*Discontinued*				*Integrated in NAT eANP Volume III, Companion Document, NAT GANP/ASBU Report (NAT eANP Volume III approval: NAT SPG Conclusion 53/21 refers).*
NAT Doc 010	Consolidated Reporting Responsibilities Handbook – North Atlantic Region	December 2020	NAT SOG and NAT IMG	NAT SPG	
NAT Doc 011	PBCS Monitoring and Reporting Guidance	July 2021	NAT SOG	NAT SPG	
NAT eANP Vol III (ICAO Doc 9634, Vol III)	Volume III of the electronic Air Navigation Plan – North Atlantic Region	2017 – June 2018	NAT IMG and its contributory groups	NAT SPG	
NAT eANP Vol III - Part 2 and 3	GANP ASBU Implementation Status Report – NAT Region	2019 – February 2021	ICAO Secretariat in coordination with NAT IMG	NAT SPG	
	Minimum Monitoring Requirements: North Atlantic RVSM	29 June 2010	NAT CMA -	NAT SOG	

Number	Title	Current edition/version	Kept under review by	Approval/Amendments/removals approved by	Remarks
NAT OPS Bulletins [*] *YYYY_nnn*	NAT Operations Bulletins	The *NAT OPS Bulletins Checklist* lists the currently valid NAT OPS Bulletins.	Content is managed by originators. Originators are noted on the cover pages. Bulletins that are originated by the NAT SPG are to be periodically reviewed for validity and accuracy by the appropriate NAT contributory bodies as part of their work programme.	NAT IMG and/or NAT SOG, as appropriate.	• *NAT Ops Bulletins are used to distribute information on behalf of the North Atlantic Systems Planning Group (NAT SPG). The material contained therein may be developed within the working structure of the NAT SPG or be third party documents posted at the request of a NAT SPG Member State.* • *As far as possible, the content of OPS Bulletins should be moved to other NAT Documents, e.g. NAT Doc 007.* • *Bulletins should, as far as practicable, be used to address specific issues of temporary nature, e.g. support ongoing implementation projects.* • *As far as possible, validity dates should be indicated.* • *NAT OPS Bulletins are reference documents only and should not be seen to be equivalent to Standards and Recommended Practices (SARPS), PANS or SUPPs.*

[*] *All currently valid NAT OPS Bulletins and Checklist are at: www.icao.int/EURNAT/EUR & NAT Documents, then NAT Documents, then NAT Ops Bulletins.*

Number	Title	Current edition/version	Kept under review by	Approval/Amendments/removals approved by	Remarks
	NAT OESB - NAT Oceanic Errors Safety Bulletin	NAT OPS Bulletin 2017_002_rev3	NAT SG	NAT SOG	*The NAT Oceanic Error Safety (OES) Bulletin (NAT OESB) is used to distribute information on best practices used to avoid errors when operating in the NAT Region. The NAT OESB is mainly addressed to the attention of pilots, dispatchers, industry and training centers. It complements and does not contradict, the guidance detailed in the current edition of North Atlantic Operations and Airspace Manual (NAT Doc 007).*
	NAT OESB Supplements - NAT Sample Oceanic Checklists	NAT OPS Bulletin 2017_005	NAT SG	NAT SOG	*The NAT Sample Oceanic Checklist (NAT SOC) is a companion document of the NAT OESB.*

APPENDIX A — NAT REGIONAL SAFETY CASE TEMPLATE

(C 55/19 - NAT SPG/55 June 2019)

NAT Regional Safety Case

[TITLE]

[DATE]

Document Change Page

Date	Change Summary	Version Number

TABLE OF CONTENTS

Section 1. Executive Summary

This section should clearly define the purpose of the regional change proposal including a summary of the hardware/software system, operation, or procedures that constitutes the change. If applicable, include elements of the issues that make it particularly unique or challenging in the NAT region.

Section 2. NAT Safety Case Components

This section should adequately address the definition and components of a regional safety case in support of changes to the NAT air navigation system requiring NAT SPG approval outlined in NAT SPG Conclusion 53/16 and documented in NAT SPG Handbook, NAT Doc 001.

A. Change Advocate(s)

List the NAT SPG sub-group(s) or Air Navigation Service Provider(s) proposing the NAT change.

B. Description of and Rationale for Proposed Change

Clearly describe the proposed NAT change and the rationale for the proposed change.

C. NAT Airspace System Assurance

Provide assurance that the proposed change will fit the NAT airspace system and that all common aspects of the implementing FIRs have been addressed.

D. Regional Safety Assessment

Describe the regional safety assessment methodology and include, as a minimum, the identification of hazards common to the NAT region (or the FIRs affected by the change), the risk assessment, and the proposed risk controls and/or mitigations applicable to the NAT region.

The following assessment checklist is provided as a guide and contains issues commonly referenced within the NAT region. When the change sponsors complete the assessment checklist from a regional perspective and determine that a barrier is "improved", "degraded" or doesn't change, their commentary should support the case for implementation. They should demonstrate that the impacts of any degraded elements are managed or mitigated.

Threat (T1)			
1. **An ATM ground system issue** -Does the proposed change affect:			
1.1 Data quality/accuracy?	Improved	Degraded	No change
1.2 Alerts/ indications?	Improved	Degraded	No change
1.3 Communications speed or quality?	Improved	Degraded	No change
1.4 Contingency facilities	Improved	Degraded	No change
1.5 Contingency or fallback procedures?	Improved	Degraded	No change
1.6 System design or testing methodology?	Improved	Degraded	No change
1.7 Cyber vulnerability to ground systems?	Improved	Degraded	No change
Threat (T1) Overall assessment	Improved	Degraded	No change
Comments:			

Threat (T2)			
2. **An airborne environmental/technical issue** -Does the proposed change affect:			
2.1 The format of messages received on the flight deck?	Improved	Degraded	No change
2.2 The usability/reliability of CPDLC?	Improved	Degraded	No change
2.3 The design and location of flight deck hardware?	Improved	Degraded	No change
2.4 Flight planning accuracy?	Improved	Degraded	No change
2.5 Pre-flight procedures/checks?	Improved	Degraded	No change
2.6 Procedures for the management of emergencies?	Improved	Degraded	No change
2.7 The operation or availability of ACAS?	Improved	Degraded	No change
2.8 Procedures for the management of weather/contingency?	Improved	Degraded	No change
2.9 Cyber risk to airborne systems?	Improved	Degraded	No change
Threat (T2) Overall assessment	Improved	Degraded	No change
Comments:			

Threat (T3)			
3. **The actions of ATC** -Does the proposed change affect:			
3.1 ATC understanding of system messages/alerts/indications?	Improved	Degraded	No change
3.2 ATC understanding of flight crew requests?	Improved	Degraded	No change
3.3 ATC understanding of controlling priorities?	Improved	Degraded	No change

3.4 ATC understanding of coordination requirements?	Improved	Degraded	No change
3.5 ATC understanding of operational procedures?	Improved	Degraded	No change
3.6 ATC understanding of the consequences of system inputs?	Improved	Degraded	No change
3.7 ATC workload?	Improved	Degraded	No change
Threat (T3) Overall assessment	Improved	Degraded	No change
Comments:			

Threat (T4)			
4. **The actions of flight crew** -Does the proposed change affect:			
4.1 Crew understanding of the clearance received?	Improved	Degraded	No change
4.2 Crew understanding of standard operating procedures?	Improved	Degraded	No change
4.3 The selection of correct profile (screen/hardware layout)?	Improved	Degraded	No change
4.4 Crew understanding of weather/technical contingency procedures?	Improved	Degraded	No change
4.5 Crew understanding of emergency procedures?	Improved	Degraded	No change
4.6 Flight deck workload	Improved	Degraded	No change
Threat (T4) Overall assessment	Improved	Degraded	No change
Comments:			

Recovery (R1)			
5. **ATCO response** -Does the proposed change affect:			
6.1 Conformance alerts?	Improved	Degraded	No change
6.2 ATCO situational awareness or techniques?	Improved	Degraded	No change
6.3 Communications speed/reliability?	Improved	Degraded	No change
6.4 ATCO workload/capacity	Improved	Degraded	No change
6.5 ATCO Team resource management? (TRM)	Improved	Degraded	No change
6.6 The Ability for adjacent sectors/centres to identify and intervene?	Improved	Degraded	No change
6.7 ATCO training/basic knowledge.	Improved	Degraded	No change
Recovery (R1) Overall assessment	Improved	Degraded	No change
Comments:			

Recovery (R2)			
6. **Pilot Response**-Does the proposed change affect:			
6.1 Pilot Situational awareness?	Improved	Degraded	No change
6.2 SLOP usage? (strategic lateral offset procedure)	Improved	Degraded	No change
6.3 Flight deck crew resource management? (CRM)	Improved	Degraded	No change
6.4 Function or operation of ACAS?*	Improved	Degraded	No change
6.5 Pilot training/basic knowledge?	Improved	Degraded	No change
Recovery (R2) Overall assessment	Improved	Degraded	No change
Comments:			

E. Conclusion of Safety Assessment

Provide a conclusion showing that the evidence and argument demonstrate the proposed change(s) increases neither the overall risk associated with the NAT, nor increases the risks associated with any component part of the NAT system beyond acceptable levels and/or established NAT safety performance targets.

F. Post-implementation Monitoring and Reversion Plan

Describe the post-implementation monitoring plan and reversion plan for the identified hazards. This section may also include information on required or proposed monitoring activities to be carried out by the NAT region.

G. Supporting Evidence

List the relevant supporting evidence related to the proposed change(s). Important evidence necessary to support a NAT Safety Case review should be included in Section 4 of this document.

H. State Approvals/Requirements

Identify the necessary State approvals and/or other State requirements necessary to accommodate the change and assurance that those will be in place prior to implementation.

Section 3. NAT Safety Case Terms and Definitions

Term	Definition	Source
Assessment	An evaluation based on engineering, operational judgement, and/or analysis methods. (An appraisal of procedures or operations based largely on experience and professional judgement.)	ESARR4
Change Proponent	The State/organization within the NAT that is proposing or sponsoring a change or means to address an identified existing safety issue.	
Risk Control	Activities that ensure that safety policies, procedures, and processes minimize the risk of an aviation accident or incident.	SM ICG[2]
Hazard	A condition or an object with the potential to cause or contribute to an aircraft incident or accident	ICAO Annex 19
Hazard Analysis	Analysis performed to identify hazards, hazard effects, and hazard causal factors used to determine system risk.	SM ICG
Hazard Identification	A process to establish a list of all hazards relevant to the activity and the causes/threats that could release them	SM ICG
Risk Mitigation	The process of incorporating defences, preventive controls or recovery measures to lower the severity and/or likelihood of a hazard’s projected consequence.	ICAO 9859 Safety Management Manual
Monitoring	Tracking and keeping hazard information under systematic review.	FAA 8000.72
Risk Analysis	Process whereby possible consequences of hazards are objectively characterized for their severity and probability. The process can be qualitative and/or quantitative.	SM ICG
Risk Assessment	The identification, evaluation, and estimation of the level of risk.	SM ICG
Safety Assessment	A systematic, comprehensive evaluation of an implemented system to show that the safety requirements are met.	CAP728
Safety Case	A documented body of evidence that provides a demonstrable and valid argument that a system is adequately safe for a given application and environment over its lifetime.	CAP760, SM ICG
Safety Risk	The predicted probability and severity of the consequences or outcomes of a hazard.	ICAO Annex 19
Safety Performance Target	The State or service provider’s planned or intended target for a safety performance indicator over a given period that aligns with the safety objectives. See Safety Performance Indicator.	ICAO Annex 19
Safety Performance Indicator	A data-based parameter used for monitoring and assessing safety performance. See also Safety	ICAO Annex 19
Severity	The extent of loss or harm associated with consequences of a hazard.	SM ICG
Likelihood	The frequency, in quantitative or qualitative terms, that an unsafe event may occur.	SM ICG
Acceptable Risk	The level of risk that individuals or groups are willing to accept given the benefits gained. Each organization will have its own acceptable risk level, which is derived from its legal and regulatory compliance responsibilities, its threat profile, and its business/organizational drivers and impacts.	SM ICG
NAT SOG ~~review~~endorsement	The NAT SOG monitoring of a regional safety case and review of a completed regional safety case is intended to provide assurance to the NAT SPG that identified risk has been managed, mitigations have or will be implemented and that adequate provision are made for post-implementation monitoring to verify that the defined level of safety on a regional basis continues to be met. A proposed change will receive formal approvals or acceptance by the appropriate State Oversight Authority	

[2] Safety Management International Collaboration Group

Section 4. Appendices

Provide relevant supporting evidence related to the proposed change(s) to support a NAT Safety Case review, e.g. Concept of Operations.

LIST OF ACRONYMS

AAD	Assigned Altitude Deviation
ADS	
ADS–B	Automatic Dependent Surveillance – Broadcast
AMC	Acceptable Means of Compliance
ANP	Air Navigation Plan
ASBU	Aviation System Block Upgrade
ASE	Altimetry System Error
ATC	Air Traffic Control
ATCO	Air Traffic Controller
ATM	Air Traffic Management
CNS	Communications, Navigation and Surveillance
Doc 10004	*Global Aviation Safety Plan* (GASP)
Doc 10037	*ICAO Global Operational Data Link* (GOLD) *Manual*
Doc 7030	*ICAO Regional Supplementary Procedures* (SUPPs)
Doc 9574	*Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive*
Doc 9750	*Global Air Navigation Plan* (GANP)
Doc 9869	*Performance-Based Communication and Surveillance (PBCS) Manual*
EANPG	European Air Navigation Planning Group
EANPG COG	EANPG Programme Coordinating Group
EASA	European Aviation Safety Agency
EUR/NAT	European and North Atlantic
fapfh	Fatal accidents per flight hour
FIR	Flight Information Region
FLAS	Flight Level Allocation Scheme
GANP	*Global Air Navigation Plan* (Doc 9750)
GASP	*Global Aviation Safety Plan* (Doc 10004)
GNE	Gross Navigation Error
GOLD	*ICAO Global Operational Data Link Manual* (Doc 10037)
IAOPA	International Council of Aircraft Owners and Pilot Associations
IATA	International Air Transport Association
IBAC	International Business Aviation Council
IFAIMA	International Federation of Aeronautical Information Management Association
IFALPA	International Federation of Air Line Pilots’ Associations
IFATCA	International Federation of Air Traffic Controllers’ Associations
KPI	Key Performance Indicator
LHD	Large Height Deviation
NAT CMA	North Atlantic Central Monitoring Agency
NAT DLMA	North Atlantic Data Link Monitoring Agency
NAT DMO	North Atlantic Document Management Office
NAT EFFG	North Atlantic Economic, Financial and Forecast Group
NAT HLA	NAT High Level Airspace
NAT IMG	North Atlantic Implementation Management Group

NAT MWG	North Atlantic Mathematicians' Working Group
NAT POG	North Atlantic Procedures and Operations Group
NAT SDR	*North Atlantic Services Development Roadmap* (NAT Doc 009) - *DISCONTINUED*
NAT SG	North Atlantic Scrutiny Group
NAT SOC	NAT Sample Oceanic Checklist
NAT SOG	North AtlanticSafety Oversight Group
NAT SPG	North Atlantic Systems Planning Group
NAT TIG	North Atlantic Technology and Interoperability Group
NFTP	NAT Fast Track Procedure
NM	Nautical Miles
OESB	Oceanic Errors Safety Bulletin
PAN ICD AIDC	*Pan-Regional (APAC and NAT) Interface Control Document for ATS Inter-facility Data Communication*
PBCS	Performance-Based Communication and Surveillance
PfA	Proposal for amendment
PIRG	Planning and Implementation Regional Group
RMA	Regional Monitoring Agency
RVSM	Reduced Vertical Separation Minimum
SLOP	Strategic Lateral Offset Procedures
SUPPs	*ICAO Regional Supplementary Procedures* (Doc 7030)
TLS	Target Level of Safety
ToR	Terms of Reference
TVE	Total Vertical Error
VSM	Vertical Separation Minimum

— END —

APPENDIX H —PROPOSED AMENDMENT TO THE NAT REGIONAL SUPPLEMENTARY PROCEDURES (NAT SUPPS, DOC 7030/5)

(*paragraph 5.2.3 refers*)

(Note: See Appendix A, column 2 and explanatory text in column 3)

North Atlantic Doc 7030 Review Project Team (NAT Doc 7030 Review PT)

Final Report

25 February 2021

Report Prepared by Project Team Lead: Bjarni K. Stefánsson

Contents

1. PT Work

1.1 The NAT Doc 7030 Review PT was established by NAT IMG Decision 57/3 per project definition as provided in Appendix C to this report.

1.2 The project team arranged its work to have weekly Teams telecon meetings on Wednesdays at 1300-1500 UTC. There were 10 meetings, the first one on 16 December 2020 and the last one on 24 February 2021.

1.3 Detailed discussion notes were not recorded for the meetings, but general meeting notes and meeting attendance list can be found in Appendix B to this report.

1.4 The NAT Doc 7030 amendment proposals are contained in Appendix A.

1.5 The project high level tasks were the following:

1. To establish a baseline for the NAT SUPPs, as the current working copy is not in a correct shape and has errors
2. To review and propose amendments to the NAT section of the ICAO Regional Supplementary Procedures.
3. To submit proposals and report to NAT POG/11.

1.6 All tasks have been completed and the NAT Doc 7030 Review PT proposes that the PT be disbanded.

2. Baseline for the NAT SUPPs

2.1 Project high level task #1 was "*to establish a baseline for the NAT SUPPs, as the current working copy is not in a correct shape and has errors*".

2.2 The project team agreed that the baseline should be the Current NAT SUPPs working copy on the ICAO Paris website and a proposal for amendment that the ICAO Paris office has sent out to states for comments. This entails the following documents:

a. Doc7030-NAT SUPPs - Web copy (EN) - Ed5 Amd9_latest version_191014 clean

b. 19-0492 CL NAT SUPPs PfA Serial no EURNAT-S 19-02-NAT

2.3 It should be noted that the Doc 7030 amendments that are proposed in 2.2 b. above have not yet been approved by the ICAO Council. This must be considered when any subsequent Doc 7030 amendment proposals based on the work of this Project Team are sent to the ICAO Council for approval.

2.4 Pending amendments per 2.2 b. above, which the ICAO Council has not yet approved, are highlighted with explanation text in turquoise color in the third column in Appendix A to this report.

3. Significant issues in agreement

The following sections list significant issues that the Project Team members agreed on. In addition to those, Appendix A contains a multitude of other Doc 7030 changes that the project team also agreed on.

3.1 Duplication of Annex and PANS provisions

3.1.1 A significant number of Doc 7030 provisions are proposed for deletion because they are simply a repetition of existing Annex and PANS provisions. Removing those provisions will satisfy the following description in paragraph 1 of the foreword of Doc 7030:

> The ICAO Regional Supplementary Procedures (SUPPS) form the procedural part of the Air Navigation Plans developed by Regional Air Navigation (RAN) Meetings to meet those needs of specific areas **which are not covered in the worldwide provisions**. ………… Procedures of

worldwide applicability are included either in the Annexes to the Convention on International Civil Aviation as Standards or Recommended Practices, or in the Procedures for Air Navigation Services (PANS).

3.1.2 There are also some proposals for deletion of Doc 7030 material that is a repetition of requirements that are published in ICAO Manuals (for example the PBN Manual) which are referenced from Annexes and PANS. The project team agreed that there would normally be no need to repeat ICAO Manual material in Doc 7030.

3.2 Flight Planning

3.2.1 A significant number of flight planning provisions are proposed for deletion from Chapter 2 Flight Plans. PANS ATM (ICAO Doc 4444) specifies the following:

4.4.1.1 A flight plan form based on the model in Appendix 2 should be provided and should be used by operators and air traffic services units for the purpose of completing flight plans.

4.4.1.3 Operators and air traffic services units should comply with:

a) the instructions for completion of the flight plan form and the repetitive flight plan listing form given in Appendix 2; and

b) any constraints identified in relevant Aeronautical Information Publications (AIPs).

3.2.2 PANS-ATM Appendix 2 specifies in detail how various items should be filed by aircraft operators in the filed flight plan (FPL). The project team agreed that there was no need to repeat those in Doc 7030 unless the flight plan item only applied if "*prescribed on the basis of a regional air navigation agreement*" or "*when required by the appropriate ATS authority*". Those flight plan items that are specific to the NAT Region would remain in Doc 7030.

3.3 Prescription on the basis of regional air navigation agreements

3.3.1 For RCP, RNP and RSP specifications, ICAO Annex 11 states that "**When applicable, the [RCP, RNP, RSP] specification(s) shall be prescribed on the basis of regional air navigation agreements".** This requirement is in addition to the need for States to prescribe RCP, RNP and RSP. ICAO however does not provide any guidance as to when the prescription, on the basis of regional air navigation agreement, would be applicable or how it should be worded.

3.3.2 The project team had extensive discussions about this issue because at least one State had the view that there was no need in the NAT for this prescription in Doc 7030. In the end the project team agreed to retain the prescription in Doc 7030 but with a revised wording (refer to Appendix A).

3.4 SATCOM equipment in DLM airspace

3.4.1 The project team noted that the CPDLC and ADS-C provisions applicable in Data Link Mandated (DLM) airspace could be misunderstood to mean that HF data link would satisfy the requirement. The project team agreed to recommend that this provision be reinforced by specifying that SATCOM equipment was required to meet the DLM requirements outside VHF data link coverage.

3.5 Separation

3.5.1 Annex 11 section 3.4.1, specifies the following:

3.4.1 The selection of separation minima for application within a given portion of airspace shall be as follows:

a) the separation minima shall be selected from those prescribed by the provisions of the PANS-ATM (Doc 4444) and the Regional Supplementary Procedures as applicable under the prevailing circumstances except that, where types of aids are used or circumstances prevail *which are not covered by current ICAO provisions, other separation minima shall be established as necessary by:*

1) the appropriate ATS authority, following consultation with operators, for routes or portions of routes contained within the sovereign airspace of a State;

2) regional air navigation agreements for routes or portions of routes contained within airspace over the high seas or over areas of undetermined sovereignty.

Note.— Details of current separation minima prescribed by ICAO are contained in the PANS-ATM (Doc 4444) and the Regional Supplementary Procedures *(Doc 7030).*

3.5.2 The foreword of Doc 7030 contains the following:

2. In the development of Regional Supplementary Procedures, the following criteria must be satisfied:

a) ***Regional Supplementary Procedures should indicate a mode of implementing procedural provisions in Annexes and PANS****, as distinct from a statement or description of required facilities and services as published in the Air Navigation Plan publications. Regional Supplementary Procedures may also indicate permissible additions to provisions in Annexes and PANS, subject to the restrictions in b) and c).*

3.5.3 In view of the Annex 11 provisions and the criteria specified in the foreword of Doc 7030, the project team agreed to the following principles regarding documentation of separation minima that is used on a regional basis in the NAT Region:

1. All separation minima used in the NAT must be documented in either the PANS-ATM or Doc 7030.
2. PANS-ATM separation minima that are applied in a more restrictive manner in the NAT must be documented in Doc 7030 ("*a mode of implementing procedural provisions in Annexes and PANS*").
3. NAT Doc 008 will contain the separation minima from the PANS-ATM and Doc 7030 that are applied on a regional basis in the NAT and, when needed, describe the practical application of separation.

3.6 Safety Monitoring

3.6.1 The project team agreed to delete from Doc 7030 section 7 "Safety Monitoring" outdated material that only applied to safety monitoring in the New York airspace. This material included the mention of the target level of safety of 5×10^{-9} fatal accidents per flight hour but only in the context of specific separation minima in the New York airspace.

3.6.2 The project team noted that extensive NAT safety related policies and implementation planning policies, including the TLS of 5×10^{-9} fatal accidents per flight hour, are documented in NAT Doc 001 sections 5:A and 5:B. The project team agreed to abstain from making recommendations regarding inclusion of any of the policies in Doc 7030 noting that the NAT SPG would make such recommendations when and if there was a perceived need to include any of those in Doc 7030. Currently the Doc 7030 amendment proposal therefore does not mention the TLS of 5×10^{-9} fatal accidents per flight hour.

4. Issues that the PT did not come to an agreement on

Following are the issues that the NAT Doc 7030 Review PT could not reach an agreement on.

4.1 MNPS Approval

4.1.0.1 The following excerpt from NAT SPG/51 (June 2015) Summary of Discussions is the last documented discussion regarding the MNPS to PBN transition that can be found in NAT SPG reports:

7.6 UPDATE ON TRANSITION FROM NAT MNPS TO PBN

> 7.6.1 The NAT SPG recalled that a NAT MNPS to PBN transition Task Force had been established through NAT IMG Decision 44/1 in order to:
>
> i) Clearly define the NAT MNPS to PBN transition process and milestones as currently defined in the Task List for the Transition from MNPS to PBN;
>
> ii) Identify the necessary changes to ICAO documentation;
>
> iii) Draft proposals for amendment supporting the transition from MNPS to PBN; and
>
> iv) Finalize its work and report its outcome to NAT IMG/46.
>
> 7.6.2 The NAT SPG noted that NAT IMG/45 had received an interim report from the Task Force and approved Decision 45/2 on renaming of the NAT MNPS airspace to the NAT HLA as of 4 February 2016, and Decision 45/3 that set the expiry date for MNPS approvals as of 30 January 2020.
>
> 7.6.3 The NAT SPG also noted that the foregoing actions and previous approved related amendments to the NAT SUPPs had effectively enabled the Task Force to successfully address the subject of transition from MNPS to PBN in the NAT as pertains to the navigation specification part. The remaining issue was now the transition from MNPS airspace approval to HLA approvals. In this respect, the NAT SPG concurred with the NAT SOG on the need for States of Registry or States of Operator to grant operational approval for flights in NAT HLA. That would ensure a level of State oversight and standardization of operator training and operations manuals, equivalent to the existing ICAO Annex 6 requirements for Minimum Navigation Performance Specifications Airspace (MNPSA) authorizations.
>
> 7.6.4 The NAT SPG noted that the HLA approvals would essentially be equivalent to those for MNPSA as stipulated in the NAT SUPPs and in NAT Doc 007. Therefore, it was agreed that in order to formalise this agreement, a statement of equivalence of NAT MNPSA to NAT HLA in the NAT SUPPs should be sufficient to respond to the needs of the transition period from 2016 till 2020 (NAT IMG Decisions 45/2 and 45/3 refer). In addition, the appropriate NAT documentation (e.g. NAT Doc 007) would need to be modified to reflect the renaming of MNPSA to HLA. The NAT SPG invited the Secretariat and NAT DMO to take appropriate actions to amend these documents in a timely manner for Milestone 1 of the transition plan (NAT IMG Decision 45/2 refers).
>
> 7.6.5 In this regard, the NAT SPG noted that the current NAT Region provisions covered several exemptions applicable for specific geographical areas and ATS services provided within. Therefore, it was agreed that the NAT HLA should also accommodate for exemptions similar to those currently applicable within the MNPS airspace. The NAT SPG agreed that the envisaged exemptions would be addressed by the NAT IMG in coordination with NAT SOG and support of NAT DMO.
>
> 7.6.6 The NAT SPG agreed that prior to Milestone 2 of the NAT MNPS to PBN plan (NAT IMG Decision 45/3 refers), the appropriate NAT SUPPS provisions be reviewed to take into account future developments, e.g. satellite-based ADS-B, improvements in ADS-B coverage, new ICAO provisions. The ultimate goal of the NAT MNPS to PBN plan would be to eliminate the need for specific MNPS airspace approvals after 2020,

also taking into account the new ICAO provisions on PBN and PBCS requirements for aircraft operators.

7.6.7 It was agreed that the foregoing would be coordinated by the Secretariat with the NAT IMG and the Task Force.

4.1.0.2 Based on the NAT SPG statement above that "t*he ultimate goal of the NAT MNPS to PBN plan would be to eliminate the need for specific MNPS airspace approvals after 2020, also taking into account the new ICAO provisions on PBN and PBCS requirements for aircraft operators*", the NAT Doc 7030 Review PT proposes that the NAT SPG should formally decide on the future of MNPS approvals in the NAT. If the decision is to retain an approval for operation in the NAT HLA then the purpose of such an approval should be clearly specified in Doc 7030.

4.1.0.3 The following sections provide the viewpoints of NAT states represented in the NAT Doc 7030 Review PT regarding the future of MNPS approvals for operation in the NAT HLA.

4.1.1 Canada

4.1.1.1 Canada has the following position regarding MNPS approvals for operations in NAT HLA:

- That approvals to operate within NAT HLA should be maintained.
- The "name" of the approvals may be changed. For instance:
    - Operations Within Oceanic and Remote Areas.
- The X should be retained to signify such approvals. The X would constitute not only operators' adherence to PBN requirements as set out in the ICAO Performance-based Navigation (PBN) Manual (ICAO Doc 9613) but also State of the Operator or State of the Regulator oversight of the same.

4.1.1.2 Not withstanding the NAT SPG/51 SoD section 7.6.6 and the mentioned "ultimate goal" of eliminating the need for specific MNPS airspace approvals as mentioned above, Canada maintains section 7.6.3 more closely aligns with the intent when transitioning from MNPS to NAT HLA.

7.6.3 The NAT SPG also noted that the foregoing actions and previous approved related amendments to the NAT SUPPs had effectively enabled the Task Force to successfully address the subject of transition from MNPS to PBN in the NAT as pertains to the navigation specification part. The remaining issue was now the transition from MNPS airspace approval to HLA approvals. In this respect, the NAT SPG concurred with the NAT SOG on the need for States of Registry or States of Operator to grant operational approval for flights in NAT HLA. That would ensure a level of State oversight and standardization of operator training and operations manuals, equivalent to the existing ICAO Annex 6 requirements for Minimum Navigation Performance Specifications Airspace (MNPSA) authorizations.

The assurance of the State oversight and standardization of operator training and operations manuals is the basis for Canada's position on the retention of approvals for NAT HLA operations.

4.1.1.3 While ICAO documentation has evolved to cover requirements associated with the transition from MNPS to PBN the "oversight" portion associated with the original MNPS approvals has been lost. For instance, compare;

NAT DOC 7030

4.1.1.5.1.4 When granting MNPS specific approvals for operations in NAT HLA, the State of Registry or the State of the Operator, as appropriate, shall ensure that:

a) in-flight operating drills include mandatory navigation cross-checking procedures which will identify navigation errors in sufficient time to prevent the aircraft inadvertently deviating from the ATC-cleared route;

and

PBN Manual (9613)

PBN Manual Volume II Part B Chapter 1 on RNP10 specifications:

> 1.3.9.3 Operator in-flight operating drills must include mandatory cross-checking procedures to identify navigation errors in sufficient time to prevent aircraft from inadvertent deviation from ATC-cleared routes.

Both references cover the requirement to have drills that include cross checking procedures and more but only the 7030 references adds the oversight component.

4.1.1.4 While Canada fully expects all operators to comply with requirements as set forth by ICAO, it must be recognized that the entire process is easier for established commercial carriers. These groups would already have a safety system of checks and balances in place that will likely just continue on from the procedures established for MNPS approvals. Single GA aircraft or new carriers would not have that experience. Regulatory oversight with all the assistance it includes would ensure a level of compliance for NAT HLA operations.

4.1.1.5 In airspace largely without the benefit of ground-based surveillance or communication systems, the assurance provided by the regulatory oversight of crew training procedures cannot be overstated.

4.1.2 Iceland

4.1.2.1 Iceland has the following opinion regarding MNPS approvals for operation in the NAT HLA:

- That the MNPS approvals should be discontinued from a specified date, for example 1. January 2025 to give all parties enough time to adjust their systems and processes to the change.
- That the NAT SPG should develop a project plan for the discontinuation of MNPS approvals and application of the "X" FPL indicator in the NAT Region.

4.1.2.2 The main arguments for the Iceland position are the following:

- The NAT SPG stated in June 2015 in connection with the plan to transition from MNPS to PBN that "*The ultimate goal of the NAT MNPS to PBN plan would be to eliminate the need for specific MNPS airspace approvals after 2020*" (NAT SPG/51 SoD paragraph 7.6.6 refers).
- With the development of ICAO documentation over the recent years, the current MNPS approval does not contain anything that is not already included in Global and Regional ICAO documentation.
- Over the last few years, the NAT has been striving to harmonize its operating procedures with globally applicable procedures (ex: contingency procedures, normal speed, oceanic clearance) for the benefit of aircraft operators.
- Requiring a MNPS approval for operation in the NAT HLA adds cost for aircraft operators without added safety or any identified benefits that are not already included in globally applicable performance-based operations.

4.1.2.3 With implementation of the Minimum Navigation Performance Specification airspace (MNPS) airspace in 1976, the NAT Region was the first to implement performance-based operations to support reduction in separation minima. At that time, in the absence of global provisions, the NAT Region had to develop its own performance and operational specifications. Since then, ICAO has developed an extensive catalogue of performance-based operations (PBN, PBC, PBS) that already surpass those specifications that were developed for the NAT MNPS. This has now reached a point where the MNPS approval for operation in the NAT HLA has become redundant and should be discontinued in support of globally harmonized operations. If there is a perceived need to restrict entry into the NAT HLA to only "high performing" aircraft, then this can be restricted to RNAV 10 and RNP 4 approved aircraft instead of the current restriction tied to an MNPS approval.

4.1.2.4 The MNPS approval for operations in the NAT HLA is documented in Doc 7030 section 4.1.1.5.1 "*means of compliance*". The following summary provides an overview of how the MNPS approval for operations in the NAT HLA has become redundant.

4.1.1.5.1.3 Only aircraft approved for RNP 4 or RNAV 10 (RNP 10) shall be eligible for a new MNPS specific approval.
Since January 2020, the old navigation criteria for an MNPS approval no longer applies and, subject to the exceptions listed in Doc 7030 section 6.9.1, all aircraft that operate in the NAT HLA must have either RNAV 10 or RNP 4 approval.

4.1.1.5.1.4 When granting MNPS specific approvals for operations in NAT HLA, the State of Registry or the State of the Operator, as appropriate, shall ensure that: a) in-flight operating drills include mandatory navigation cross-checking procedures which will identify navigation errors in sufficient time to prevent the aircraft inadvertently deviating from the ATC-cleared route;
This requirement is already contained in: a) PBN Manual Volume II Part B Chapter 1 describing the RNAV 10 specification: 1.3.9.3 Operator in-flight operating drills must include mandatory cross-checking procedures to identify navigation errors in sufficient time to prevent aircraft from inadvertent deviation from ATC-cleared routes. b) PBN Manual Volume II Part C Chapter 1 describing the RNP 4 specification: 1.3.4.4.2 In flight operating procedures must include mandatory cross-checking procedures to identify navigation errors in sufficient time to prevent inadvertent deviation from ATC-cleared routes.

4.1.1.5.1.4 When granting MNPS specific approvals for operations in NAT HLA, the State of Registry or the State of the Operator, as appropriate, shall ensure that: b) the operator has established programmes to provide for the continued airworthiness of aircraft navigation systems necessary to navigate to the degree of accuracy required;
Annex 6 P1/P2 contain the following in sections 7.2.3/2.5.2.4 that deal with navigation equipment: 7.2.3 The State of the Operator shall, for operations where a navigation specification for PBN has been prescribed, ensure that the operator has established and documented: 2.5.2.4 In establishing criteria for operations where a navigation specification for PBN has been prescribed, the State of Registry shall require that the operator/owner establish: d) appropriate maintenance procedures to ensure continued airworthiness in accordance with the appropriate navigation specifications.

4.1.1.5.1.4 When granting MNPS specific approvals for operations in NAT HLA, the State of Registry or the State of the Operator, as appropriate, shall ensure that:

c) the operator has established procedures to ensure flight crews have adequate knowledge of the current provisions regarding: i) the position reporting procedures detailed in 3.1.3; ii) mandatory carriage of the NAT OTS message as detailed in 6.4.1.2; and iii) the NAT special procedures detailed in Chapter 9.
Annex 6 specifies for PBC, PBN and PBS operations that the state of the operator/state of registry ensure/require that the operator/owner establish: • "*a training programme for relevant personnel consistent with the intended operations*". This would include knowledge of provisions in Regional Supplementary Procedures which are fundamental for operations in any ICAO Region. • "*normal and abnormal procedures including contingency procedures*". This would include the NAT contingency procedures when the aircraft operates in the NAT. The ICAO Performance-based Navigation (PBN) Manual (ICAO Doc 9613) states in paragraph 1.2.8.1 "*The ICAO navigation specifications (i.e. those included in this volume) do not address all the requirements that may be specified for operation in a particular airspace, route or in a particular area. Such additional requirements are specified in other documents such as operating rules, AIPs and the Regional Supplementary Procedures (Doc 7030). Before conducting flights into an airspace, the appropriate State regulations of that airspace require that operators and pilots take account of all operational documents relating to that airspace*". The ICAO Performance-based Navigation (PBN) Operational Approval Manual (ICAO Doc 9997) states in paragraph 3.3.2.8 that "*Flight crews need to be aware of the ATC procedures that may be applicable to the particular PBN operation*" and the manual lists Doc 7030 as a reference document for the navigation specification job aids that are used when granting PBN approvals. There is a lot of procedures that flight crew must follow when operating in the NAT. Singling out for an MNPS approval only those three (see i, ii and iii above), sends the signal that the other procedures are not important for NAT operations.

4.1.2.5 The NAT should continue to publish the NAT Operations and Airspace Manual (NAT Doc 007) to provide guidance material for aircraft operations in the NAT. It should however be especially noted that there are no ICAO provisions that require aircraft operators to use NAT Doc 007 in their operations or training and NAT Doc 007 is not part of the MNPS approval in any way. From a regulatory point of view the MNPS approval only consists of those items that are listed in Doc 7030 sections 4.1.1.5.1.3 and 4.1.1.5.1.4.

4.1.3 Norway

4.1.3.1 The Norwegian CAA do not see any arguments for keeping the additional MNPS approval requirements that is stated in DOC 7030 section 4. In our opinion, the ICAO provisions and regulations should be sufficient. Avinor also confirms that the ATM system can be changed to identify required navigation performance without the X in section 10a, provided enough lead time is given (at least a year).

4.1.4 Portugal

4.1.4.1 Portugal has the opinion that the MNPS approvals should be discontinued, in full agreement with the arguments presented by Iceland in 4.1.2.

4.1.5 United Kingdom

4.1.5.1 In principle the UK supports the ultimate goal of the NAT MNPS to PBN plan to eliminate the need for specific MNPS airspace approvals, taking into account the ICAO provisions on PBN and PBCS requirements for aircraft operators.

4.1.5.2 However, further safety risk analysis is required to ensure that the Flight Operations and Crew Training Procedures contained in other ICAO Documents (e.g. PBN Manual and Annex 6) adequately mitigate against the challenges associated with operations in the NAT HLA. This includes Special Procedures and congestion on the Organised Track System.

4.1.5.3 The UK will therefore continue to require a specific NAT HLA Approval in order to approve and oversee the Operating Procedures and Crew Training Programme until a sufficient safety assurance exists. We will be happy to support activities to identify ways of establishing this safety assurance framework. The UK supports the move away from the term 'MNPS' and will manage the issue of Oceanic/Remote HLA Operational Approval using other means.

4.1.5.4 In addition, the UK cannot support any recommendation for the removal of the requirement to file 'X' (MNPS Approved) in Item 10 of the ICAO flight plan for aircraft operating in the NAT HLA. Changes to flight data processing systems to enable them to recognize RNP/RNAV approval rather than MNPS approval would involve significant cost for NATS and other service providers. The ICAO Air Traffic Management Requirements & Performance Panel (ATMRPP) has developed provisions and implementation guidance to support the introduction of Flight & Flow – Information for a Collaborative Environment (FF-ICE). Consequently, in the build-up to the implementation of FF-ICE Phase 1 (Pre-Departure) any changes to the current flight planning requirements (FPL 2012) that result in significant cost to service providers that have to make changes to FDP systems will not be supported unless they are of a safety critical nature. The UK will instead propose a change to the meaning of 'X' in the flight plan to reflect the agreed title for the ongoing approval to operate in the NAT HLA.

4.1.6 United States

4.1.6.1 The United States supports the retention of the requirement of a specific operational approval to conduct flight operations in the North Atlantic region High Level Airspace (NAT HLA).

4.1.6.2 With the advent of Minimum Navigation Performance Specification airspace (MNPS) airspace in the NAT in the 1970s, operators were required to obtain a specific MNPS operational approval. In 2015, the NAT began a transition from MNPS airspace to Performance-based Navigation (PBN) airspace. That transition concluded on 30 January 2020 with the removal of acceptance, into the NAT HLA, of aircraft only capable of meeting the minimum navigation performance specification. Henceforth, to conduct flight in NAT HLA, operators must also obtain, at a minimum, PBN approval RNP 10 (RNAV 10). RNP 4 or RNP 2 are preferred and operators having those approvals can enjoy the benefits of reduced aircraft separation.

4.1.6.3 At its June 2015 meeting, the North Atlantic Systems Planning Group (NAT SPG) concurred with the North Atlantic Oversight Group (NAT SOG) on the need for States of Registry or States of Operator to grant operational approval for flights in NAT HLA. That would ensure a level of State oversight and standardization of operator training and operations manuals, equivalent to the existing ICAO Annex 6 requirements for Minimum Navigation Performance Specifications Airspace (MNPSA) authorizations. Furthermore, the NAT SPG noted that the HLA approvals would essentially be equivalent to those for MNPSA as stipulated in the NAT SUPPs and in NAT Doc 007. Therefore, it was agreed that in order to formalize this agreement, a statement of equivalence of NAT MNPSA to NAT HLA in the NAT SUPPs should be sufficient to respond to the needs of the *transition* (italics added) period from 2016 till 2020. Nevertheless, "…the ultimate goal of the NAT MNPS to PBN plan would be to eliminate the need for specific MNPS airspace approvals after 2020, also taking into account the new ICAO Annex 6, Part I & II provisions on PBN and PBCS requirements for aircraft operators." (NAT SPG/51 (June 2015) Para. 7.6.6 refers)

4.1.6.4 The NAT HLA is currently recognized as the busiest oceanic airspace with a complex operational structure. The traffic level and complexity is addressed by procedures – both normal and abnormal – specific to NAT HLA. Those procedures are addressed in operational approvals. *The NAT traffic level and complexity has not decreased with the transition from MNPS to PBN airspace.*

PBN approval

4.1.6.5 It is doubtful that dependence on "…the new ICAO Annex 6 provisions on PBN and PBCS requirements for aircraft operators" (NAT SPG/51 Para. 7.6.6 refers) would continue to yield a sufficiently trained and knowledgeable operator population. Because it is globally applicable, the *Performance-based Navigation (PBN) Operational Approval Manual*, 2nd Edition - 2015 (ICAO Doc 9997) provides no information specific to any one region. The sole operational guidance is provided with the following statement – "In-flight operating procedures must include mandatory cross-checking procedures to identify navigation errors in sufficient time to prevent inadvertent deviation from ATC-cleared routes." (Vol. II, Part C, Sect. 1-12, Para. 1.3.4.4.2 refers). It is noted that the Pilot knowledge and training is focused on performance of the equipage and not operational, e.g. "Operators/owners must ensure that pilots are trained and have appropriate knowledge of the topics contained in this guidance material, the limits of their RNP 4 navigation capabilities, the effects of updating, and RNP 4 contingency procedures" (Vol. II, Part C, Sect. 1-12, Para. 1.3.5.1 refers).

Existing specific NAT HLA approval

4.1.6.6 The existing requirement for specific operational approval includes requirements for;

- "in-flight operating drills…" and,
- provision "for the continued airworthiness of aircraft navigation systems…"

But, it also includes important operator knowledge requirements of current provisions e.g.

- the position reporting procedures detailed in 3.1.3,
- mandatory carriage of the NAT OTS message as detailed in 6.4.1.2; and
- the NAT special procedures detailed in (ICAO Doc 7030) Chapter 9. Special Procedures.

4.1.6.7 *Note 1* of the proposed amendment requiring the continuation of specific approval for operations in NAT HLA informs the following: "*Guidance material of use to those who intend to operate aircraft in the ICAO NAT Region is provided in the North Atlantic Operations and Airspace Manual (NAT Doc 007).*" One cannot overstate the value of operators having knowledge of the guidance in the *North Atlantic Operations and Airspace Manual*, (Doc 007). The NAT SPG working groups continuously amend the document to keep it applicable. The most recent document approved by the NAT SPG is V.2020-2.1 (Applicable from July 2020). The NAT should not depend solely upon PBN approvals to address all of its operational requirements.

4.2 PBN approvals

4.2.1 NAT Doc 7030 contains the following provisions as "means of compliance" for RNAV 10 and RNP 4:

> 4.1.1.1.2 The aircraft and operator must be approved RNAV 10 (RNP 10) by the State of the Operator or the State of Registry, as appropriate.
>
> 4.1.2.1.2 The aircraft and operator shall be approved RNP 4 by the State of the Operator or the State of Registry, as appropriate.

4.2.2 At least one member of the NAT Doc 7030 Review PT expressed the view that he believes that the provisions in Annex 6 Part I section 7.2, Part II section 2.5.2 and Part III section 5.2. do not ensure that an RNAV 10 / RNP 4 approval has been granted.

4.2.3 The subject of PBN approvals is discussed in various places in ICAO documentation. Examples are:

PANS-ATM:

4.4.1.4 An operator shall, prior to departure:

a) ensure that, where the flight is intended to operate on a route or in an area where a navigation specification is prescribed, it has an appropriate RNP approval, and that all conditions applying to that approval will be satisfied;

b) ensure that, where the flight is intended to operate in reduced vertical separation minimum (RVSM) airspace, it has the required RVSM approval;

c) ensure that, where the flight is intended to operate where an RCP specification is prescribed, it has an appropriate approval, and that all conditions applying to that approval will be satisfied.

d) ensure that, where the flight is intended to operate where an RSP specification is prescribed, it has an appropriate RSP approval, and that all conditions applying to that approval will be satisfied.

Annex 6 Attachment D - Air operator certification and validation

3.3 Provisions that require an approval

The following provisions require or encourage approval by specified States. The approval of the State of the Operator is required in all of the certification actions listed below that are not preceded by one or more asterisks. Certification actions listed below that are preceded by one or more asterisks require approval by the State of Registry (single asterisk or "*"), or by the State of Design (double asterisk or "**"). However, the State of the Operator should take the necessary steps to ensure that operators for which it is responsible comply with any applicable approvals issued by the State of Registry and/or State of Design, in addition to its own requirements.

....

j) Performance-based navigation operations (7.2.2 b));

....

PBN Manual ICAO Doc 9613:

3.1.3.3 The State of the Operator/Registry must ensure that the aircraft is properly certified and approved to operate in accordance with the navigation specification prescribed for operations in an airspace, along an ATS route or instrument procedure. Consequently, the State of the Operator/Registry must be cognisant of the navigation application because this provides a context to the navigation specification. Operators/users need to make determinations regarding their equipage and personnel training in accordance with the associated navigation specification and any other operational requirements.

3.4.1.1 Aircraft must be equipped with an RNAV or RNP system able to support the desired navigation application. The RNAV system and aircraft operations must be compliant with regulatory material that reflects the navigation specification developed for a particular navigation application (see Chapter 1) and approved by the appropriate regulatory authority for the operation.

4.2.4 Some European states however indicate that they do not issue a specific PBN approval to their operators except for RNP AR APCH and RNP 0.3 (H) operations.

4.2.5 To seek clarification of this subject, the NAT Doc 7030 Review PT proposes that a specific review be conducted within the NAT on the subject of PBN approvals seeking information from appropriate global ICAO groups and regulatory authorities such as the FAA and EASA.

5. Editorial issues

5.1 There are several sections in the NAT part of Doc 7030 that contain “Nil”. The NAT Doc 7030 Review PT recommends that ICAO review those sections across the other ICAO Regions and delete the sections if it is found that they contain “Nil” in all Regions.

Appendix A:
Proposed changes to NAT section of ICAO Doc 7030

Legend

First column:

The first column in the table contains the agreed baseline for the work, which includes the Current NAT SUPPs working copy on the ICAO Paris website and a proposal for amendment that the ICAO Paris office has sent out to states for comments. This entails the following documents:

a. Doc7030-NAT SUPPs - Web copy (EN) - Ed5 Amd9_latest version_191014 clean

b. 19-0492 CL NAT SUPPs PfA Serial no EURNAT-S 19-02-NAT

It should be noted that the Doc 7030 amendments that are proposed in 2.2 b. above have not yet been approved by the ICAO Council.

Pending amendments per 2.2 b. above, which the ICAO Council has not yet approved, are highlighted with explanation text in turquoise color in the third column in Appendix A to this report.

Second column:

The second column contains the Doc 7030 amendment proposals. New text is highlighted grey while deleted text is indicated with ~~struck out text~~.

Solid grey table cells indicate that there is no amendment proposed for that Doc 7030 provision.

Third column:

The third column includes any rationale or notes. On few occasions, where extensive text is required, the text refers to a Notes section that is located at the end of Appendix A.

The color coding of the third column cells is as follows:

No change is proposed.
The NAT Doc 7030 Review PT has agreed to the change proposal.
The NAT Doc 7030 Review PT has not come to an agreement on the Doc 7030 provision.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
Chapter 1. FLIGHT RULES		No change is proposed.
	Note.— Guidance material of use to those who intend to operate aircraft in the ICAO NAT Region is provided in the North Atlantic Operations and Airspace Manual *(NAT Doc 007).*	Note that used to be in the MNPS section 4.1.1.5.1 moved to this location because the guidance in NAT Doc 007 applies to all aircraft operating in the NAT and provides general guidance, not only guidance on navigation.
1.1 VISUAL FLIGHT RULES (VFR)		No change is proposed.
1.1.1 Special application		No change is proposed.
Nil.		No change is proposed.
1.2 INSTRUMENT FLIGHT RULES (IFR) (A2 – Chapters 2 and 5)		No change is proposed.
Note.— Annex 2, 2.2, permits a flight to operate using either instrument flight rules or visual flight rules when operated in visual meteorological conditions subject to the limitations listed in Chapter 4 of the Annex. The following indicates certain additional restrictions.		No change is proposed.
1.2.1 Special application		No change is proposed.
1.2.1.1 Flights shall be conducted in accordance with the instrument flight rules when operated at or above flight level (FL) 60 or 600 m (2 000 ft) above ground,	1.2.1.1 Flights shall be conducted in accordance with the instrument flight rules when operated at or above flight level (FL) 60 or 600 m (2 000 ft) above ground,	Sondrestom FIR has been re-named Nuuk FIR. Note: Isavia ANS plans to bring a dedicated working paper to POG with proposals

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
whichever is the higher, within: a) the New York Oceanic, Gander Oceanic, Shanwick Oceanic, Santa Maria Oceanic, Søndrestrøm and Reykjavik flight information regions (FIRs); and b) the Bodø Oceanic FIR when operated more than 185 km (100 NM) seaward from the shoreline.	whichever is the higher, within: a) the New York Oceanic, Gander Oceanic, Shanwick Oceanic, Santa Maria Oceanic, ~~Søndrestrøm~~ Nuuk and Reykjavik flight information regions (FIRs); and b) the Bodø Oceanic FIR when operated more than 185 km (100 NM) seaward from the shoreline.	regarding this provision.
1.2.2 Flight level changes		No change is proposed.
Nil.		No change is proposed.
1.3 AIR TRAFFIC ADVISORY SERVICE		No change is proposed.
Nil.		No change is proposed.
Chapter 2. FLIGHT PLANS		No change is proposed.
2.1 CONTENT – GENERAL		No change is proposed.
(A2 – Chapter 3; P-ATM – Chapter 4 and Appendix 2)		No change is proposed.
2.1.1 Date of flight		No change is proposed.
Nil.		No change is proposed.
2.1.2 Area navigation (RNAV) specifications		No change is proposed.
2.1.2.1 All RNAV 10 (RNP 10) approved aircraft intending to operate in the NAT	~~2.1.2.1 All RNAV 10 (RNP 10) approved aircraft intending to operate in the NAT~~	1. Refer to Note 1 for general PANS-ATM

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
Region shall insert the letter R in Item 10a of the flight plan and the A1 descriptor in Item 18 of the flight plan, following the PBN/indicator.	~~Region shall insert the letter R in Item 10a of the flight plan and the A1 descriptor in Item 18 of the flight plan, following the PBN/indicator.~~ Nil.	provisions concerning flight planning. 2. PANS-ATM Appendix 2 specifies that RNAV 10 is indicated with the letter R in Item 10a of the flight plan and the A1 descriptor in Item 18 of the flight plan, following the PBN/indicator.
2.1.3 Required navigation performance (RNP) specifications		No change is proposed.
2.1.3.1 All RNP 4 approved aircraft intending to operate in the NAT Region shall insert the letter R in Item 10a of the flight plan and the L1 descriptor in Item 18 of the flight plan, following the PBN/indicator.	~~2.1.3.1 All RNP 4 approved aircraft intending to operate in the NAT Region shall insert the letter R in Item 10a of the flight plan and the L1 descriptor in Item 18 of the flight plan, following the PBN/indicator.~~ Nil.	1. Refer to Note 1 for general PANS-ATM provisions concerning flight planning. 2. PANS-ATM Appendix 2 specifies that RNP 4 is indicated with the letter R in Item 10a of the flight plan and the L1 descriptor in Item 18 of the flight plan, following the PBN/indicator.
2.1.4 Minimum navigation performance specifications (MNPS)		No change is proposed.
2.1.4.1 All MNPS-approved aircraft intending to operate in the NAT Region shall insert the letter X in Item 10a of the flight plan. *Note.— Refer to 4.1.1.5.1 for area of applicability and means of compliance.*		If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the NAT HLA, then no change is proposed to this provision. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer to the NAT Doc 7030 Review PT report section 4.1.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
2.1.5 Required communication performance (RCP) specifications		No change is proposed.
2.1.5.1 From 29 March 2018, all aircraft authorized for performance-based communication (PBC) and planning to operate in the NAT Region shall insert the appropriate descriptor (P1, P2 and/or P3) in Item 10a of the flight plan to indicate the compliance with the relevant required communication performance (RCP) specification(s).	~~2.1.5.1 From 29 March 2018, all aircraft authorized for performance-based communication (PBC) and planning to operate in the NAT Region shall insert the appropriate descriptor (P1, P2 and/or P3) in Item 10a of the flight plan to indicate the compliance with the relevant required communication performance (RCP) specification(s).~~ Nil.	1. Refer to Note 1 for general PANS-ATM provisions concerning flight planning. 2. PANS-ATM Appendix 2 specifies that RCP is indicated with the descriptors P1, P2 and P3 as appropriate in Item 10a of the flight plan.
2.1.6 Required surveillance performance (RSP) specifications		No change is proposed.
2.1.6.1 From 29 March 2018, all aircraft authorized for performance-based surveillance (PBS) and planning to operate in the NAT Region shall insert relevant required surveillance performance (RSP) specification(s) (e.g RSP180) in Item 18 of the flight plan following the SUR/ indicator.	~~2.1.6.1 From 29 March 2018, all aircraft authorized for performance-based surveillance (PBS) and planning to operate in the NAT Region shall insert relevant required surveillance performance (RSP) specification(s) (e.g RSP180) in Item 18 of the flight plan following the SUR/ indicator.~~ Nil.	1. Refer to Note 1 for general PANS-ATM provisions concerning flight planning. 2. PANS-ATM Appendix 2 specifies that RSP is indicated in Item 18 of the flight plan following the SUR/ indicator (e.g. RSP180).
2.1.7 Reduced vertical separation minimum (RVSM)-approved aircraft		No change is proposed.
2.1.7.1 All RVSM approved aircraft intending to operate in the NAT Region,	~~2.1.7.1 All RVSM approved aircraft intending to operate in the NAT Region,~~	1. Refer to Note 1 for general PANS-ATM provisions concerning flight planning.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
regardless of the requested flight level, shall insert the letter W in Item 10a of the flight plan.	~~regardless of the requested flight level, shall insert the letter W in Item 10a of the flight plan.~~ Nil.	2. PANS-ATM Appendix 2 specifies that RVSM approval is indicated with the descriptor W in Item 10a of the flight plan.
2.1.8 Non-RVSM-approved aircraft		No change is proposed.
Nil.		No change is proposed.
2.1.9 Non-RVSM-approved State aircraft		No change is proposed.
Nil.		No change is proposed.
2.1.10 Indication of 8.33 kHz channel spacing capability		No change is proposed.
Nil.		No change is proposed.
2.1.11 Route		No change is proposed.
2.1.11.1 General		No change is proposed.
2.1.11.1 Flights conducted wholly or partly outside the organized tracks shall be planned along great circle tracks joining successive significant points. Unless otherwise prescribed by the appropriate ATS Authority, flight plans shall be made in accordance with the following.	2.1.11.1.1 Flights conducted wholly or partly outside the NAT organized tracks and fixed ATS routes shall be planned along great circle tracks joining successive significant points. Unless otherwise prescribed by the appropriate ATS Authority, flight plans shall be made in accordance with the following.	1. Editorial, paragraph numbering corrected. 2. Amendment done to enable deletion of paragraph 2.1.11.5.
2.1.11.2 Flights operating between North America and Europe shall generally be considered as operating in a predominantly east-west direction. However, flights planned	2.1.11.1.2 Flights operating between North America and Europe shall generally be considered as operating in a predominantly east-west direction. However, flights planned	Editorial, paragraph numbering corrected.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
between these two continents via the North Pole shall be considered as operating in a predominantly north-south direction.	between these two continents via the North Pole shall be considered as operating in a predominantly north-south direction.	
2.1.11.2 Flights operating predominantly in an east-west direction		No change is proposed.
2.1.11.2.1 For flights operating at or south of 70°N, the planned tracks shall normally be defined by significant points formed by the intersection of half or whole degrees of latitude with meridians spaced at intervals of 10 degrees from the Greenwich meridian to longitude 70°W.		No change is proposed.
2.1.11.2.2 For flights operating north of 70°N and at or south of 80°N, the planned tracks shall normally be defined by significant points formed by the intersection of parallels of latitude expressed in degrees and minutes with meridians normally spaced at intervals of 20 degrees from the Greenwich meridian to longitude 60°W, using the longitudes 000W, 020W, 040W and 060W.		No change is proposed.
2.1.11.2.3 For flights operating at or south of 80°N, the distance between significant points shall, as far as possible, not exceed one hour's flight time. Additional significant points should be established when deemed necessary due to aircraft speed or the angle at		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
which the meridians are crossed, e.g.: a) at intervals of 10 degrees of longitude (between 5°W and 65°W) for flights operating at or south of 70°N; and b) at intervals of 20 degrees of longitude (between 10°W and 50°W) for flights operating north of 70°N and at or south of 80°N.		
2.1.11.2.4 When the flight time between successive significant points referred to in 2.1.9.2.3 is less than 30 minutes, one of these points may be omitted.	2.1.11.2.4 When the flight time between successive significant points referred to in 2.1.~~9~~11.2.3 is less than 30 minutes, one of these points may be omitted.	Editorial, corrected reference.
2.1.11.2.5 For flights operating north of 80°N, the planned tracks shall be defined by points of intersection of parallels of latitude expressed in degrees and minutes with meridians expressed in whole degrees. The distance between significant points shall normally equate to not less than 30 and not more than 60 minutes of flying time.		No change is proposed.
2.1.11.3 Flights operating predominantly in a north-south direction		No change is proposed.
2.1.11.3.1 For flights whose flight paths at or south of 80°N are predominantly oriented in a north-south direction, the planned tracks shall normally be defined by significant points formed by the intersection of whole degrees		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
of longitude with specified parallels of latitude which are spaced at intervals of 5 degrees.		
2.1.11.3.2 For flights operating north of 80°N, the planned tracks shall be defined points of intersection of parallels of latitude expressed in degrees and minutes with meridians expressed in whole degrees. The distance between significant points shall normally equate to not less than 30 and not more than 60 minutes of flying time.		No change is proposed.
2.1.11.4 Flights operating on an organized track	**2.1.11.4 Flights operating on a~~n~~ NAT organized track**	Editorial amendment.
2.1.11.4.1 For flights conducted along one of the organized tracks from the entry point into the NAT FIRs to the exit point, the organized track shall be defined in the flight plan by the abbreviation "NAT" followed by the code letter assigned to the track.	2.1.11.4.1 For flights conducted along one of the NAT organized tracks from the entry point into the NAT FIRs to the exit point, the organized track shall be defined in the flight plan by the abbreviation "NAT" followed by the code letter assigned to the track.	Editorial amendment.
2.1.11.5 Flights operating along fixed ATS routes	~~**2.1.11.5 Flights operating along fixed ATS routes**~~	See argument below.
2.1.11.5.1 For flights operating along the fixed ATS route network between Canada, the United States, Bermuda and the CAR Region, the track shall be defined by appropriate reference to this route network.	~~2.1.11.5.1 For flights operating along the fixed ATS route network between Canada, the United States, Bermuda and the CAR Region, the track shall be defined by appropriate reference to this route network.~~	PANS-ATM Appendix 2 specifies the following for item 15 Route: ATS route (2 to 7 characters) *The coded designator* assigned to the route or route segment including, where appropriate,

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
		the coded designator assigned to the standard departure or arrival route (e.g. BCN1, Bl, R14, UB10, KODAP2A).
2.1.12 Estimated times		No change is proposed.
2.1.12.1 The accumulated estimated elapsed time to each oceanic FIR boundary shall be specified in Item 18 of the flight plan.	2.1.12.1 The accumulated estimated elapsed time to each oceanic FIR boundary shall be specified in Item 18 of the flight plan following the EET/ indicator.	1. This provision needs to be retained because PANS-ATM Appendix 2 specifies: [EET/ Significant points or FIR boundary designators and accumulated estimated elapsed times from take-off to such points or FIR boundaries, **when so prescribed on the basis of regional air navigation agreements**, or by the appropriate ATS authority] 2. Editorial change for clarification and consistency.
2.1.13 Mach number		No change is proposed.
2.1.13.1 For turbo-jet aircraft intending to operate within the Bodø Oceanic, Gander Oceanic, New York Oceanic, Reykjavik, Santa Maria Oceanic and Shanwick Oceanic control areas, the planned true Mach number for any portion of their flight within these control areas shall be specified in Item 15 of the flight plan.	2.1.13.1 For ~~turbo-jet~~ aircraft capable of maintain an assigned Mach and intending to operate within the NAT Region ~~Bodø Oceanic, Gander Oceanic, New York Oceanic, Reykjavik, Santa Maria Oceanic and Shanwick Oceanic control areas~~, the planned true Mach number for any portion of their flight within these control areas shall be specified in Item 15 of the flight plan.	1. “Turbo-jet” deleted to align with the recent PANS-ATM amendment. 2. List of FIRs replaced with “NAT Region” for simplification.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
2.1.14 Alternative flight level		No change is proposed.
2.1.14.1 For turbo-jet aircraft intending to operate within the Gander Oceanic, New York Oceanic, Reykjavik, Santa Maria Oceanic and Shanwick Oceanic control areas, requests for a suitable alternative flight level may be included in Item 18 of the flight plan.	~~2.1.14.1 For turbo-jet aircraft intending to operate within the Gander Oceanic, New York Oceanic, Reykjavik, Santa Maria Oceanic and Shanwick Oceanic control areas, requests for a suitable alternative flight level may be included in Item 18 of the flight plan.~~ Nil.	This provision can be deleted because no NAT OCAs are using this information.
2.1.15 Special handling (STS)		No change is proposed.
Nil.		No change is proposed.
2.1.16 Controller-pilot data link communications (CPDLC)		No change is proposed.
2.1.16.1 All aircraft planning to operate in the NAT Region and intending to use controller-pilot data link communications (CPDLC) shall insert the appropriate descriptor (J2, J5 or J7) in Item 10a of the flight plan	~~2.1.16.1 All aircraft planning to operate in the NAT Region and intending to use controller-pilot data link communications (CPDLC) shall insert the appropriate descriptor (J2, J5 or J7) in Item 10a of the flight plan~~ Nil.	1. Refer to Note 1 for general PANS-ATM provisions concerning flight planning. 2. PANS-ATM Appendix 2 specifies that CPDLC is indicated with the descriptors J1, J2, J3, J4, J5, J6 or J7 as appropriate in Item 10a of the flight plan.
2.1.17 Automatic dependent surveillance – contract (ADS-C)		No change is proposed.
2.1.17.1 All aircraft planning to operate in the NAT Region and intending to use automatic dependent surveillance — contract (ADS-C) services shall insert the D1 descriptor in Item 10b of the flight plan.	~~2.1.17.1 All aircraft planning to operate in the NAT Region and intending to use automatic dependent surveillance — contract (ADS-C) services shall insert the D1 descriptor in Item 10b of the flight plan.~~	1. Refer to Note 1 for general PANS-ATM provisions concerning flight planning. 2. PANS-ATM Appendix 2 specifies that ADS-C with FANS 1/A capabilities is indicated with the descriptor D1 in Item

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
	Nil.	10b of the flight plan.
2.1.18 Automatic Dependent Surveillance – Broadcast (ADS-B)		No change is proposed.
2.1.18.1 All ADS-B approved aircraft intending to operate in the NAT Region shall insert either the B1 or B2 descriptor as appropriate in Item 10b of the flight plan. *Note.— Eligibility for ADS-B service in the NAT Region is based upon the compliance considerations of the European Aviation Safety Agency (EASA) AMC 20-24 or equivalent.*	~~2.1.18.1 All ADS-B approved aircraft intending to operate in the NAT Region shall insert either the B1 or B2 descriptor as appropriate in Item 10b of the flight plan.~~ ~~*Note.— Eligibility for ADS-B service in the NAT Region is based upon the compliance considerations of the European Aviation Safety Agency (EASA) AMC 20-24 or equivalent.*~~ Nil.	1. Refer to Note 1 for general PANS-ATM provisions concerning flight planning. 2. PANS-ATM Appendix 2 specifies that 1090 MHz ADS-B is indicated with the descriptors B1 or B2 as appropriate in Item 10b of the flight plan. 3. The Note is not required because this subject is covered in section 5.6.
2.1.19 Aircraft Registration and Aircraft Address	**2.1.19 ~~Aircraft Registration and~~ Aircraft Address**	Heading changed because, after amendment, it only covers Aircraft Address.
2.1.19.1 All aircraft intending to operate in the NAT Region shall insert the nationality or common mark and registration mark of the aircraft, if different from the aircraft identification in Item 7 of the flight plan, and, if available, the aircraft address (expressed in the form of an alphanumerical code of six hexadecimal characters) in Item 18 of the flight plan, following respectively the REG/ and CODE/ indicator.	2.1.19.1 All aircraft intending to operate in the NAT Region shall insert ~~the nationality or common mark and registration mark of the aircraft, if different from the aircraft identification in Item 7 of the flight plan, and~~, if available, the aircraft address (expressed in the form of an alphanumerical code of six hexadecimal characters) in Item 18 of the flight plan, following ~~respectively~~ the ~~REG/ and~~ CODE/ indicator.	1. Refer to Note 1 for general PANS-ATM provisions concerning flight planning. 2. PANS-ATM Appendix 2 specifies that the nationality or common mark and registration mark of the aircraft, if different from the aircraft identification in Item 7 should be inserted in the FPL. 3. PANS-ATM Appendix 2 specifies that the aircraft address should be inserted in the FPL **when required by the appropriate ATS authority**. This

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
		therefore needs to be retained.
2.2 CONTENT – AIR TRAFFIC FLOW MANAGEMENT (ATFM)		No change is proposed.
2.2.1 Runway visual range (RVR)		No change is proposed.
Nil.		No change is proposed.
2.2.2 Flight plan addressing and distribution		No change is proposed.
Nil.		No change is proposed.
2.2.3 Slot allocation exemptions		No change is proposed.
Nil.		No change is proposed.
2.3 SUBMISSION (A2 – Chapter 3; P-ATM – Chapter 4)		No change is proposed.
2.3.1 General		No change is proposed.
2.3.1.1 Flight plans for flights departing from points within adjacent regions and entering the NAT Region without intermediate stops shall be submitted as early as possible.	~~2.3.1.1 Flight plans for flights departing from points within adjacent regions and entering the NAT Region without intermediate stops shall be submitted as early as possible.~~ Nil.	(Refer also to section 6.12.1.2). Annex 2 specifies the following: 3.3.1.4 Unless otherwise prescribed by the appropriate ATS authority, a flight plan for a flight to be provided with air traffic control service or air traffic advisory service shall be submitted at least sixty minutes before departure, ……. PANS-ATM specifies the following:

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
		4.4.2.1.1 Flight plans shall not be submitted more than 120 hours before the estimated off-block time of a flight. Annex 2 and the PANS-ATM therefore specify that a FPL shall be submitted between 1 and 120 hours before departure. This Doc 7030 provision is vague and does not add anything to the Annex 2 and PANS-ATM provisions.
2.3.2 Amendments		No change is proposed.
Nil.		No change is proposed.
2.4 REPETITIVE FLIGHT PLANS (RPLs)		No change is proposed.
Nil.		No change is proposed.
Chapter 3. COMMUNICATIONS		No change is proposed.
3.1 PERFORMANCE-BASED COMMUNICATION (PBC)		No change is proposed.
(A6, Part I – Chapter 7; A6, Part II – Chapter 2.5; A6, Part III, Sections II and III – Chapter 5; A11 – Chapters 2, 3 and 6; A15 – Chapter 7, P-ATM – Chapters 4 and 5, and Appendix 2)	(A6, Part I – Chapter 7; A6, Part II – Chapter 2.5; A6, Part III, Sections II and III – Chapter 5; A11 – Chapters 2, 3 and 6; ~~A15 – Chapter 7,~~ P-ATM – Chapters 4 and 5, and Appendix 2)	Annex 15 Chapter 7 does not exist.
Note.— Additional guidance can be found in		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
the ICAO Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869).		
3.1.1 Required communication performance (RCP) specifications		No change is proposed.
3.1.1.1 RCP 240		No change is proposed.
3.1.1.1.1 RCP 240 is applicable to communication systems used to support the separation minima specified in 6.2.1.1 a), 6.2.1.1. b) and 6.2.2.3.	3.1.1.1.1 The RCP 240 specification is applicable in the NAT region for application of specified ~~to communication systems used to support the~~ separation minima ~~specified in 6.2.1.1 a), 6.2.1.1. b) and 6.2.2.3~~.	Annex 11 section 2.8: [2.8.1 In applying performance-based communication (PBC), RCP specifications shall be prescribed by States. **When applicable, the RCP specification(s) shall be prescribed on the basis of regional air navigation agreements**.] 1. The amendment is intended to satisfy the Annex 11 requirement for prescription of RCP 240 on the basis of a regional air navigation agreement. 2. There is no need to detail here what separation minima RCP 240 supports as this is specified with each applicable separation minima.
Means of compliance 3.1.1.1.2 The aircraft operator shall: a) implement provisions for receiving the reports of observed performance and taking	~~*Means of compliance*~~ ~~3.1.1.1.2 The aircraft operator shall:~~ ~~a) implement provisions for receiving the reports of observed performance and taking~~	1. Annex 6 Part 1 section 7.1.5, Part 2 section 2.5.1.9 and Part 3 section 5.1.5 specify the following: [7.1.5 The [State of the Operator / State of registry] shall ensure that, in respect of those

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
corrective actions for aircraft identified as not complying with RCP specification(s); and b) be authorized by the State of the Operator or the State of Registry, as appropriate, in order to qualify for the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3. *Note.— As of 29 March, 2018, the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3 will be applied in portions of the ICAO NAT Region, as notified in State AIPs.*	~~corrective actions for aircraft identified as not complying with RCP specification(s); and~~ ~~b) be authorized by the State of the Operator or the State of Registry, as appropriate, in order to qualify for the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3.~~ ~~*Note.— As of 29 March, 2018, the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3 will be applied in portions of the ICAO NAT Region, as notified in State AIPs.*~~	aeroplanes mentioned in [7.1.3 / 2.5.1.6 / 5.1.3], adequate provisions exist for: a) receiving the reports of observed communication performance issued by monitoring programmes established in accordance with Annex 11, Chapter 3, 3.3.5.2; and b) taking immediate corrective action for individual aircraft, aircraft types or operators, identified in such reports as not complying with the RCP specification(s).] 2. Annex 6 Part I section 7.1, Part II section 2.5.1 and Part III section 5.1 specify the requirements that operators must satisfy for RCP operations. 3. The Note is not needed anymore.
3.1.1.1.3 The air navigation services providers (ANSPs) shall: a) ensure that the communication system satisfies RCP 240 when applying the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3; b) establish PBCS monitoring programmes; and c) apply the appropriate flight plan designator to determine aircraft eligibility for the	~~3.1.1.1.3 The air navigation services providers (ANSPs) shall:~~ ~~a) ensure that the communication system satisfies RCP 240 when applying the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3;~~ ~~b) establish PBCS monitoring programmes; and~~ ~~c) apply the appropriate flight plan designator to determine aircraft eligibility for the~~	1. Annex 11 section 6.1.1.2 specifies the following: [6.1.1.2 Where an RCP specification has been prescribed by States for performance-based communication, ATS units shall, in addition to the requirements specified in 6.1.1.1, be provided with communication equipment which will enable them to provide ATS in accordance with the prescribed RCP specification(s).]

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
application of relevant separation minima. *Note.— As of 29 March, 2018, the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3 will be applied in portions of the ICAO NAT Region, as notified in State AIPs.*	~~application of relevant separation minima.~~ ~~*Note.— As of 29 March, 2018, the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3 will be applied in portions of the ICAO NAT Region, as notified in State AIPs.*~~	2. Annex 11 section 3.3.5.2 specifies the following: [3.3.5.2 Where RCP/RSP specifications are applied, programmes shall be instituted for monitoring the performance of the infrastructure and the participating aircraft against the appropriate RCP and/or RSP specifications, to ensure that operations in the applicable airspace continue to meet safety objectives. The scope of monitoring programmes shall be adequate to evaluate communication and/or surveillance performance, as applicable.] 3. The PANS-ATM specifies where RCP is required for application of a separation minimum and the PANS-ATM also describes what is the flight plan designator for that RCP. 4. The Note is not needed any more.
3.2 AIR-GROUND COMMUNICATIONS AND IN-FLIGHT REPORTING		No change is proposed.
3.2.1 Communications equipment		No change is proposed.
Nil.		No change is proposed.
3.2.2 Continuous listening watch in uncontrolled airspace		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
Nil.		No change is proposed.
3.2.3 Position reports		No change is proposed.
(A2 – Chapters 3 and 5; P-ATM – Chapter 4)		No change is proposed.
3.2.3.1 Unless otherwise required by air traffic services, position reports for flights on routes not defined by designated reporting points shall be made at the significant points listed in the flight plan.		No change is proposed.
3.2.3.2 Air traffic services may require any flight operating predominantly in an east-west direction to report its position at any of the intermediate meridians spaced at intervals of: a) 10 degrees of longitude south of 70°N (between 5°W and 65°W); and b) 20 degrees of longitude north of 70°N (between 10°W and 50°W).		No change is proposed.
3.2.3.3 In requiring aircraft to report their position at intermediate intervals, the air traffic services authorities will be guided by the requirement to have position information at approximately hourly intervals and also by the need to cater for varying types of aircraft and for varying traffic and meteorological conditions.		No change is proposed.
Position and time		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
3.2.3.4 Verbal position reports shall be identified by the spoken word "Position" transmitted immediately before or after the aircraft identification.		No change is proposed.
3.2.3.5 For flights outside the ATS route network, the position shall be expressed in terms of latitude and longitude as follows: a) for flights operating in a predominantly east-west direction: 1) latitude in degrees and minutes; and 2) longitude in degrees only; b) for flights operating in a predominantly north-south direction: 1) latitude in degrees only; and 2) longitude in degrees and minutes.	3.2.3.5 For flights outside the ATS route network, the position shall be expressed as named waypoints or in terms of latitude and longitude as follows: a) for flights operating in a predominantly east-west direction: 1) latitude in degrees and minutes; and 2) longitude in degrees only; b) for flights operating in a predominantly north-south direction: 1) latitude in degrees only; and 2) longitude in degrees and minutes.	This modification is to account for the multitude of published named waypoints located outside the ATS route network that now exist in the NAT.
3.2.3.6 When making position reports, all times should be expressed in four digits, giving both the hour and minutes.		No change is proposed.
Time over next position		No change is proposed.
3.2.3.7 If the estimated time for the next position last reported to air traffic control is found to be in error by three minutes or more, a revised estimated time over shall be transmitted as soon as possible to the ATS	~~3.2.3.7 If the estimated time for the next position last reported to air traffic control is found to be in error by three minutes or more, a revised estimated time over shall be transmitted as soon as possible to the ATS~~	Annex 2 contains the following in paragraph 3.6.2.2 d): Change in time estimate: except where ADS-C is activated and serviceable in airspace

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
unit concerned.	~~unit concerned.~~ Nil.	where ADS-C services are provided, if the time estimate for the next applicable reporting point, flight information region boundary or destination aerodrome, whichever comes first, changes **in excess of 2 minutes** from that previously notified to air traffic services, or such other period of time as is prescribed by the appropriate ATS authority or on the basis of regional air navigation agreements, the flight crew shall notify the appropriate air traffic services unit as soon as possible. There is no need for the NAT to have this requirement different from the one specified in Annex 2.
Transmission		No change is proposed.
*(*P-ATM – Chapter 4)		No change is proposed.
3.2.3.8 Position reports made by aircraft operating within an oceanic control area at a distance of 110 km (60 NM) or less from the common boundary with an adjacent oceanic control area, including aircraft operating on tracks through successive points on such boundary, shall also be made to the area control centre serving the adjacent control area.		No change is proposed.
3.2.3.9 Responsibility for the transmission of	3.2.3.9 Responsibility for the transmission of	Editorial change, reference corrected.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
position reports to the additional ATS units specified in 3.1.3.8 may be delegated to the appropriate communications station(s) through local arrangements.	position reports to the additional ATS units specified in 3.2~~1~~.3.8 may be delegated to the appropriate communications station(s) through local arrangements.	
3.2.4 Abbreviated position reports		No change is proposed.
Nil.		No change is proposed.
3.2.5 Read-back of VHF channels		No change is proposed.
Nil.		No change is proposed.
3.3 MANDATORY CARRIAGE OF 8.33 KHZ CHANNEL SPACING CAPABLE RADIO EQUIPMENT		No change is proposed.
Nil.		No change is proposed.
3.4 CONTROLLER-PILOT DATA LINK COMMUNICATIONS (CPDLC)		No change is proposed.
Area of applicability		No change is proposed.
3.4.1 All aircraft intending to conduct flights in specified portions of NAT High Level Airspace (HLA) shall be fitted with and shall operate CPDLC equipment	3.4.1 All aircraft intending to conduct flights in specified portions of NAT High Level Airspace (HLA) shall be fitted with and shall operate CPDLC equipment.	Editorial, full stop missing at the end of the paragraph.
Note.— The specified portions of NAT HLA MNPS airspace and aircraft equipment performance requirements where applicable will be published by the States concerned in national AIPs.	*Note.— The specified portions of NAT HLA ~~MNPS~~ airspace and aircraft equipment performance requirements where applicable will be published by the States concerned in national AIPs.*	The airspace name is the NAT HLA airspace.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
Means of compliance		No change is proposed.
3.4.2 Operators intending to conduct flights within specified portions of NAT HLA shall be authorized, where applicable, to use CPDLC by the State of Registry or the State of the Operator as appropriate. 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-258/EUROCAE ED-100 or equivalent, capable of operating outside VHF data link coverage.	3.4.2 Operators intending to conduct flights within specified portions of NAT HLA shall be authorized, where applicable, to use CPDLC by the State of Registry or the State of the Operator as appropriate. 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-258/EUROCAE ED-100 or equivalent, with SATCOM equipment capable of operating outside VHF data link coverage.	This change is to clarify that HF data link is not enough for CPDLC operation outside VHF coverage in the NAT.
3.4.3 The CPDLC services provided within the specified portions of NAT HLA shall comply with the Oceanic Safety and Performance Requirements as specified in RTCA DO-306/EUROCAE ED-122 or equivalent.		No change proposed. Those are effectively requirements that ANSPs, CSPs and SSPs providing services in the NAT have to be RCP 240 compliant and those provisions should remain until at least the OPDLWG has finished its overhaul of the PBCS provisions in ICAO documents.
Note.— Additional guidance can be found in the Global Operational Data Link (GOLD) Manual (Doc 10037).		No change is proposed.
3.4 SATELLITE COMMUNICATION (SATCOM)	**3.4~~5~~ SATELLITE VOICE COMMUNICATION (SATVOICE~~COM~~)**	1. Editorial, numbering revision. 2. Adding the word “voice” to the title to harmonize with other regions. 3. Replacing “SATCOM” with

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
		"SATVOICE", which is not the commonly used acronym.
(A2 – Chapter 3; P-ATM – Chapter 15; P-OPS, Vol. 1)		No change is proposed.
3.4.1 Within the Bodø Oceanic, Gander Oceanic, New York Oceanic, Reykjavik, Santa Maria Oceanic and Shanwick Oceanic control areas, aircraft with installed aeronautical mobile satellite (route) services (AMS(R)S) voice equipment, may use such equipment for additional ATS communications capability, provided the following requirements are met: a) the equipment shall be approved by the State of the Operator or the State of Registry; b) the equipment shall be operated in accordance with the provisions of the respective AIPs; c) pilots shall operate SELCAL in accordance with Section 3.5.1 or maintain a listening watch on the assigned HF frequency; and d) AMS(R)S voice communications should be made to aeronautical stations rather than ATS units unless the urgency of the communication dictates otherwise.	3.4~~4~~5.1 Within the Bodø Oceanic, Gander Oceanic, New York Oceanic, Reykjavik, Santa Maria Oceanic and Shanwick Oceanic control areas, aircraft with installed SATVOICE ~~aeronautical mobile satellite (route) services (AMS(R)S) voice~~ equipment, may use such equipment for additional ATS communications capability, provided the following requirements are met: a) the equipment shall be approved by the State of the Operator or the State of Registry; b) the equipment shall be operated in accordance with the provisions of the respective AIPs; c) pilots shall operate SELCAL in accordance with Section 3.5.1 or maintain a listening watch on the assigned HF frequency; and d) SATVOICE ~~AMS(R)S voice~~ communications should be made to aeronautical stations rather than ATS units unless the urgency of the communication dictates otherwise.	1. Editorial, numbering revision. 2. SATVOICE is now the commonly used term for AMS(R)S SATVOICE technology. 3. If the amendment from AMS(R)S to SATVOICE is not agreed by ICAO, then add "SATVOICE" in brackets after AMS(R)S to clarify the context to the reader because AMS(R)S is not commonly understood.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
Note 1.— AMS(R)S voice communication initiated due to HF propagation difficulties does not constitute urgency. Dedicated AMS(R)S voice telephone numbers (short codes) for air-ground radio facilities and air traffic control facilities are published in national AIPs where approved.	*Note 1.— AMS(R)S voice communication initiated due to HF propagation difficulties does not constitute urgency. Dedicated SATVOICE ~~AMS(R)S voice~~ telephone numbers (short codes) for air-ground radio facilities and air traffic control facilities are published in national AIPs where approved.*	1. SATVOICE is now the commonly used term for AMS(R)S SATVOICE technology. 2. If the amendment from AMS(R)S to SATVOICE is not agreed by ICAO, then add "SATVOICE" in brackets after AMS(R)S to clarify the context to the reader because AMS(R)S is not commonly understood.
Note 2.— AMS(R)S voice is not a replacement for ADS-C, CPDLC or HF communications, but rather a means of reducing the risk of communications failure, improving the safety of operations and alleviating HF congestion. AMS(R)S voice provides an additional discrete communications medium and potential minimum equipment list (MEL) relief because States approving reduced carriage requirements for HF radio may allow aircraft to operate with only one serviceable HF radio.	*Note 2.— SATVOICE ~~AMS(R)S voice~~ is not a replacement for ADS-C, CPDLC or HF communications, but rather a means of reducing the risk of communications failure, improving the safety of operations and alleviating HF congestion. SATVOICE ~~AMS(R)S voice~~ provides an additional discrete communications medium and potential minimum equipment list (MEL) relief because States approving reduced carriage requirements for HF radio may allow aircraft to operate with only one serviceable HF radio.*	1. SATVOICE is now the commonly used term for AMS(R)S SATVOICE technology. 2. If the amendment from AMS(R)S to SATVOICE is not agreed by ICAO, then add "SATVOICE" in brackets after AMS(R)S to clarify the context to the reader because AMS(R)S is not commonly understood.
3.5 AERONAUTICAL MOBILE SERVICE	**3.~~5~~6 AERONAUTICAL MOBILE SERVICE**	Editorial, numbering revision.
3.5.1 Selective calling (SELCAL)	**3.~~5~~6.1 Selective calling (SELCAL)**	Editorial, numbering revision.
3.5.1.1 While operating in an HF air-ground communications environment, pilots shall	3.~~5~~6.1.1 While operating in an HF air-ground communications environment, pilots shall	Editorial, numbering revision

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
maintain a listening watch on the assigned radio frequency. This will not be necessary, however, if a SELCAL watch is maintained and correct operation is ensured. Correct SELCAL operation shall be ensured by: a) the inclusion of the SELCAL code in the flight plan; b) the issue of a correction to the SELCAL code if subsequently altered due to change of aircraft or equipment; and c) an operational check of the SELCAL equipment with the appropriate radio station at or before initial entry into oceanic airspace. This SELCAL check must be completed successfully before commencing a SELCAL watch.	maintain a listening watch on the assigned radio frequency. This will not be necessary, however, if a SELCAL watch is maintained and correct operation is ensured. Correct SELCAL operation shall be ensured by: a) the inclusion of the SELCAL code in the flight plan; b) the issue of a correction to the SELCAL code if subsequently altered due to change of aircraft or equipment; and c) an operational check of the SELCAL equipment with the appropriate radio station at or before initial entry into oceanic airspace. This SELCAL check must be completed successfully before commencing a SELCAL watch.	
3.5.2 HF operations	**3.~~5~~6.2 HF operations**	Editorial, numbering revision.
(A10, Vol. II – Chapter 5)		No change is proposed.
3.5.2.1 Assignment of voice traffic to HF families	**3.~~5~~6.2.1 Assignment of voice traffic to HF families**	Editorial, numbering revision.
3.5.2.1.1 Procedures for the distribution of the NAT HF air-to-ground message traffic of the users on the NAT routes between the various NAT HF families are indicated in Table 1.	3.~~5~~6.2.1.1 Procedures for the distribution of the NAT HF air-to-ground message traffic of the users on the NAT routes between the various NAT HF families are indicated in Table 1.	Editorial, numbering revision.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
	3.6.2.1.2 NAT Aeronautical Radio Stations may tactically assign Regional and Domestic Air Route Area (RDARA) HF Frequencies as published in State AIPs and ICAO NAT DOC 003.	This new provision has been coordinated with and agreed by all NAT radio stations.
Note.— Use of the NAT-D radiotelephony network frequencies is extended to the Arctic area of the Anchorage Arctic FIR, via Gander Radio.		No change is proposed.
3.5.2.1.2 In the event of overloading of a family or for other operational reasons, stations should not assign a frequency from an alternate family to aircraft flying routes outside the areas defined in Table 1, without prior coordination and agreement of other network stations, in order to minimize adverse impact on existing sub-network traffic.	3.~~5~~6.2.1.~~2~~3 In the event of overloading of a family or for other operational reasons, stations should not assign a frequency from an alternate family to aircraft flying routes outside the areas defined in Table 1, without prior coordination and agreement of other network stations, in order to minimize adverse impact on existing sub-network traffic.	Editorial, numbering revision.
Table 1. Procedures for the distribution of NAT HF air-to-ground message traffic		No change is proposed.
Table 1 not included in this document because it does not fit into this table, refer to Note 3.	Amendments to Table 1 are presented in Note 3.	Amendments to Table 1 have been coordinated with and agreed by all NAT radio stations, refer to Note 3.
3.5.2.2 Procedures for mutual assistance	**3.~~5~~6.2.2 Procedures for mutual assistance**	Editorial, numbering revision.
3.5.2.2.1 NAT radio stations shall function as a network and render assistance to each other and all aircraft as necessary, in accordance	3.~~5~~6.2.2.1 NAT radio stations shall function as a network and render assistance to each other and all aircraft as necessary, in	Editorial, numbering revision.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
with Annex 10, Volume II.	accordance with Annex 10, Volume II.	
3.5.2.3 Procedures to follow when unable to obtain an oceanic clearance using HF communications	**3.~~5~~6.2.3 Procedures to follow when unable to obtain an oceanic clearance using HF communications**	Editorial, numbering revision.
(P-ATM – Chapter 15)		No change is proposed.
3.5.2.3.1 Aircraft experiencing radio communication failure shall maintain their current flight level, route and speed to the Oceanic exit point. Thereafter, it shall follow the radio communication failure procedure applicable for that airspace.	3.~~5~~6.2.3.1 Aircraft experiencing radio communication failure shall maintain their current flight level, route and speed to the Oceanic exit point. Thereafter, it shall follow the radio communication failure procedure applicable for that airspace.	Editorial, numbering revision.
Note.— In this context, the current flight level is the last cleared level unless the preceding units' radio communication failure procedure dictates otherwise. In all cases, aircraft should stay in level flight in the oceanic area. Current speed should be the initial oceanic Mach number in the flight plan, if the aircraft does not have a speed clearance.		No change is proposed.
3.6 AERONAUTICAL FIXED SERVICE	**3.~~6~~7 AERONAUTICAL FIXED SERVICE**	Editorial, numbering revision.
3.6.1 AFTN rationalization	**3.~~6~~7.1 AFTN rationalization**	Editorial, numbering revision.
Nil.		No change is proposed.
3.7 RADIO CHANNELS/FREQUENCIES	**3.~~7~~8 RADIO CHANNELS/FREQUENCIES**	Editorial, numbering revision.
Nil.		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
Chapter 4. NAVIGATION		No change is proposed.
4.1 PERFORMANCE-BASED NAVIGATION (PBN)		No change is proposed.
Note.— As the North Atlantic (NAT) Region transitions to PBN as contained in the Performance-based Navigation (PBN) Manual *(Doc 9613), the contents of 4.1 will be amended. Doc 9613 provides guidance on aircraft, operations and maintenance programmes for the initial achievement and continued compliance with the authorized navigation specification.*	*Note.— As the North Atlantic (NAT) Region transitions to PBN as contained in the* Performance-based Navigation (PBN) Manual *(Doc 9613), the contents of 4.1 will be amended. Doc 9613 provides guidance on aircraft, operations and maintenance programmes for the initial achievement and continued compliance with the authorized navigation specification, including programmes for avoiding navigational errors.*	End of Note added to enable deletion of Note 2 under paragraph 4.1.1.5.1.3.
4.1.1 Area navigation (RNAV) specifications		No change is proposed.
4.1.1.1 RNAV 10 (RNP 10)		No change is proposed.
Note.— RNAV 10 retains the RNP 10 designation, as specified in Doc 9613, 1.2.3.5.		No change is proposed.
4.1.1.1.1 The RNAV 10 (RNP 10) specification shall be applicable to navigation systems used to support the separation minima specified in 6.2.1.1 c), 6.2.1.1.d) 6.2.2.3 and 6.2.2.3c)	4.1.1.1.1 The RNAV 10 (RNP 10) specification ~~shall be~~ is applicable in the NAT Region for application of specified ~~to navigation systems used to support the~~ separation minima. ~~specified in 6.2.1.1 c),~~	Annex 11 specifies the following: [2.7.1 In applying performance-based navigation, navigation specifications shall be prescribed by States. When applicable, the navigation specification(s) for designated

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
	~~6.2.1.1.d) 6.2.2.3 and 6.2.2.3c)~~	areas, tracks or ATS routes shall be prescribed on the basis of regional air navigation agreements. In designating a navigation specification, limitations may apply as a result of navigation infrastructure constraints or specific navigation functionality requirements.] 1. The amendment is intended to satisfy the Annex 11 requirement for prescription of RNAV 10 on the basis of a regional air navigation agreement. 2. There is no need to detail here what separation minima RNAV 10 supports as this is specified with each applicable separation minima.
Means of compliance		No change is proposed.
4.1.1.1.2 The aircraft and operator must be approved RNAV 10 (RNP 10) by the State of the Operator or the State of Registry, as appropriate.		This provision requires clarification, refer to the NAT Doc 7030 Review PT Report section 4.2.
4.1.1.1.3 When granting RNAV 10 (RNP 10) approvals for operators that intend to operate in the NAT Region, States shall take account of the RNAV 10 (RNP 10) time limits for aircraft equipped with dual INS or inertial reference unit (IRS) systems.	~~4.1.1.1.3 When granting RNAV 10 (RNP 10) approvals for operators that intend to operate in the NAT Region, States shall take account of the RNAV 10 (RNP 10) time limits for aircraft equipped with dual INS or inertial reference unit (IRS) systems.~~	The PBN Manual Volume II Part B Chapter 1 section 1.3.9.6 specifies requirements for Route evaluation for RNP 10 time limits for aircraft equipped only with INS or IRU including but not limited to: [1.3.9.6.1 An RNP 10 time limit must be established for aircraft equipped only with

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
		INS or IRU. When planning operations in areas where RNP 10 is applied, the operator must establish that the aircraft will comply with the time limitation on the routes that it intends to fly.]
Note.— RNAV 10 (RNP 10) time limits are discussed in the Performance-based Navigation (PBN) Manual *(Doc 9613) Part B, Volume II, Chapter 1.*	~~*Note.— RNAV 10 (RNP 10) time limits are discussed in the* Performance-based Navigation (PBN) Manual *(Doc 9613) Part B, Volume II, Chapter 1.*~~	See argument above.
4.1.1.2 RNAV 5		No change is proposed.
Nil.		No change is proposed.
4.**1.1.3 RNAV 2**		No change is proposed.
Nil.		No change is proposed.
4.1.1.4 RNAV 1		No change is proposed.
Nil.		No change is proposed.
4.1.1.5 Pre-PBN navigation specifications		No change is proposed.
4.1.1.5.1 Minimum navigation performance specifications (MNPS)		If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the NAT HLA, then no change is proposed to this heading. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer to the NAT Doc 7030 Review PT report section 4.1.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
Area of applicability		If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the NAT HLA, then no change is proposed to this heading. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer to the NAT Doc 7030 Review PT report section 4.1.
4.1.1.5.1.1 The MNPS shall be applicable in that volume of airspace between FL 285 and FL 420 within the Oceanic Control Areas of Bodø Oceanic, Gander Oceanic, New York Oceanic East, Reykjavik, Santa Maria and Shanwick, excluding the Brest Oceanic Transition Area (BOTA) and the Shannon Oceanic Transition Area (SOTA).	4.1.1.5.1.1 The MNPS shall be applicable in that volume of airspace between FL 290~~85~~ and FL 41~~2~~0 inclusive within the Oceanic Control Areas of Bodø Oceanic, Gander Oceanic, the portion of New York Oceanic East which is north of 27°N, Reykjavik, Santa Maria and Shanwick, excluding the Brest Oceanic Transition Area (BOTA) and the Shannon Oceanic Transition Area (SOTA).	If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the NAT HLA, then it is proposed to amend the vertical definition of the NAT HLA to harmonize it with the definition of RVSM airspace and NAT DLM airspace for simplification. Corrected description of what part of New York Oceanic East is part of NAT HLA. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer to the NAT Doc 7030 Review PT report section 4.1.
Note.— The volumes of airspace in 4.1.1.5.1.1 are referred to as the "North Atlantic High Level Airspace (NAT HLA), part of which were previously referred to as the "North Atlantic Minimum Navigation Performance Specifications Airspace (NAT	*Note.— The volumes of airspace in 4.1.1.5.1.1 are referred to as the "North Atlantic High Level Airspace (NAT HLA), part of which were previously referred to as the "North Atlantic Minimum Navigation Performance Specifications Airspace (NAT*	If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the NAT HLA, then no change is proposed to this note. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
MNPSA)".	*MNPSA)".*	to the NAT Doc 7030 Review PT report section 4.1.
Means of compliance		If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the NAT HLA, then no change is proposed to this provision. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer to the NAT Doc 7030 Review PT report section 4.1.
(A2 – Chapter 5; A6, Part I – Chapters 3, 4 and 7; A6, Part II – Chapters 3 and 7; A8 – Chapter 8)	(A2 – Chapter 5; A6, Part I – Chapters 3, 4 and 7; A6, Part II – Chapters 2 and 3 ~~and 7~~; A8 – Chapter 8)	The Annex 6 Part II reference should be to chapters 2 and 3. If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the NAT HLA, then no change is proposed to this provision. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer to the NAT Doc 7030 Review PT report section 4.1.
4.1.1.5.1.2 Aircraft that have been MNPS approved before 1 January 2015 based on standard deviation of lateral track error of 11.7 km (6.3 NM) by the State of Registry or the State of the Operator shall be permitted to operate in NAT HLA until 30 January 2020.	~~4.1.1.5.1.2 Aircraft that have been MNPS approved before 1 January 2015 based on standard deviation of lateral track error of 11.7 km (6.3 NM) by the State of Registry or the State of the Operator shall be permitted to operate in NAT HLA until 30 January 2020.~~	This change is proposed because this provision no longer applies.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
4.1.1.5.1.3 Only aircraft approved for RNP 4 or RNAV 10 (RNP 10) shall be eligible for a new MNPS specific approval.	4.1.1.5.1.~~3~~2 Only aircraft approved for RNP 4 or RNAV 10 (RNP 10) shall be eligible for having a ~~new~~ MNPS ~~specific~~ approval for operation in the NAT HLA.	1. If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the NAT HLA, then this change is proposed to this provision. 2. Since January 2020, the old navigation criteria for an MNPS approval no longer applies and all MNPS approved aircraft must have either RNAV 10 or RNP 4 approval. 3. The Annex 6 MNPS provisions are general and do not require RNP 4 or RNAV 10. The RNP 4/ RNAV 10 requirement for MNPS is specific for the NAT HLA. 4. Paragraph re-numbered and text edited for clarification. 5. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer to the NAT Doc 7030 Review PT report section 4.1.
4.1.1.5.1.4 When granting MNPS specific approvals for operations in NAT HLA, the State of Registry or the State of the Operator, as appropriate, shall ensure that: a) in-flight operating drills include mandatory navigation cross-checking procedures which		This section specifies what is the current content of the MNPS approval for operation in the NAT HLA. There is not agreement in the project team to retain a specific HLA approval and consequently what that approval should

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
will identify navigation errors in sufficient time to prevent the aircraft inadvertently deviating from the ATC-cleared route; b) the operator has established programmes to provide for the continued airworthiness of aircraft navigation systems necessary to navigate to the degree of accuracy required; c) the operator has established procedures to ensure flight crews have adequate knowledge of the current provisions regarding: i) the position reporting procedures detailed in 3.1.3; ii) mandatory carriage of the NAT OTS message as detailed in 6.4.1.2; and iii) the NAT special procedures detailed in Chapter 9.		contain if the decision of the NAT SPG is that there should be continued requirement for an approval for operation in the NAT HLA. There is also not agreement on the future name of such approval. Refer to the NAT Doc 7030 Review PT report section 4.1.
Note 1.— Guidance material of use to those who intend to operate aircraft in the ICAO NAT Region is provided in the North Atlantic Operations and Airspace Manual *(NAT Doc 007).*	~~*Note 1.— Guidance material of use to those who intend to operate aircraft in the ICAO NAT Region is provided in the* North Atlantic Operations and Airspace Manual *(NAT Doc 007).*~~	Note moved to beginning of Chapter 1.
Note 2.— The Performance-based Navigation (PBN) Manual *(Doc 9613) provides guidance on aircraft, operations and maintenance programmes for the initial achievement and continued compliance with the authorized*	~~*Note 2.— The* Performance-based Navigation (PBN) Manual *(Doc 9613) provides guidance on aircraft, operations and maintenance programmes for the initial achievement and continued compliance with the authorized*~~	This Note is deleted because its content can be found in a Note at the beginning of the Chapter.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
navigation specification, including programmes for avoiding navigational errors.	~~*navigation specification, including programmes for avoiding navigational errors.*~~	
4.1.2 Required navigation performance (RNP) specifications		No change is proposed.
4.1.2.1 RNP 4		No change is proposed.
4.1.2.1.1 The RNP 4 specification shall be applicable to navigation systems used to support the separation minima specified in 6.2.1.1 a), 6.2.1.1 b), 6.2.1.1 c), 6.2.2.3	4.1.2.1.1 The RNP 4 specification ~~shall be~~ is applicable in the NAT region for application of specified ~~to navigation systems used to support the~~ separation minima ~~specified in 6.2.1.1 a), 6.2.1.1 b), 6.2.1.1 c), 6.2.2.3~~.	Annex 11 specifies the following: [2.7.1 In applying performance-based navigation, navigation specifications shall be prescribed by States. When applicable, the navigation specification(s) for designated areas, tracks or ATS routes shall be prescribed on the basis of regional air navigation agreements. In designating a navigation specification, limitations may apply as a result of navigation infrastructure constraints or specific navigation functionality requirements.] 1. The amendment is intended to satisfy the Annex 11 requirement for prescription of RNP 4 on the basis of a regional air navigation agreement. 2. There is no need to specify here what separation minima RNP 4 supports as this is specified with each applicable separation minima.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
Means of compliance		No change is proposed.
4.1.2.1.2 The aircraft and operator shall be approved RNP 4 by the State of the Operator or the State of Registry, as appropriate.		This provision requires clarification, refer to the NAT Doc 7030 Review PT Report section 4.2.
4.1.2.2 Basic RNP 1		No change is proposed.
Nil.		No change is proposed.
4.1.2.3 Advanced RNP 1		No change is proposed.
Nil.		No change is proposed.
4.2 REDUCED VERTICAL SEPARATION MINIMUM (RVSM)		No change is proposed.
Area of applicability		No change is proposed.
4.2.1 RVSM shall be applicable in that volume of airspace between FL 290 and FL 410 inclusive in all FIRs of the NAT Region.	4.2.1 RVSM ~~shall be~~ is applicable in that volume of airspace between FL 290 and FL 410 inclusive in all FIRs of the NAT Region.	Wording amended to be consistent with other sections that are a prescription on the basis of a regional air navigation agreement. Annex 6 Part I section 7.2.6 and Part II section 2.5.2.7 specify: [For flights in defined portions of airspace where, **based on Regional Air Navigation Agreement**, a reduced vertical separation minimum (RVSM) of 300 m (1 000 ft) is applied between FL 290 and FL 410 inclusive, an aeroplane: …….]
Means of compliance	~~**Means of compliance**~~	See arguments below.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
(A2 – Chapter 5 and Appendix 3; A6, Part I – Chapters 3, 4 and 7; A6, Part II – Chapters 3 and 7; A8, Part IIIA – Chapter 8, A11 – Chapter 2)	~~(A2 – Chapter 5 and Appendix 3; A6, Part I – Chapters 3, 4 and 7; A6, Part II – Chapters 3 and 7; A8, Part IIIA – Chapter 8, A11 – Chapter 2)~~	See arguments below.
4.2.2 Operators intending to conduct flights within the NAT Region where RVSM is applied shall require an RVSM approval either from the State of Registry or the State of the Operator. The State of Registry or the State of the Operator, as appropriate, should verify that the height-keeping performance capability of approved aircraft meets the requirements specified in Annex 6, Parts I and II.	~~4.2.2 Operators intending to conduct flights within the NAT Region where RVSM is applied shall require an RVSM approval either from the State of Registry or the State of the Operator. The State of Registry or the State of the Operator, as appropriate, should verify that the height-keeping performance capability of approved aircraft meets the requirements specified in Annex 6, Parts I and II.~~	1. Annex 6 Part I section 7.2.6 and Part II section 2.5.2.7 specify: [For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, a reduced vertical separation minimum (RVSM) of 300 m (1 000 ft) is applied between FL 290 and FL 410 inclusive, an aeroplane: ……. b) shall be authorized by the State of the Operator for operation in the airspace concerned] 2. Annex 6 Part I section 7.2.9 and Part II section 2.5.2.10 specify: [[The State of the Operator/The State of Registry] that has issued an RVSM approval to the operator shall establish a requirement which ensures that a minimum of two aeroplanes of each aircraft type grouping of the operator have their height-keeping performance monitored, at least once every two years or within intervals of 1 000 flight hours per aeroplane, whichever period is

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
		longer. If the operator aircraft type grouping consists of a single aeroplane, monitoring of that aeroplane shall be accomplished within the specified period.]
Note.— Guidance material of use to those involved in the initial achievement and continued maintenance of the height-keeping performance has been issued by ICAO under the title North Atlantic Operations and Airspace Manual (NAT Doc 007) and will be supplemented and updated as required and as new material becomes available.	~~*Note.— Guidance material of use to those involved in the initial achievement and continued maintenance of the height-keeping performance has been issued by ICAO under the title North Atlantic Operations and Airspace Manual (NAT Doc 007) and will be supplemented and updated as required and as new material becomes available.*~~	The Note is not required.
Chapter 5. SURVEILLANCE		No change is proposed.
5.1 PERFORMANCE-BASED SURVEILLANCE (PBS)		No change is proposed.
(A6, Part I – Chapter 7; A6, Part II – Chapter 2.5; A6, Part III, Sections II and III – Chapter 5; A11 – Chapters 2, 3 and 6; A15 – Chapter 7, P-ATM – Chapters 4 and 5, and Appendix 2)	(A6, Part I – Chapter 7; A6, Part II – Chapter 2.5; A6, Part III, Sections II and III – Chapter 5; A11 – Chapters 2, 3 and 6; ~~A15 – Chapter 7,~~ P-ATM – Chapters 4 and 5, and Appendix 2)	Annex 15 Chapter 7 does not exist.
Note.— Additional guidance can be found in the ICAO Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869).		No change is proposed.
5.1.1 Required surveillance performance		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
(RSP) specifications		
5.1.1.1 RSP 180		No change is proposed.
5.1.1.1.1. RSP 180 is applicable to surveillance systems used to support the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3.	5.1.1.1.1. The RSP 180 specification is applicable in the NAT region for application of specified ~~to surveillance systems used to support the~~ separation minima ~~specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3~~.	Annex 11 specifies the following: [2.9.1 In applying performance-based surveillance (PBS), RSP specifications shall be prescribed by States. When applicable, the RSP specification(s) shall be prescribed on the basis of regional air navigation agreements.] 1. The amendment is intended to satisfy the Annex 11 requirement for prescription of RSP 180 on the basis of a regional air navigation agreement. 2. There is no need to specify here what separation minima RSP 180 supports as this is specified with each applicable separation minima.
Means of compliance	~~*Means of compliance*~~	See arguments below.
5.1.1.1.2 The aircraft operator shall: a) implement provisions for receiving the reports of observed performance and taking corrective actions for aircraft identified as not complying with RSP specification(s); and b) be authorized by the State of the Operator or the State of Registry, as appropriate, in	~~5.1.1.1.2 The aircraft operator shall:~~ ~~a) implement provisions for receiving the reports of observed performance and taking corrective actions for aircraft identified as not complying with RSP specification(s); and~~ ~~b) be authorized by the State of the Operator or the State of Registry, as appropriate, in~~	1. Annex 6 Part I section 7.3.4 and Part II section 2.5.3.5 specify: [[The State of the Operator / The state of Registry] shall ensure that, in respect of those aeroplanes mentioned in 7.3.2, adequate provisions exist for: a) receiving the reports of observed

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
order to qualify for the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3.	~~order to qualify for the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3.~~	surveillance performance issued by monitoring programmes established in accordance with Annex 11, Chapter 3, 3.3.5.2; and b) taking immediate corrective action for individual aircraft, aircraft types or operators, identified in such reports as not complying with the RSP specification(s).] 2. Annex 6 Part I section 7.3, Part II section 2.5.3 and Part III section 5.3 specify the requirements that operators must satisfy for RSP operations.
Note.— As of 29 March, 2018, the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3 will be applied in portions of the ICAO NAT Region, as notified in State AIPs.	~~*Note.— As of 29 March, 2018, the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3 will be applied in portions of the ICAO NAT Region, as notified in State AIPs.*~~	This information is no longer needed.
5.1.1.1.3 The air navigation services providers (ANSPs) shall: a) ensure that the surveillance system satisfies RSP 180 when applying the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3; b) establish PBCS monitoring programmes; and c) apply the appropriate flight plan designator to determine aircraft eligibility for the	~~5.1.1.1.3 The air navigation services providers (ANSPs) shall:~~ ~~a) ensure that the surveillance system satisfies RSP 180 when applying the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3;~~ ~~b) establish PBCS monitoring programmes; and~~ ~~c) apply the appropriate flight plan designator to determine aircraft eligibility for the~~	1. Annex 11 specifies the following: [2.9.3 Where an RSP specification has been prescribed by States for performance-based surveillance, ATS units shall be provided with equipment capable of performance consistent with the prescribed RSP specification(s).] 2. Annex 11 specifies the following: [3.3.5.2 Where RCP/RSP specifications are applied, programmes shall be instituted for

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
application of relevant separation minima.	~~application of relevant separation minima.~~	monitoring the performance of the infrastructure and the participating aircraft against the appropriate RCP and/or RSP specifications, to ensure that operations in the applicable airspace continue to meet safety objectives. The scope of monitoring programmes shall be adequate to evaluate communication and/or surveillance performance, as applicable.] 3. Separation minima specify what conditions must be satisfied for application of the separation.
Note.— As of 29 March, 2018, the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3 will be applied in portions of the ICAO NAT Region, as notified in State AIPs.	~~*Note.— As of 29 March, 2018, the separation minima specified in 6.2.1.1 a), 6.2.1.1 b) and 6.2.2.3 will be applied in portions of the ICAO NAT Region, as notified in State AIPs.*~~	This information is no longer needed.
5.2 SECONDARY SURVEILLANCE RADAR (SSR)		No change is proposed.
(P-ATM – Chapter 8; P-OPS, Vol. I)		No change is proposed.
5.2.1 Carriage of pressure-altitude reporting SSR transponders		No change is proposed.
5.2.1.1 All aircraft operating as IFR flights in the NAT Region shall be equipped with a pressure-altitude reporting SSR transponder.		No change is proposed.
5.2.2 Code allocation methodology		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
Nil.		No change is proposed.
5.2.3 Assignment of SSR codes		No change is proposed.
Nil.		No change is proposed.
5.2.4 Operation of pressure-altitude reporting SSR transponders		No change is proposed.
5.2.4.1 Unless otherwise directed by ATC, pilots of aircraft equipped with SSR flying in NAT FIRs shall retain the last assigned identity (Mode A) code for a period of 30 minutes after entry into NAT airspace.		No change is proposed.
5.2.5 Monitoring of SSR-derived information		No change is proposed.
Nil.		No change is proposed.
5.3 SSR MODE S		No change is proposed.
5.3.1 Carriage and operation of SSR Mode S		No change is proposed.
Nil.		No change is proposed.
5.3.2 Transition between Mode A/C and Mode S		No change is proposed.
Nil.		No change is proposed.
5.4 AIRBORNE COLLISION AVOIDANCE SYSTEMS (ACAS)		No change is proposed.
5.4.1 Carriage and operation of ACAS II		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
(A2 – Chapter 3; A6, Part I – Chapter 6; A6, Part II – Chapter 3.6; A10, Vol. IV; A11 – Chapter 2; P-OPS, Part III, Vol. I; P-ATM – Chapters 4 and 10)		No change is proposed.
Nil.		No change is proposed.
5.5 AUTOMATIC DEPENDENT SURVEILLANCE – CONTRACT (ADS-C)		No change is proposed.
Area of applicability		No change is proposed.
5.5.1 All aircraft intending to conduct flights in the specified portions of NAT High Level Airspace (HLA) shall be fitted with and shall operate ADS-C equipment:	5.54.1 All aircraft intending to conduct flights in the specified portions of NAT High Level Airspace (HLA) shall be fitted with and shall operate ADS-C equipment.~~:~~	Editorial, full stop missing at the end of the paragraph.
Note.— The specified portions of NAT MNPS HLA airspace and aircraft equipment performance requirements, where applicable, will be published by the States concerned in national AIPs.	*Note.— The specified portions of NAT ~~MNPS~~ HLA ~~airspace~~ and aircraft equipment performance requirements, where applicable, will be published by the States concerned in national AIPs.*	The airspace name is the NAT HLA.
Means of compliance		No change is proposed.
5.5.2 Operators intending to conduct flights within the specified portions of NAT HLA shall be authorized, where applicable, to use ADS- C by the State of Registry or the State of the Operator as appropriate. The State of Registry or the State of the Operator shall verify that the equipment has been certified in	5.5.2 Operators intending to conduct flights within the specified portions of NAT HLA shall be authorized, where applicable, to use ADS- C by the State of Registry or the State of the Operator as appropriate. The State of Registry or the State of the Operator shall verify that the equipment has been certified in	This change is to clarify that HF data link is not enough for ADS-C operation outside VHF coverage in the NAT.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
accordance with the requirements specified in RTCA DO-258/EUROCAE ED-100 or equivalent, capable of operating outside VHF data link coverage.	accordance with the requirements specified in RTCA DO-258/EUROCAE ED-100 or equivalent, with SATCOM equipment capable of operating outside VHF data link coverage.	
5.5.3 The ADS-C services provided within the specified portions of NAT HLA shall comply with the Oceanic Safety and Performance Requirements as specified in RTCA DO-306/EUROCAE ED-122 or equivalent. Conformance monitoring shall provide alerts to the controller when reports do not match the current flight plan, and the following ADS contracts shall be used: a) ADS periodic contracts at an interval consistent with safety requirements and published by the States concerned in national AIPs; and b) ADS event contracts that include the following event types: 1) lateral deviation event (LDE) with a lateral deviation threshold of 9.3 km (5 NM) or less; 2) level range deviation event (LRDE) with a vertical deviation threshold of 90 m (300 ft) or less; and 3) waypoint change event (WCE) at		No change proposed. Those are effectively requirements that ANSPs, CSPs and SSPs providing services in the NAT have to be RCP RSP 180 compliant and those provisions should remain until at least the OPDLWG has finished its overhaul of the PBCS provisions in ICAO documents.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
compulsory reporting points.		
Note.— Additional guidance can be found in the Global Operational Data Link (GOLD) Manual *(Doc 10037)*..	*Note.— Additional guidance can be found in the* Global Operational Data Link (GOLD) Manual *(Doc 10037)*.~~.~~	Editorial, double full stop at the end of the paragraph.
5.6 AUTOMATIC DEPENDENT SURVEILLANCE – BROADCAST (ADS-B)		No change is proposed.
5.6.1 The procedures contained in 5.5.2 shall be applicable in those portions of the following FIRs where an ADS-B based ATS surveillance service is provided: Reykjavik FIR, Søndrestrøm FIR, Bodø FIR, Gander Oceanic FIR, New York Oceanic East FIR and Santa Maria Oceanic FIR.	5.6.1 The procedures contained in 5.6~~5~~.2 shall be applicable in those portions of the following FIRs where an ADS-B based ATS surveillance service is provided: Reykjavik FIR, ~~Søndrestrøm~~ Nuuk FIR, Bodø FIR, Gander Oceanic FIR, ~~New York Oceanic East FIR~~ Shanwick FIR and Santa Maria Oceanic FIR.	1. Editorial, amended reference. 2. Söndrestöm FIR has been renamed Nuuk FIR. 3. ADS-B services are not provided in the New York Oceanic East FIR. 4. Shanwick has started ADS-B services.
5.6.2 An aircraft carrying 1090 MHz extended squitter (1090ES) ADS-B equipment shall disable ADS-B transmission unless: a) the aircraft emits position information of an accuracy and integrity consistent with the transmitted values of the position quality indicators; or b) the aircraft always transmits a value of 0 (zero) for one or more of the position quality indicators (NUCp, NIC, NAC or SIL), when		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
the requirements of a) above cannot be met; or c) the operator has received an exemption granted by the appropriate ATS authority.		
Note.—The following documents provide guidance for the installation and airworthiness approval of ADS-B OUT system in aircraft and ensure compliance with a) above: *1. European Aviation Safety Agency (EASA) AMC 20-24; or* *2. FAA AC No. 20-165A – Airworthiness Approval of ADS-B; or* *3. Configuration standards reflected in Appendix XI of Civil Aviation Order 20.18 of the Civil Aviation Safety Authority of Australia.*		No change is proposed.
5.6.3 Downlinked ADS-B data shall not be used by the ATC system for determining aircraft position when any of the position quality indicators (NUCp, NIC, NAC or SIL) have a value of 0 (zero).		No change is proposed.
Chapter 6. AIR TRAFFIC SERVICES		No change is proposed.
6.1 AIR TRAFFIC CONTROL (ATC)		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
CLEARANCES		
6.1.1 Content		No change is proposed.
(A11 – Chapter 3; P-ATM – Chapters 4 and 11)		No change is proposed.
6.1.1.1 An abbreviated clearance shall only be issued by ATS when clearing an aircraft to follow one of the organized tracks throughout its flight within the NAT control areas or when clearing an aircraft to follow its flight plan route. In all other circumstances, full details of the cleared track shall be specified in the clearance message.	6.1.1.1 An abbreviated clearance shall only be issued by ATS when clearing an aircraft to follow one of the NAT organized tracks throughout its flight within the NAT control areas or when clearing an aircraft to follow its flight plan route. In all other circumstances, full details of the cleared track shall be specified in the clearance message.	Editorial change.
6.1.1.2 When an abbreviated clearance is issued to follow one of the organized tracks, it shall include: a) cleared track specified by the track code; b) cleared flight level(s); c) cleared true Mach number (if required); and d) if the aircraft is designated to report meteorological information in flight, the phrase "SEND MET REPORTS".	6.1.1.2 When an abbreviated clearance is issued to follow one of the NAT organized tracks, it shall include: a) cleared track specified by the track code; b) cleared flight level(s); c) cleared true Mach number (if required); and ~~d) if the aircraft is designated to report meteorological information in flight, the phrase "SEND MET REPORTS".~~	1. Editorial change. 2. According to Annex 3 section 5.4, aircraft not equipped with air-ground data link shall be exempted from making routine aircraft observations. Since the majority of aircraft operating on the NAT organized tracks is ADS-C equipped and automatically send MET reports, there is no need anymore to verbally designate aircraft to send MET reports. Note: Refer to provisions in section 12.1 that satisfy the Annex 3 paragraph 5.3.3 requirement to designate data link equipped aircraft to make routine observations.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
		Annex 3 contains the following: [5.4 Routine aircraft observations — exemptions Aircraft not equipped with air-ground data link shall be exempted from making routine aircraft observations.]
6.1.1.3 On receipt of an abbreviated clearance, the pilot shall read back the contents of the clearance message. In addition, when cleared to follow one of the organized tracks, the pilot shall read back full details of the track specified by the code letter, except where alternative procedures using VHF techniques exist which include provision for the confirmation of cleared track by the pilot.	6.1.1.3 On receipt of an abbreviated clearance, the pilot shall read back the contents of the clearance message. In addition, when cleared to follow one of the NAT organized tracks, the pilot shall read back full details of the track specified by the code letter, except where alternative procedures using VHF techniques exist which include provision for the confirmation of cleared track by the pilot.	Editorial change.
6.1.1.4 When an abbreviated clearance is issued to follow the flight plan route, it shall only be issued using direct controller-pilot communication and shall include: a) the expression "cleared via flight planned route"; b) cleared flight level(s); and c) cleared true Mach number (if required).		No change is proposed.
6.1.1.5 On receipt of an abbreviated clearance, the pilot shall read back the		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
contents of the clearance message. In addition, when cleared via "flight planned route", the pilot shall read back full details of the flight plan route.		
6.1.1.6 A pilot-in-command shall, if at any time in doubt, request a detailed description of the route from ATS.		No change is proposed.
6.1.2 Adherence		No change is proposed.
(A2 – Chapter 3)	~~(A2 – Chapter 3)~~	See argument below.
6.1.2.1 If an aircraft has inadvertently deviated from the route specified in its ATC clearance, it shall forthwith take action to regain such route within 185 km (100 NM) from the position at which the deviation was observed	~~6.1.2.1 If an aircraft has inadvertently deviated from the route specified in its ATC clearance, it shall forthwith take action to regain such route within 185 km (100 NM) from the position at which the deviation was observed~~ Nil.	Annex 2 specifies the following. [3.6.2.2 *Deviations from the current flight plan.* In the event that a controlled flight deviates from its current flight plan, the following action shall be taken: a) *Deviation from track:* if the aircraft is off track, action shall be taken forthwith to adjust the heading of the aircraft to regain track as soon as practicable] The 100 NM is a far too relaxed requirements in today's environment.
6.1.2.2 Unable to obtain oceanic clearance using HF voice		No change is proposed.
(P-ATM – Chapter 15)		No change is proposed.
6.1.2.2.1 Aircraft operating outside VHF coverage that are unable to contact ATC on		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
HF to obtain an Oceanic clearance shall continue to operate at the last assigned flight level and along the cleared route of flight until communications are re-established.		Note: This may need to be changed or deleted if oceanic clearances are discontinued.
Note.— Failure of HF communications often stems from poor signal propagation, frequently because of sun spot activity, and is likely to simultaneously affect multiple aircraft operating in a particular region. ATM systems dependent on HF are designed around the assumption that communication may be temporarily interrupted and that aircraft affected will continue to operate in accordance with the last received and acknowledged clearance, until communication is restored.		No change is proposed.
6.2 SEPARATION		This section is amended to better align with Annex 11 section 3.4 and the rules described in the foreword to Doc 7030. Accordingly, the following principles were agreed by the PT: 1. All separation minima used in the NAT must be documented in either the PANS-ATM or Doc 7030. 2. PANS-ATM separation minima that are applied in a more restrictive manner in the NAT must be documented in Doc

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
		7030 (“*a mode of implementing procedural provisions in Annexes and PANS*“). 3. NAT Doc 008 will contain the separation minima from the PANS-ATM and Doc 7030 that are applied on a regional basis in the NAT and, when needed, describe the practical application of separation.
	Note – Guidance material concerning practical application of separation minima is contained in NAT Doc 008, Application of Separation Minima North Atlantic Region (NAT ASM).	This is to clarify that the role of Doc 008 is practical application of separation, not definition of separation minima.
6.2.1 Lateral		No change is proposed.
(P-ATM – Chapter 5)		No change is proposed.
6.2.1.1 Minimum lateral separation shall be:	6.2.1.1 ~~Minimum l~~Lateral separation between aircraft shall be applied in accordance with PANS-ATM sections 5.4.1 and 5.11. In addition, the following Lateral separation minima may be applied:	New lead-in paragraph to match the principles described in section 6.2 above.
a) 42.6 km (23 NM) between aircraft operating within the control area of the Gander Oceanic FIR, Reykjavik Oceanic FIR, Santa Maria Oceanic FIR and Shanwick Oceanic FIR. This minima is applied in accordance with 5.4.1.2.1.6 b) of the PANS-ATM and provided that the following	~~a) 42.6 km (23 NM) between aircraft operating within the control area of the Gander Oceanic FIR, Reykjavik Oceanic FIR, Santa Maria Oceanic FIR and Shanwick Oceanic FIR. This minima is applied in accordance with 5.4.1.2.1.6 b) of the PANS-ATM and provided that the following~~	This separation minima is specified in PANS-ATM Table 5-2.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
conditions are met: 1) communication – CPDLC RCP 240 in accordance with 3.1.1.1; 2) navigation – RNP 4 in accordance with 4.1.2.1; and 3) surveillance – ADS-C RSP 180 in accordance with 5.1.1.1.	~~conditions are met:~~ ~~1) communication – CPDLC RCP 240 in accordance with 3.1.1.1;~~ ~~2) navigation – RNP 4 in accordance with 4.1.2.1; and~~ ~~3) surveillance – ADS-C RSP 180 in accordance with 5.1.1.1.~~	
b) 55.5 km (30NM) between aircraft operating within the control area of the New York Oceanic East FIR provided that the following conditions are met: 1) Communication – CPDLC RCP 240 in accordance with 3.1.1.1; 2) navigation – RNP4 in accordance with 4.1.2.1; and 3) surveillance –ADS-C RSP 180 in accordance with 5.1.1.1. *Note – Guidance concerning RCP and RSP specifications, application and performance requirements can be found in the Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869).*	a~~b~~) 55.5 km (30NM) between aircraft operating within the control area of the New York Oceanic East FIR provided that the following conditions are met: 1) Communication – CPDLC RCP 240 in accordance with 3.1.1.1; 2) navigation – RNP4 in accordance with 4.1.2.1; and 3) surveillance –ADS-C RSP 180 in accordance with 5.1.1.1. *Note – Guidance concerning RCP and RSP specifications, application and performance requirements can be found in the Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869).*	1. Paragraph re-numbered. 2. This separation minima does not exist in the PANS-ATM any more, it needs to be retained in Doc 7030 while the USA continues to use it.
c) 93 km (50 NM) between aircraft operating in the New York Oceanic East FIR and Santa Maria Oceanic FIR meeting RNP 10 or RNP	~~c) 93 km (50 NM) between aircraft operating in the New York Oceanic East FIR and Santa Maria Oceanic FIR meeting RNP 10 or RNP~~	This separation minima is specified in PANS-ATM Table 5-2.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
4 specification in accordance with the provisions of 4.1.1.1 or 4.1.2.1, respectively.	~~4 specification in accordance with the provisions of 4.1.1.1 or 4.1.2.1, respectively.~~	
d) 110 km (60 NM) between aircraft which meet the minimum navigation performance specifications (MNPS) provided that a portion of the route of the aircraft is within, above, or below MNPS airspace NAT HLA;	b~~d~~) 110 km (60 NM) between aircraft operating in the Shanwick FIR, Gander FIR and Bodö FIR provided the aircraft has filed MNPS approval in the flight plan ~~which meet the minimum navigation performance specifications (MNPS) provided that a portion of the route of the aircraft is within, above, or below MNPS airspace NAT HLA~~;	1. Paragraph re-numbered. 2. The Minimum Navigation Performance Specifications as a navigation specification (6.3 NM Standard Deviation + other requirements) does not exist any more. 3. This separation minima does not exist in the PANS-ATM so it needs to be retained in Doc 7030 while Shanwick, Gander and Bodö continue to apply it. 4. Even though MNPS as a navigation specification does not exist anymore, the separation can safely be applied to aircraft filing MNPS approval in the FPL because such aircraft are RNAV 10 (RNP 10) and/or RNP 4 approved and the 60 NM separation applied with the gentle slope rule is never less than 50.5 NM.
e) 167 km (90 NM) between aircraft not approved RNP 10 or RNP 4 operating outside NAT HLA where no portion of the route of the aircraft is within, above, or below NAT HLA: 1) between the United States/Canada and	~~ce) 167 km (90 NM) between aircraft not approved RNP 10 or RNP 4 operating outside NAT HLA where no portion of the route of the aircraft is within, above, or below NAT HLA:~~ ~~1) between the United States/Canada and~~	This separation is not applied in the NAT Region anymore. It should be noted that the baseline in column one includes changes proposed in ICAO state letter “19-0492 CL NAT SUPPs PfA Serial no EURNAT-S 19-02-NAT” that have not

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
Bermuda; and 2) west of 55°W between the United States, Canada or Bermuda and points in the CAR Region;	~~Bermuda; and~~ ~~2) west of 55°W between the United States, Canada or Bermuda and points in the CAR Region;~~	yet been approved by the ICAO Council.
f) 223 km (120 NM) between other aircraft;	c~~f~~) 223 km (120 NM) when other lateral separation minima does not apply ~~between other aircraft~~.~~;~~	1. Paragraph re-numbered. 2. 120 NM is the default minima when no other minima applies. 3. Editorial, full stop added.
except that lower minima in 5.4.1.2 of the PANS-ATM may be applied, or further reduced in accordance with 5.11 when the conditions specified in the relevant PANS-ATM provisions are met (see 5.4).	~~except that lower minima in 5.4.1.2 of the PANS-ATM may be applied, or further reduced in accordance with 5.11 when the conditions specified in the relevant PANS-ATM provisions are met (see 5.4).~~	With amended lead-in paragraph 6.2.1.1, this provision is no longer needed.
6.2.1.2 In the practical application of the minima in 6.2.1.1 c), d) and e), tracks may be spaced with reference to their difference in latitude, using one degree instead of 110 km (60 NM); one and one-half degrees instead of 167 km (90 NM); and two degrees instead of 223 km (120 NM), provided that in any interval of ten degrees of longitude, the change in latitude of at least one of the tracks does not exceed: a) three degrees at or south of 58°N; b) two degrees north of 58°N and south of	6.2.1.2 In the practical application of the minima in 6.2.1.1 b) and, c)~~, d), and e)~~, tracks may be spaced with reference to their difference in latitude, using one degree instead of 110 km (60 NM)~~; one and one-half degrees instead of 167 km (90 NM);~~ and two degrees instead of 223 km (120 NM), provided that in any interval of ten degrees of longitude, the change in latitude of at least one of the tracks does not exceed: a) three degrees at or south of 58°N; b) two degrees north of 58°N and south of	1. Amended references. 2. The 90 NM separation has been deleted.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
70°N; and c) one degree at or north of 70°N and south of 80°N. At or north of 80°N, or where the above rates of change of latitude are exceeded, the required lateral separation must be ensured by reference to the track spacing expressed in nautical miles.	70°N; and c) one degree at or north of 70°N and south of 80°N. At or north of 80°N, or where the above rates of change of latitude are exceeded, the required lateral separation must be ensured by reference to the track spacing expressed in nautical miles.	
6.2.2 Longitudinal		No change is proposed.
(P-ATM – Chapter 5)		No change is proposed.
	6.2.2.1 Longitudinal separation between aircraft shall be applied in accordance with PANS-ATM sections 5.4.2 and 5.11 with the following exceptions:	New lead-in paragraph to match the principles described in paragraph 6.2.
	a) When appropriate, the more restrictive definition of same direction 0-89° and opposite direction 90-180° may be used instead of the same track, crossing track and reciprocal track definitions in PANS-ATM section 5.4.2.1.5.	General statement to allow application of same direction and opposite direction as has been the practice for some NAT ANSPs for a long time.
	b) The 15 minute separation minima in PANS-ATM sections 5.4.2.2.1.1 a), 5.4.2.2.1.2 a), 5.4.2.2.2.1 a) and 5.4.2.2.2.2 a) shall, when direct controller pilot VHF voice communication is not available, be applied as follows:	NAT Doc 008 3.4.2 C.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
	1. between turbojet aircraft, and 2. between other than turbojet aircraft and any other aircraft provided the following conditions are satisfied: i) the aircraft are equipped with GNSS; and ii) the aircraft are in communication via a third party VHF. This separation minima shall also apply to opposite direction aircraft that satisfy the same conditions.	NAT Doc 008 3.4.7.B.
	c) The 10 minute separation minima in PANS-ATM sections 5.4.2.2.1.1 b) and 5.4.2.2.1.2 b) shall, when direct controller pilot VHF voice communication is not available, be applied only to turbojet aircraft and only when the aircraft have ADS-C periodic contracts with a maximum reporting interval of 20 minutes.	NAT Doc 008 3.4.2 D.
	d) The 10 minute separation minima in PANS-ATM sections 5.4.2.2.2.1 b) and 5.4.2.2.2.2 b) shall, when direct controller pilot VHF voice communication is not available, be applied only to turbojet aircraft and only when: i) the aircraft have ADS-C periodic	NAT Doc 008 3.4.2 E.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
	contracts with a maximum reporting interval of 20 minutes; or ii) both aircraft are GNSS equipped and that both aircraft have reported their position within 20 minutes of the time when the clearance to climb or descend is issued.	
	e) The 10 minute separation minimum in PANS-ATM section 5.4.2.2.3 shall, when DCPC VHF voice communication is not available, be applied only to turbojet aircraft and only after the aircraft have passed each other and have reported over a common point.	NAT Doc 008 3.4.7 C.
	f) The 5 minute and 3 minute separation minima in PANS-ATM sections 5.4.2.2.1.1 c) and d) shall only be applied when direct controller pilot VHF voice communication is available.	This PANS-ATM provision is added for completeness.
	g) The 5 minute separation minima in PANS-ATM section 5.4.2.2.2.1 c) shall only be applied between GNSS equipped aircraft and can be applied on tracks that diverge up to 89°.	NAT Doc 008 3.4.2 H.
6.2.2.1 Minimum longitudinal separation based on time between turbo-jet aircraft shall be:	6.2.2.2~~1~~ ~~Minimum longitudinal separation based on time between turbo-jet aircraft shall be:~~ The following Longitudinal separation between aircraft shall be applicable in the NAT region when the longitudinal separation	New lead-in paragraph.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
	minima in section 6.2.2.1 does not apply:	
a) 15 minutes; or	~~a) 15 minutes; or~~	This separation minima is covered in 6.2.2.1 b).
b) 10 minutes, provided the Mach number technique is applied whether in level, climbing or descending flight; and the aircraft concerned have reported over a common point to follow continuously diverging tracks until some other form of separation is provided; and: 1) at least 10-minute longitudinal separation exists at the point where the tracks diverge; and 2) at least 5-minute longitudinal separation exists where lateral separation is achieved; and 3) lateral separation will be achieved at or before the next significant point (normally ten degrees of longitude along track(s)) or, if not, within 90 minutes of the time the second aircraft passes the common point or within 1 112 km (600 NM) of the common point, whichever is estimated to occur first.	a~~b~~) 10 minutes, provided the Mach number technique is applied whether in level, climbing or descending flight; and the aircraft concerned have reported over a common point to follow continuously diverging tracks until some other form of separation is provided; and: 1) at least 10-minute longitudinal separation exists at the point where the tracks diverge; and 2) at least 5-minute longitudinal separation exists where lateral separation is achieved; and 3) lateral separation will be achieved at or before the next significant point (normally ten degrees of longitude along track(s)) or, if not, within 90 minutes of the time the second aircraft passes the common point or within 1 112 km (600 NM) of the common point, whichever is estimated to occur first.	Numbering change. NAT Doc 008 3.4.2 F
Note.— The minima contained in 6.2.2.1 b) are in addition to those found in the PANS-ATM, 5.4.2.4.	~~*Note.— The minima contained in 6.2.2.1 b) are in addition to those found in the PANS-ATM, 5.4.2.4.*~~	This is covered in the lead-in paragraph 6.2.2.2.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
6.2.2.2 Minimum longitudinal separation based on time between non-turbo-jet aircraft shall be 30 minutes.	~~6.2.2.2~~b) Minimum longitudinal separation based on time between a non-turbo-jet aircraft and any other aircraft shall be 30 minutes.	NAT Doc 008 3.4.2 B and 3.4.7.A. Text amended for clarification.
6.2.2.3 Performance-based longitudinal separation minima shall be: a) 93 km (50 NM) between aircraft operating within the control area of the New York Oceanic East FIR in accordance with the provisions in 5.4.2.9 of the PANS-ATM provided that the following conditions are met: 1) communication – CPDLC RCP 240 in accordance with 3.1.1.1; 21) navigation – RNP 10 or RNP 4 in accordance with 4.1.1.1 or 4.1.2.1; and 3) surveillance – ADS-C RSP 180 in accordance with 5.1.1.1.	~~6.2.2.3 Performance-based longitudinal separation minima shall be:~~ ~~a) 93 km (50 NM) between aircraft operating within the control area of the New York Oceanic East FIR in accordance with the provisions in 5.4.2.9 of the PANS-ATM provided that the following conditions are met:~~ ~~1) communication – CPDLC RCP 240 in accordance with 3.1.1.1;~~ ~~21) navigation – RNP 10 or RNP 4 in accordance with 4.1.1.1 or 4.1.2.1; and~~ ~~3) surveillance – ADS-C RSP 180 in accordance with 5.1.1.1.~~	NAT Doc 008 3.4.4.A. 1. This separation minima is specified in PANS-ATM 5.4.2.9. 2. Each country specifies in its AIP which separation minima it is using.
b) 55.5 km (30 NM) between aircraft operating within the control area of the New York Oceanic East FIR and Santa Maria Oceanic FIR in accordance with the provisions in 5.4.2.9 of the PANS-ATM and provided that the following conditions are met: 1) communication – CPDLC RCP 240 in	~~b) 55.5 km (30 NM) between aircraft operating within the control area of the New York Oceanic East FIR and Santa Maria Oceanic FIR in accordance with the provisions in 5.4.2.9 of the PANS-ATM and provided that the following conditions are met:~~ ~~1) communication – CPDLC RCP 240 in~~	NAT Doc 008 3.4.4.B. 1. This separation minima is specified in PANS-ATM 5.4.2.9. 2. Each country specifies in its AIP which separation minima it is using.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
accordance with 3.1.1.1; 2) navigation – RNP 4 in accordance with 4.1.2.1; and 3) surveillance – ADS-C RSP 180 in accordance with 5.1.1.1.	~~accordance with 3.1.1.1;~~ ~~2) navigation – RNP 4 in accordance with 4.1.2.1; and~~ ~~3) surveillance – ADS-C RSP 180 in accordance with 5.1.1.1.~~	
c) 5 minutes between aircraft operating in the Gander Oceanic FIR, Reykjavik Oceanic FIR, Shanwick Oceanic FIR and Santa Maria Oceanic FIR provided that the following conditions are met; 1) communication – CPDLC RCP 240 in accordance with 3.1.1.1; 2) navigation – RNP 10 or RNP4 in accordance with 4.1.1.1 or 4.1.2.1; and 2) surveillance – ADS-C RSP 180 in accordance with 5.1.1.1.	~~c) 5 minutes between aircraft operating in the Gander Oceanic FIR, Reykjavik Oceanic FIR, Shanwick Oceanic FIR and Santa Maria Oceanic FIR provided that the following conditions are met;~~ ~~1) communication – CPDLC RCP 240 in accordance with 3.1.1.1;~~ ~~2) navigation – RNP 10 or RNP4 in accordance with 4.1.1.1 or 4.1.2.1; and~~ ~~2) surveillance – ADS-C RSP 180 in accordance with 5.1.1.1.~~	NAT Doc 008 3.4.2.I. 1. This separation minima is specified in PANS-ATM 5.4.2.9. 2. Each country specifies in its AIP which separation minima it is using.
6.2.3 Composite		No change is proposed.
Nil.		No change is proposed.
6.2.4 Vertical		No change is proposed.
6.2.4.1 Between FL 290 and FL 410 inclusive, 300 m (1 000 ft) vertical separation shall be applied in the NAT Region.	6.2.4.1 ~~Between FL 290 and FL 410 inclusive, 300 m (1 000 ft) vertical separation shall be applied in the NAT Region~~ Minimum vertical separation between aircraft, airspace reservations, and between airspace reservations and other aircraft shall be	New lead-in paragraph to match the principles described in paragraph 6.2

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
	applied in accordance with PANS-ATM section 5.3.2 with the following exceptions:	
6.2.4.2 At or above FL 450, vertical separation between supersonic aircraft, and between supersonic aircraft and any other aircraft, shall be considered to exist if the flight levels of the two aircraft differ by at least 1 200 m (4 000 ft).	~~6.2.4.2 At or above FL 450, vertical separation between supersonic aircraft, and between supersonic aircraft and any other aircraft, shall be considered to exist if the flight levels of the two aircraft differ by at least 1 200 m (4 000 ft).~~ a) 4000 feet at or above FL 450 between supersonic aircraft, and between a supersonic aircraft and any other aircraft.	NAT Doc 008 3.2.1 A.
	b) 2000 feet at or above FL 290 between a formation flight and any other aircraft	NAT Doc 008 3.2.1 B.
	c) 1000 feet from FL 290 to FL 410 inclusive between RVSM approved aircraft.	PANS-ATM 5.3.2 b) specifies the following: [within designated airspace, subject to a regional air navigation agreement: a nominal 300 m (1 000 ft) below FL 410 or a higher level where so prescribed for use under specified conditions, and a nominal 600 m (2 000 ft) at or above this level.]
6.2.5 Radar	**6.2.5 ~~Radar~~ ATS surveillance**	It is proposed to ICAO to make this heading general for all ATS surveillance systems.
Nil.		No change is proposed.
6.2.6 Reduction in separation minima		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
(A11 – Chapter 3; P-ATM – Chapter 5)		No change is proposed.
6.2.6.1 Where, circumstances permitting, separation minima lower than those specified in 6.2.1 and 6.2.2 will be applied in accordance with the PANS-ATM, appropriate information should be published in AIPs so that users of the airspace are fully aware of the portions of airspace where the reduced separation minima will be applied and of the navigation aids on which those minima are based.	~~6.2.6.1 Where, circumstances permitting, separation minima lower than those specified in 6.2.1 and 6.2.2 will be applied in accordance with the PANS-ATM, appropriate information should be published in AIPs so that users of the airspace are fully aware of the portions of airspace where the reduced separation minima will be applied and of the navigation aids on which those minima are based.~~ Nil.	1. Allowable reduction in separation minima is specified in amended sections 6.2.1.1 and 6.2.2.1. 2. Annex 11 specifies the following: [3.4.2 Details of the selected separation minima and of their areas of application shall be notified: a) to the ATS units concerned; and b) to pilots and operators through aeronautical information publications, where separation is based on the use by aircraft of specified navigation aids or specified navigation techniques.]
6.2.7 Airspace reservations		No change is proposed.
6.2.7.1 Separation minima between moving temporary airspace reservations		No change is proposed.
6.2.7.1.1 Lateral separation shall be: a) 110 km (60 NM) between the closest tracks of any aircraft for which the airspace is reserved, provided all aircraft or formation flights meet the MNPS; or	6.2.7.1.1 Lateral separation shall be: a) 110 km (60 NM) between the closest tracks of any aircraft for which the airspace is reserved, provided all aircraft or formation flights ~~meet the~~ are MNPS approved; or	1. NAT Doc 008 3.3.1.E.1. 2. If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the NAT HLA, then this change is proposed. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer to the NAT Doc 7030 Review PT report

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
		section 4.1.
b) 223 km (120 NM) between the closest tracks of any aircraft for which the airspace is reserved.		NAT Doc 008 3.3.1.B.1. It should be noted that the baseline in column one includes changes proposed in ICAO state letter "19-0492 CL NAT SUPPs PfA Serial no EURNAT-S 19-02-NAT" that have not yet been approved by the ICAO Council.
Note.— A formation flight with at least one of the aircraft in the formation meeting MNPS is deemed to meet the requirement for the application of 110 km (60 NM) in a).	*Note.— A formation flight, with at least one of the aircraft in the formation ~~meeting~~ MNPS approved, is deemed to meet the requirement for the application of 110 km (60 NM) in a).*	If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the NAT HLA, then this change is proposed. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer to the NAT Doc 7030 Review PT report section 4.1.
6.2.7.1.2 Longitudinal separation shall be 60 minutes.		NAT Doc 008 3.4.2.A.
6.2.7.2 Separation minima between stationary temporary airspace reservations		No change is proposed.
6.2.7.2.1 Lateral separation shall be: a) 110 km (60 NM) between the boundaries of stationary temporary airspace reservations, provided the requesting agencies have guaranteed to confine their activities to the requested airspace; or		NAT Doc 008 3.3.1 E.6. It should be noted that the baseline in column one includes changes proposed in ICAO state letter "19-0492 CL NAT SUPPs PfA Serial no EURNAT-S 19-02-NAT" that have not yet been approved by the ICAO Council.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
b) 223 km (120 NM) between the boundaries of the airspace reservations, if no guarantees have been given.		NAT Doc 008 3.3.1.B.4. It should be noted that the baseline in column one includes changes proposed in ICAO state letter “19-0492 CL NAT SUPPs PfA Serial no EURNAT-S 19-02-NAT” that have not yet been approved by the ICAO Council.
6.2.7.3 Separation minima between moving temporary airspace reservations and other aircraft		No change is proposed.
6.2.7.3.1 Lateral separation shall be: a) 110 km (60 NM) between the track of an aircraft operating under the control of the ATC unit concerned and the closest track of any of the aircraft for which the airspace is reserved, provided all aircraft meet the MNPS requirements and a portion of the route of the aircraft is within, above or below NAT HLA; or	6.2.7.3.1 Lateral separation shall be: a) 110 km (60 NM) between the track of an aircraft operating under the control of the ATC unit concerned and the closest track of any of the aircraft for which the airspace is reserved, provided all aircraft ~~meet the~~ are MNPS approved ~~requirements and a portion of the route of the aircraft is within, above or below NAT HLA~~; or	1. NAT Doc 008 3.3.1 E.3. 2. The text “portion of the route of the aircraft is within, above or below NAT HLA” is meaningless. 3. If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the NAT HLA, then this change is proposed. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer to the NAT Doc 7030 Review PT report section 4.1.
b) 110 km (60 NM) between the track of an aircraft operating under the control of the ATC unit concerned and the track of a formation flight for which the airspace has been reserved, provided at least one aircraft	b) 110 km (60 NM) between the track of an aircraft operating under the control of the ATC unit concerned and the track of a formation flight for which the airspace has been reserved, provided at least one aircraft	1. NAT Doc 008 3.3.1 E.2. 2. The text “portion of the route of the aircraft is within, above or below NAT HLA” is meaningless.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
in the formation and the aircraft operating under the control of the ATC unit meet the MNPS requirements and a portion of the route of the aircraft is within, above or below NAT HLA; or	in the formation and the aircraft operating under the control of the ATC unit ~~meet the~~ are MNPS approved ~~requirements and a portion of the route of the aircraft is within, above or below NAT HLA~~; or	3. If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the NAT HLA, then this change is proposed. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer to the NAT Doc 7030 Review PT report section 4.1.
c) 223 km (120 NM) between the track of an aircraft operating under the control of the ATC unit concerned and the closest track of any of the aircraft for which the airspace is reserved.		NAT Doc 008 3.3.1 B.2. It should be noted that the baseline in column one includes changes proposed in ICAO state letter “19-0492 CL NAT SUPPs PfA Serial no EURNAT-S 19-02-NAT” that have not yet been approved by the ICAO Council.
	6.2.7.3.2 Longitudinal separation between a moving airspace reservation and other (non-reservation) aircraft shall be the applicable longitudinal minima as contained in section 6.2.2.	NAT Doc 008 section 3.4.5. This provision was not in Doc 7030 before but is added here for completeness because it is contained in Doc 008 and has been applicable in the NAT for a long time.
6.2.7.4 Separation minima between stationary temporary airspace reservations and other aircraft		No change is proposed.
6.2.7.4.1 Lateral separation shall be: a) 56 km (30 NM) between the track of an aircraft operating under the control of the ATC unit concerned or as part of a moving	6.2.7.4.1 Lateral separation shall be: a) 56 km (30 NM) between the track of an aircraft operating under the control of the ATC unit concerned or as part of a moving	1. NAT Doc 008 3.3.1.G.1. 2. The text “portion of the route of the aircraft is within, above or below NAT

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
airspace reservation and the nearest limit of the reserved airspace, provided the aircraft meets the MNPS requirements and a portion of the route of the aircraft is within, above or below NAT HLA and the requesting agency has guaranteed to confine its activities to the requested airspace; or	airspace reservation and the nearest limit of the reserved airspace, provided the aircraft ~~meets the~~ is MNPS approved ~~requirements and a portion of the route of the aircraft is within, above or below NAT HLA~~ and the requesting agency has guaranteed to confine its activities to the requested airspace; or	HLA" is meaningless. 3. If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the NAT HLA, then this change is proposed. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer to the NAT Doc 7030 Review PT report section 4.1.
b) 110 km (60 NM) between the track of an aircraft operating under the control of the ATC unit concerned or as part of a moving airspace reservation and the nearest limit of the reserved airspace, provided the aircraft meets the MNPS requirements and a portion of the route of the aircraft is within, above or below NAT HLA and the requesting agency has **not** guaranteed to confine its activities to the requested airspace; or	b) 110 km (60 NM) between the track of an aircraft operating under the control of the ATC unit concerned or as part of a moving airspace reservation and the nearest limit of the reserved airspace, provided the aircraft ~~meets the~~ is MNPS approved ~~requirements and a portion of the route of the aircraft is within, above or below NAT HLA~~ and the requesting agency has **not** guaranteed to confine its activities to the requested airspace; or	1. NAT Doc 008 3.3.1.E.4. 2. The text "portion of the route of the aircraft is within, above or below NAT HLA" is meaningless. 3. If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the NAT HLA, then this change is proposed. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer to the NAT Doc 7030 Review PT report section 4.1.
c) 110 km (60 NM) between the track of an aircraft operating under the control of the ATC unit concerned or as part of a moving airspace reservation and the nearest limit of the reserved airspace, when the aircraft does	c) 110 km (60 NM) between the track of an aircraft operating under the control of the ATC unit concerned or as part of a moving airspace reservation and the nearest limit of the reserved airspace, when the aircraft ~~does~~	1. NAT Doc 008 3.3.1 E.5. 2. If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
not meet the MNPS requirements and the requesting agency has guaranteed to confine its activities to the requested airspace; or	is **not** ~~meet the~~ MNPS approved ~~requirements~~ and the requesting agency has guaranteed to confine its activities to the requested airspace; or	NAT HLA, then this change is proposed. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer to the NAT Doc 7030 Review PT report section 4.1.
d) 223 km (120 NM) between the track of an aircraft operating under the control of the ATC unit concerned or as part of a moving airspace reservation and the nearest limit of the reserved airspace, when the aircraft does **not** meet the MNPS requirements and the requesting agency has **not** guaranteed to confine its activities to the requested airspace.	d) 223 km (120 NM) between the track of an aircraft operating under the control of the ATC unit concerned or as part of a moving airspace reservation and the nearest limit of the reserved airspace, when the aircraft ~~does~~ is **not** ~~meet the~~ MNPS approved ~~requirements~~ and the requesting agency has **not** guaranteed to confine its activities to the requested airspace.	1. NAT Doc 008 3.3.1 B.3. 2. If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the NAT HLA, then this change is proposed. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer to the NAT Doc 7030 Review PT report section 4.1.
6.3 MINIMUM FLIGHT LEVEL		No change is proposed.
6.3.1 Establishment		No change is proposed.
Nil.		No change is proposed.
6.4 ATS ROUTES		No change is proposed.
6.4.1 Track systems		No change is proposed.
6.4.1.1 Establishment and use of organized track system (OTS)	**6.4.1.1 Establishment and use of the NAT organized track system (OTS)**	Editorial change.
6.4.1.1.1 When necessary in order to permit the optimum use of the airspace, the area control centres serving Gander Oceanic, New		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
York Oceanic, Santa Maria Oceanic and Shanwick Oceanic control areas may, subject to coordination with each other and, when appropriate, with Reykjavik area control centre, establish an organized track system. The procedures in 6.4.1.1.2 and 6.4.1.1.3 shall then be applied.		
6.4.1.1.2 Operators conducting scheduled or non-scheduled flight operations at or above FL 280 within Gander Oceanic, New York Oceanic, Shanwick Oceanic and Santa Maria (North of 30°N) Oceanic control areas shall provide information to the area control centres concerned regarding the tracks likely to be requested by turbo-jet aircraft during peak traffic periods. Such information shall be provided as far in advance of the anticipated peak periods as practicable and as specified in appropriate aeronautical information publications.	6.4.1.1.2 Operators conducting scheduled or non-scheduled flight operations at or above FL 280 within Gander Oceanic, New York Oceanic and~~,~~ Shanwick Oceanic ~~and Santa Maria (North of 30°N) Oceanic~~ control areas shall provide information to the area control centres concerned regarding the tracks likely to be requested by turbo-jet aircraft during peak traffic periods. Such information shall be provided as far in advance of the anticipated peak periods as practicable and as specified in appropriate aeronautical information publications.	Santa Maria does not require PRM messages anymore.
6.4.1.1.3 Based on the above information, an OTS may be established. The location of the organized tracks will depend on traffic demand and other relevant factors. The related organized track messages will be disseminated to operators by Shanwick Oceanic area control centre for the predominantly westbound flow of air traffic	6.4.1.1.3 Based on the above information, an OTS may be established. The location of the NAT organized tracks will depend on traffic demand and other relevant factors. The related organized track messages will be disseminated to operators by Shanwick Oceanic area control centre for the predominantly westbound flow of air traffic	Editorial amendment.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
and by Gander Oceanic area control centre for the predominantly eastbound flow of air traffic. These messages shall be disseminated at least three hours in advance of each anticipated peak traffic period. Any subsequent change made to the track system shall be notified to the operators as soon as possible.	and by Gander Oceanic area control centre for the predominantly eastbound flow of air traffic. These messages shall be disseminated at least three hours in advance of each anticipated peak traffic period. Any subsequent change made to the track system shall be notified to the operators as soon as possible.	
6.4.1.2 Mandatory carriage of the OTS message		No change is proposed.
6.4.1.2.1 All aircraft operating in or above NAT HLA shall carry a copy of the current OTS message		No change is proposed.
6.4.1.3 Flights along the northern or southern boundaries of Gander Oceanic and Shanwick Oceanic flight information regions	~~**6.4.1.3 Flights along the northern or southern boundaries of Gander Oceanic and Shanwick Oceanic flight information regions**~~	See argument below.
6.4.1.3.1 Aircraft operating along tracks through successive points situated on the northern or southern boundaries of Gander Oceanic and Shanwick Oceanic flight information regions shall be provided with air traffic services by Gander or Shanwick area control centre as appropriate.	~~6.4.1.3.1 Aircraft operating along tracks through successive points situated on the northern or southern boundaries of Gander Oceanic and Shanwick Oceanic flight information regions shall be provided with air traffic services by Gander or Shanwick area control centre as appropriate.~~	The project team agreed that this provision should be deleted for the following reasons: 1. Control of flights in the vicinity of airspace boundaries does not only relate to track systems as indicated by the section heading and the text of this provision but relates to all traffic. 2. Handling of flights in the vicinity of airspace boundaries is the subject of inter-unit Letter of Agreements and is

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
		published in AIPs as required. There is no need for this Doc 7030 provision. 3. Iceland and the UK are in the process of reviewing the provision of air traffic services to aircraft operating through successive points at 61N.
6.4.2 RNAV		No change is proposed.
Nil.		No change is proposed.
6.5 AERODROME OPERATIONS		No change is proposed.
6.5.1 Area of applicability		No change is proposed.
Nil.		No change is proposed.
6.5.2 Intersection take-off		No change is proposed.
Nil.		No change is proposed.
6.5.3 Multiple line-ups on the same runway		No change is proposed.
Nil.		No change is proposed.
6.5.4 Visual departures		No change is proposed.
Nil.		No change is proposed.
6.5.5 Visual approaches		No change is proposed.
Nil.		No change is proposed.
6.5.6 Advanced surface movement guidance and control systems (A-SMGCS)		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
6.5.6.1 General		No change is proposed.
Nil.		No change is proposed.
6.5.6.2 A-SMGCS functions		No change is proposed.
Nil.		No change is proposed.
6.5.6.3 A-SMGCS alerts		No change is proposed.
Nil.		No change is proposed.
6.5.6.4 A-SMGCS identification procedures		No change is proposed.
Nil.		No change is proposed.
6.6 RNAV PROCEDURES		No change is proposed.
6.6.1 General		No change is proposed.
Nil.		No change is proposed.
6.6.2 En route		No change is proposed.
Nil.		No change is proposed.
6.6.3 Terminal		No change is proposed.
Nil.		No change is proposed.
6.6.4 State aircraft		No change is proposed.
Nil.		No change is proposed.
6.7 RNP PROCEDURES		No change is proposed.
6.7.1 General		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
Nil.		No change is proposed.
6.7.2 En route		No change is proposed.
Nil.		No change is proposed.
6.7.3 Terminal		No change is proposed.
Nil.		No change is proposed.
6.7.4 State aircraft		No change is proposed.
Nil.		No change is proposed.
6.8 COMPOSITE PROCEDURES		No change is proposed.
Nil.		No change is proposed.
6.9 NAT HLA PROCEDURES		No change is proposed.
6.9.1 Aircraft not meeting the requirements of 4.1.1.5.1 shall not be allowed to operate in NAT HLA unless the following conditions are satisfied: a) The aircraft is being provided with ATS surveillance service; b) Direct controller-pilot VHF voice communication is maintained; and c) The aircraft has a certified installation of equipment providing it the ability to navigate along the cleared track.		If the decision of the NAT SPG is that there should be continued requirement for a MNPS approval for operation in the NAT HLA, then no change is proposed to this provision. There is not agreement within the NAT Doc 7030 Review PT on the issue of MNPS. Refer to the NAT Doc 7030 Review PT report section 4.1.
6.9.2 An operator who experiences reduced navigation performance shall inform air		No change proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
traffic control (ATC) as soon as practicable.		
Note.— The procedures to be followed for an emergency descent through NAT HLA are detailed in 9.1.	~~*Note.— The procedures to be followed for an emergency descent through NAT HLA are detailed in 9.1.*~~	Note deleted because the emergency descent procedures are now contained in the PANS-ATM.
6.10 RVSM PROCEDURES		No change is proposed.
6.10.1 General		No change is proposed.
Nil.		No change is proposed.
6.10.2 Transition to/from RVSM airspace		No change is proposed.
Nil.		No change is proposed.
6.11 ATS COORDINATION		No change is proposed.
6.11.1 Between units providing area control services		No change is proposed.
Nil.		No change is proposed.
6.11.2 RNAV		No change is proposed.
Nil.		No change is proposed.
6.11.3 RNP		No change is proposed.
Nil.		No change is proposed.
6.11.4 RVSM		No change is proposed.
Nil.		No change is proposed.
6.11.5 SSR codes		No change is proposed.
Nil.		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
6.12 ATS MESSAGES		No change is proposed.
6.12.1 Flight plan and departure		No change is proposed.
(P-ATM – Chapter 11)		No change is proposed.
6.12.1.1 Filed flight plan messages for flights intending to operate within the NAT Region at a distance of 110 km (60 NM) or less from the northern and southern boundaries of Gander Oceanic and Shanwick Oceanic FIRs shall be addressed to the ACCs in charge of the NAT FIRs along the route and, in addition, to the ACCs in charge of the nearest adjacent NAT FIRs.		No change is proposed.
6.12.1.2 For flights departing from points within adjacent regions and entering the NAT Region without intermediate stops, filed flight plan messages shall be transmitted to the appropriate ACCs immediately after the flight plan has been submitted.	~~6.12.1.2 For flights departing from points within adjacent regions and entering the NAT Region without intermediate stops, filed flight plan messages shall be transmitted to the appropriate ACCs immediately after the flight plan has been submitted.~~	Deleted as Annex 2 and the PANS-ATM contain sufficient provisions in this regard and all NAT ACCs have confirmed that appropriate provisions regarding flight plan submissions are contained in their state AIPs. (Refer also to section 2.3.1). Annex 2 specifies the following: 3.3.1.4 Unless otherwise prescribed by the appropriate ATS authority, a flight plan for a flight to be provided with air traffic control service or air traffic advisory service shall be submitted at least sixty minutes before departure, …….

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
		PANS-ATM specifies the following: 4.4.2.1.1 Flight plans shall not be submitted more than 120 hours before the estimated off-block time of a flight. Annex 2 and the PANS-ATM therefore specify that a FPL shall be submitted between 1 and 120 hours before departure.
6.12.2 Arrival		No change is proposed.
Nil.		No change is proposed.
6.12.3 Boundary estimates		No change is proposed.
Nil.		No change is proposed.
6.12.4 Computer-assisted coordination		No change is proposed.
Nil.		No change is proposed.
6.13 FLIGHT INFORMATION SERVICE (FIS)		No change is proposed.
6.13.1 Automatic terminal information services (ATIS)		No change is proposed.
Nil.		No change is proposed.
6.13.2 SIGMETs		No change is proposed.
(P-ATM – Chapter 9)		No change is proposed.
6.13.2.1 SIGMET information shall be transmitted to aircraft by VOLMET broadcast, by a general call to a group of		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
aircraft, or by directed transmission to individual aircraft, as determined by the appropriate ACC according to the circumstances, bearing in mind the need to ensure timely receipt of the information by the aircraft and to keep the load on the HF en-route communications channels to a minimum.		
6.13.2.2 SIGMET information passed to aircraft shall cover a portion of the route up to two hours' flying time ahead of the aircraft.	~~6.13.2.2 SIGMET information passed to aircraft shall cover a portion of the route up to two hours' flying time ahead of the aircraft.~~	All NAT ANSPs confirm that they cannot satisfy the 2-hour criteria in all cases, for example for aircraft exiting from the NAT into adjacent regions. The group therefore recommends that this Doc 7030 provision be removed leaving the PANS-ATM provision as the applicable provision in this regard. The group further recommends that the NAT ANSPs publish in their AIPs their procedures for passing SIGMET information to aircraft. PANS-ATM section 9.1.3.2.2 specifies the following: [9.1.3.2.2 The special air-report, SIGMET and AIRMET information to be passed to aircraft on ground initiative should cover a portion of the route up to one hour's flying time ahead of the aircraft except when another period has been determined on the basis of regional air navigation agreements.] The PANS-ATM requirement contradicts

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
		with ICAO DOC 8896, *Manual of Aeronautical Meteorological Practice*, which specifies the following: [4.2.4 SIGMET information is issued by MWOs and disseminated to aircraft in flight through associated ATS units. Aircraft in flight should be given, on the initiative of FICs, SIGMET information affecting their routes to a distance equivalent to 2 hours' flying time ahead of the position of the aircraft.] It should also be noted that the foreword of DOC 8896 states the following: [11. It should be stressed that the material in this manual is intended for guidance only. It is not intended to replace relevant national instructions or explanatory material, nor is it intended to cover the many non-aeronautical uses of meteorological information. Nothing in this manual should be taken as contradicting or conflicting with Annex 3 provisions or any other Standards, Recommended Practices, procedures or guidance material published by ICAO or WMO. It should also be noted that in this manual the words "shall" or "should" are not used in a regulatory sense as in ICAO or WMO regulatory documents.]

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
6.13.3 Special air-reports		No change is proposed.
Nil.		No change is proposed.
6.13.4 Amended aerodrome forecasts		No change is proposed.
(P-ATM – Chapter 9)		No change is proposed.
6.13.4.1 Amended aerodrome forecasts shall be passed to aircraft within 60 minutes from the aerodrome of destination, unless the information has been made available through other means.	~~6.13.4.1 Amended aerodrome forecasts shall be passed to aircraft within 60 minutes from the aerodrome of destination, unless the information has been made available through other means.~~ Nil.	No NAT ANSPs are passing amended aerodrome forecasts to aircraft on the initiative of ATC. Forecasts for principal airports in Europe and North America are broadcast by Volmet. The provisions of PANS-ATM section 9.1.3.5 are not understood as a requirement to transmit amended aerodrome forecasts on the initiative of ATC. The group therefore recommends that this Doc 7030 provision be removed leaving the PANS-ATM provision as the applicable provision in this regard. PANS-ATM 9.1.3.5 is contained in Note 2 at the end of this document.
6.13.5 Landing forecasts		No change is proposed.
Nil.		No change is proposed.
6.14 ALERTING SERVICE		No change is proposed.
Nil.		No change is proposed.
Chapter 7. SAFETY MONITORING		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
7.1 STRATEGIC LATERAL OFFSET PROCEDURES (SLOP)		No change is proposed.
Nil.		No change is proposed.
7.2 AIRSPACE MONITORING		No change is proposed.
7.2.1 General		No change is proposed.
7.2.1.1 Adequate monitoring of flight operations shall be conducted to provide data to assist in the assessment of the achieved lateral navigation performance of the aircraft population. A safety assessment shall be carried out periodically, based on the data collected, to verify that the safety level continues to be met. Data shall include operational errors due to all causes.		No change is proposed. It should be noted that the baseline in column one includes changes proposed in ICAO state letter “19-0492 CL NAT SUPPs PfA Serial no EURNAT-S 19-02-NAT” that have not yet been approved by the ICAO Council.
Note.— Guidance material on monitoring and conducting safety assessments is contained in the Manual on Airspace Planning Methodology for the Determination of Separation Minima *(Doc 9689) and the* Safety Management Manual (SMM) *(Doc 9859).*		No change is proposed.
7.2.2 RNAV		No change is proposed. It should be noted that the baseline in column one includes the deletion of section 7.2.2.2 “Legacy MNPS” proposed in ICAO state letter “19-0492 CL NAT SUPPs PfA Serial

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
		no EURNAT-S 19-02-NAT" that has not yet been approved by the ICAO Council.
7.2.2.1 RNAV 10 (RNP 10)		No change is proposed.
7.2.2.1.1 A target level of safety (TLS) of 5 x 10^{-9} fatal accidents per flight hour per dimension shall be established for route systems operating a 93 km (50 NM) lateral separation minimum. The safety level of such airspace shall be determined by an appropriate safety assessment.	~~7.2.2.1.1 A target level of safety (TLS) of 5 x 10^{-9} fatal accidents per flight hour per dimension shall be established for route systems operating a 93 km (50 NM) lateral separation minimum. The safety level of such airspace shall be determined by an appropriate safety assessment.~~ Nil.	1. According to NAT Doc 001 sections 5:A and 5:B, the NAT SPG intends the TLS of 5 x 10^{-9} fatal accidents per flight hour to apply to vertical, lateral and longitudinal separation in general and not only to this specific case. 2. NAT safety related policies and implementation planning policies, including the TLS of 5 x 10^{-9} fatal accidents per flight hour, are documented in NAT Doc 001 sections 5:A and 5:B. The NAT SPG would determine if there was a need to include any of those Doc 7030.
7.2.2.1.2 Navigation performance shall be measured to ensure that the following criteria are met in order for separation minima specified in 6.2.1.1 b) to be utilized in the New York Oceanic East FIR: a) the proportion of the total flight time spent by aircraft 46 km (25 NM) or more off the cleared track shall be less than 9.11 × 10^{-5}; and b) the proportion of the total flight time spent	~~7.2.2.1.2 Navigation performance shall be measured to ensure that the following criteria are met in order for separation minima specified in 6.2.1.1 b) to be utilized in the New York Oceanic East FIR:~~ ~~a) the proportion of the total flight time spent by aircraft 46 km (25 NM) or more off the cleared track shall be less than 9.11 × 10^{-5}; and~~ ~~b) the proportion of the total flight time spent~~	1. The Rapporteur of the NAT MWG confirmed that those monitoring criteria are not used anymore. 2. Monitoring should be based on NAT MWG best practices at any given time. 3. Refer to Note 4 for NAT MWG Rapporteur responses to questions regarding this issue.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
by aircraft between 74 and 111 km (40 and 60 NM) off the cleared track shall be less than 1.68×10^{-5}.	~~by aircraft between 74 and 111 km (40 and 60 NM) off the cleared track shall be less than 1.68×10^{-5}.~~	
7.2.3 RNP		No change is proposed.
7.2.3.1 RNP 4		No change is proposed.
7.2.3.1.1 Navigation performance shall be measured to ensure that the following criteria are met in order for the separation minima specified in 6.2.1.1 a) to be utilized in the New York Oceanic East FIR: a) the proportion of the total flight time spent by aircraft 28 km (15 NM) or more off the cleared track shall be less than 5.44×10^{-5}; and b) the proportion of the total flight time spent by aircraft between 44 and 67 km (24 and 36 NM) off the cleared track shall be less than 1.01×10^{-5}.	~~7.2.3.1.1 Navigation performance shall be measured to ensure that the following criteria are met in order for the separation minima specified in 6.2.1.1 a) to be utilized in the New York Oceanic East FIR:~~ ~~a) the proportion of the total flight time spent by aircraft 28 km (15 NM) or more off the cleared track shall be less than 5.44×10^{-5}; and~~ ~~b) the proportion of the total flight time spent by aircraft between 44 and 67 km (24 and 36 NM) off the cleared track shall be less than 1.01×10^{-5}.~~ Nil.	1. The Rapporteur of the NAT MWG confirmed that those monitoring criteria are not used anymore. 2. Monitoring should be based on NAT MWG best practices at any given time. 3. Refer to Note 4 for NAT MWG Rapporteur responses to questions regarding this issue.
7.2.4 PBCS		No change is proposed.
7.2.4.1 Adequate monitoring shall be conducted to assess continuing compliance of the communication and/or surveillance systems with the prescribed RCP and/or RSP specifications.	~~7.2.4.1 Adequate monitoring shall be conducted to assess continuing compliance of the communication and/or surveillance systems with the prescribed RCP and/or RSP specifications.~~	This provision is covered by Annex 11 which states the following in paragraph 3.3.5.2: [Where RCP/RSP specifications are applied, programmes shall be instituted for monitoring the performance of the infrastructure and the

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
	Nil.	participating aircraft against the appropriate RCP and/or RSP specifications, to ensure that operations in the applicable airspace continue to meet safety objectives. The scope of monitoring programmes shall be adequate to evaluate communication and/or surveillance performance, as applicable.] Considering the extensive work that the ICAO OPDLWG is currently undertaking regarding PBCS, it is considered premature to include NAT SPG conclusion 55/06 regarding NAT PBCS Requirements in Doc 7030.
7.2.5 RVSM		No change is proposed.
7.2.4.1 Adequate monitoring of flight operations in the NAT Region shall be conducted to assist in the assessment of continuing compliance of aircraft with height-keeping requirements.	~~7.2.4.1 Adequate monitoring of flight operations in the NAT Region shall be conducted to assist in the assessment of continuing compliance of aircraft with height-keeping requirements.~~ Nil.	1. This provision is covered by Annex 11 which states the following in paragraph 3.3.5.1: [For all airspace where a reduced vertical separation minimum of 300 m (1 000 ft) is applied between FL 290 and FL 410 inclusive, a programme shall be instituted, on a regional basis, for monitoring the height-keeping performance of aircraft operating at these levels, in order to ensure that the continued application of this vertical separation minimum meets the safety objectives. The scope of regional monitoring programmes shall be adequate to conduct

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
		analyses of aircraft group performance and evaluate the stability of altimetry system error.] 2. NAT safety related policies and implementation planning policies, including the TLS of 5×10^{-9} fatal accidents per flight hour, are documented in NAT Doc 001 sections 5:A and 5:B. The NAT SPG would determine if there was a need to include any of those Doc 7030.
Chapter 8. AIR TRAFFIC FLOW MANAGEMENT (ATFM)		No change is proposed.
8.1 PROVISION		No change is proposed.
Nil.		No change is proposed.
8.2 APPLICATION		No change is proposed.
Nil.		No change is proposed.
8.3 EXEMPTIONS FROM ATFM SLOT ALLOCATION		No change is proposed.
Nil.		No change is proposed.
8.4 DEPARTURE SLOT MONITORING		No change is proposed.
Nil.		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
8.5 PROMULGATION OF ATFM MEASURES		No change is proposed.
8.5.1 Strategic ATFM measures		No change is proposed.
Nil.		No change is proposed.
8.5.2 Amendments to promulgated strategic ATFM measures		No change is proposed.
Nil.		No change is proposed.
8.5.3 ATFM circulars and information		No change is proposed.
Nil.		No change is proposed.
8.5.4 Pre-flight information bulletin (PIB)		No change is proposed.
Nil.		No change is proposed.
8.5.5 Query procedures		No change is proposed.
Nil.		No change is proposed.
Chapter 9. SPECIAL PROCEDURES		No change is proposed.
9.1 EMERGENCY DESCENT PROCEDURES		No change is proposed.
(P-ATM – Chapter 15)		No change is proposed.
9.1.1 Action by the pilot-in-command		No change is proposed. It should be noted that the baseline in column one includes changes proposed in ICAO state letter "19-0492 CL NAT SUPPs PfA Serial

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
		no EURNAT-S 19-02-NAT" that have not yet been approved by the ICAO Council.
Nil.		No change is proposed.
9.1.2 Action by the ATS unit		No change is proposed.
Nil.		No change is proposed.
9.2 CONTINGENCY PROCEDURES INCLUDING TURN-BACKS		No change is proposed.
Nil.		No change is proposed.
9.3 AIR-GROUND COMMUNICATION FAILURE		No change is proposed.
(A2 – Chapter 3; P-ATM – Chapter 15; P-OPS, Vol. I)		No change is proposed.
Note.— The following procedures are intended to provide general guidance for aircraft operating into or from the NAT Region experiencing a communications failure. These procedures are intended to complement and not supersede Annex 2, the PANS-ATM and State procedures/regulations. It is not possible to provide guidance for all situations associated with a communications failure.		No change is proposed.
General		No change is proposed.
9.3.1 The pilot shall attempt to contact either another aircraft or any ATC facility and		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
inform it of the difficulty and request that information be relayed to the ATC facility with whom communications are intended.		
Communications failure prior to entering NAT Region		No change is proposed.
9.3.2 If operating with a received and acknowledged oceanic clearance, the pilot shall enter oceanic airspace at the cleared oceanic entry point, level and speed and proceed in accordance with the received and acknowledged oceanic clearance. Any level or speed changes required to comply with the oceanic clearance shall be completed within the vicinity of the oceanic entry point.		No change is proposed.
9.3.3 If operating without a received and acknowledged oceanic clearance, the pilot shall enter oceanic airspace at the first oceanic entry point, level and speed, as contained in the filed flight plan, and proceed via the filed flight plan route to the oceanic exit point. That first oceanic level and speed shall be maintained until the oceanic exit point.		No change is proposed. It should be noted that the baseline in column one includes changes proposed in ICAO state letter “19-0492 CL NAT SUPPs PfA Serial no EURNAT-S 19-02-NAT” that have not yet been approved by the ICAO Council.
Communications failure prior to exiting NAT Region – Cleared on filed flight plan route		No change is proposed.
9.3.4 The pilot shall proceed in accordance with the last received and acknowledged		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
oceanic clearance, including level and speed, to the last specified oceanic route point, normally landfall, and then continue on the filed flight plan route. The pilot shall maintain the last assigned oceanic level and speed to landfall and, after passing the last specified oceanic route point, shall conform with the relevant State procedures/regulations.		
Communications failure prior to exiting NAT Region – Cleared on other than filed flight plan route		No change is proposed.
9.3.5 The pilot shall proceed in accordance with the last received and acknowledged oceanic clearance, including level and speed, to the last specified oceanic route point, normally landfall. After passing this point, the pilot shall conform with the relevant State procedures/regulations and rejoin the filed flight plan route by proceeding, via the published ATS route structure where possible, to the next significant point ahead as contained in the filed flight plan.		No change is proposed.
Note.— The relevant State procedures/regulations to be followed by aircraft in order to rejoin its filed flight plan route are specified in detail in the appropriate national Aeronautical		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
Information Publication.		
9.4 DEGRADATION OR FAILURE OF THE RNAV SYSTEM		No change is proposed.
9.4.1 Action by the pilot-in-command		No change is proposed.
Nil.		No change is proposed.
9.4.2 Action by the ATS unit		No change is proposed.
Nil.		No change is proposed.
9.5 LOSS OF VERTICAL NAVIGATION PERFORMANCE REQUIRED FOR RVSM		No change is proposed.
9.5.1 General		No change is proposed.
Nil.		No change is proposed.
9.5.2 Degradation of aircraft equipment – pilot reported		No change is proposed.
Nil.		No change is proposed.
9.5.3 Severe turbulence – not forecast		No change is proposed.
Nil.		No change is proposed.
9.5.4 Severe turbulence – forecast		No change is proposed.
Nil.		No change is proposed.
9.6 EN-ROUTE DIVERSION		No change is proposed.
Nil.		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
		It should be noted that the baseline in column one includes changes proposed in ICAO state letter "19-0492 CL NAT SUPPs PfA Serial no EURNAT-S 19-02-NAT" that have not yet been approved by the ICAO Council.
9.7 INTER-REGION INTERFACE FOR NON-RVSM-APPROVED AIRCRAFT		No change is proposed.
Nil.		No change is proposed.
9.8 MANNED BALLOON FLIGHTS		No change is proposed.
9.8.1 Manned balloon flights authorized to operate in the NAT Region shall operate outside the NAT HLA.		No change is proposed.
9.8.2 Within the NAT Region, manned balloons shall have a communications capability in accordance with Annex 2.		No change is proposed.
Chapter 10. PHRASEOLOGY		No change is proposed.
10.1 RNAV		No change is proposed.
Nil.		No change is proposed.
10.2 RNP		No change is proposed.
Nil.		No change is proposed.
10.3 SURVEILLANCE		No change is proposed.
Nil.		No change is proposed.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
10.4 AERODROME OPERATIONS		No change is proposed.
Nil.		No change is proposed.
10.5 ATFM		No change is proposed.
Nil.		No change is proposed.
Chapter 11. SEARCH AND RESCUE		No change is proposed.
11.1 INTERNATIONAL GENERAL AVIATION (IGA)		No change is proposed.
Nil.	~~Nil.~~	This should not be "Nil" because there is a provision there.
11.1.1 International general aviation (IGA) shall be equipped with functioning two-way radio communications equipment except that, under special local circumstances, the appropriate authorities may grant exemption from this requirement.		No change is proposed.
Chapter 12. METEOROLOGY		No change is proposed.
12.1 AIRCRAFT OBSERVATIONS AND REPORTS		No change is proposed.
	(A3 – Chapter 5)	No change is proposed.
Nil.	12.1.1 The Meteorological Group shall be included in every ADS-C periodic contract	New provision added to satisfy the Annex 3 paragraph 5.3.3 requirement that designation

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
	request.	procedures shall be subject to regional air navigation agreement. Annex 3 contains the following: [5.3 Routine aircraft observations — designation 5.3.1 Recommendation.— *When air-ground data link is used and automatic dependent surveillance (ADS) or secondary surveillance radar (SSR) Mode S is being applied, automated routine observations should be made every 15 minutes during the en-route phase and every 30 seconds during the climb-out phase for the first 10 minutes of the flight.* 5.3.3 In the case of air routes with high-density air traffic (e.g. organized tracks), an aircraft from among the aircraft operating at each flight level shall be designated, at approximately hourly intervals, to make routine observations in accordance with 5.3.1. The designation procedures shall be subject to regional air navigation agreement.] Reykjavík, Shanwick, Gander, New York and Santa Maria already request the MET group with periodic ADS-C reports and Bodö will add the met group to their ADS-C periodic reports.

1	2	3
Current baseline provisions	**Amendment proposals**	**Rationale/Notes**
Chapter 13. AERONAUTICAL INFORMATION SERVICES		No change is proposed.
13.1 NOTAM ADDRESSING AND DISTRIBUTION		No change is proposed.
Nil.		No change is proposed.
13.2 AERONAUTICAL CHART INFORMATION		No change is proposed.
13.2.1 Visual procedures		No change is proposed.
Nil.		No change is proposed.

Notes

1. The PANS-ATM specifies the following:

4.4.1.1 A flight plan form based on the model in Appendix 2 should be provided and should be used by operators and air traffic services units for the purpose of completing flight plans.

4.4.1.3 Operators and air traffic services units should comply with:

a) the instructions for completion of the flight plan form and the repetitive flight plan listing form given in Appendix 2; and

b) any constraints identified in relevant Aeronautical Information Publications (AIPs).]

2. PANS-ATM section 9.1.3.5 is as follows:

9.1.3.5 TRANSMISSION OF SPECI AND AMENDED TAF

9.1.3.5.1 Special reports in the SPECI code form and amended TAF shall be transmitted on request and supplemented by:

a) directed transmission from the appropriate air traffic services unit of selected special reports and amended TAF for the departure, destination and its alternate aerodromes, as listed in the flight plan; or

b) a general call on appropriate frequencies for the unacknowledged transmission to affected aircraft of selected special reports and amended TAF; or

c) continuous or frequent broadcast or the use of data link to make available current METAR and TAF in areas determined on the basis of regional air navigation agreements where traffic congestion dictates. VOLMET broadcasts and/or D-VOLMET should be used to serve this purpose (see Annex 11, 4.4).

9.1.3.5.2 The passing of amended aerodrome forecasts to aircraft on the initiative of the appropriate air traffic services unit should be limited to that portion of the flight where the aircraft is within a specified time from the aerodrome of destination, such time being established on the basis of regional air navigation agreements.

3. Proposed changes to Table 1 in section 3.6.2.1.3:

HF NAT family	*Route or portion of route flown*	*Radio stations*	*Remarks*
D	Aircraft flying routes with reporting point coordinates north of 62°N	Bodø Gander Iceland Shanwick	During off-peak periods and when watch is reduced on other families, Family D should remain the primary assignment for aircraft flying north of 62°N.
B and C	Aircraft flying routes with reporting point coordinates between 47°N and 64°N	Gander Iceland Shanwick	In order to ensure even peak-time distribution of traffic between Family B and C, aircraft may be assigned to either family on the basis of State of Registry, airline company or other such criteria as agreed between Shanwick Radio and Gander Radio.
F	Aircraft flying routes entirely within the Gander and Shanwick areas	Gander Shanwick	Hours of operation of Family F shall be coordinated on a tactical basis between Shanwick Radio and Gander Radio.

HF NAT family	*Route or portion of route flown*	*Radio stations*	*Remarks*
A	Aircraft flying routes with reporting point coordinates between 43°N and 47°N	Gander New York Santa Maria Shanwick	~~During off-peak periods and when watch is reduced on other families, Family A should remain the primary assignment for aircraft flying south of 43°N.~~ Santa Maria: Aircraft flying routes with reporting coordinates between 45N and 43N may be assigned other frequencies from HF NAT Family E and/or HF RDARA H (additional details available in ICAO NAT DOC 003 and Portugal AIP.)
E	Aircraft flying routes with reporting point coordinates south of 43°N	New York Santa Maria	~~During off-peak periods and in the case of reduction of the number of available families, the guard of this family should be discontinued.~~ Santa Maria: Aircraft flying routes with reporting point coordinates South of 43N may be assigned other frequencies from HF NAT Family A or HF RDARA Family H (additional details available in ICAO NAT DOC003 and Portugal AIP.)

4. Questions sent to and answers received from the NAT MWG Rapporteur concerning Doc 7030 provisions 7.2.2.1.2 and 7.2.3.1.1. regarding airspace monitoring:

Questions:

a) Does the NAT MWG use the parameters specified in 7.2.2.1.2 and 7.2.3.1.1 in the NAT monitoring?

b) If yes, are they only used for New York or also for the other FIRs?

c) If no, what monitoring parameters is the MWG using for lateral separation?

d) Do you have any general thoughts regarding those Doc 7030 provisions?

Answers:

a) No – the MWG does not reference those lateral monitoring values anymore. We recently revised the lateral risk methodology to incorporate both deviation magnitude and the time spent in deviation. This is possible due to the availability of position data through increased use of ADS-C and ADS-B in NAT HLA. Because there are multiple lateral separation standards available in NAT HLA, the impact of each reported occurrence on the risk estimate takes into account the qualifications of the aircraft involved (e.g. filed RNP, RCP, and/or RSP).

b) The lateral risk estimates produced by the MWG apply to all of NAT HLA not just to specific OCAs.

c) There are not specific lateral monitoring parameters similar to those listed in the 7030 for ZNY. Whether or not the TLS is met depends on several factors, most importantly the time spent on the incorrect route (lateral deviations) or number of routes crossed without clearance. The other factors have to do with the airspace itself – number of flying hours, occupancy/density of the traffic, etc. If the 7030 requires these monitoring values, we can provide them (I would need a little time to put those together).

d) Those 7030 provisions come from the collision risk modelling done in support of the lateral standards themselves. They are meant to provide a rule-of-thumb for whether the TLS can be met in an airspace. These provisions are useful when considering implementation. However, the provisions rely on the ability to account for the deviation flying time while off route and were not particularly useful for airspace monitoring once the standards were implemented (my opinion) – because it was difficult to account for both the deviation magnitude and flying time before ADS-C/ADS-B. For example, the flying time spent 25NM or more off route and the flying time spent between 40 and 60NM would be needed for the 50NM standard. Those proportions are based on the eta and zeta values assumed in the CRM for lateral overlap probability.

Appendix B:
NAT Doc 7030 Review Project Team meeting notes

<table>
<tr><td>Meeting 1</td><td>16 December 2020</td></tr>
<tr><td colspan="2">Doc 7030 Sections discussed:
All of Chapter 1
Chapter 2 up to 2.1.17 excluding 2.1.4 (MNPS).</td></tr>
<tr><td colspan="2">Notes:
1. The Terms of Reference were reviewed.
2. The list of PT members was reviewed.
3. The arrangement to have weekly Teams meetings on Wednesday at 1300-1500 UTC was discussed. It is considered too cumbersome and will slow the progress of the PT to try to arrange each meeting to fit everybody.
4. Decisions that have been made regarding Doc 7030 material can be re-opened for further discussion, for example if a member misses a meeting.
5. Working methods and working documents were presented and discussed. There will be two documents; one “Meeting Notes” document to give a short overview of what was discussed at each meeting and the main Doc 7030 review working document. After each meeting, the working document will be saved with the date of that meeting and sent to all PT members with track changes of what was changed at that meeting. This way the non-attending members should be able to review what happened at the meeting.
6. Project high level task #1 discussed: “To establish a baseline for the NAT SUPPs, as the current working copy is not in a correct shape and has errors“. It was agreed that the baseline should be the Current NAT SUPPs working copy on the ICAO Paris website + amendments that the Council has already approved. Pending amendments will be highlighted in the working document.
7. All PT members are asked to review the baseline against the working document to ensure that no errors are made.
8. Reviewed the discussion section of NAT POG/10 WP/02 regarding the following:
a. Duplication of Annex and PANS provisions.
b. Prescription on the basis of regional air navigation agreements.
c. NAT data link mandate.
d. NAT HLA approval. NAT OPS Bulletin 001/2016 needs to be reviewed.
e. Separation.
9. Review of Doc 7030 was started.</td></tr>
</table>

<table>
<tr><td>Meeting 2</td><td>23 December 2020</td></tr>
<tr><td colspan="2">Doc 7030 Sections discussed:
2.1.5, 2.1.6, 2.1.7, 2.1.11.4, 2.1.18, 2.1.19, 2.2 – 2.4.
3.1 – 3.4
5.6
6.4.1.1, 6.4.1.1.3, 6.12.1.2</td></tr>
<tr><td colspan="2">Notes:
1. Reviewed action item list.
2. Regarding the Baseline for the NAT Doc 7030 work and E-mail from Sven that was forwarded to PT members on 22 December 2020. It was agreed to continue working with the two baseline documents that Sven listed (see below) and as the work progresses, try to identify any discrepancies that are not captured by those two documents:
a. Doc7030-NAT SUPPs - Web copy (EN) - Ed5 Amd9_latest version_191014 clean
b. 19-0492 CL NAT SUPPs PfA Serial no EURNAT-S 19-02-NAT
3. A “Notes” section was added at the end of the NAT Doc 7030 Review Working Document. This section will contain text that is too bulky for the cells in the main table. The text in the cells will in those cases refer to the Notes section. Example paragraph 2.1.2.1.
4. It was decided to use the phrase “NAT Organized Track” in Doc 7030 and it will be required to review how Doc 007 refers to the organized tracks.
5. Review of Doc 7030 was continued.</td></tr>
</table>

Meeting 3	**30 December 2020**
Doc 7030 Sections discussed: 3.1.1.1.1, 3.4.2, 3.4.3, section 3.5 (old 3.4), 3.6 (old 3.5), 3.7 (old 3.6), 3.8 (old 3.7). 4.1.1.5. Section 5.6. 6.12.1.2.	
Notes: 1. Reviewed action item list. 2. Regarding action 2-1: "*Review how Doc 007 refers to the organized tracks. Doc 7030 will use the words "NAT organized track*", the following was found in Doc 7030: "*an organized track*", "*any organized track*" and "*the organized tracks*". Doc 007 should be aligned with Doc 7030 in the future. 3. Regarding action 2-4: "*Investigate if New York East FIR should be counted in ADS-B section 5.6.1*", the USA confirmed that ADS-B services are not being provided in the New York Oceanic East FIR and that the FIR should therefore be removed from the list of FIRs in paragraph 5.6.1. 4. Review of Doc 7030 was continued.	

Meeting 4	6 January 2021

Doc 7030 Sections discussed:

1.2.1.1

Section 3.1.1, 3.2.3.6, section 3.4, 3.6.1

Section 4.1.1.5, 4.1.2.2, 4.1.2.3, section 4.2,

Section 5.2, section 5.3, section 5.4.

Section 6.1, section 6.3, section 6.4 excluding 6.4.1.3, section 6.5, section 6.6, section 6.7, section 6.8, section 6.10, section 6.11, section 6.12, section 6.13, section 6.14.

Section 7.1, Section 7.2.1.

Notes:

1. Reviewed action item list.
2. Regarding action 1-4 *"Send material relating to the F060 restriction in 1.2.1.1."*: Isavia ANS feels that there is a need to do some further research into this issue (such as data collection) and plan to submit a dedicated working paper to POG. Action closed.
3. Regarding action 2-5: "*Regarding section 6.12.1.2 (submission of FPLs). Check and confirm that transmission of FPLs to their ATS units is contained in their state AIPs"*. Norway, Portugal and Canada confirmed that this is contained in their AIPs. The action is still open for USA.
4. Regarding action 3-3: *"Review section 3.6.1 AFTN rationalization concerning AMHS"*. Ireland confirmed that this should remain as "Nil". Action closed.
5. Review of Doc 7030 was continued.

Meeting 5	13 January 2021

Doc 7030 Sections discussed:

2.1.13.1.

3.4.2, 3.5.2.1.1 Note, 3.5.2.1.2.

6.1.1.2, 6.4.1.1.2, 6.4.1.3.1, 6.12.1.2, 6.13.2.2, 6.13.4.1.

7.2.4, 7.2.5.

Chapter 8.

Chapter 9.

Chapter 10.

Chapter 11.

Chapter 12.

Chapter 13.

Notes:

1. There will be no PT meeting on 27 January due to the NAT SPG meeting at the same time. Invitations to meetings in February will be sent out tomorrow. Hope to finish the PT work before end of February. Members need to form an opinion on the major issues as soon as possible to facilitate the work.
2. Reviewed action item list.
3. Regarding action 3-4 *"Review NAT OPS bulletin 001/2016 concerning MNPS"*. Flimsy 2 was discussed. The Flimsy reviewed material concerning the MNPS to PBN transition in NAT SPG reports since 2015 and Doc 7030 changes since 2016. The conclusion was that NAT OPS Bulletin 2016_001 titled "*Re-naming of the NAT MNPSA to NAT HLA*" contained out-of-date and misleading information and should be removed from the ICAO Paris website. A NAT SPG working paper to that effect has already been submitted. The discrepancy between the NAT OPS Bulletin and current NAT Doc 7030 provisions may be the reason for some of the prevailing confusion regarding the MNPS to PBN transition. The action was closed.
4. Regarding action 2-5: "*Regarding section 6.12.1.2 (submission of FPLs). Check and confirm that transmission of FPLs to their ATS units is contained in their state AIPs"*. The USA confirmed that the relevant information is contained in their AIP and the action was closed.
5. Regarding action 3-2: *"Review Doc 7030 section 3.5.2.1 Assignment of voice traffic to HF families".* This provision was coordinated with the NAT radio stations and the conclusion was that Santa Maria want to propose a revision. The proposed revision will be coordinated with all NAT radio stations and then brought to the NAT Doc 7030 PT. The action remains open.
6. Regarding action 3-6: *"Check if the Note to paragraph 3.5.2.1.1 is still applicable"*. Canada confirmed that the Note is still applicable. The action is closed.
7. Review of Doc 7030 was continued.

<table>
<tr><td>Meeting 6</td><td>20 January 2021</td></tr>
<tr><td colspan="2">Doc 7030 Sections discussed:
3.1.1.1.1, 3.4.3, 3.6.2.1.2, 3.6.2.1.3, Table 1.
4.1.1.5.1,
6.2, 6.2.1.
Chapter 7
12.1.</td></tr>
<tr><td colspan="2">Notes:
1. There will be no PT meeting on 27 January due to the NAT SPG meeting at the same time.
2. Reviewed action item list.
3. Regarding action 3-2: “Review Doc 7030 section 3.5.2.1 Assignment of voice traffic to HF families”. Santa Maria propose some revisions that have been coordinated with all NAT radio stations who have all agreed to the proposals. The action is closed.
4. Taking into account provisions in Annex 11 Section 3.4 “Separation minima” and the rules specified in the Foreword to Doc 7030, the group agreed on the following principles for documenting separation minima in Doc 7030 and NAT Doc 008 (refer to Flimsy 3 rev1):
  1. All separation minima used in the NAT must be documented in either the PANS-ATM or Doc 7030.
  2. PANS-ATM separation minima that are applied in a more restrictive manner in the NAT must be documented in Doc 7030 (“a mode of implementing procedural provisions in Annexes and PANS“).
  3. NAT Doc 008 will contain the separation minima from the PANS-ATM and Doc 7030 that are applied on a regional basis in the NAT and, when needed, describe the practical application of separation.
5. Review of Doc 7030 was continued.</td></tr>
</table>

Meeting 7	3 February 2021

Doc 7030 Sections discussed:

3.1.1.1.1, 3.4.3

4.1.1.5.1

5.5.3

6.2.2, 6.2.3, 6.2.4, 6.2.5, 6.2.6, 6.2.7.

7.2.2, 7.2.3, 7.2.4, 7.2.5.

Notes:

1. Reviewed action item list.
2. In the Working document "Rationale/Notes" column: gray background indicates that no change is proposed, green background indicates that the group has agreed on changes and orange background indicates that the group could not reach an agreement on changes. Changes were made to the background color for many cells to reflect this.
3. In many places the working document is, since last version, showing "Formatted: Highlight" for the Amended proposals column. There was not consistency in use of background color to indicate new text. This has now been amended to standardize on dark grey.
4. Regarding action item 2-2 "*Regarding section 3.1.1.1.1: Is there a need to prescribe RCP 240 on the basis of a regional air navigation agreement and include in Doc 7030? Or is it enough to only prescribe RCP 240 in the NAT region state AIPs and remove it from Doc 7030? In this regard note the wording of Annex 11 paragraph 2.8.1 "…. When applicable, ….." The same considerations apply to RSP 180 in section 5.1.1.1.1, RNAV 10 in section 4.1.1.1.1 and RNP 4 in section 4.1.2.1.1*". Iceland stated that it wanted to keep the prescriptions in Doc 7030. The action item is closed.
5. Regarding action item 2-3 "*Review and form an opinion on Section 3.4 CPDLC bearing in mind that RCP 240 performance is not mandated in the NAT. The same consideration applies to ADS-C and RSP 180 in section 5-5*". It was noted that the provisions in sections 3.4.3 (CPDLC) and 5.5.3 (ADS-C) were effectively requirements that ANSPs, CSPs and SSPs providing services in the NAT have to be RCP 240 compliant and the group agreed that those provisions should remain until at least the OPDLWG has finished its overhaul of the PBCS provisions in ICAO documents. The action item is closed.
6. Regarding action item 6-1: "*Review Flimsy 4 and consider if NAT SPG conclusions regarding TLS and PBCS should be added to Chapter 7 Safety Monitoring"*. The group noted that NAT safety related policies and implementation planning policies, including the TLS of 5×10^{-9} fatal accidents per flight hour, are documented in NAT Doc 001 sections 5:A and 5:B. The NAT SPG would determine if there was a need to include any of those in Doc 7030. The group therefore agreed to remove Doc 7030 section 7.2.2.1.1. The action item is closed.
7. Review of Doc 7030 was continued.

Meeting 8	10 February 2021
Doc 7030 Sections discussed: Chapter 1 Note at the very beginning. 2.1.4 3.1.1, 3.4.2 4.1, 4.1.1.5.1.4 Note 1 and 2, 4.1.2.1 5.1, 5.5.1, 5.5.2 6.2.7, 6.9	
Notes: 1. Regarding the requirement in4.1.1.1.2 and 4.1.2.1.2 that the aircraft and operator must be approved RNAV 10 (RNP 10) / RNP 4 by the State of the Operator or the State of Registry; one state was of the opinion that the provisions in Annex 6 Part I section 7.2, Part II section 2.5.2 and Part III section 5.2. did not ensure that a RNAV 10/RNP 4 approval had been granted and that those Doc 7030 provisions should remain. 2. It was questioned what was the reason for the words “or equivalent” in provisions 3.4.2 and 5.5.2 concerning the RTCA DO-258/EUROCAE ED-100 interoperability standards. Sven agreed to investigate the matter. 3. Review of Doc 7030 was continued.	

Meeting 9	17 February 2021
Doc 7030 Sections discussed: 4.1.1.1.2, 4.1.1.5.1.1, 4.1.1.5.1.2, 4.1.1.5.1.3, 4.1.1.5.1.4, 4.1.2.1.2 5.6.1 6.2.1.1, 6.2.7.1.1, 6.2.7.2.1, 6.2.7.3.1, 6.4.1.3 7.2.1, 7.2.2 9.1.1, 9.3.3, 9.6	

Notes:

1. Regarding the requirement in4.1.1.1.2 and 4.1.2.1.2 that the aircraft and operator must be approved RNAV 10 (RNP 10) / RNP 4 by the State of the Operator or the State of Registry; It was noted that at least one NAT state was of the opinion that the provisions in Annex 6 Part I section 7.2, Part II section 2.5.2 and Part III section 5.2. did not ensure that a RNAV 10/RNP 4 approval had been granted and that those Doc 7030 provisions should remain. It was also noted that some European states do not issue a specific PBN approval to their operators except for RNP AR APCH and RNP 0.3 (H) operations. The group agreed that further research into this issue was needed by appropriate NAT groups.
2. Regarding action 8-1 “Provide a list of paragraph/Notes that show a discrepancy in the definition of the vertical limits of the NAT HLA”; it was highlighted that these is not consistency between the vertical definition of MNPS airspace in 4.1.1.5.1.1 (between F285 and FL420), RVSM airspace in 4.2.1 (between FL290 and FL410 inclusive) and DLM airspace in NAT OPS Bulletin 2017-001 Rev 04 (FL290 to FL410 inclusive). It was agreed to recommend aligning the NAT HLA definition with the definition of the RVSM airspace.
3. Regarding action 8-2 “Check the rationale for 3.4.2 and 5.5.2 on the term “or equivalent”; It was explained that this referred to the possibility that some states might use industry documents that are equivalent with the referenced RTCA and Eurocae documents.
4. Review of Doc 7030 was finished.
5. Daft NAT POG working paper was reviewed.
6. Draft NAT Doc 7030 Review PT report was reviewed.
7. The working document version that goes into the PT report will not contain the meetings # markings in the third column cells. Those were just used to track the work between PT meetings.

Meeting 10	24 February 2021
Doc 7030 Sections discussed: 3.1 4.1.1.5.1.1 5.1 6.4.1.3	
Notes: 1. Review of Doc 7030 was completed. 2. NAT Doc 7030 Review PT report was finalized and approved. 3. NAT POG working paper was finalized and approved.	

Attendance List

Telecon #	1	2	3	4	5	6	7	8	9	10
Anthony Stevens UK CAA	X	X	X	X	X	X	X	X	X	
Arnar Sigurðsson Isavia	X				X	X		X	X	
Bard Larsen Norway CAA	X	X	X	X	X		X	X	X	X
Bjarni K. Stefánsson Isavia	X	X	X	X	X	X	X	X	X	X
Carlos Rodriquez IFALPA	X	X			X	X	X		X	
David Asgeirsson UK CAA			X	X	X	X		X		
Elkhan Nahmadov ICAO	X									
Iain Brown NATS	X	X	X		X	X	X	X	X	X
Jeffrey Miller IATA	X			X	X	X		X	X	X
Joe Ryan IAA	X		X	X	X	X		X	X	X
Kelly Dunn Nav Canada									X	X
Kenneth Voldenberg Avinor	X			X		X	X	X	X	X
Luis Tojais Nav Portugal		X	X	X	X	X	X	X	X	X
Lyn Terris Nav Canada		X	X	X	X	X	X	X	X	X
Nicola NiRiada IFATCA	X			X	X	X	X	X	X	X
Rich Stark IATA	X	X	X	X	X	X	X	X	X	X
Shawn Knight FAA	X	X	X	X	X	X	X	X	X	X
Steinunn Arnardóttir Isavia	X			X	X	X	X	X	X	
Sven Halle ICAO	X	X		X			X	X	X	
Trausti Magnússon Icetra	X			X	X	X	X		X	
Vincent Mcmenamy FAA	X	X		X	X		X	X	X	X

Appendix C:
Terms of Reference for the NAT Doc 7030 Review Project Team

Project Title	NORTH ATLANTIC DOC 7030 REVIEW PROJECT TEAM
Parent Group	NAT IMG
Project Supervisory body	NAT POG
Project Period	October 2020 – April 2021
Project Objective	To review and propose amendments to the NAT section of the ICAO Regional Supplementary Procedures.
Project High Level Tasks	1. To establish a baseline for the NAT SUPPs, as the current working copy is not in a correct shape and has errors 2. To review and propose amendments to the NAT section of the ICAO Regional Supplementary Procedures. 3. To submit proposals and report to NAT POG/11.
Membership	NAT ANSPs, NAT regulators, IATA, IBAC, IFALPA, IFATCA, IFALDA. Note: Other subject matter experts may also participate, as deemed appropriate by the Project Team.
Coordination Requirements	None.
Project Outcomes	Recommendations to NAT POG/11 concerning amendments to the NAT section of the ICAO Regional Supplementary Procedures.
Project Lead	Bjarni K. Stefánsson (NAT DMO).
Project Secretariat Support	ICAO EUR/NAT Office.

END

APPENDIX I — NORTH ATLANTIC MNPS/HLA&PBN APPROVAL PROJECT TEAM (NAT MHP PT)

(*paragraphs 5.2.5 and 5.2.6 refer*)

Project Title	NORTH ATLANTIC MNPS/HLA&PBN APPROVAL PROJECT TEAM (NAT MHP PT)
Parent Group	NAT SOG
Project Supervisory body	NAT SPG
Project Period	June 2021 – March 2022
Project Objective	1. To determine what steps are necessary to remove the requirement for a MNPS/HLA-specific approval for operation in the NAT HLA and develop appropriate Doc 7030 amendment proposals. 2. To clarify if there is a need to retain the NAT Doc 7030 provision that the aircraft and operator must be approved by the State of the Operator or the State of Registry.
Project High Level Tasks	1. MNPS/HLA related: a) Discuss and scrutinise the arguments for and against requiring an MNPS approval for operation in the NAT HLA. b) Based on the outcome of a), develop appropriate Doc 7030 amendment proposals. c) If the decision is to discontinue the MNPS approval for operation in the NAT HLA, then develop a NAT transition plan for discontinuation of the MNPS approval. 2. PBN related: a) Investigate the following opposing viewpoints: i) the need to retain the NAT Doc 7030 provision that the aircraft and operator must be approved by the State of the Operator or the State of Registry, because the globally applicable ICAO documentation does not ensure that an approval has been granted. ii) that the provisions in Annex 6 Part I section 7.2, Part II section 2.5.2 and Part III section 5.2 in connection with the guidance material provided in the Performance-based Navigation (PBN) Manual (Doc 9613) and the Performance-based Navigation (PBN) Operational Approval Manual (Doc 9997) ensure that an approval has been granted for the PBN capability filed in the FPL. iii) that some State`s do not issue a specific PBN approval to their operators except for RNP AR APCH and RNP 0.3 (H) operations. b) Based on the outcome of a), develop appropriate Doc 7030 amendment proposals if needed. 3. Report to NAT IMG/60, SOG/26 and SPG/58.
Membership	NAT SPG members, IATA, IBAC, IFALDA, IFALPA and IFATCA. *Note: Other subject matter experts may also participate, as deemed appropriate by the Project Team.*
Coordination Requirements	NAT IMG
Project Outcomes	1. Finalization of the NAT MNPS to PBN transition. 2. Clarification of what PBN related provisions are required in NAT Doc 7030.
Project Lead	TBD
Project Secretariat Support	ICAO EUR/NAT Office

APPENDIX J — UPDATE TO EUR AND NAT VACP (NAT DOC 006 PART II/EUR DOC 019)

(*paragraph 5.4.4 refers*)

Starts on next page

———————————

European and North Atlantic Office

EUR Doc 019,

NAT Doc 006, Part II

VOLCANIC ASH CONTINGENCY PLAN

—

EUROPEAN AND NORTH ATLANTIC REGIONS

EUR/NAT VACP

~~Edition 2.0.0 — July 2016~~Edition 2.0.1 — June 2021

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

EUROPEAN AND NORTH ATLANTIC OFFICE OF ICAO

International Civil Aviation Organization (ICAO)
European and North Atlantic (EUR/NAT) Office
3 bis, Villa Emile Bergerat
92522, Neuilly-sur-Seine CEDEX
FRANCE

e-mail	:	icaoeurnat@paris.icao.int
Tel	:	+33 1 46 41 85 85
Fax	:	+33 1 46 41 85 00
Web	:	http://www.icao.int/EURNAT/

Field Cod

TABLE OF CONTENTS

RECORD OF AMENDMENTS

The *Volcanic Ash Contingency Plan – European and North Atlantic Regions* (EUR/NAT VACP, EUR Doc 019, NAT Doc 006, Part II) –Edition 2.0.0 resumes the practice of a VACP common to both European and North Atlantic ICAO Regions.

Subsequent to an update to the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444) section 15.8 taking effect in November 2014, which transferred the responsibility for Volcanic Ash (VA) avoidance or the decision to fly or not to fly into an area of known or forecast VA contamination from Air Traffic Management (ATM) to Aircraft Operators (AO), there was a period when each of the EUR and NAT Region had its own VACP. Edition 2 of this document covers both EUR and NAT Regions, as was the case before November 2014 and the aforementioned change to the PANS–ATM (Doc 4444).

Proposal for amendments to the EUR/NAT VACP are processed according to the principles set forth in the *Document Configuration Management* sub-section in the foreword, at page 9 (paragraphs 0.0.21 and 0.0.22 refer). The space below is provided to keep a record of amendments to this document.

FOREWORD

0.0.1 Within and adjacent to the European (EUR) and North Atlantic (NAT) 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 coordination of information and the alerting of aircraft before and during a volcanic eruption and procedures to be followed.

0.0.2 Volcanic ash is a hazard to flight operations. It is important to note that other contaminants are also associated with volcanic activity.

0.0.3 To mitigate the hazards of volcanic contamination aircraft operators need to obtain information and support from many different sources including Air Traffic Management (ATM[1]). The management of air traffic will be impacted proportionally to the extent and nature of the contamination. The issue cannot be resolved by individual stakeholders in isolation but needs collaborative decision making (CDM) involving all entities concerned.

0.0.4 Contingency planning for major service disruptions, such as that caused by volcanic ash, needs to encompass the whole ATM Community[2] as defined in ICAO's *Global Air Traffic Management Operational Concept* (Doc 9854). While general provisions exist for ATM Contingency Planning in Annex 11 [*Air Traffic Services*] and in the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444), and some aspects are addressed in the *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds* (Doc 9691 and in the *Handbook on the International Airways Volcano Watch* (IAVW Handbook, Doc 9766), ICAO's International Volcanic Ash Task Force (IVATF) developed comprehensive Guidance Material for ATM Volcanic Ash Contingency Planning in the form of a template.

0.0.5 This document is based on all of these sources and the needs and experience of the members of the ATM community in the EUR and NAT Regions of ICAO. While it focuses on the provision of ATM related services to airspace users within the frameworks of International Airways Volcano Watch (IAVW) and EUR Crisis Management, it also establishes the connection to all relevant interfaces, such as the International Airways Volcano Watch, Meteorological Services, Flight Operations and Aerodromes. Wherever possible, duplication of text from other ICAO and industry documents is avoided by reference to the source.

0.0.6 This common EUR/NAT Volcanic Ash Contingency Plan (VACP) is based on the following principles that are rooted in the Standards of various ICAO Annexes. States have the responsibility to establish and supervise the requirements on flight operations and the provision of the necessary services.

0.0.7 The airspace users have (full and final) responsibility for the safety of flight operations in accordance with their Safety Risk Assessment (SRA) as accepted by their State's authority. This includes the decision about operation in airspace where volcanic ash is present or forecast (Annexes 6

[1] *ATM is defined in PANS-ATM (Doc 4444) as "The dynamic, integrated management of air traffic and airspace including air traffic services, airspace management and air traffic flow management — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions."*

[2] *ATM Community is defined in Doc 9854 as "The aggregate of organizations, agencies or entities that may participate, collaborate and cooperate in the planning, development, use, regulation, operation and maintenance of the ATM system."*

[*Operation of Aircraft*], and 19 [*Safety Management*]; *Manual on Flight Safety and Volcanic Ash* (Doc 9974) refer).

0.0.8 The Air Navigation Service Providers (ANSP) act to achieve the objectives of the *Air Traffic Services* (Annex 11), which are (inter alia) to:

- prevent collisions between aircraft;
- expedite and maintain an orderly flow of air traffic;
- provide advice and information useful for the safe and efficient conduct of flights.

0.0.9 States are furthermore obliged to ensure, inter alia, appropriate *Meteorological Services for International Air Navigation* (Annex 3) and *Aeronautical Information Services* (Annex 15).

0.0.10 Further principles of this contingency plan are that a cautious approach in case of limited information is adopted; and responses are scaled proportionally to the prevailing conditions.

0.0.11 When limited information is available, the initial procedures are conservative. With increasing amount of and confidence in the information the constraints on flight operations can be relaxed based on appropriate risk management.

0.0.12 Small eruptions might only need a local response, while significant or major eruptions are likely to trigger national, sub-regional, Regional or even inter-Regional activities.

0.0.13 The contingency plan aims to ensure the highest level of service possible, to support safe and efficient flight operations in adverse conditions.

0.0.14 This contingency plan is written to give sufficient background information and guidance to operational personnel, describing the end-to-end processes and information flows and referencing relevant Standard and Recommended Practices (SARPs) and Guidance Material.

0.0.15 While it is firmly rooted in the ICAO SARPs, this contingency plan is intended to provide the enabling support structure to implement best practices that serve the needs of the ATM Community.

0.0.16 Desired developments (e.g. an action plan on arrangements that still need to be implemented) may be listed as an attachment to support the planning of amendments and improvements.

0.0.17 The guidelines provided in this document assume that the operators follow the ICAO requirements regarding Safety Management Systems (SMS). Detailed guidance on Safety Risk Assessments (SRAs) for flight operations with regard to volcanic ash contamination can be found in the *Manual on Flight Safety and Volcanic Ash* (ICAO Doc 9974) and in Attachment X8~~Attachment X8Attachment X8~~ [*Regional Regulations, Means of Compliance and Guidance Material*~~*Regional Regulations, Means of Compliance and Guidance MaterialRegional Regulations, Means of Compliance and Guidance Material*~~].

0.0.18 Volcanic ash can also affect the operation of aircraft at aerodromes. Volcanic ash deposition at an aerodrome, even in small amounts, can result in the closure of the aerodrome until all the deposited ash has been removed. In extreme cases, the aerodrome may no longer be available for operation at all, resulting in repercussions on the ATM system, e.g. diversions, revised traffic flows, etc.

Structure of the Document

0.0.19 This document is organised in three levels:

i) A main body, common to both Regions;

ii) Appendices; and

iii) Attachments

0.0.20 Consistent with ICAO practice,

- **Appendices** to the document comprise material grouped separately for convenience but forming part of the main body of the document: information in VACP Appendices complement the main body text, and is therefore applicable to both Regions.

- **Attachments** to the document comprise material supplementary to the main body of the document, or included as a guide to the application of the provisions in the document: information contained in the VACP Attachments is applicable to individual Regions or sub-Regions, and may contain variations from the main body text. To this end, most of the attachments are therefore organised in three (3) sections, namely: EUR Region – Eastern Part, EUR Region – Western Part, and NAT.

Figure 1: European and North Atlantic Regions of ICAO

Document Configuration Management

0.0.21 Because this document is common to the ICAO EUR and NAT Regions, special care is to be taken when amending it, to avoid that an amendment proposed by one Region introduce modification disrupting for the other Region. Therefore, amendments to the EUR/NAT VACP will abide to the following principles:

a) Each Proposal for amendments (PfA) to the common EUR/NAT VACP is to be channelled through the appropriate working body in the ~~EANPG~~EASPG or the NAT SPG working structure, as seen fit, for initial assessment before further processing;

b) Each PfA to an Attachment is to be endorsed by either the ~~COG~~PCG or the NAT IMG, as appropriate, once assured that the impact to the resulting document was under control and limited to the content specific to the endorsing Region;

- the ~~COG~~PCG and NAT IMG, as appropriate, shall be informed about the existence of amendment(s) endorsed only by the other group due to the amendment(s) having an impact limited to only one ICAO Region (EUR or NAT); and

- PfAs to Attachments do not need to be approved (by the ~~EANPG~~EASPG and NAT SPG);

c) Each PfA to an Appendix or to the document main body is to be endorsed by both the ~~COG~~PCG and the NAT IMG, once assured that the impact to the resulting document was under control and all the modifications to the document fully developed in the PfA;

- PfA to Appendices do not need to be approved by the ~~EANPG~~EASPG and NAT SPG;

d) PfA to the document main body shall be approved by both the NAT SPG and ~~EANPG~~EASPG, once endorsed by the NAT IMG and ~~COG~~PCG;

0.0.22 If appropriate[3], a common date of applicability for the amended common EUR/NAT VACP should be determined for both NAT and EUR Regions, coordinated between the NAT IMG and ~~COG~~PCG. Approval by correspondence would be sought when time is critical.

[3] *A common date of applicability would not be required for a new version of the common EUR/NAT VACP subsequent to amendments having an impact limited to only one of the EUR or NAT Region.*

1. DEALING WITH THE HAZARD

1.0.1 During an eruption volcanic ash can reach and exceed the cruising altitudes of turbine-powered aeroplanes within minutes and spread over vast geographical areas within a few days. Encounters with volcanic ash may result in one or more of the following and other problems:

- malfunction, or failure, of one or more engines leading not only to reduction, or complete loss, of thrust but also to failures of electrical, pneumatic and hydraulic systems;
- blockage of pitot and static sensors resulting in unreliable airspeed indications and erroneous warnings;
- windscreens rendered partially or completely opaque;
- smoke, dust and/or toxic chemical contamination of cabin air requiring crew use of oxygen masks, thus impacting communications; electronic systems may also be affected;
- erosion of external and internal aircraft components;
- reduced electronic cooling efficiency leading to a wide range of aircraft system failures;
- aircraft need to be manoeuvred in a manner that conflicts with other aircraft;
- deposits of volcanic ash on a runway degrading braking performance, most significantly if the ash is wet; in extreme cases, this can lead to runway closure.

1.0.2 This list is not exhaustive and other unusual occurrences may develop.

1.0.3 In this context it should be noted that some aircraft types or engine technologies are more vulnerable to volcanic contaminants; any specific measures to be applied by the regulatory authorities for flight operations, would therefore need to take into account these differences.

1.0.4 Considering that a turbine-engine aircraft travels about 150 km (80 NM) in 10 minutes and that volcanic ash can rise to flight levels commonly used by these aircraft in half that time, a timely response to volcanic eruptions and volcanic ash in the atmosphere is essential. It is therefore imperative that information on the volcanic activity is disseminated as soon as possible.

1.0.5 In order to ensure the smooth implementation and effectiveness of the contingency plan in case of an actual volcanic eruption, volcanic ash training and exercising should be conducted (Section 2.7 [*Training and Exercising*] refers).

1.0.6 ICAO has set up the International Airways Volcano Watch (IAVW) to provide near-real-time information on the largest possible number of volcanic events that affect aviation. State volcano observatories (VO) shall monitor active or potentially active volcanoes and shall provide information to Area Control Centres (ACC), Meteorological Watch Offices (MWO) and Volcanic Ash Advisory Centres (VAAC). It should be noted that currently not all active or potentially active volcanoes are actually monitored. VAACs detect the existence and extent of discernible volcanic ash in the atmosphere in their area of responsibility and issue advisory information regarding the extent and forecast movement of the volcanic ash cloud.

1.0.7 Special air-reports on volcanic activity (prescribed in PANS-ATM – Doc 4444) and the information collected by the IAVW (detailed in IAVW Handbook – Doc 9766) in accordance with

SARPs of ICAO Annex 3 are elements of the input for the generation of volcanic ash advisories in alphanumeric (VAA) and graphic (VAG) forms. VAAs/VAGs are used by

- MWOs to derive Significant Meteorological information (SIGMET)
- airspace users for flight planning
- Air Traffic Service (ATS) units for contingency planning

1.0.8 The complexity of ATM operations in the EUR and NAT Regions requires well-coordinated and controlled actions to deal effectively and efficiently with volcanic ash in the airspace.

1.0.9 The Flight Information Centre (FIC)/ACC unit serves during a volcanic eruption as the critical communication link between affected aircraft in flight and the information providers. Commercial operators will coordinate actions with their flight crews en-route and affected air traffic services units. As this all results in increased workload for the ATS personnel involved, local procedures should address how this situation should be handled.

1.0.10 Due to the density of EUR and NAT traffic permanent ATS system capacity and air traffic flow management[4] (ATFM) arrangements[5] are in place in some parts of the Regions. The contingency plan details the (additional) arrangements in case of volcanic ash affecting the airspace.

1.0.11 The provisions of Annexes 3 [*Meteorological Services for International Air Navigation*], 15 [*Aeronautical Information Services*] (AIS), and related documents are the basis of the detailed instructions contained in this contingency plan. Airspace users need as much advance notification as possible on the status of a volcano and/or volcanic ash airspace contamination and/or volcanic ash deposition at airports for strategic planning and the execution of flights to ensure the safety of the flying public.

1.0.12 This contingency plan provides Regional guidance on airspace management measures that might be taken by competent authorities (e.g. the establishment and withdrawal of Danger Areas); and the creation and dissemination of Notices to Airmen (NOTAM)/ASHTAM and special air-reports on volcanic activity.

1.0.13 The contingency plan, including its Appendices[6] and Attachments[7], contains the organisation of the information flow as per Annex 3 [*Meteorological Services for International Air Navigation*] and the information flow relating to supplementary information.

[4] *The Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, ICAO Doc 4444), Air Traffic Flow Management (ATFM): A service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC) capacity is utilised to the maximum extent possible, and that the traffic volume is compatible with the capacities declared by the appropriate ATS authority.*

[5] *Manual on Collaborative Air Traffic Flow Management (ICAO Doc 9971) refers.*

[6] *Appendices, according to ICAO Practice, comprise material grouped separately for convenience but forming part of the main body of the document.*

[7] *Attachments, according to ICAO Practice, comprise material supplementary to the main body of the document, or included as a guide to the application of the provisions in the document. Information contained in an Attachment is applicable to individual Regions or sub-Regions, and may contain variations from the main body text.*

2. REGIONAL PREPARATION

2.0.1 The successful operation of air traffic in case of a volcanic ash event depends on coordinated arrangements. This section lists those issues which are common to both Regions. Attachments to the Contingency Plan contain the current details and arrangements agreed in the respective Region.

2.1 INTERNATIONAL AIRWAYS VOLCANO WATCH (IAVW)

2.1.1 Annex 3 [*Meteorological Services for International Air Navigation*], Chapter 3 obliges States to arrange the monitoring of active and potentially active volcanoes by selected State volcano observatories.

2.1.2 The IAVW Handbook (Doc 9766) details the responsibilities of volcano observatories.

2.1.3 In areas where volcanoes are not adequately monitored by volcano observatories, remote sensing technologies, such as observation by satellites, and pilot reports serve as the main sources of information about eruptions and volcanic ash. Annex 3 [*Meteorological Services for International Air Navigation*], paragraphs 4.8, 5.5 and 5.9 refer.

2.1.4 Flight crews are required to report observations of volcanic activity by means of a special air-report. Arrangements should be put in place to ensure that such information is transferred without delay to the appropriate agencies. Instructions for air reporting of volcanic activity and the special air-report of volcanic activity form (Model VAR) can be found in Appendix 1 of PANS-ATM (Doc 4444).

2.1.5 Special air-reports on volcanic activity are necessary to improve the knowledge base of the VAACs. The communication and dissemination of pilot reports on volcanic activity is described in Appendix 2~~Appendix 2Appendix 2~~ [*Pilot Reports*].

2.1.6 Volcanic Ash Advisory Centres (VAAC) are established in the UK (London VAAC) and in France (Toulouse VAAC) serving the eastern part of the NAT and most of Europe; and in Montreal and Washington for the western part of the NAT; the far eastern part of the EUR Region is served by VAAC Tokyo and VAAC Anchorage. Their area of responsibility and cooperation with other VAACs is described in Doc 9766 (Handbook on the IAVW). The VAACs follow a best practices approach agreed among them, that aims to achieve global harmonisation of their services.

2.1.7 VAACs provide approved and recognised information as defined in Annex 3 [*Meteorological Services for International Air Navigation*] that supports the SRA methodology applied by airspace users. Additionally, MET Offices collocated with VAACs London and Toulouse provide supplementary information[8]. Attachment X3~~Attachment X3Attachment X3~~ [*Description of* Selected VA Products~~*Description of* Selected VA Products*Description of* Selected VA Products~~] contains explanatory information about both Annex 3 [*Meteorological Services for International Air Navigation*], VA products, and supplementary information; this enables airspace users to understand the limitations of the products, and sources of information, when developing their SRAs and operational planning (Appendix 4~~Appendix 4Appendix 4~~ [*VAAC Checklist*] refers).

[8] *In this document "supplementary information" means additional information on volcanic activity available beyond that prescribed by ICAO SARPs (Attachment X3~~Attachment X3Attachment X3~~ [Description of Selected VA Products~~Description of Selected VA ProductsDescription of Selected VA Products~~] refers).*

2.1.8 To keep information about affected airspace as accurate as possible, so that restrictions to flight operations can be limited as much as possible, the VAACs should have arrangements with those States having suitable infrastructure (LIDAR networks, aircraft to provide in-situ measurements, etc) to allow the use of relevant data for the verification of actual volcanic ash (horizontal and vertical extent).

2.1.9 VAAC products should be amended as appropriate once information on observed volcanic ash has been verified.

2.1.10 Attachment X1 contains the Regional monitoring capabilities and arrangements.

2.2 INFORMATION FLOW

2.2.1 Information on areas of observed and/or forecast volcanic ash shall be disseminated in accordance with Annex 3 [*Meteorological Services for International Air Navigation*] and Annex 15 [*Aeronautical Information Services*].

2.2.2 The details of all communication channels need to be established in advance and be available in local contingency arrangements. Telephone numbers, e-mail addresses, URLs of websites etc should be kept up-to-date and saved on electronic systems for easy use (e.g. electronic phone book, internet browser bookmarks).

Templates for required messages and all relevant information for their completion shall be available locally.

2.2.3 Regional arrangements and example templates are available, as appropriate, in Attachment X2~~Attachment X2Attachment X2~~ [*Regional Information Flow Arrangements and Model Templates*~~*Regional Information Flow Arrangements and Model TemplatesRegional Information Flow Arrangements and Model Templates*~~] (e.g. EVITA[9], EACCC[10], teleconference procedures).

2.3 INFORMATION CONTROL

2.3.1 While the availability of required information is crucial for planning and execution of ATM operations and flight operations, recent events have shown that information overload can result from the inappropriate application of communication requirements.

2.3.2 Regional arrangements should be made to ensure availability of the necessary information in accordance with Annexes 3 [*Meteorological Services for International Air Navigation*] and 15 [*Aeronautical Information Services*].

2.3.3 States are encouraged to ensure the availability of guidance and procedures, on the range of information that may be used for the planning and execution of operations in their airspace (Appendix 3~~Appendix 3Appendix 3~~ [*State Checklist*]. and Appendix 5~~Appendix 5Appendix 5~~ [*ANSP Checklist*] refer).

2.3.4 Attachment X3 contains current Regional arrangements and agreements for information service provisions.

[9] *EVITA: European Crisis Visualization Interactive Tool for ATFCM (Air Traffic Flow and Capacity Management)*

[10] *EACCC: European Aviation Crisis Coordination Cell*

2.4 AIRSPACE MEASURES

The Chicago Convention reserves each contracting State the right, in the interest of public safety, temporarily to restrict or prohibit flying over the whole or any part of its territory.[11]

2.4.1 Annexes 11 [*Air Traffic Services*] and 15 [*Aeronautical Information Services*] define Restricted, Prohibited and Danger Areas and specify requirements for their identification and promulgation. Neither the Convention, nor any of the Annexes provide detailed guidance on the conditions that would necessitate the establishment of such areas, nor on specific procedures for their use. By inference of Article 12 of the Convention, over the High Seas only Danger Areas can be established. This is based on the United Nations Convention on the Law of the Sea (Montego Bay 1982).

2.4.2 In a volcanic ash scenario the State should ensure that the authority which is responsible for determining the need for and extent of Danger, Prohibited or Restricted Areas should have the appropriate competencies, including on flight operations. The facility should be available permanently.

2.4.3 Whereas Danger Areas traditionally were absolutely avoided by aircraft, current safety management practices might allow the operation of (certain) aircraft in accordance with an appropriate Safety Risk Assessment (SRA). Although ATM normally expects aircraft to avoid Danger Areas established in connection to a volcanic ash event, the final decision regarding the route to be flown, whether it will be to avoid or proceed through an area of volcanic ash or activity, is the flight crew's responsibility.

2.4.4 Attachment X4~~Attachment X4Attachment X4~~ [*Guidance on the Establishment, Amendment and Withdrawal of Danger Areas*~~*Guidance on the Establishment, Amendment and Withdrawal of Danger AreasGuidance on the Establishment, Amendment and Withdrawal of Danger Areas*~~] describes the procedures for the use of Danger Areas.

2.5 AIR TRAFFIC FLOW MANAGEMENT – ATFM

2.5.1 Annex 11 [*Air Traffic Services*] paragraph 3.7.5 states that Air Traffic Flow Management shall be implemented for airspace where air traffic demand at times exceeds, or is expected to exceed, the declared capacity of the air traffic control services concerned.

2.5.2 Volcanic ash in airspace may result in a significant number of aircraft being re-routed into adjacent, non-affected areas. Regional arrangements should aim to provide sufficient capacity to safely and efficiently accommodate the revised traffic flow.

2.5.3 Regional ATFM units should be the ideal information pools and communication nodes for contingency situations and could be set up to support collaborative decision making (CDM) between ANSPs, Civil Aviation Authorities (CAA), VAACs, Meteorological Watch Offices (MWO) and airspace users.

2.5.4 Where permanent ATFM arrangements do not exist or cannot cope with the consequences of disruption caused by volcanic ash, contingency measures should be developed and agreed between the ANSPs and the airspace users. Attachment X5~~Attachment X5Attachment X5~~ [*Air Traffic Flow Management arrangements*~~*Air Traffic Flow Management arrangementsAir Traffic Flow Management arrangements*~~] contains some existing Regional and sub-regional ATFM arrangements.

[11] *Chicago Convention (ICAO Doc 7300), Article 9 refers.*

2.6 CRISIS MANAGEMENT ARRANGEMENTS

2.6.1 The nature of extraordinary contingency situations might require decision-making on a higher level than that of normal operations and beyond ATM. Arrangements should be in place to share information with national, Regional and sub-regional disaster management services that may have been implemented to address the crisis. These measures are to assure the delivery of essential goods through alternative means of transport in case of prolonged non-availability of airspace or airports, or the evacuation of humans from hazardous areas.

2.6.2 Regional and/or sub-regional crisis management arrangements are detailed in Attachment X6~~Attachment X6~~~~Attachment X6~~ [*Crisis Management Arrangements*~~*Crisis Management Arrangements*~~~~*Crisis Management Arrangements*~~].

2.7 TRAINING AND EXERCISING

2.7.1 It is important to appropriately train personnel that may be involved in volcanic ash contingency operations, so that they have the necessary competency[12] of their own area of responsibility, and have awareness of the information needs and the impact on stakeholders.

2.7.2 System-wide response to volcanic ash events shall be tested by the conduct of regular exercises. Doc 9766 Appendix F contains *Guidance for conducting volcanic ash exercises in ICAO Regions*. The collection and documentation of relevant data on system performance is a key objective of exercising. Subsequent analysis of exercises and actual events should be used to develop improvements to the Regional and global volcanic ash contingency procedures.

2.7.3 Attachment X7~~Attachment X7~~~~Attachment X7~~ [*VOLCEX Arrangements*] contains information on the Regional and/or sub-regional volcanic ash exercise arrangements.

2.8 REGULATIONS, MEANS OF COMPLIANCE AND GUIDANCE MATERIAL

2.8.1 States determine which Regulations and Directives they need to implement to ensure compliance with the global and Regional requirements.

2.8.2 Attachment X8~~Attachment X8~~~~Attachment X8~~ [*Regional Regulations, Means of Compliance and Guidance Material*~~*Regional Regulations, Means of Compliance and Guidance Material*~~~~*Regional Regulations, Means of Compliance and Guidance Material*~~] contains references to relevant Regional and sub-regional (non-ICAO) regulations and guidance material.

2.9 OPERATORS FROM OUTSIDE THE REGION

2.9.1 Regional contingency planning should be transparent to all users, and take account, as far as practical, of operators from outside the Region to ensure that they are familiar with the Regional operations.

[12] ***Competency.*** *A combination of skills, knowledge and attitudes required to perform a task to the prescribed standard.*

3. RESPONSE TO A VOLCANIC ASH EVENT

3.0 PHASES OF AN EVENT

3.0.1 The response to a volcanic event that impacts air traffic has been divided into four distinct phases in this document — a Pre-Eruption Phase, a Start of Eruption Phase, an On-going Eruption Phase, and a Recovery Phase — as follows:

PRE-ERUPTION PHASE (when applicable): The initial response, "raising the alert", commences when a volcanic eruption is expected. It should be noted that sometimes volcanoes erupt unexpectedly without any alert being raised; hence the pre-eruption phase may be omitted.

START OF ERUPTION PHASE (when applicable): The start of eruption phase commences when information about the outbreak of a volcanic eruption becomes available.

ON-GOING ERUPTION PHASE: The on-going eruption phase commences with the issuance of the first complete volcanic ash advisory (VAA) containing information on the extent and forecast movement of the volcanic ash cloud.

RECOVERY PHASE: The recovery phase commences with the issuance of the first VAA containing the statement "NO VA EXP" (i.e. "no volcanic ash expected") which normally occurs when it is determined that no volcanic ash is expected in the atmosphere and the volcanic activity has reverted to its non-eruptive state.

3.0.2 The Handbook on the International Airways Volcano Watch (Doc 9766) does not differentiate consistently between these different phases, which are functionally quite different. The Regional VA Contingency Plan lists the appropriate actions in the respective sections.

3.0.3 Although the four distinct phases herein describe actions to be undertaken during an actual volcanic event, they are based on a theoretical scenario. Actual eruptions may not always be distinct with respect to ATM actions to be undertaken. Similarly, an eruption may occur without any pre-eruptive activity, or may cease and restart more than once. Hence, the first observation may be the presence of an ash cloud, which is already some distance away from the volcano. It is essential that the contingency planning prepares the ATM system for an appropriate response depending on the actual conditions.

3.1 PRE-ERUPTION PHASE

General

3.1.1 Emphasis in this phase is placed on raising awareness of the potential hazard and to protect aircraft in flight. The actions shall be based on well-prepared, well-exercised contingency plans and standard operating procedures.

3.1.2 This phase is frequently characterised by a very limited availability of information on the potential extent and severity of the impending eruption. Notwithstanding the potentially limited extent of information available, the pre-eruption phase actions described below should be carried out for every expected eruption.

3.1.3 Volcano observatories shall provide the information on the state of the volcano showing pre-eruptive activity and notify their associated ACC, MWO and VAAC in form of the Volcano Observatory Notice for Aviation (VONA), as described in Appendix E of ICAO Doc 9766 (IAVW Handbook); Annex 3 [*Meteorological Services for International Air Navigation*], Appendix 2 para 4.1 refers.

3.1.4 If volcano observatories, VAACs or MWOs suspect volcanic activity in an area, they could request the appropriate ATS unit(s) to solicit Special air-reports on volcanic ash from suitable aircraft (route and altitude) at appropriate time intervals (e.g. every half hour).

3.1.5 Initial awareness of the event may be provided by means of a Special AIREP, VONA, satellite data, as well as other remote sensors. This information may lead to the production of the initial SIGMET, VAA/VAG, NOTAM as per the On-Going Eruption Phase. States should ensure that alerting information is distributed expeditiously by the most appropriate means to allow for the early warning of aircraft in flight.

3.1.6 VAACs should consider whether the information warrants the issuance of an initial Volcanic Ash Advisory (VAA).

3.1.7 Air operators and flight crews are expected to consider the potential effect of an eruption based on the operator's Safety Risk Assessment and standard operating procedures or to avoid the affected area.

Originating ACC/FIC Actions (eruption expected in its own FIR)

3.1.8 In the event of pre-eruption volcanic activity, which could pose a hazard to aviation, an area ACC or FIC when appropriate, on receiving information of such an occurrence, should carry out the following:

a) ensure that appropriate AIS messages are originated in accordance with Annex 15 [*Aeronautical Information Services*]. These must provide as precise information as is available regarding the activity of the volcano. It is imperative that this information is issued by the international NOTAM office and disseminated as soon as possible in accordance with the provisions of Annex 15;

b) when so required by the State, define an initial, precautionary danger area in accordance with established local procedures. The size of the danger area should encompass a volume of airspace around the volcano in accordance with the information available, aiming to avoid undue disruption of flight operations;

   i) if no such local procedures have been established, the danger area should be defined as a circle with a radius of 110 km (60 NM). The circle should be centred on the estimated or known location of the volcanic activity; in case of wind speeds exceeding 30 kts the danger area should be extended downwind by maximum half an hour of wind influence;

   ii) ATC would not normally initiate a clearance through a danger area, it will inform aircraft about the potential hazard and continue to provide normal services. It is the responsibility of the pilot-in-command to determine the safest course of action.

c) advise the associated MWO and MET service provider(s) in accordance with national/Regional arrangements (unless the initial notification originated from such provider(s)), who will then inform the associated Volcanic Ash Advisory Center (VAAC);

d) alert flights already within the area concerned and offer assistance to enable aircraft to exit the area in the most expeditious and appropriate manner. Flight crews should be provided with all necessary information required to make safe and efficient decisions in dealing with the hazards in the defined area. Aircraft that are close to the area should be offered assistance to remain clear of the area;

e) immediately notify other affected ACCs/FICs of the event and the location and dimensions of the area concerned. The ACC should provide information on potential implications on traffic flow and its capability to handle the expected traffic. Adjacent ACCs may be asked to reroute flights not yet coordinated to keep them clear of the area. It should be noted that flight crews make the decision whether or not to completely avoid the area based on, for example, visual observations;

f) review the local contingency plan;

g) advise the appropriate ATFM unit(s) and coordinate and implement ATFM measures if necessary to maintain the required level of safety; and

h) relax airspace restrictions when possible to facilitate efficient traffic flow.

In order to assist staff in expediting the process of composing the AIS messages, a series of templates should be available for this stage of the volcanic activity.

3.1.9 In addition to sending the relevant AIS messages to the normal distribution list, they will be sent to the relevant MWO(s), all VAACs, SADIS and the WIFS gateway (Appendix 2~~Appendix 2Appendix 2~~ [*Pilot Reports*] refers).

Adjacent ACC/FIC actions

3.1.10 During the pre-eruption phase, ATS units will inform aircraft about the potential hazard and continue to provide normal services. Adjacent ACCs/FICs should take the following action to assist:

i) gain and maintain awareness of the affected area and inform pilots that will or might be affected;

j) when requested by pilots of aircraft advised that they will be affected by the area, re-clear flights to which control services are being provided after coordination with other affected ACCs; and

k) unless otherwise instructed, continue normal operations and;

l) if future traffic is affected by the area, consider the potential impact and the necessity for ATFM measures.

ATFM Unit actions

3.1.11 Where an ATFM unit is established, it should, upon receipt of preliminary information on volcanic activity from an ACC or the lead VAAC, initiate actions in accordance with its procedures to ensure exchange of information in order to support CDM between air navigation service providers (ANSPs), meteorological watch offices (MWOs), VAACs and aircraft operators concerned.

3.2 START OF ERUPTION PHASE

General

3.2.1 This phase commences when information about the outbreak of a volcanic eruption becomes available, with volcanic ash being ejected into the atmosphere. The focus of the processes in this phase is to protect aircraft in flight and at aerodromes from the hazards associated with the eruption through the collection and dissemination of information.

When an eruption does not impact the airspace above and around the volcano (e.g. lava flow) the processes described in the pre-eruption phase may be applicable.

3.2.2 Volcano observatories should assess the information on the state of the volcano showing eruptive activity and provide notification to their associated ACC, MWO and VAAC in form of the *Volcano Observatory Notice for Aviation* (VONA), as described in Appendix E of the IAVW Handbook (Doc 9766) (Annex 3 [*Meteorological Services for International Air Navigation*], Appendix 2 para 4.1 refers).

3.2.3 VAACs should collect all relevant information and act in accordance with paragraph 4.5 of the IAVW Handbook (Doc 9766).

3.2.4 Major activities of the start of eruption phase are: issuance of relevant AIS and MET messages in accordance with Annexes 15 [*Aeronautical Information Services*] and 3 [*Meteorological Services for International Air Navigation*], respectively (as detailed in the IAVW Handbook (Doc 9766), paragraphs 4.3 and 4.4); as well as provision of information and assistance to airborne traffic.

3.2.5 As appropriate, danger areas may be declared by the authority which is responsible for determining the need for and extent of Danger, Prohibited or Restricted Areas, and published via NOTAM (in accordance with the "*Airspace Measures*" section of this contingency plan).

Originating ACC/FIC actions (eruption in its own FIR)

3.2.6 The ACC/FIC providing services in the FIR within which the volcanic eruption takes place should act in accordance with the ATS contingency procedures contained in the PANS–ATM (Doc 4444), paragraph 15.8 and the guidance in paragraph 4.2 of the IAVW Handbook (Doc 9766) and inform flights about the existence, extent and forecast movement of volcanic ash and provide information useful for the safe and efficient conduct of flights.

3.2.7 If necessary, rerouting of traffic should commence immediately or may be in progress if the alerting time has been sufficient to activate the pre-eruption phase. The ACC should assist in rerouting aircraft around the affected and/or danger area as expeditiously as possible. Adjacent ACCs should also take the affected and/or danger area into account and give similar assistance to aircraft as early as possible.

3.2.8 During the start of eruption phase, although ATC will not normally initiate a clearance through a danger area, it will inform aircraft about the hazard and will continue to provide normal services. It is expected that aircraft will attempt to remain clear of the danger area; however, it is the responsibility of the pilot-in-command to determine the safest course of action.

3.2.9 During the start of eruption phase the ACC/FIC should:

a) ensure that a NOTAM is originated to define a Danger Area delineated cautiously so as to encompass a volume of airspace in accordance with the limited information available. Until reliable information on the extent of the eruption is available, the guidance for precautionary Danger Areas should be followed. In determining the area, information on upper winds should be taken into account. The purpose is to ensure safety of flight in the absence of any prediction from a competent authority on the extent of volcanic ash in the airspace;

b) maintain close liaison with MWOs and, where appropriate, VAACs, who should issue appropriate MET messages in accordance with Annex 3 [*Meteorological Services for International Air Navigation*];

c) solicit as far as practicable special air-reports on volcanic activity from aircraft in the area concerned to enlarge the knowledge about volcanic ash in the airspace; and

d) devise, implement and update ATFM measures when necessary to ensure safe and efficient flight operations, based on MET observations and forecasts in cooperation with aircraft operators and the adjacent ACCs using the CDM process;

e) ensure that reported differences between published information and observations (pilot reports, airborne measurements, etc.) are forwarded as soon as possible to the appropriate authorities to ensure revision of incorrect information and its dissemination to all concerned;

f) begin planning for the on-going eruption phase in conjunction with the aircraft operators, the appropriate ATFM unit and ACCs concerned; and

g) initiate appropriate AIS messages in accordance with Annex 15 [*Aeronautical Information Services*] and the IAVW Handbook (Doc 9766), should significant reductions in intensity of volcanic activity take place during this phase and evidence confirms that the airspace is no longer contaminated by volcanic ash. Otherwise, begin CDM planning for the on-going eruption phase in conjunction with aircraft operators, the appropriate ATFM unit and the affected ACCs.

Adjacent ACC/FIC actions

3.2.10 During the start of eruption phase, adjacent ACCs/FICs should take the following actions:

- gain and maintain awareness of the affected area and inform flights that will or might be affected; and

- maintain a close liaison with the appropriate ATFM unit, aircraft operators and the originating ACC/FIC to devise, implement and update ATFM measures (including relaxation of airspace restrictions) which will enable safe and efficient flight operations; and

- begin planning for the on-going eruption phase in conjunction with the aircraft operators, the appropriate ATFM unit and ACCs/FICs concerned.

ATFM Unit actions

3.2.11 During the start of eruption phase, depending on the impact and/or extent of the volcanic ash cloud, the appropriate ATFM unit should organise the exchange of latest information on the developments with the associated VAACs, ANSPs, MWOs and operators concerned in order to support CDM.

3.2.12 The ATFM unit will apply ATFM measures on request of the ANSPs concerned. The measures should be reviewed and updated in accordance with latest information. Airspace measures should be relaxed as soon as the situation allows.

3.3 ON-GOING ERUPTION PHASE

General

3.3.1 The on-going eruption phase commences with the issuance of the first complete (i.e. including forecasts) volcanic ash advisory (VAA) by the responsible VAAC that contains information on the extent and expected movement of the volcanic ash cloud in accordance with Annex 3 [*Meteorological Services for International Air Navigation*] provisions. It may take up to 3 hours after start of eruption to issue this first complete VAA.

Volcanic ash advisory information in graphical format (VAG) should also be issued by the VAAC, containing the same information as its text-based VAA equivalent. (Doc 9766, paragraph 4.5.1).

3.3.2 The VAA/VAG should be used to:

- prepare appropriate AIS and MET messages in accordance with Annex 15 [*Aeronautical Information Services*] and Annex 3 [*Meteorological Services for International Air Navigation*] provisions, respectively; and

- plan the provision of air traffic services, including the application of appropriate ATFM measures.

ACC/FIC Actions

3.3.3 Volcanic ash may affect any combination of airspace; therefore it is not possible to prescribe measures to be taken for all situations. The following guidance therefore may prove useful during the on-going eruption phase, but should not be considered mandatory or exhaustive:

- The ACC/FIC will continue to act in accordance with the ATS Contingency Procedures contained in PANS-ATM (Doc 4444) Chapter 15.8 ;

- ACCs/FICs affected by the movement of the volcanic ash shall ensure that appropriate AIS messages are originated in accordance with Annex 15 [*Aeronautical Information Services*]. ACCs/FICs concerned and the appropriate ATFM unit should continue to publish details on measures taken to ensure dissemination to all concerned;

- the ACC/FIC should solicit special air-reports on volcanic activity if so requested by the appropriate VAAC;

- ACCs/FICs and ATFM units should be aware that for the purposes of flight planning and execution, operators could treat the horizontal and vertical extent of the volcanic ash contaminated area to be over-flown as if it were mountainous terrain; and

- any reported differences between published information and observations (pilot reports, airborne measurements, etc.) should be forwarded as soon as possible to the appropriate authorities to ensure revision of any incorrect information and its dissemination to all concerned.

ATFM Unit actions

3.3.4 The ATFM units will continue to apply ATFM measures on request of the ANSPs concerned. The measures should be reviewed and updated (including relaxation of airspace measures) in accordance with latest information. Depending on the impact and/or extent of the volcanic ash, the appropriate ATFM unit may take the initiative to organize teleconferences to exchange the latest information on the developments, in order to support CDM, with the VAACs, ANSPs and MWOs and operators concerned.

3.4 RECOVERY PHASE

3.4.1 The recovery phase commences with the issuance of the first VAA/VAG containing the statement "NO VA EXP" (i.e. "no volcanic ash expected") — which normally occurs when it is determined that the volcanic activity has reverted to its non-eruptive state and the airspace is no longer affected by volcanic ash. Consequently, appropriate MET and AIS messages should be issued in accordance with Annex 3 [*Meteorological Services for International Air Navigation*] and Annex 15 [*Aeronautical Information Services*], respectively.

3.4.2 ACCs/FICs and ATFM units should revert to normal operations as soon as practical.

LIST OF APPENDICES AND ATTACHMENTS

List of Appendices

Appendices *to the document comprise material grouped separately for convenience but forming part of the main body of the document: information in VACP Appendices complement the main body text, and is therefore applicable to both Regions.*~~***Appendices*** *to the document comprise material grouped separately for convenience but forming part of the main body of the document: information in VACP Appendices complement the main body text, and is therefore applicable to both Regions.****Appendices*** *to the document comprise material grouped separately for convenience but forming part of the main body of the document: information in VACP Appendices complement the main body text, and is therefore applicable to both Regions.*~~

List of Attachments

Attachments *to the document comprise material supplementary to the main body of the document, or included as a guide to the application of the provisions in the document: information contained in the VACP Attachments is applicable to individual Regions or sub-Regions, and may contain variations from the main body text. To this end, most of the attachments are therefore organised in three (3) sections, namely: EUR Region – Eastern Part, EUR Region – Western Part, and NAT.*~~***Attachments*** *to the document comprise material supplementary to the main body of the document, or included as a guide to the application of the provisions in the document: information contained in the VACP Attachments is applicable to individual Regions or sub-Regions, and may contain variations from the main body text. To this end, most of the attachments are therefore organised in three (3) sections, namely: EUR Region – Eastern Part, EUR Region – Western Part, and NAT.****Attachments*** *to the document comprise material supplementary to the main body of the document, or included as a guide to the application of the provisions in the document: information contained in the VACP Attachments is applicable to individual Regions or sub-Regions, and may contain variations from the main body text. To this end, most of the attachments are therefore organised in three (3) sections, namely: EUR Region – Eastern Part, EUR Region – Western Part, and NAT.*~~

Attachment X5 — Air Traffic Flow Management arrangements

Attachment X6 — Crisis Management Arrangements

Attachment X7 — VOLCEX Arrangements (GM in Doc 9766)

Attachment X8 — Regional Regulations, Means of Compliance and Guidance Material (References)

APPENDIX 1
—
ANTICIPATED FLIGHT CREW ISSUES WHEN ENCOUNTERING VOLCANIC ASH (INFORMATION FOR ATS PERSONNEL)

1. General issues concerning airborne observation of volcanic ash and the effect of volcanic ash on aircraft are contained in ICAO Doc 9691 (*Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds*). Specific instructions for pilots should be based on the recommendations of the original equipment manufacturers (OEM) and shall be contained in the operations manual.

Ash detection by flight crew

2. ATS personnel should be aware that flight crews may detect the presence of volcanic ash by the following means:

a) If VMC, visually

b) Reports from aircraft ahead

c) smoke or dust appearing in the cockpit

d) acrid odour similar to electrical smoke;

e) Increase in engine EGT[13], changing engine conditions;

f) at night,
   i. St. Elmo's fire/static discharges may be observed around the windshield, accompanied by a bright glow in the engine inlet(s);
   ii. sharp distinct shadows cast by landing lights as compared to the diffused shadows observed in clouds.

Flight crew and volcanic ash encounter

3. Once volcanic ash is encountered flight crew may have to deal with the following issues depending on the severity of the encounter:

a) smoke, fumes or dust appearing in the cockpit which may prompt the flight crew to don oxygen masks (this interferes with the clarity of voice communications);

b) multiple engine malfunctions, such as stalls, overtemperature (EGT), and thrust loss or complete failure of one or more engines. Engines may have to be shut down and restarted.

c) because of the abrasive effects of volcanic ash on windshields and landing lights, visibility for approach and landing may be markedly reduced or even be lost completely.

d) Should pitot tubes become blocked, airspeed indications may become unreliable. The pilots will probably disconnect the autopilot, set engine thrust to an appropriate value and maintain the aircraft's pitch attitude manually. This will keep the aircraft at a safe speed, but will probably result in difficulty to maintain the assigned altitude. Increased separation is required (above and below).

e) ATS personnel should be aware that a volcanic ash encounter may create extreme workload for pilots.

[13] *EGT = Exhaust Gas Temperature (this is a major parameter for determining operating limits of turbine engines).*

Appendix 1 (page 2 of 2)
— Anticipated Flight Crew Issues when Encountering Volcanic Ash —

4. Depending on the severity of the encounter, the reaction of the flight crew will be as follows:

a) Carry out the emergency drill for a volcanic ash encounter. This generally has the following elements:

i. Reduce thrust to idle if possible. *By reducing thrust, the temperature in the combustion section will be lower and less ash will deposit in the engine. Also lower thrust requires lower airflow (and ash) through the engine. To maintain a safe speed, the aircraft will have to descend. The resulting descent rate will be less that during an emergency descent due to pressurisation failure*.

ii. Execute a descending 180 degree turn. A turnback is usually the quickest route out of an ash cloud.

iii. Don oxygen masks if required. This may make communication on the flight deck and with ATC difficult.

iv. declaration of an emergency (MAYDAY MAYDAY MAYDAY) or request for an immediate reclearance possibly accompaniment by an urgency signal (PAN PAN; PAN PAN; PAN PAN). **Note:** the manoeuvre above may commence prior to an emergency or urgency being declared.

v. Carry out various emergency/non-normal drills as required, such as engine relight, unreliable airspeed, system failure drills.

vi. Communication with Cabin crew and passengers.

b) Diversion to the nearest suitable aerodrome.

c) If an aerodrome is contaminated with ash, the deceleration will be less than usual despite the use of maximum braking, resulting in a longer ground run. This may be aggravated by limited use of reverse thrust to avoid blowing up ash from the runway surface. If reverse thrust is necessary to bring the aircraft to a stop, a dust cloud may be raised.

Flight crew expectations from ATC

5. What the flight crew may require from ATC:

a) An immediate reclearance, laterally and/or vertically.

b) If carrying out the escape manoeuvre, ensuring other traffic is kept clear.

c) vectors to an area clear of ash if possible.

d) Information on the nearest suitable aerodrome and its weather and condition, including braking action. An aerodrome with a long runway.

e) vectors to an alternate and a priority landing.

f) If the windscreen is obscured, an autoland.

g) Emergency services for landing and provision of medical assistance for passengers and crew.

Note: *While carrying out an escape manoeuvre, and associated emergency/non-normal drills, the flight crew workload and the priority to control the aircraft may limit the ability of the crew to communicate to ATC and comply with ATC instructions.*

APPENDIX 2
—
PILOT REPORTS

Introduction

1. ICAO Annex 3 [*Meteorological Services for International Air Navigation*], paragraph 5.5, g) and h), prescribes that volcanic ash clouds, volcanic eruptions and pre-eruption volcanic activity, when observed, shall be reported by all aircraft. The ICAO *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444) contain detailed provisions on this special air report requirement in paragraphs 4.12.3 and 4.12.5, and the Volcanic Activity Report form in its Appendix 1.

2. In order to improve the rate of reporting and the sharing of information on volcanic ash encounters and observations in accordance with the above mentioned provisions (in-flight, via Special Air-Reports and post-flight via Volcanic Activity Report) the following procedures have been agreed for the EUR and NAT Regions. A high level of global harmonization is essential to achieve the desired level of implementation and consistency of the information.

3. The purposes of volcanic ash reporting and data collection; and the responsibilities and roles of the participants in the reporting process are described in detail in Appendix C of the Volcanic Ash ATM Contingency Plan Template (VAACPT), that can be found on the ICAO Portal under group EEVOLCEXSG.

4. With reference to the format of special air-report on volcanic ash, the EANPG/56 recognized the existence of various formats provided in the provisions (Annex 3 [*Meteorological Services for International Air Navigation*] and PANS-ATM [Doc 4444] refer). Consequently, the EANPG/56 agreed to Conclusion 56/13 that requests the appropriate ICAO working structure at the global level to consider harmonizing the format of special air-report on volcanic ash in Annex 3 and PANS-ATM (Doc 4444). As this task may take some time (years) to be completed, the various formats are used in examples below based on the current provisions and to whom they apply. In this context it is noted that the European Aviation Safety Agency (EASA) requires operators under their jurisdiction to report to EASA (report@easa.europa.eu) any encounter with volcanic ash or any other relevant maintenance and airworthiness related findings. The form referenced in EASA Safety Information Bulletin EASA_SIB_2010-17R6 contains the same basic information as the ICAO VAR form. Therefore it might be useful to consider the development of a single reporting form that addresses the need of all stakeholders.

5. Pilots should be aware that reporting *no volcanic ash* is important to verify information about airspace contamination from various sources that could lead to less airspace restrictions. Doc 9766, paragraph 4.7 requires that in the event of an eruption, operators should request their pilots to report, when appropriate, any observation related to a volcanic ash cloud including the absence of visible ash and all other relevant information such as observational conditions. The operator should then forward this information to the association VAAC in a timely manner. The best way to do so is to send this information by e-mail. The operational e-mail addresses of the VAACs are listed in Table 4-2 of Doc 9766.

6. “NO VISIBLE ASH OBSERVED” or “NO ASH VISIBLE” shall be reported in the “Other” plain text field of item 8 of the Special air-report of volcanic activity or VAR Form.

Appendix 2 (page 2 of 4)
— Pilot Reports —

7. When a flight is observing volcanic activity or contamination over a prolonged period during flight, a series of special air-reports on volcanic ash shall be made, so that a four-dimensional representation of the situation is created.

8. Pilots should be trained for airborne observations of volcanic activity/contamination to avoid an erosion of the credibility of special air-reports on volcanic ash. Improved instructions on the use of the Volcanic Activity Report Form are required to achieve high quality of information for the VAR users.

VAAC requirements

9. VAACs Montréal, Washington, London and Toulouse serve the NAT Region; VAACs London, Toulouse, Anchorage and Tokyo serve the EUR Region. Their requirements for receiving Special Air-Reports of Volcanic Activity are listed in Appendix-04.

Format and Routing instructions

10. For in-flight Special Air-Reports on Volcanic Activity and post-flight Volcanic Activity Reports, the form provided in PANS-ATM (Doc 4444) Appendix 1, section 2 shall be used.

Examples

Pilots:

11. Example referencing PANS-ATM (Doc 4444) Appendix 1, Part 1-Reporting instructions sections 1-4 and 9 is provided:

> “AIREP SPECIAL UNITED AIRLINES TREE TOO TOO POSITION FIFE FIFE ZERO TREE NORTH WUN SEVen ZERO TOO ZERO EAST FLIGHT LEVEL TREE ZERO ZERO CLIMBING TO FLIGHT LEVEL TREE FIFE ZERO VOLCANIC ASH CLOUD”

ATS unit:

12. The format used for forwarding of meteorological information received by voice communications to the associated meteorological watch office (MWO) is provided in subtitle 3 of Appendix 1 of PANS-ATM. An example is provided based on the information given by the pilot.

> ARS UAL322 5503N17020E 0105 F300 ASC F350 VA CLD=

MWO:

13. Example referencing Annex 3 [*Meteorological Services for International Air Navigation*], Appendix 6, Table A6-1 is provided based on information given by the ATS unit:

> ARS UA322 VA CLD FL300/350 OBS AT 0105Z N5503E17020=
> The MWO should send this message in accordance with regional dissemination schema such as RODEX in EUR region, and to:
>
> Appropriate Regional OPMET Data Bank
> Appropriate Volcanic Ash Advisory Centre

Appendix 2 (page 3 of 4)
— Pilot Reports —

Example:

MWO Yelizovo sends this information using the World Organization Abbreviated Header Line (WMO AHL) of UARA71 RUPK to:

Appropriate ROC – in this case, ROC Vienna at AFTN address LOWMMMXX which will then route to SADIS (EGZZWPXX) and WIFS (KWBCYMYX), according to the regional OPMET exchange schema.

Appropriate VAAC – in this case, VAAC Tokyo (fax: +81 (3) 3212 6446; email vac@eqvol2.kishou.go.jp; AFTN address RJTDYMYX)

When the volcanic crisis is announced by EACCC EVITA will receive Special Air-Reports and VARs through the information upload on the protected part of the EUROCONTROL NOP portal (~~https://www.nm.eurocontrol.int/PORTAL~~ https://www.nm.eurocontrol.int/PORTAL/gateway/spec/index.html

EVITA portlet). Only those professionally engaged in Air Traffic Management and Aircraft Operations who have applied for access, signed an Agreement and received the necessary rights, and therefore bound to EUROCONTROL NM Terms and Conditions may login and upload reports or access the NM Protected Applications to obtain the information.

To get the access, organizations professionally engaged in Air Traffic Management and Aircraft Operations, have to submit their request via the procedure described in the following link http://www.eurocontrol.int/network-operations/nm-operational-services-and-products. Technical requirements and instructions how to access or upload the volcanic observation can be found in the EVITA User's Guide available via the link at the bottom right hand side of the NOP Portal.

Tools and media for presenting and sharing the volcanic ash information

14. To report, transmit and disseminate information about visible or discernible ash, the following tools are used in the EUR and NAT Regions

a) VAA/VAG ('Info Source' and 'Remark' sections)

b) Radiotelephony and Data link Communications (Special Air Report)

c) VAR

d) NOTAM is issued for change in volcanic eruption status and is therefore possible that a special air-report could contribute to the evidence that would warrant a change in volcanic eruption status

e) SIGMET is issued by the MWO when volcanic ash is observed by aircraft, volcano observatory, ground-based radars, lidars or ceilometers or discernible on satellite.

f) Central data repository e.g. Network Manager(NM) Network Operations Portal (NOP)

g) EVITA: http://www.eurocontrol.int/services/evita-european-crisis-visualisation-interactive-tool-atfcm

h) Teleconferences

i) Periodic Bulletins with the set of information defined by the data providers and data users; e.g. Smithsonian Institution Weekly Bulletin.

j) Summaries containing general information and lessons learned from previous experience may be found on SKYbrary: http://www.skybrary.aero/

Appendix 2 (page 4 of 4)
— Pilot Reports —

APPENDIX 3
—
STATE CHECKLIST

1. States need to ensure that they have robust arrangements in place that can be activated when there is volcanic contamination in their airspace. These arrangements should be in line with global and regional provisions. The aim should be to create cooperation of all entities involved, including those from non-aviation sectors, as appropriate. Contingency arrangements shall ensure safe and efficient flight operations for most circumstances. Crisis management should be available to assist in situations resulting in major loss of network capacity.

2. The following checklist provides a list of areas that might need to be covered, but is not necessarily exhaustive.

3. It is envisaged the following organisations in a State will be required to provide information to their stakeholders during a volcanic eruption, when volcanic contaminants are present or expected in the airspace or on airports. Their activities need to be coordinated by those operating the State Crisis Management Plan (if available).

a) Department/Ministry for Transport;

b) National Supervisory Authority (Regulator);

c) ANSPs (En Route and Terminal);

d) Meteorological Office;

e) NOTAM Office;

f) Airlines and other airspace users;

g) Airports; and

h) Department/Ministry of Defence.

Preparatory Activities (see also ICAO Doc 9766, section 4.1)

4. States having active or potentially active volcanos in their territory should establish:

a) one or more Volcano Observatories; and

b) a routine process for monitoring messages produced by Volcano Observatories;

5. Each State should:

a) consider the use of available infrastructure or the implementation of new assets for the observation of volcanic contaminants; and review routinely their status

b) mobile radar, gas and seismological sensors, GPS stations, etc. for use at or near volcanos;

c) LIDAR networks and high-performance ceilometer networks; and

d) aircraft that can provide in-situ measurements.

e) implement and routinely review a State Volcanic Contamination policy and guidance (in particular also for VA Danger Areas);

f) establish and routinely review VA contingency plans, procedures, communication channels and message templates for all Stakeholders;

Appendix 3 (page 2 of 2)
— State Checklist —

g) establish and routinely update Staff Training activities (State and all stakeholders);

h) establish and routinely review Crisis management provisions (ideally taking into account non-aviation sectors);

i) establish a regular review and acceptance of new SRAs for State based operators (according to ICAO Doc 9974; or GM2 ORO.GEN.200(a)(3) to EU Regulation 965/2012 if applicable); and

j) participate in State and ICAO Regional VA exercises.

Crisis Management Activities

6. All States shall:

a) ensure that all those involved in crisis management are briefed in due time when exceedance of the capacity of contingency arrangements has to be expected;

b) activate State Crisis Management Plan (if appropriate);

c) activate State volcanic ash NOTAM / SIGMET process as an addition to the VACP process;

d) convene regular meetings of State Crisis Management Teams until situation returns to non-crisis circumstances;

e) take part in Regional / sub-Regional (e.g. EUROCONTROL / EACCC) Crisis Management teleconferences;

f) take part in regular teleconferences with airspace users (in particular airlines) operating in State FIR;

g) check VAAC guidance ahead of the provision of SIGMETs by MWOs; and

h) share volcanic contamination information from in situ sensors (e.g. LIDAR, Optical Particle Counter (OPC) and Aircraft) with other States and the responsible VAACs.

APPENDIX 4
—
VAAC CHECKLIST

1. VAACs and Volcano Observatories are elements of the *Air Navigation Plan* (ANP) Vol I

VAAC Procedures

2. Detailed VAAC responsibilities and procedures are contained in Annex 3 [*Meteorological Services for International Air Navigation*] to the convention on International Civil Aviation.

3. Standards and Recommended Practices (Annex 3 chapter 3.5)

   a) Technical specifications (Annex 3 Appendix 2.3)

   b) Volcanic Ash Advisory Example (Annex 3 Appendix 2 Example A2-1)

   c) Volcanic Ash Advisory Template (Annex 3 Appendix 2 Table A2-1)

4. Operational procedures and contact lists are documented in the *Handbook on the International Airways Volcano Watch* (IAVW Handbook, Doc 9766)

   a) MWOs and ACCs to which information is to be sent: refer to Doc 9766 Part5 (International airways volcano watch contact)

   b) VAAC Websites (by alphabetical order):

      i. VAAC Anchorage: ~~http://vaac.arh.noaa.gov/~~ https://www.weather.gov/vaac/

      ii. VAAC Montreal: ~~http://weather.gc.ca/eer/vaac/~~ https://weather.gc.ca/eer/vaac/index_e.html

      iii. VAAC London: ~~http://www.metoffice.gov.uk/aviation/vaac/~~ https://www.metoffice.gov.uk/services/transport/aviation/regulated/vaac/advisories

      iv. VAAC Tokyo: ~~http://ds.data.jma.go.jp/svd/vaac/data/~~ http://www.data.jma.go.jp/svd/vaac/data/index.html

      v. VAAC Toulouse: ~~http://www.meteo.fr/vaac/~~ http://vaac.meteo.fr/

      vi. VAAC Washington: ~~http://www.ssd.noaa.gov/VAAC/messages.html~~ https://www.ssd.noaa.gov/VAAC/washington.html

   c) Actions to be taken by VAACs in the event of a volcanic eruption: refer to Doc 9766 chapter 4.6.

   d) Collaborative Decision Analysis and Forecasting guidelines and procedures between VAACs for VAAs: refer to Doc 9766 chap 4.10.

   e) Guidance for Volcanic Ash Exercises: refer to Attachment X7~~Attachment X7Attachment X7~~ [*VOLCEX Arrangements*]

   f) VAAC Contact Numbers: refer to Doc 9766 Table 4-2.

   g) VAA Bulletin Headers: refer to Doc 9766Table 4-3.

   h) Co-ordination and handover procedures between VAACs: refer to Doc 9766 Appendix C.

   i) Back-up arrangements between VAACs London and Toulouse: refer to Doc 9766 Appendix D.

APPENDIX 5
—
ANSP CHECKLIST

Local instructions

1. Air Navigation Service Providers (ANSP) will ensure that suitable local instructions are in place at ATC facilities to enable staff at all levels of the organisation to manage a volcanic contamination contingency event safely and efficiently. These instructions be in accordance with the appropriate Volcanic Contamination Contingency Plan and will detail procedures necessary to deal with the ATC aspect of the contingency and also the interfaces with external agencies. These will include at a minimum, State regulators, adjacent ANSPs, Met Offices and the central ATFM unit (if any). These instructions may also detail the interface with the VAAC if appropriate.

2. Air Traffic Control provides services in a normal manner, including issuing reroute, flight level change and speed change clearances, to aircraft operating or planning to operate inside areas contaminated with volcanic ash when required due to traffic.It is the responsibility of the pilot-in-command to determine if such clearances can be safely accepted or not.

Personnel Training and Exercises

3. ANSPs will establish a training and exercise plan to ensure staff at all levels within the organisation involved in a volcanic contamination contingency can execute the procedures detailed in local instructions. Continuation training will be provided to ensure that staff maintain a level of proficiency which allows them to safely and efficiently manage a volcanic contamination contingency situation at any time.

4. In the EUR/NAT Region ANSPs will participate in regular volcanic ash exercises organised within the framework of the ICAO VOLCEX Steering Group which includes wide participation by ANSPs, AOs, VAACs, Met providers, state regulators and Network and Crisis Management units.

Communication links

5. ANSPs will have in place effective communication links with at least their state regulator, adjacent ANSPs, Met Offices and their central ATFM unit (if any). Communication links with the VAAC may also be established where appropriate.

ATFM and Crisis Management

6. Central ATFM units (if any) will facilitate information exchange among existing crisis management structures.

Dealing with the media

7. During a volcanic contamination contingency event ANSPs can expect a level of interest from the media. ANSPs will have in place as process for addressing any requests for information.

APPENDIX 6
—
AIRSPACE USER (OPERATOR) CHECKLIST

1. **SRA** (according to ICAO Doc 9974) within SMS (Annex 19 [*Safety Management*]; Doc 9859).

All following should be according to the Operator's SRA:

SOPs

2. Standard Operating Procedures (SOP**)** should be included in different Operations (OPS) Manual Parts (General & Definitions, Aircraft Specifics, Training) for both phases:

- FLIGHT EXECUTION
- FLIGHT PLANNING

Sources of information

3. To avoid information overload, the Operator should identify, prioritize & select the sources of information according to areas flown and as approved by its regulator, including Private Weather Service Provider, VAA, VAGs, European Concentration Charts, SIGMETS (OBS or FCST), Special AIREPs, NOTAMs & Surface weather METARs.

Procedures.

4. The Operator should establish acceptable areas within which it may fly: above, below or with or without a margin of a predicted contaminated area.

Volcano Eruption Required information for dispatchers and flight crews

5. FLIGHT EXECUTION :

a) Alert Flight Crews (ACARS, VHF, HF or SatCom…), FOC & Engineers/Maintenance.

b) Provide Volcano name & location, ash direction, Entry & Exit points of expected contaminated areas.

c) If possible & when distance permits: create an exclusion zone, establish wind direction to circumnavigate area.

d) Review Destination, alternate, ETOPS & Depressurisation aerodromes availability.

e) Review & provide ETPs & escape routes.

f) Specific instructions for Flight Crews & Operational Control in case of volcanic contamination are described in Ops Manual Part related to Aircraft Specifics.

g) Monitor updated information.

h) When available, pilot participation via pre-formatted ACARS messages (Special AIREPS): Visible Ash Yes/No.

i) FOC/Dispatch to Relay Special AIREPs to the European Network Manager (subregional procedure).

Appendix 6 (page 2 of 2)
— Airspace User (Operator) Checklist —

6. FLIGHT PLANNING :

a) Identify areas to be avoided.

b) Flight plan avoiding identified areas.

c) Establish Company Fuel policy (RCF, Contingency, …).

d) Avoid selecting ETOPS alternates & escape routes that are within predicted contaminated area.

e) Consider Depressurisation (O_2) time limits.

f) Provide related text and graphic in weather/flight brief.

Dedicated team

7. It is recommended to nominate a temporary team dedicated to monitor, disseminate & centralize updated information & participate in teleconferences & crisis contingency plans.

Training

8. Crew: OPS Manual (General & Definitions, Aircraft Specifics, Training)

9. Dispatch: Ops Manual (General & Definitions, Training)

10. Engineers/Maintenance: Ops Manual (Aircraft Specifics, Training)

11. Contents:

a) volcanic contamination hazards
   - general
   - aircraft specific

b) safety management principles

c) operator SMS and SRA

d) ATM contingency planning

e) planning of operations

f) executing of operations

g) handling of differences to planned operating conditions in flight

h) communications

Participation in volcanic contingency exercises (e.g. VOLCEX, VOLKAM)

APPENDIX 7
—
MWO CHECKLIST

The MWO role is crucial during a volcanic ash contingency. MWO's are responsible for producing VA SIGMET for their FIRs making use of information from VAACs and any other locally available information. These SIGMETs may subsequently be used in NOTAM production. The accuracy and timeliness of VA SIGMET production is very important for the effectiveness of mitigation actions and the safety and efficiency of air traffic.

Action taken by MWO in the event of a volcanic eruption:

- Pay attention to VAA/VAG produced by the appropriate VAAC (Montréal and Washington for western part of NAT; Toulouse and London for the eastern part of the NAT and the EUR Region west of 90°E; Tokyo and Anchorage for the EUR Region east of 90°E) as well as supplementary products provided by the MET offices co-located with VAACs Toulouse and London;
- Monitor information from volcano observatories in their area of responsibility;
- Immediately after the reception of any of those advisories, check within their area of responsibility for VA contaminated areas and;
- Issue SIGMET according to VAAC advisory information, special air-reports on volcanic ash and any other relevant information and/or measurements available;
- Assure that VA SIGMET format is compliant with provisions and SIGMET template of ICAO Annex 3 [*Meteorological Services for International Air Navigation*]; templates available in local instructions might help to achieve this;
- Advise ACC and VAAC whether or not the volcanic ash is identifiable from satellite images/data, ground based or airborne measurements or other relevant sources.
- Report differences between aircraft observations (e.g. ash encounters) or any other qualified source and the information published in VAA/VAG, SIGMET or NOTAM/ASHTAM to appropriate VAACs and MWO. The information should be passed immediately to adjacent MWO(s) downstream of the moving ash cloud;
- On reception, forward special air-reports on volcanic ash to appropriate VAACs, appropriate Regional OPMET Centre by AFTN which would then route to SADIS (EGZZWPXX) and WIFS (KWBCYMYX); Referencing Annex 3, Appendix 6, the format of a special air-report on volcanic ash is illustrated by the following example:

  ARS UA322 VA CLD FL300/350 OBS AT 0105Z N5503E17020=
- Coordinate as far as practicable with ACCs, adjacent MWOs and the VAAC concerned to ensure as much as possible consistency in VA analysis and forecast.
- Provide as far as practicable regular volcanic briefings, based on the latest available ash observations and forecasts, to ACCs, ATFM units, airport operators and aircraft operators concerned;
- Ensure that local instructions address VA contingency procedures;
- Ensure that all relevant staff are trained regularly to apply the VA contingency procedures;
- Participate in volcanic ash exercises.

ATTACHMENT X1

—

REGIONAL MONITORING CAPABILITIES OF VOLCANIC ACTIVITIES AND ARRANGEMENTS

Common to EUR and NAT Regions

Information sources are listed below:

Volcano Observatories and Volcanoes monitored

- Azores**:** http://www.cvarg.azores.gov.pt/Paginas/home-cvarg.aspx
- Canary Islands**:** http://www.ign.es/ign/layout/volcaVolcanologia.do
- Iceland**:** http://en.vedur.is/
- Italy**:** http://www.ingv.it/it/
- Eastern Russian Federation: http://www.kscnet.ru/ivs/kvert/van/

Satellites

- MSG**:** http://oiswww.eumetsat.org/IPPS/html/MSG/RGB/DUST/

LIDAR Networks

- France LIDAR network (webpage available early 2016)
- Germany DWD Ceilomap: http://www.dwd.de/ceilomap
- United Kingdom MO LIDARNET**:** http://www.metoffice.gov.uk/public/lidarnet/lcbr-network.html

EARLINET - http://earlinet.org/

TOPROF - http://www.cost.eu/COST_Actions/essem/Actions/ES1303

E-PROFILE- http://eumetnet.eu/e-profile

In-situ airborne monitoring

- France: http://www.safire.fr/web/index.php
- Germany: http://www.deutscher-wetterdienst.de/gsb/emergency/
  (*for username/password, email to*: luftfahrt@dwd.de)
- United Kingdom:
  http://www.metoffice.gov.uk/publicsector/emergencies/civil_contingency_aircraft

Aircraft Sensors

- AVOID: http://www.nilu.no/Nyhetsarkiv/tabid/74/language/en-GB/NewsId/261/AVOID-volcanic-ash-detection-technology-tested-on-Airbus-aircraft.aspx
- ZEUS: http://www.metoffice.gov.uk/news/releases/archive/2014/zeus

---

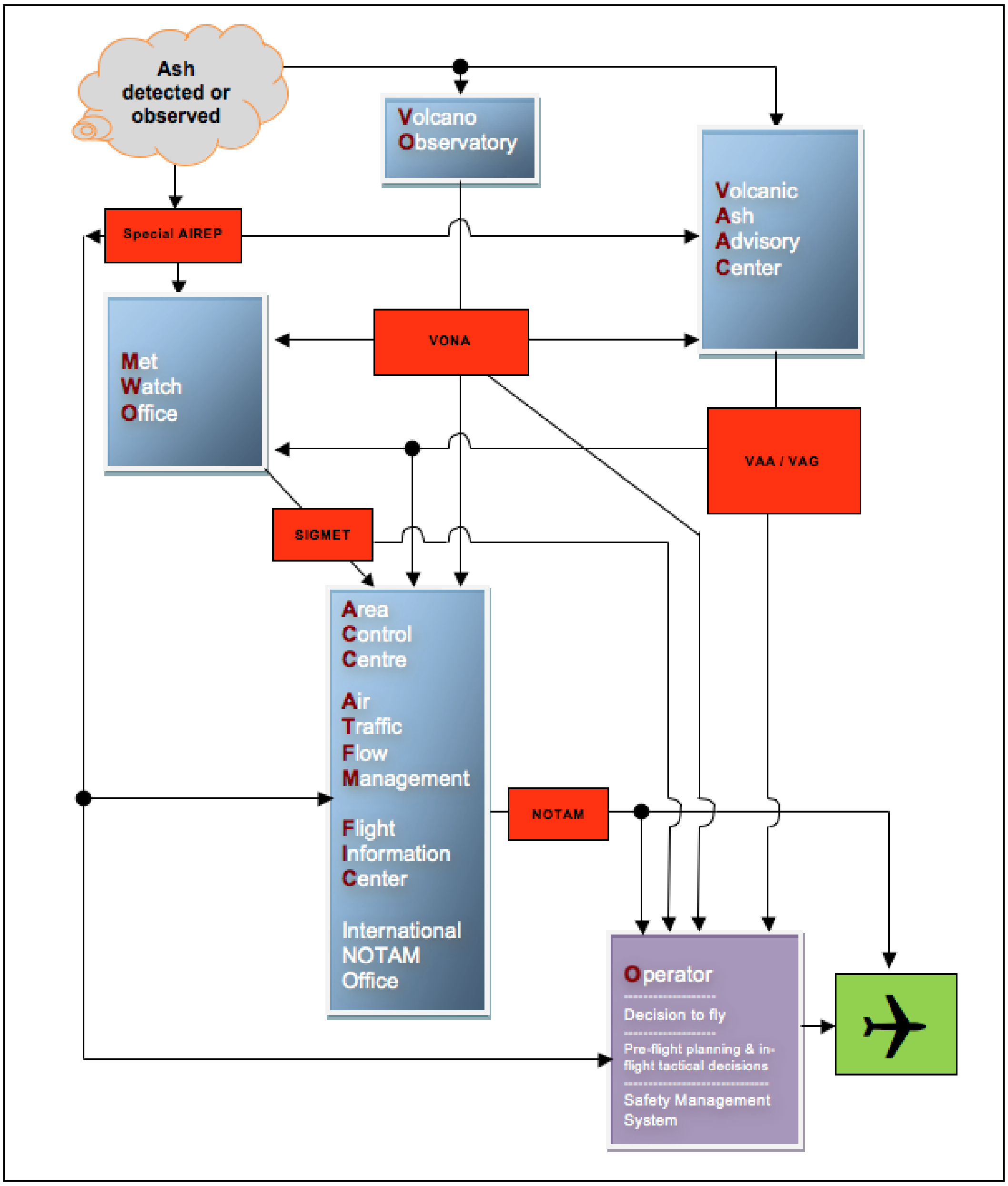
ATTACHMENT X2

—

REGIONAL INFORMATION FLOW ARRANGEMENTS AND MODEL TEMPLATES (ACCORDING TO GLOBAL STANDARDS; SUPPLEMENTED BY REGIONAL REQUIREMENTS)

EUR Region – Eastern Part

Information Flow schema



Attachment X2 (page 2 of 14)
— Regional Information Flow Arrangements and Model Templates —

VAAC

1. VAAC contact details:

- They can be found in ICAO Doc 9766 table 4-2 [VAAC Contact numbers]. Hyperlink: Doc 9766 VAAC contact points

Field Cod

2. VAAs (Volcanic Ash Advisory) and VAGs (Volcanic Ash Graphics)

The VAA template is described in Annex 3 [*Meteorological Services for International Air Navigation*], in Appendix 2, Table A2-1 [*template for advisory message for volcanic Ash*].

VAA examples:

```
VA ADVISORY
DTG: 20100101/0605Z
VAAC: TOULOUSE
VOLCANO: ETNA 211060
PSN: N3744 E01500
AREA:  ITALY
SUMMIT ELEV: 3330M
ADVISORY NR: 2015/12
INFO SOURCE: INGV, WEBCAM
AVIATION COLOUR CODE: RED
ERUPTION DETAILS: ERUPTION STARTED AT 0600Z
OBS VA DTG: 02/0600Z
OBS VA CLD: SFC/FL130 N3750 E01500 - N3800 E01550 - N3735 E01550 -
N3750 E01500 MOV E 45KT
FCST VA CLD +6HR: 02/1200Z SFC/FL130 N3750 E01505 - N3840 E01950 -
N3710 E01945 - N3750 E01505
FCST VA CLD +12HR: 02/1800Z NOT PROVIDED
FCST VA CLD +18HR: 03/0000Z NOT PROVIDED
RMK: PLEASE CHECK SIGMET FOR CURRENT WARNINGS.
NXT ADVISORY: NO LATER THAN 20150202/1200Z=

VA ADVISORY
DTG: 20100101/1500Z
VAAC: LONDON
VOLCANO: ORAEFAJOKULL 374010
PSN: N6400 W01639
AREA: ICELAND
SUMMIT ELEV: 2119M
ADVISORY NR: 2010/002
INFO SOURCE: IMO
AVIATION COLOUR CODE: RED
ERUPTION DETAILS: OBS ASH PLUME, EST 12KM FROM RADAR.
OBS VA DTG: 10/1500Z
OBS VA CLD: NO VA EXP
FCST VA CLD +6HR: 10/2100Z SFC/FL200 N6329 W01651 - N6517
W01614 - N6849 E00351 - N6742 E01549 - N6329 W01651
FL200/350 N6327 W01656 - N6600 W01444 - N6750 W00307 - N6854 E01550 -
N6718 E01833 - N6327 W01656
FL350/550 N6325 W01635 - N6450 W01625 - N6812 W00004 - N6841 E01441 -
N6726 E01653 - N6325 W01635
FCST VA CLD +12HR: 11/0300Z SFC/FL200 N6334 W01640 - N6526 W01629 -
N6945 E00502 - N6658 E03036 - N6327 E03908 - N6629 E00931 - N6334
W01640
FL200/350 N6329 W01701 - N6556 W01624 - N7009 E00806 - N6431 E04310 -
N6026 E04358 - N6709 E00854 - N6329 W01701
FL350/550 N6334 W01650 - N6551 W01547 - N6931 E01235 - N6439 E03929 -
N6128 E04027 - N6634 E01013 - N6334 W01650
FCST VA CLD +18HR: 11/0900Z SFC/FL200 N6327 W01717 - N6517 W01706 -
N6905 E00017 - N6949 E02107 - N6024 E05301 - N5804 E05147 - N6630
E01612 - N6327 W01717 FL200/350 N6327 W01645 - N6556 W01613 - N7054
```

Attachment X2 (page 3 of 14)

— Regional Information Flow Arrangements and Model Templates —

```
E01405 - N5925 E05658 - N5421 E04829 - N6717 E01018 - N6327 W01645
FL350/550 N6327 W01634 - N6634 W01510 - N7012 E01458 - N5953 E05349 -
N5558 E04930 - N6630 E01405 - N6327 W01634
RMK: ASH PLUME NOW OBS, ESTIMATED HEIGHT 12KM FROM RADAR. INCREASING
SEISMIC ACTIVITY.
NXT ADVISORY: WILL BE ISSUED BY 20150210/1800Z =
```

3. VAA and VAG dissemination:

a) VAA are sent by the VAACs to the MWOs and ACC/FICs following ICAO Doc 9766 Part 2 (hyperlink: ICAO Doc 9766 Part 2 on ICAO website).

b) The VAAs are to be sent onto AFTN.

c) They can be retrieved as the VAGs in the VAACs Websites

- VAAC London: VAAs & VAGs
- VAAC Toulouse: VAAs & VAGs
- VAAC Tokyo: VAAs & VAGs
- VAAC Montréal: VAAs & VAGs
- VAAC Washington: VAAs & VAGs

d) They can be retrieved as well in the secure SADIS FTP site (hyperlink: SADIS) and WIFS https service (hyperlink: WIFS).

Volcano Observatories (VO)

4. VONA (Volcano Observatory Notice to Aviation)

VONA is a recommended practice (Annex 3). The VONA template can be found in ICAO Doc 9766 Appendix E.

5. VONA example:

(1) VOLCANO OBSERVATORY NOTICE FOR AVIATION (VONA)

(2) Issued:	(20150202/0559Z)
(3) Volcano:	Etna 211060
(4) Current Color Code:	**RED**
(5) Previous Color Code:	ORANGE
(6) Source:	Etna Volcano Observatory
(7) Notice Number:	2015/0011/03E11
(8) Volcano Location:	3744N 01500E
(9) Area:	Italy
(10) Summit Elevation:	3300 m
(11) Volcanic Activity Summary:	EXPLOSIVE ACTIVITY AT NEW SE CRATER (NSEC) SUMMIT VENT - SIGNIFICANT ASH EMISSION OCCURS
(12) Volcanic cloud height:	UNKNOWN
(13) Other volcanic cloud information:	dark ash cloud at low elevation due to strong wind
(14) Remarks:	THE PHENOMENON IS DETECTED BY VIDEOSURVEILLANCE CAMERAS FROM 0558Z

(1) VOLCANO OBSERVATORY NOTICE FOR AVIATION (VONA)

(15) Contacts:	24/7 OE Control Room operator turnista@ct.ingv.it +39 095 7165800 Eugenio Privitera (OE Director) direttore.oe@ingv.it +39 095 7165800
(16) Next Notice:	A new VONA will be issued if conditions change significantly or the colour code is changes.

MWO

6. Volcanic Ash SIGMETs

a) The VA SIGMET template is described in Annex 3 [*Meteorological Services for International Air Navigation*], Appendix 6 [*Template for SIGMET and AIRMET messages*].

b) VA SIGMET examples:

```
LFMM SIGMET 1 VALID 020800/021200 LFPW-
LFMM MARSEILLE FIR/UIR VA ERUPTION MT STROMBOLI
LOC N3848 E01511 VA CLD FCST E OF E00900 SFC/FL200 MOV NW 40KT
FCST 1200Z N4415 E00700 - N4400 E00700 - N4315 E00945 - N4115 E00945 –
N4115 E00800 - N4045 E00800 - N4215 E00545 - N4345 E00545=
```

7. VA SIGMET dissemination

Appropriate Regional OPMET Centre – in this case, ROC Vienna at AFTN address LOWMMMXX, which would then route to SADIS (EGZZWPXX) and WIFS (KWBCYMYX) and be available to all stakeholders with a SADIS or WIFS account.

Appropriate VAAC – example: VAAC Tokyo at RJTDYMYX

Appropriate ACC and ATFM – example: ACC Petropavlovsk-Kamchatsky at UHPPZRZX and MATMC at UUUWZDZX

NOTAM office

8. NOTAMs (ASHTAMs)

An example of NOTAM related to Volcanic Ash follows:

```
(W2867/15 NOTAMR W2866/15
Q)LIRR/QWWXX/IV/NBO/W/000/999/3759N01525E087
A)LIRR B)1512090826 C)1512101812EST
E)VOLCANO ETNA ID211060, PSN COORDINATES 374403N0150014E, ELEV
10922FT/3330M, EXPLOSIVE ACTIVITY IS INCREASED AT SE CRATER
 SUMMIT VENT.
-SIGNIFICANT ASH EMISSION OCCURS.
GREY CLOUD OF ASH AND VAPOR GROWING ABOVE VOLCANO SUMMIT.
THE PHENOMENON IS OBSERVED BY VIDEOSURVEILLANCE CAMERAS.
ICAO LEVEL OF ALERT COLOUR: RED.
RMK: PILOTS SHALL WATCH OUT FOR RELEVANT SIGMET AND VOLCANIC
 ADVISORY PRODUCTS PROVIDED BY TOULOUSE VOLCANIC ASH ADVISOR
CENTER (VAAC) IF AVBL THROUGH WEB SITE.
HTTP://WWW.METEO.FR/VAAC/EVAA.HTML (LOWER CASE).
REF AIP ENR 5.3.3-1
F)GND
G)UNL)=
```

Field Code
Field Code
Field Code
Field Code

Attachment X2 (page 5 of 14)

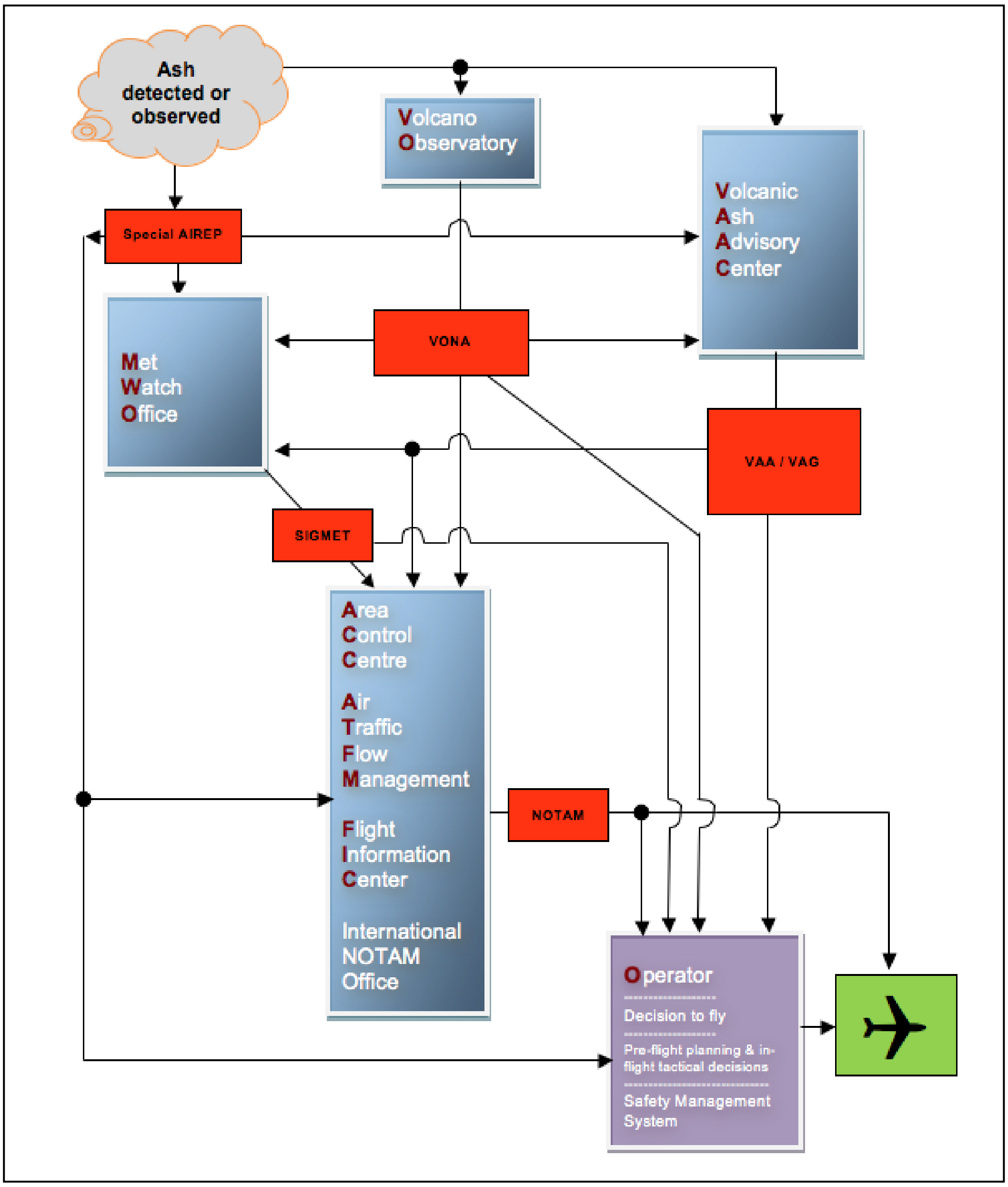
— Regional Information Flow Arrangements and Model Templates —

9. Messages dissemination

SADIS/WIFS Gateway at EGZZVANW

EUR Region – Western Part

Information Flow schema



VAAC

1. VAAC contact details:

- They can be found in ICAO Doc 9766 table 4-2 [VAAC Contact numbers]. Hyperlink: [Doc 9766 VAAC contact points]

Field Cod

Attachment X2 (page 6 of 14)
— Regional Information Flow Arrangements and Model Templates —

2. VAAs (Volcanic Ash Advisory) and VAGs (Volcanic Ash Graphics)

The VAA template is described in Annex 3 [*Meteorological Services for International Air Navigation*], Appendix 2, Table A2-1 [*template for advisory message for volcanic ash*].

VAA examples:

```
VA ADVISORY
DTG: 20100101/0605Z
VAAC: TOULOUSE
VOLCANO: ETNA 211060
PSN: N3744 E01500
AREA:  ITALY
SUMMIT ELEV: 3330M
ADVISORY NR: 2015/12
INFO SOURCE: INGV, WEBCAM
AVIATION COLOUR CODE: RED
ERUPTION DETAILS: ERUPTION STARTED AT 0600Z
OBS VA DTG: 02/0600Z
OBS VA CLD: SFC/FL130 N3750 E01500 - N3800 E01550 - N3735 E01550 -
N3750 E01500 MOV E 45KT
FCST VA CLD +6HR: 02/1200Z SFC/FL130 N3750 E01505 - N3840 E01950 -
N3710 E01945 - N3750 E01505
FCST VA CLD +12HR: 02/1800Z NOT PROVIDED
FCST VA CLD +18HR: 03/0000Z NOT PROVIDED
RMK: PLEASE CHECK SIGMET FOR CURRENT WARNINGS.
NXT ADVISORY: NO LATER THAN 20150202/1200Z=
```

```
VA ADVISORY
DTG: 20100101/1500Z
VAAC: LONDON
VOLCANO: ORAEFAJOKULL 374010
PSN: N6400 W01639
AREA: ICELAND
SUMMIT ELEV: 2119M
ADVISORY NR: 2010/002
INFO SOURCE: IMO
AVIATION COLOUR CODE: RED
ERUPTION DETAILS: OBS ASH PLUME, EST 12KM FROM RADAR.
OBS VA DTG: 10/1500Z
OBS VA CLD: NO VA EXP
FCST VA CLD +6HR: 10/2100Z SFC/FL200 N6329 W01651 - N6517
W01614 - N6849 E00351 - N6742 E01549 - N6329 W01651
FL200/350 N6327 W01656 - N6600 W01444 - N6750 W00307 - N6854 E01550 -
N6718 E01833 - N6327 W01656
FL350/550 N6325 W01635 - N6450 W01625 - N6812 W00004 - N6841 E01441 -
N6726 E01653 - N6325 W01635
FCST VA CLD +12HR: 11/0300Z SFC/FL200 N6334 W01640 - N6526 W01629 -
N6945 E00502 - N6658 E03036 - N6327 E03908 - N6629 E00931 - N6334
W01640
FL200/350 N6329 W01701 - N6556 W01624 - N7009 E00806 - N6431 E04310 -
N6026 E04358 - N6709 E00854 - N6329 W01701
FL350/550 N6334 W01650 - N6551 W01547 - N6931 E01235 - N6439 E03929 -
N6128 E04027 - N6634 E01013 - N6334 W01650
FCST VA CLD +18HR: 11/0900Z SFC/FL200 N6327 W01717 - N6517 W01706 -
N6905 E00017 - N6949 E02107 - N6024 E05301 - N5804 E05147 - N6630
E01612 - N6327 W01717 FL200/350 N6327 W01645 - N6556 W01613 - N7054
E01405 - N5925 E05658 - N5421 E04829 - N6717 E01018 - N6327 W01645
FL350/550 N6327 W01634 - N6634 W01510 - N7012 E01458 - N5953 E05349 -
N5558 E04930 - N6630 E01405 - N6327 W01634
RMK: ASH PLUME NOW OBS, ESTIMATED HEIGHT 12KM FROM RADAR. INCREASING
SEISMIC ACTIVITY.
NXT ADVISORY: WILL BE ISSUED BY 20150210/1800Z =
```

Attachment X2 (page 7 of 14)

— Regional Information Flow Arrangements and Model Templates —

3. VAA and VAG dissemination:

a) VAA are sent by the VAACs to the MWOs and ACC/FICs following ICAO Doc 9766 Part 2 (hyperlink: ICAO Doc 9766 Part 2 on ICAO website).

b) The VAAs are to be sent onto AFTN.

c) They can be retrieved as the VAGs in the VAACs Websites

- VAAC London: VAAs & VAGs
- VAAC Toulouse: VAAs & VAGs
- VAAC Tokyo: VAAs & VAGs
- VAAC Montréal: VAAs & VAGs
- VAAC Washington: VAAs & VAGs

d) They can be retrieved as well in the secure SADIS FTP site (hyperlink: SADIS) and WIFS https service (hyperlink: WIFS).

Volcanic Ash Supplementary information

4. In the EUR region, some supplementary products are available in accordance with EASA Safety Information Bulletin SIB N° 2010-17R6.

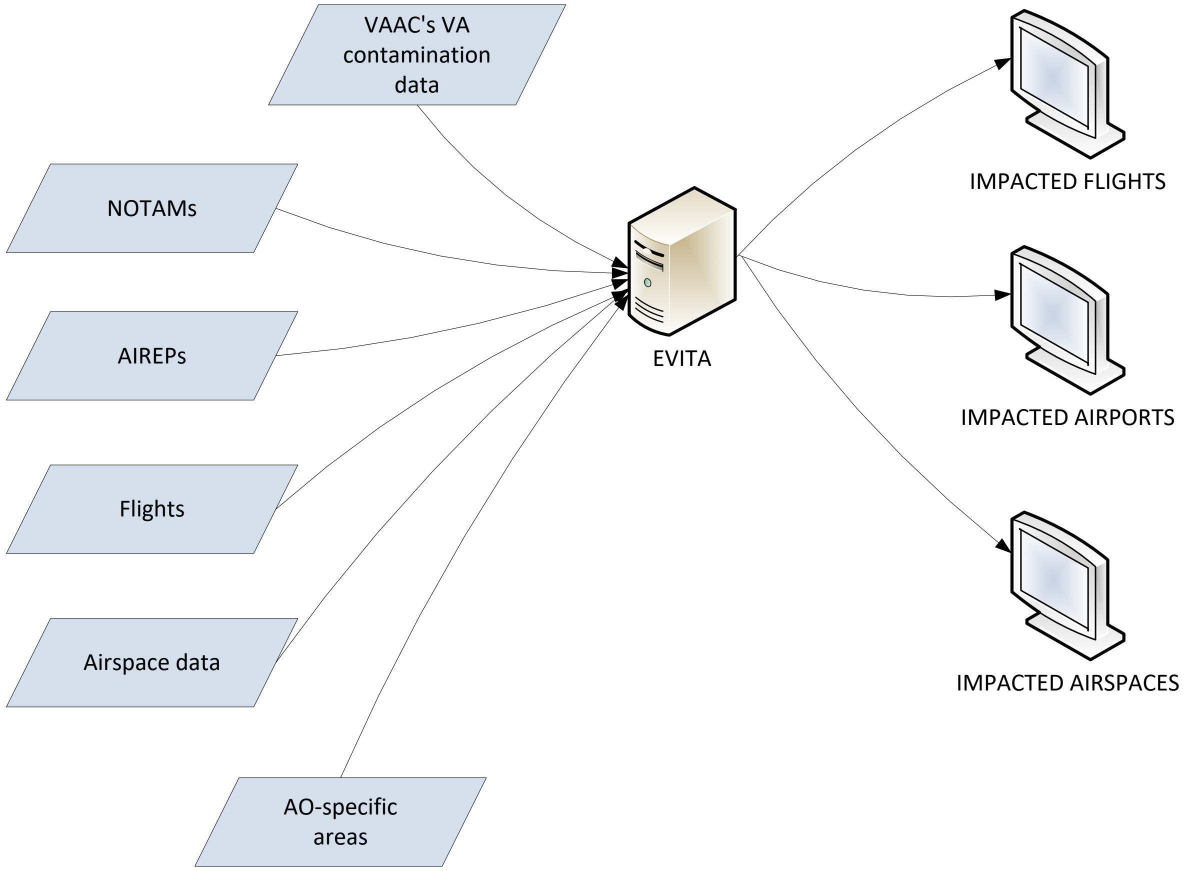
5. These data or graphics, when produced, represent additional information on VA contaminated areas, such as Concentration charts and data.

6. They are available in the VAACs Websites (VAAC London: VAAC London volcanic ash concentration charts and VAAC Toulouse: VAAC Toulouse volcanic ash concentration charts).

Attachment X2 (page 8 of 14)
— Regional Information Flow Arrangements and Model Templates —

EUROCONTROL

7. EVITA



8. Teleconference procedures EUROCONTROL

a) Information and details about operational teleconferences called by the Network Manager will be published in the head line news of the NOP portal: ~~https://www.public.nm.eurocontrol.int/PUBPORTAL/~~ https://www.public.nm.eurocontrol.int/PUBPORTAL/gateway/spec/index.html

Volcano Observatories (VO)

9. VONA (Volcano Observatory Notice to Aviation)

VONA is a recommended practice (Annex 3). The VONA template can be found in ICAO Doc 9766 Appendix E.

10. VONA example:

(1) VOLCANO OBSERVATORY NOTICE FOR AVIATION (VONA)

(2) Issued:	(20150202/0559Z)
(3) Volcano:	Etna 211060
(4) Current Color Code:	**RED**
(5) Previous Color Code:	ORANGE

(1) VOLCANO OBSERVATORY NOTICE FOR AVIATION (VONA)

(6) Source:	Etna Volcano Observatory
(7) Notice Number:	2015/0011/03E11
(8) Volcano Location:	3744N 01500E
(9) Area:	Italy
(10) Summit Elevation:	3300 m
(11) Volcanic Activity Summary:	EXPLOSIVE ACTIVITY AT NEW SE CRATER (NSEC) SUMMIT VENT - SIGNIFICANT ASH EMISSION OCCURS
(12) Volcanic cloud height:	UNKNOWN
(13) Other volcanic cloud information:	dark ash cloud at low elevation due to strong wind
(14) Remarks:	THE PHENOMENON IS DETECTED BY VIDEOSURVEILLANCE CAMERAS FROM 0558Z
(15) Contacts:	24/7 OE Control Room operator turnista@ct.ingv.it +39 095 7165800 Eugenio Privitera (OE Director) direttore.oe@ingv.it +39 095 7165800
(16) Next Notice:	A new VONA will be issued if conditions change significantly or the colour code is changes.

Field Cod

Field Cod

MWO

11. Volcanic Ash SIGMETs

a) The VA SIGMET template is described in Annex 3 [*Meteorological Services for International Air Navigation*], Appendix 6 [*Template for SIGMET and AIRMET messages*].

b) VA SIGMET examples:

```
LFMM SIGMET 1 VALID 020800/021200 LFPW-
LFMM MARSEILLE FIR/UIR VA ERUPTION MT STROMBOLI
LOC N3848 E01511 VA CLD FCST E OF E00900 SFC/FL200 MOV NW 40KT
FCST 1200Z N4415 E00700 - N4400 E00700 - N4315 E00945 - N4115 E00945 –
N4115 E00800 - N4045 E00800 - N4215 E00545 - N4345 E00545=
```

12. VA SIGMET dissemination

In the EUR region, the VA SIGMET are sent onto AFTN following RODEX schema, i.e. the National OPMET Centers send the VA SIGMET from their MWO(s) to their Regional OPMET Center (ROC: London, Toulouse or Vienna, following the Area of responsibility) which will disseminate the VA SIGMET internationally.

NOTAM office

13. NOTAMs (ASHTAMs)

An example of NOTAM related to Volcanic Ash follows:

```
(W1436/2016
Q)LIXX/QWWXX/IV/NBO /W /000/999/4339N01139E999
A)LIBB LIMM LIRR B)2016-06-14 15:58 C)2016-06-14 18:00 EST
VOLCANO ETNA ID 211060, PSN COORDINATES 374403N0150014E, ELEV
10922FT/3330M, EXPLOSIVE ACTIVITY IS STILL ONGOIING FROM 1455Z NO
SIGNIFICANT ASH EMISSION OCCURED. ASH SI STILL DRIFTING IN ROME FIR,
BRINDISI FIR AND THE SOUTH PART OF LIMM FIR.
ICAO LEVEL OF ALERT COLOUR: ORANGE
```

```
RMK:
1. THE EXPLOSIVE ACTIVITY WAS DETECTED BY VIDEO SURVEILLANCE CAMERAS
AT 1455Z.
2. PILOTS SHALL WATCH OUT FROM RELEVANT SIGMET AND VOLCANIC ADVISORY
PRODUCTS PROVIDED BY TOULOUSE VOLCANIC ASH ADVISOR CENTER (VAAC) IF
AVAILABLE THROUGH WEB SITE
HTTP://WWW.METEO.FR/VAAC/EVAAHTML (LOWERCASE)
REF AIP ENR 5.3.3-1
F)SFC G)UNL)=
```

14. Messages dissemination

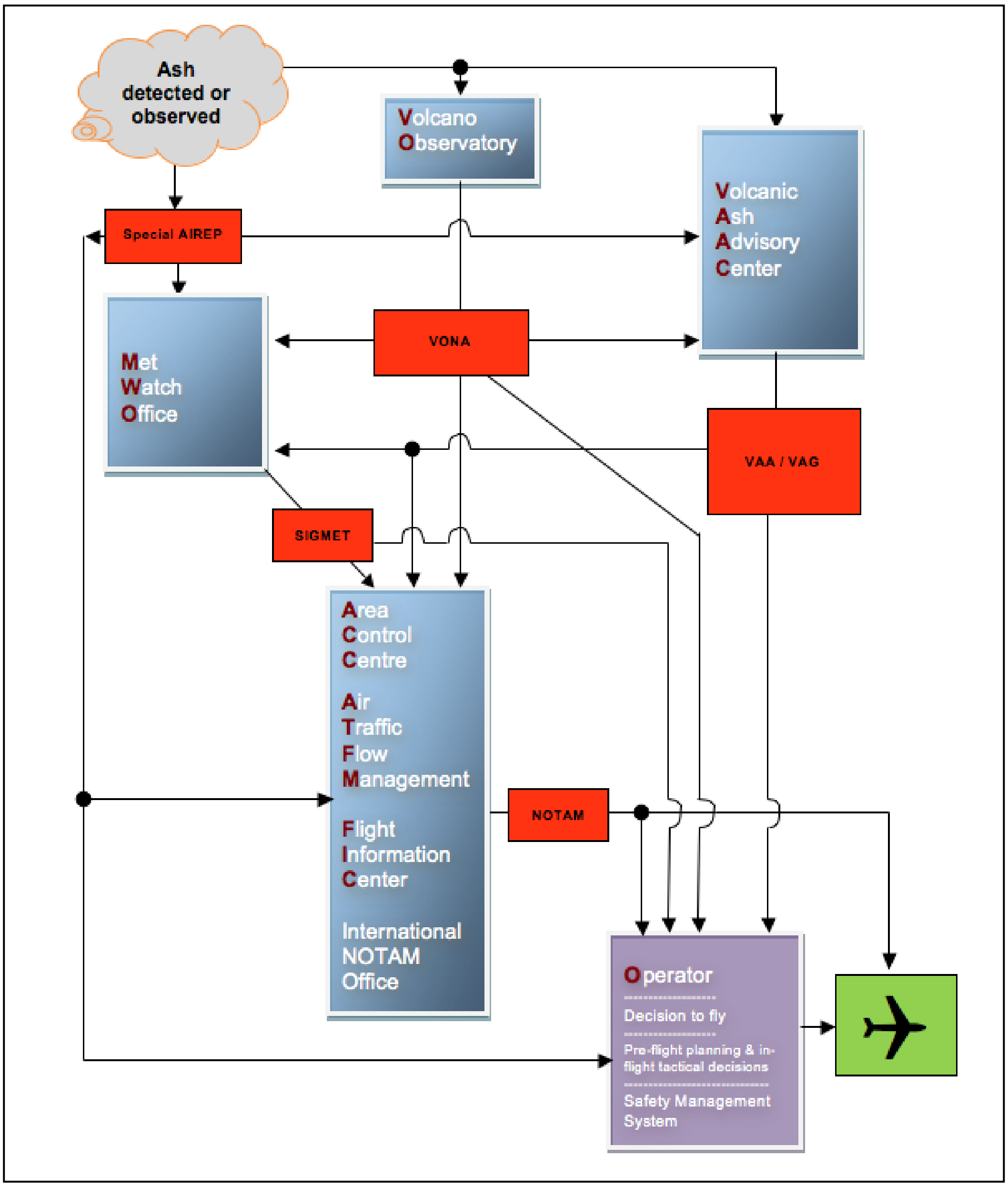
SADIS/WIFS Gateway at EGZZVANW

Attachment X2 (page 11 of 14)

— Regional Information Flow Arrangements and Model Templates —

NAT Region

Information Flow schema



VAAC

1. VAAC contact details:

- They can be found in ICAO Doc 9766 table 4-2 [VAAC Contact numbers]. Hyperlink: [Doc 9766 VAAC contact points]

Field Cod

2. VAAs (Volcanic Ash Advisory) and VAGs (Volcanic Ash Graphics)

The VAA template is described in Annex 3 [Meteorological Service for International Air navigation], in Appendix 2, Table A2-1 [template for advisory message for volcanic Ash].

VAA examples:

```
VA ADVISORY
DTG: 20100101/0605Z
VAAC: TOULOUSE
VOLCANO: ETNA 211060
PSN: N3744 E01500
AREA:  ITALY
SUMMIT ELEV: 3330M
ADVISORY NR: 2015/12
INFO SOURCE: INGV, WEBCAM
AVIATION COLOUR CODE: RED
ERUPTION DETAILS: ERUPTION STARTED AT 0600Z
OBS VA DTG: 02/0600Z
OBS VA CLD: SFC/FL130 N3750 E01500 - N3800 E01550 - N3735 E01550 -
N3750 E01500 MOV E 45KT
FCST VA CLD +6HR: 02/1200Z SFC/FL130 N3750 E01505 - N3840 E01950 -
N3710 E01945 - N3750 E01505
FCST VA CLD +12HR: 02/1800Z NOT PROVIDED
FCST VA CLD +18HR: 03/0000Z NOT PROVIDED
RMK: PLEASE CHECK SIGMET FOR CURRENT WARNINGS.
NXT ADVISORY: NO LATER THAN 20150202/1200Z=
```

```
VA ADVISORY
DTG: 20100101/1500Z
VAAC: LONDON
VOLCANO: ORAEFAJOKULL 374010
PSN: N6400 W01639
AREA: ICELAND
SUMMIT ELEV: 2119M
ADVISORY NR: 2010/002
INFO SOURCE: IMO
AVIATION COLOUR CODE: RED
ERUPTION DETAILS: OBS ASH PLUME, EST 12KM FROM RADAR.
OBS VA DTG: 10/1500Z
OBS VA CLD: NO VA EXP
FCST VA CLD +6HR: 10/2100Z SFC/FL200 N6329 W01651 - N6517
W01614 - N6849 E00351 - N6742 E01549 - N6329 W01651
FL200/350 N6327 W01656 - N6600 W01444 - N6750 W00307 - N6854 E01550 -
N6718 E01833 - N6327 W01656
FL350/550 N6325 W01635 - N6450 W01625 - N6812 W00004 - N6841 E01441 -
N6726 E01653 - N6325 W01635
FCST VA CLD +12HR: 11/0300Z SFC/FL200 N6334 W01640 - N6526 W01629 -
N6945 E00502 - N6658 E03036 - N6327 E03908 - N6629 E00931 - N6334
W01640
FL200/350 N6329 W01701 - N6556 W01624 - N7009 E00806 - N6431 E04310 -
N6026 E04358 - N6709 E00854 - N6329 W01701
FL350/550 N6334 W01650 - N6551 W01547 - N6931 E01235 - N6439 E03929 -
N6128 E04027 - N6634 E01013 - N6334 W01650
FCST VA CLD +18HR: 11/0900Z SFC/FL200 N6327 W01717 - N6517 W01706 -
N6905 E00017 - N6949 E02107 - N6024 E05301 - N5804 E05147 - N6630
E01612 - N6327 W01717 FL200/350 N6327 W01645 - N6556 W01613 - N7054
E01405 - N5925 E05658 - N5421 E04829 - N6717 E01018 - N6327 W01645
FL350/550 N6327 W01634 - N6634 W01510 - N7012 E01458 - N5953 E05349 -
N5558 E04930 - N6630 E01405 - N6327 W01634
RMK: ASH PLUME NOW OBS, ESTIMATED HEIGHT 12KM FROM RADAR. INCREASING
SEISMIC ACTIVITY.
NXT ADVISORY: WILL BE ISSUED BY 20150210/1800Z =
```

3. VAA and VAG dissemination:

a) VAA are sent by the VAACs to the MWOs and ACC/FICs following ICAO Doc 9766 Part 2 (hyperlink: ICAO Doc 9766 Part 2 on ICAO website).

b) The VAAs are to be sent onto AFTN.

Field Cod

c) They can be retrieved as the VAGs in the VAACs Websites

- VAAC London: VAAs & VAGs
- VAAC Toulouse: VAAs & VAGs
- VAAC Tokyo: VAAs & VAGs
- VAAC Montréal: VAAs & VAGs
- VAAC Washington: VAAs & VAGs

d) They can be retrieved as well in the secure SADIS FTP site (hyperlink: SADIS) and WIFS https service (hyperlink: WIFS).

Volcano Observatories (VO)

4. VONA (Volcano Observatory Notice to Aviation)

VONA is a recommended practice (Annex 3). The VONA template can be found in ICAO Doc 9766 Appendix E.

5. VONA example:

(1) VOLCANO OBSERVATORY NOTICE FOR AVIATION (VONA)

(2) Issued:	(20150202/0559Z)
(3) Volcano:	Etna 211060
(4) Current Color Code:	**RED**
(5) Previous Color Code:	ORANGE
(6) Source:	Etna Volcano Observatory
(7) Notice Number:	2015/0011/03E11
(8) Volcano Location:	3744N 01500E
(9) Area:	Italy
(10) Summit Elevation:	3300 m
(11) Volcanic Activity Summary:	EXPLOSIVE ACTIVITY AT NEW SE CRATER (NSEC) SUMMIT VENT - SIGNIFICANT ASH EMISSION OCCURS
(12) Volcanic cloud height:	UNKNOWN
(13) Other volcanic cloud information:	dark ash cloud at low elevation due to strong wind
(14) Remarks:	THE PHENOMENON IS DETECTED BY VIDEOSURVEILLANCE CAMERAS FROM 0558Z
(15) Contacts:	24/7 OE Control Room operator turnista@ct.ingv.it +39 095 7165800 Eugenio Privitera (OE Director) direttore.oe@ingv.it +39 095 7165800
(16) Next Notice:	A new VONA will be issued if conditions change significantly or the colour code is changes.

Attachment X2 (page 14 of 14)
— Regional Information Flow Arrangements and Model Templates —

MWO

6. Volcanic Ash SIGMETs

a) The VA SIGMET template is described in Annex 3 [*Meteorological Services for International Air Navigation*], Appendix 6 [*Template for SIGMET and AIRMET messages*].

b) VA SIGMET examples:

```
LFMM SIGMET 1 VALID 020800/021200 LFPW-
LFMM MARSEILLE FIR/UIR VA ERUPTION MT STROMBOLI
LOC N3848 E01511 VA CLD FCST E OF E00900 SFC/FL200 MOV NW 40KT
FCST 1200Z N4415 E00700 - N4400 E00700 - N4315 E00945 - N4115 E00945 –
N4115 E00800 - N4045 E00800 - N4215 E00545 - N4345 E00545=
```

7. VA SIGMET dissemination

Appropriate Regional OPMET Center (ROC: London, Toulouse or Washington, following the Area of responsibility) which will disseminate the VA SIGMET internationally.

NOTAM office

8. NOTAMs (ASHTAMs)

An example of NOTAM related to Volcanic Ash follows:

```
(W2867/15 NOTAMR W2866/15
Q)LIRR/QWWXX/IV/NBO/W/000/999/3759N01525E087
A)LIRR B)1512090826 C)1512101812EST
E)VOLCANO ETNA ID211060, PSN COORDINATES 374403N0150014E, ELEV
10922FT/3330M, EXPLOSIVE ACTIVITY IS INCREASED AT SE CRATER
 SUMMIT VENT.
-SIGNIFICANT ASH EMISSION OCCURS.
GREY CLOUD OF ASH AND VAPOR GROWING ABOVE VOLCANO SUMMIT.
THE PHENOMENON IS OBSERVED BY VIDEOSURVEILLANCE CAMERAS.
ICAO LEVEL OF ALERT COLOUR: RED.
RMK: PILOTS SHALL WATCH OUT FOR RELEVANT SIGMET AND VOLCANIC
 ADVISORY PRODUCTS PROVIDED BY TOULOUSE VOLCANIC ASH ADVISOR
CENTER (VAAC) IF AVBL THROUGH WEB SITE.
HTTP://WWW.METEO.FR/VAAC/EVAA.HTML (LOWER CASE).
REF AIP ENR 5.3.3-1
F)GND
G)UNL)=
```

9. Messages dissemination

SADIS/WIFS Gateway at EGZZVANW

ATTACHMENT X3
—
DESCRIPTION OF SELECTED VA PRODUCTS

EUR Region – Eastern Part

Use of Volcanic Ash VAA/VAG, SIGMET and NOTAM

1. There are a variety of methods by which volcanic ash information can be provided to users in a form that can be plotted on charts.

2. The VAA/VAG provided by the VAAC provides a regional view of the areas of ash contamination.

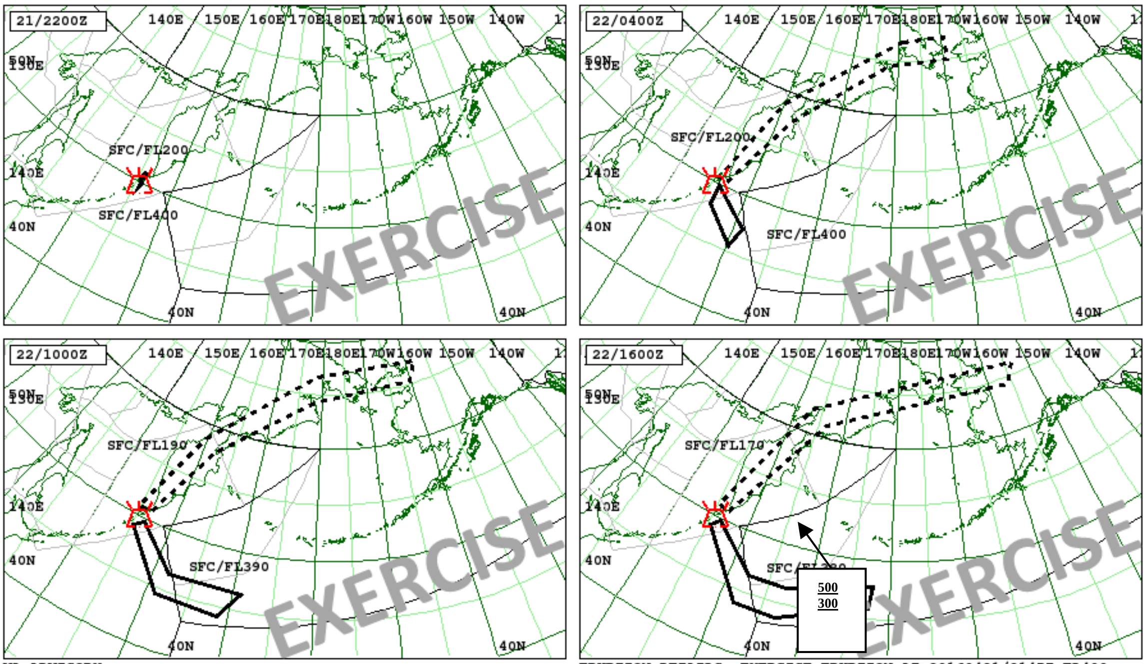
3. The VA SIGMET is issued by each MWO, who usually, unless they have additional information, take the VAA data and provide this for specific FIRs. SIGMETs are provided from the start of VA contamination of the corresponding FIR/UIR. They give information (based on a snapshot) for the beginning of the validity period and an outlook (also a snapshot) for the end of the validity period (which is a maximum of 6h later). The first SIGMET is generally shorter than 6h in order to have the following ones issued at synoptic hours (00, 06, 12 and 18z) and are mainly based on the VAAC's production (T+0 and T+6).

4. The VA NOTAM is issued by the NOTAM Office (NOF) and is usually supplied on the basis of information received from the MWO. In order to reduce information overload the NOTAMs, where provided, give information on significant changes of the status of the volcano eruption and references existing information such as VAA/VAG and SIGMET.

Attachment X3 (page 2 of 11)
— Description of Selected VA Products —

ICAO Volcanic Ash Advisory (VAA) and VAG (Volcanic Ash Graphic)

5. In the event of an eruption, VAAC Tokyo or VAAC Anchorage will provide the ICAO Annex 3 [*Meteorological Services for International Air Navigation*] Volcanic Ash Advisory (VAA) and Volcanic Ash Graphic (VAG) as soon as practicable. Thereafter, VAA and VAG will be updated every 6 hours at 00, 06, 12 and 18 UTC for T+0, T+6, T+12, T+18 hours.



VA ADVISORY
DTG: 20160421/2240Z
VAAC: TOKYO
VOLCANO: KARPINSKY GROUP 290350
AREA: KURIL ISLANDS
SUMMIT ELEV: 1326M
ADVISORY NR: 9999/2
INFO SOURCE: EXERCISE VOLKAM16 HIMAWARI-8 KVERT UHPP
AVIATION COLOUR CODE: NIL
ERUPTION DETAILS: EXERCISE ERUPTION AT 20160421/2145Z FL400
EXTD SE MOV 60KT REPORTED
RMK: EXERCISE VOLKAM16 NIL EXERCISE EXERCISE EXERCISE
NXT ADVISORY: 20160422/0000Z

6. Both products are provided on the website detailed below, additionally the VAA is provided as an AFTN message.

- VAAC Tokyo Website http://ds.data.jma.go.jp/svd/vaac/data/index.html
- VAAC Anchorage Website http://vaac.arh.noaa.gov/

~~Although not currently a standard product, a T+24 VAG and/or VAA product is currently being trialled by VAAC Tokyo and VAAC Anchorage. This product is simply a standalone continuation of the standard VAG/VAA product showing the expected locations of plumes at the T+24 hour forecast stage.~~

EUR Region – Western Part

Use of Volcanic Ash VAA/VAG, SIGMET, NOTAM and ASHTAM

1. There are a variety of methods by which volcanic ash information can be provided to users in a form that can be plotted on charts.

Attachment X3 (page 3 of 11)

— Description of Selected VA Products —

2. The VAA/VAG provided by the VAAC provides a regional view of the areas of ash contamination.

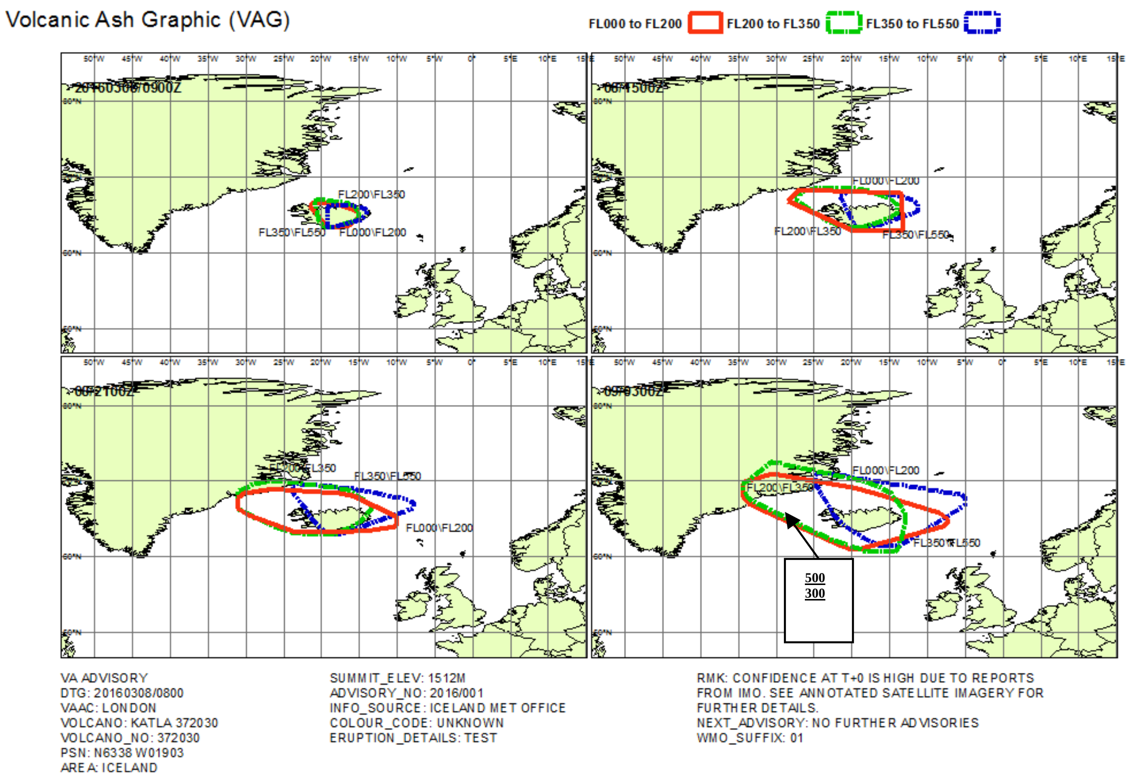
3. The VA SIGMET is issued by each MWO, who usually, unless they have additional information, take the VAA data and provide this for specific FIRs. Where a VAAC provides supplementary volcanic ash products [the information provided on the SIGMET is consistent with the low contamination area]. SIGMETs are provided from the start of VA contamination of the corresponding FIR/UIR. They give information (based on a snapshot) for the beginning of the validity period and an outlook (also a snapshot) for the end of the validity period (which is a maximum of 6h later). The first SIGMET is generally shorter than 6h in order to have the following ones issued at synoptic hours (00, 06, 12 and 18z) and are mainly based on the VAAC's production (T+0 and T+6).

4. The VA NOTAM is issued by the NOTAM Office (NOF) and is usually supplied on the basis of information received from the MWO. In order to reduce information overload the NOTAMs, where provided, give information on significant changes of the status of the volcano eruption and references existing information such as VAA/VAG and SIGMET.

5. The ASHTAM is not widely used as a means of disseminating Volcanic Ash information and is not required where a State provides VA NOTAMs.

ICAO Volcanic Ash Advisory (VAA) and VAG (Volcanic Ash Graphic)

6. In the event of an eruption, VAAC London or VAAC Toulouse will provide the ICAO Annex 3 [*Meteorological Services for International Air Navigation*] Volcanic Ash Advisory (VAA) and Volcanic Ash Graphic (VAG) as soon as practicable. Thereafter, VAA and VAG will be updated every 6 hours at 00, 06, 12 and 18 UTC for T+0, T+6, T+12, T+18 hours.



Attachment X3 (page 4 of 11)

— Description of Selected VA Products —

7. Both products are provided on the website detailed below, additionally the VAA is provided as an AFTN message.

- VAAC London Website ~~www.metoffice.gov.uk/aviation/**vaac**/~~ https://www.metoffice.gov.uk/services/transport/aviation/regulated/vaac/advisories
- VAAC Toulouse Website ~~www.meteo.fr/**vaac**/~~ http://vaac.meteo.fr/

~~8. Although not currently a standard product, a T+24 VAG and/or VAA product is currently being trialled by VAAC Toulouse and VAAC London. This product is simply a standalone continuation of the standard VAG/VAA product showing the expected locations of plumes at the T+24 hour forecast stage.~~

9. In addition to the ICAO products detailed above a range of supplementary products are provided. These are detailed below.

Supplementary Volcanic Ash Charts provided by the London and Toulouse VAACs

10. The EUR region is required to provide supplementary information on volcanic ash beyond a simple ash/no ash product to support the region's Safety Risk Assessment (SRA) based approach in case of a significant ash producing eruption. This means that multiple contamination levels will continue to underpin the EUR/NAT Volcanic Ash Contingency Plan (VACP).

11. Since the 2010 Eruption of Ejyafjallajökull, VAACs London and Toulouse have provided Volcanic Ash Concentration Charts in support of the VACP. These charts predict the location of a quantitative mass of ash per unit volume.

12. The Volcanic Ash Concentration Charts are provided for three contamination levels:-

- **'Low contamination'** Volcanic Ash Mass Concentration greater than or equal to 200 micrograms per cubic metre and less than or equal to 2000 micrograms per cubic metre.
- **'Medium contamination'** Volcanic Ash Mass Concentration greater than 2000 micrograms per cubic metre and less than 4000 micrograms per cubic metre.
- **'High contamination'** Volcanic Ash Mass Concentration greater than or equal to 4000 micrograms per cubic metre

13. Volcanic Ash Mass Concentration charts are issued every 6 hours at 00, 06, 12 and 18 UTC for T+0, T+6, T+12, and T+18 hours ahead. It should be noted that the charts represent the actual or forecast location of ash ~~over the 6-hour period up to the~~ at the given validity time.

14. The charts detail a number of polygons which will be divided into low, medium and high contamination areas.

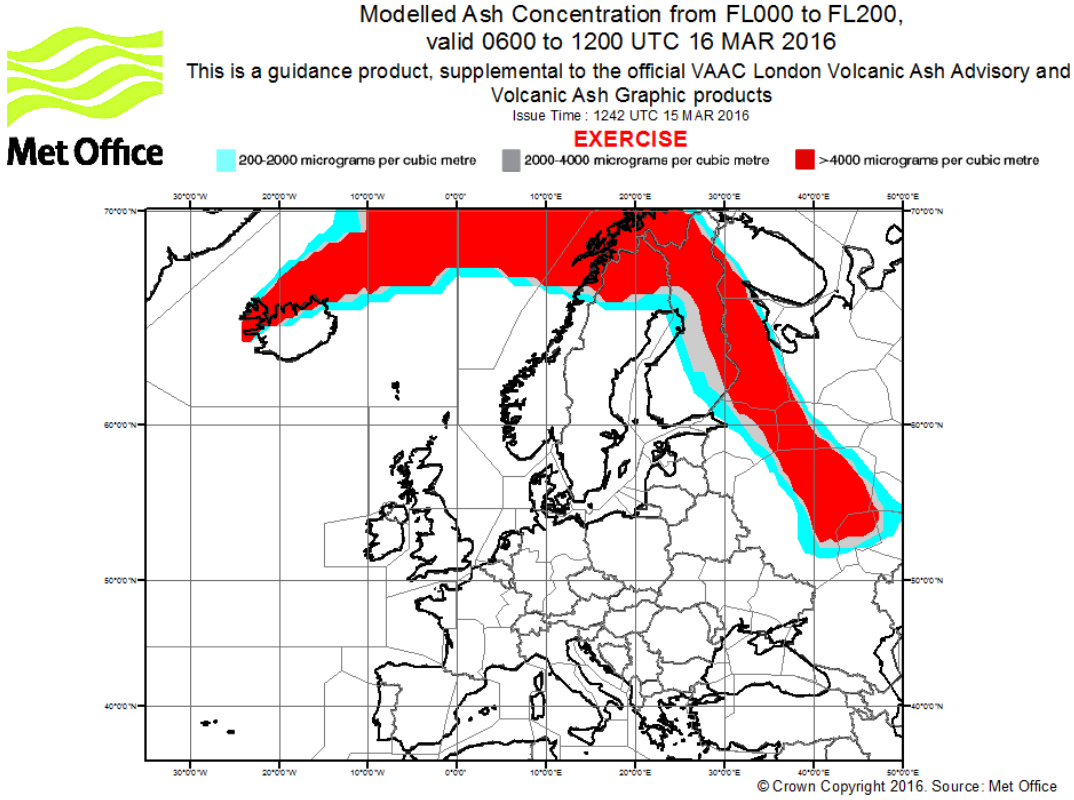
- Low Contamination: >= 200 <= 2000 micrograms per cubic metre
- Medium Contamination: > 2000 < 4000 micrograms per cubic metre
- High Contamination: >= 4000 micrograms per cubic metre

15. Separate charts covering different Flight Level bands (FL000-200, FL200-350, FL350-550 are provided.

Attachment X3 (page 5 of 11)

— Description of Selected VA Products —

16. Example VA concentration chart



Annotated Satellite Image

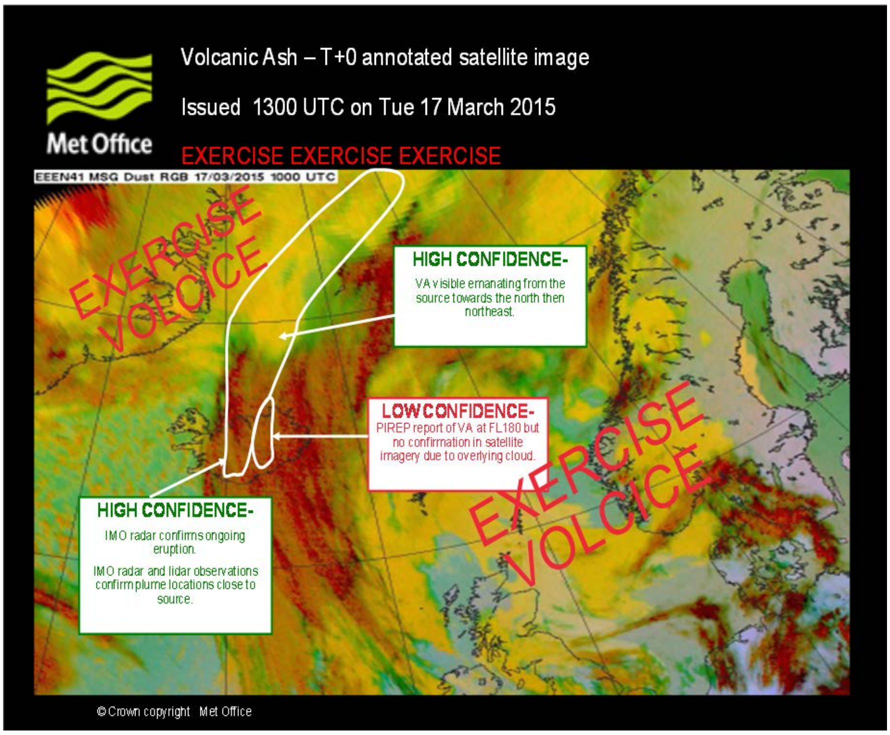
17. At regular intervals (every 3 hours for VAAC London) VAAC Toulouse and VAAC London will produce a satellite image which is annotated with a variety of observational information related to volcanic ash including pilot reports, research aircraft reports, lidar information and other satellite information. This information assists users to understand how the VAAC forecasters are using this additional information that is being provided by indicating the confidence on which it is being evaluated.

18. These products will be issued every 3 hours at the following approximate times: 02, 05, 08, 11, 14, 17, 20, and 23 UTC.

Attachment X3 (page 6 of 11)

— Description of Selected VA Products —

19. Example Annotated Satellite Image:



Data Files

20. Data files in csv format will be provided for contour co-ordinates of the ~~CML~~concentration charts in a similar format to those currently provided for VAA/VAG. Note, however, that some of the information contained in the header (the first 11 lines of the csv file) will differ from those currently issued in TAC VAA. Consideration will be given to publishing an XML schema for ingestion of this data. This will facilitate more streamlined ingestion of the contour data into visualisation packages.

21. CSV Format as provided to EUROCONTROL~~ – Current (as at 15.03.16) format – as provided to EUROCONTROL – other variants also exist~~

```
~~VOLCANO: KATLA 372030
PSN: N6338 W01903
VOLCANIC ASH CONCENTRATION: LOW 200 MICROGRAMS PER CUBIC METRE CONTOUR
LOW; 200 MICROGRAMS PER CUBIC METRE CONTOUR
ISSUE TYPE: TEST
MODEL RUN: 20160308/0900
ISSUE TIME: 20160308/0858
VALIDITY TIME: 20160308/2100
FLIGHT LEVEL: FL200/FL350
REMARKS: CONFIDENCE AT T+0 IS HIGH DUE TO REPORTS FROM IMO. SEE
ANNOTATED SATELLITE IMAGERY FOR FURTHER DETAILS.
ORIGINATOR: LONDON VAAC
POLY 1
N695414,W0245459
N693250,W0235049
N693215,W0220807
N684750,W0195437
N684648,W0191745
N682734,W0184723
N684737,W0174604
N684655,W0162922~~
```

Attachment X3 (page 7 of 11)
— Description of Selected VA Products —

~~N684025,W0161917~~
~~N680250,W0155101~~
~~N680022,W0151806~~
~~N665056,W0133348~~
~~N664025,W0132621~~
~~N662733,W0132612~~
~~N644629,W0144126~~
~~N635947,W0155135~~
~~N633641,W0165949~~
~~N625250,W0180538~~
~~N624940,W0181647~~
~~N624943,W0210705~~
~~N631210,W0221637~~
~~N631258,W0240012~~
~~N640316,W0262425~~
~~N645526,W0270302~~
~~N660404,W0270440~~
~~N663440,W0272739~~
~~N663440,W0274707~~
~~N654942,W0300425~~
~~N655254,W0301659~~
~~N662254,W0305802~~
~~N682727,W0310052~~
~~N684454,W0305010~~
~~N690819,W0294126~~
~~N693143,W0290455~~
~~N693250,W0282753~~
~~N695456,W0272057~~
~~N695414,W0245459~~

	A	B	C	D
1	CONCENTRATION: MEDIUM			
2	VALIDITY FROM: 20161011/1800			
3	VALIDITY TO: 20161012/0000			
4	FLIGHT LEVEL: FL350/FL550			
5	ORIGINATOR: LONDON VAAC			
6	POLY 1			
7	N651728,E0072136			
8	N650655,E0071129			
9	N644411,E0060357			
10	N642051,E0052740			
11	N635742,E0041753			
12	N635710,E0034253			
13	N625018,E0002206			
14	N625051,E0000951			
15	N625748,E0000000			
16	N622849,W0004221			
17	[illegible]			

NAT Region

Use of Volcanic Ash VAA/VAG, SIGMET, NOTAM and ASHTAM

1. There are a variety of methods by which volcanic ash information can be provided to users in a form that can be plotted on charts.

Attachment X3 (page 8 of 11)
— Description of Selected VA Products —

2. The VAA/VAG provided by the VAAC provides a regional view of the areas of ash contamination.

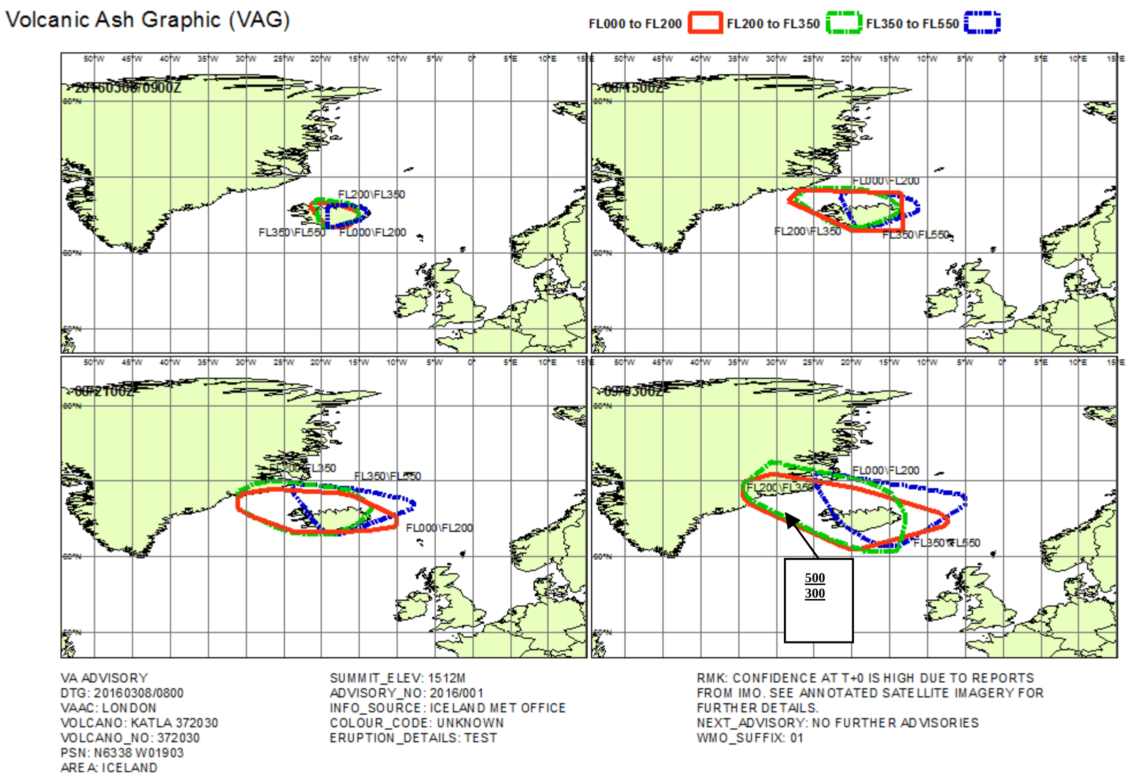
3. The VA SIGMET is issued by each MWO, who usually, unless they have additional information, take the VAA data and provide this for specific FIRs. Where a VAAC provides supplementary volcanic ash products [the information provided on the SIGMET is consistent with the low contamination area]. SIGMETs are provided from the start of VA contamination of the corresponding FIR/UIR. They give information (based on a snapshot) for the beginning of the validity period and an outlook (also a snapshot) for the end of the validity period (which is a maximum of 6h later). The first SIGMET is generally shorter than 6h in order to have the following ones issued at synoptic hours (06, 12 and 18z) and are mainly based on the VAAC's production (T+0 and T+6).

4. The VA NOTAM is issued by the NOTAM Office (NOF) and is usually supplied on the basis of information received from the MWO. In order to reduce information overload the NOTAMs, where provided, give information on significant changes of the status of the volcano eruption and references existing information such as VAA/VAG and SIGMET.

5. The ASHTAM is not widely used as a means of disseminating Volcanic Ash information and is not required where a State provides VA NOTAMs.

ICAO Volcanic Ash Advisory (VAA) and VAG (Volcanic Ash Graphic)

6. In the event of an eruption, VAAC London or VAAC Toulouse will provide the ICAO Annex 3 [*Meteorological Services for International Air Navigation*] Volcanic Ash Advisory (VAA) and Volcanic Ash Graphic (VAG) as soon as practicable. Thereafter, VAA and VAG will be updated every 6 hours at 00, 06, 12 and 18 UTC for T+0, T+6, T+12, T+18 hours.



Attachment X3 (page 9 of 11)

— Description of Selected VA Products —

7. Both products are provided on the website detailed below, additionally the VAA is provided as an AFTN message.

- VAAC London Website ~~www.metoffice.gov.uk/aviation/**vaac**/~~ https://www.metoffice.gov.uk/services/transport/aviation/regulated/vaac/advisories
- VAAC Toulouse Website ~~www.meteo.fr/**vaac**/~~ http://vaac.meteo.fr/

~~8. Although not currently a standard product, a T+24 VAG and/or VAA product is currently being trialled by VAAC Toulouse and VAAC London. This product is simply a standalone continuation of the standard VAG/VAA product showing the expected locations of plumes at the T+24 hour forecast stage.~~

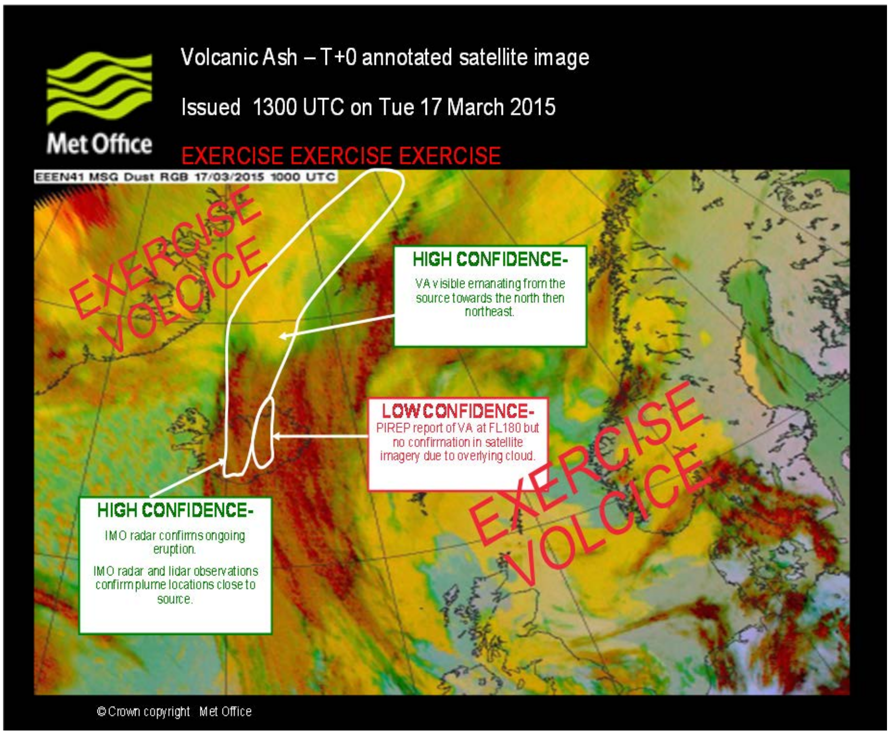
9. In addition to the ICAO products detailed above a range of supplementary products are provided. These are detailed below.

Annotated Satellite Image

10. At regular intervals (every 3 hours for VAAC London) VAAC Toulouse and VAAC London will produce a satellite image which is annotated with a variety of observational information related to volcanic ash including pilot reports, research aircraft reports, lidar information and other satellite information. This information assists users to understand how the VAAC forecasters are using this additional information that is being provided by indicating the confidence on which it is being evaluated.

11. These products will be issued every 3 hours at the following approximate times: 02, 05, 08, 11, 14, 17, 20, and 23 UTC.

12. Example Annotated Satellite Image:



Attachment X3 (page 10 of 11)

— Description of Selected VA Products —

Data Files

13. Data files in csv format will be provided for contour co-ordinates of the ~~CML~~concentration–_charts in a similar format to those currently provided for VAA/VAG. Note, however, that some of the information contained in the header (the first 11 lines of the csv file) will differ from those currently issued in TAC VAA. Consideration will be given to publishing an XML schema for ingestion of this data. This will facilitate more streamlined ingestion of the contour data into visualisation packages.

14. CSV Format as provided to EUROCONTROL~~ — Current (as at 15.03.16) format — as provided to EUROCONTROL – other variants also exist~~

~~VOLCANO: KATLA 372030~~
~~PSN: N6338 W01903~~
~~VOLCANIC ASH CONCENTRATION: LOW 200 MICROGRAMS PER CUBIC METRE CONTOUR LOW; 200 MICROGRAMS PER CUBIC METRE CONTOUR~~
~~ISSUE TYPE: TEST~~
~~MODEL RUN: 20160308/0900~~
~~ISSUE TIME: 20160308/0858~~
~~VALIDITY TIME: 20160308/2100~~
~~FLIGHT LEVEL: FL200/FL350~~
~~REMARKS: CONFIDENCE AT T+0 IS HIGH DUE TO REPORTS FROM IMO. SEE ANNOTATED SATELLITE IMAGERY FOR FURTHER DETAILS.~~
~~ORIGINATOR: LONDON VAAC~~
~~POLY 1~~
~~N695414,W0245459~~
~~N693250,W0235049~~
~~N693215,W0220807~~
~~N684750,W0195437~~
~~N684648,W0191745~~
~~N682734,W0184723~~
~~N684737,W0174604~~
~~N684655,W0162922~~
~~N684025,W0161917~~
~~N680250,W0155101~~
~~N680022,W0151806~~
~~N665056,W0133348~~
~~N664025,W0132621~~
~~N662733,W0132612~~
~~N644629,W0144126~~
~~N635947,W0155135~~
~~N633641,W0165949~~
~~N625250,W0180538~~
~~N624940,W0181647~~
~~N624943,W0210705~~
~~N631210,W0221637~~
~~N631258,W0240012~~
~~N640316,W0262425~~
~~N645526,W0270302~~
~~N660404,W0270440~~
~~N663440,W0272739~~
~~N663440,W0274707~~
~~N654942,W0300425~~
~~N655254,W0301659~~
~~N662254,W0305802~~
~~N682727,W0310052~~
~~N684454,W0305010~~
~~N690819,W0294126~~
~~N693143,W0290455~~
~~N693250,W0282753~~
~~N695456,W0272057~~
~~N695414,W0245459~~

Attachment X3 (page 11 of 11)

— Description of Selected VA Products —

	A	B	C	D
1	CONCENTRATION: MEDIUM			
2	VALIDITY FROM: 20161011/1800			
3	VALIDITY TO: 20161012/0000			
4	FLIGHT LEVEL: FL350/FL550			
5	ORIGINATOR: LONDON VAAC			
6	POLY 1			
7	N651728,E0072136			
8	N650655,E0071129			
9	N644411,E0060357			
10	N642051,E0052740			
11	N635742,E0041753			
12	N635710,E0034253			
13	N625018,E0002206			
14	N625051,E0000951			
15	N625748,E0000000			
16	N622849,W0004221			
17	[illegible]			

ATTACHMENT X4
—
GUIDANCE ON THE ESTABLISHMENT, AMENDMENT AND WITHDRAWAL OF DANGER AREAS

EUR Region – Eastern Part

Use of Danger Areas

1. Danger area is not issued for en-route flight – reference NOTAM and SIGMET.

EUR Region – Western Part

1. This is a guidance to be used by Regional agencies as reference in the use of Danger Areas in regards to Volcanic Ash.

Use of Danger Areas

2. The use of precautionary Danger Areas over and in the proximity of a volcanic eruption has been considered appropriate. It should be noted that an initial Danger Area will always be a stationary circle around the volcano, it will not follow the ash cloud.

3. The competent authority for determining the need for and extent of Danger Areas is the one regulating flight operations. States should implement arrangements to ensure the timely declaration of Danger Area by an appropriate authority according to pre-defined conditions.

4. In the Pre-Eruption and Start of Eruption phases there is lack of available information and the focus should be on aircraft in flight in the vicinity and or heading towards the volcano. The most effective tool at that time period is a Danger Area and it should be determined by prevailing local wind speeds.

5. As more information is received the restrictions should be lifted appropriately.

6. Appropriate AIS and MET messages shall be issued in accordance with Annex 15 [*Aeronautical Information Services*] and Annex 3 [*Meteorological Services for International Air Navigation*], respectively.

7. When respective VAAC or local Met Office issues the first area of forecasted ash, Danger Areas should normally be deactivated.

Size and dimensions of Danger Areas:

- the area will be centered on the estimated or known position of the volcanic activity;
- the size of the Danger Area should not exceed 60NM in the EUR Region;
- in case of strong wind speeds the danger area should be extended downwind, not exceeding half the size of the area but will not follow the wind further;
- the Danger Area should be promulgated via NOTAM.

Attachment X4 (page 2 of 2)

— Guidance on the Establishment, Amendment and Withdrawal of Danger Areas —

NAT Region

1. This is a guidance to be used by Regional agencies as reference in the use of Danger Areas in regards to Volcanic Ash.

Use of Danger Areas

2. The use of precautionary Danger Areas over and in the proximity of a volcanic eruption has been considered appropriate. It should be noted that an initial Danger Area will always be a stationary circle around the volcano, it will not follow the ash cloud.

3. The competent authority for determining the need for and extent of Danger Areas is the one regulating flight operations. States should implement arrangements to ensure the timely declaration of Danger Area by an appropriate authority according to pre-defined conditions.

4. In the Pre-Eruption and Start of Eruption phases there is lack of available information and the focus should be on aircraft in flight in the vicinity and or heading towards the volcano. The most effective tool at that time period is a Danger Area and it should be determined by prevailing local wind speeds.

5. As more information is received the restrictions should be lifted appropriately.

6. Appropriate AIS and MET messages shall be issued in accordance with Annex 15 [*Aeronautical Information Services*] and Annex 3 [*Meteorological Services for International Air Navigation*], respectively.

7. When respective VAAC or local Met Office issues the first area of forecasted ash, Danger Areas should normally be deactivated.

Size and dimensions of Danger Areas:

- the area will becentered on the estimated or known position of the volcanic activity;
- the size of the Danger Area should not exceed 120NM in the NAT Region;
- in case of strong wind speeds the danger area should be extended downwind, not exceeding half the size of the area but will not follow the wind further;
- the Danger Area should be promulgated via NOTAM.

ATTACHMENT X5
—
AIR TRAFFIC FLOW MANAGEMENT ARRANGEMENTS

EUR Region – Eastern Part

Intentionally left blank.

EUR Region – Western Part

EUROCONTROL/Network Manager

1. In the EUROCONTROL/Network Manager (NM) area of operations the NM perform the ATFM function in collaborative approach with all operational stakeholders.

2. Comprehensive guidance on ATFM in the NM area of operations can be found in the EUROCONTROL/Network Manager (NM) Network Operations Handbook (http://www.eurocontrol.int/network-management/publications)

NAT Region

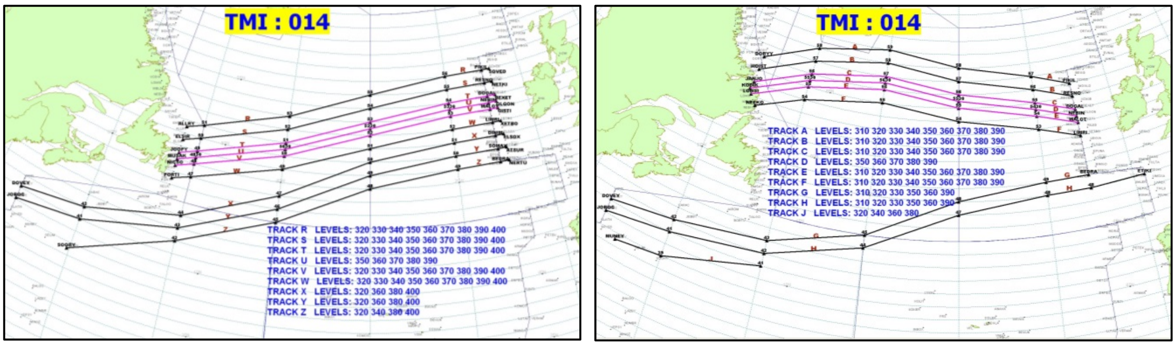
NAT Organised Track System (OTS) and oceanic clearance arrangements:

1. North Atlantic air traffic generally follows a diurnal pattern, with traffic flowing eastbound during the night and westbound during the day. To facilitate this two sets of Organised Tracks are established daily with:

- the eastbound OTS operating between 0100 and 0800 UTC; and
- the westbound OTS between 1130 and 1900 UTC.

2. Examples of typical NAT OTS structures are as shown:

Figure 2: Structure of eastbound (left) and westbound (right) NAT OTS



3. Comprehensive guidance on the North Atlantic Organised Track System can be found at Chapter 2 of the ICAO *North Atlantic Operations and Airspace Manual* (NAT Doc 007). Guidance on oceanic clearance procedures can be found at Chapter 5 of the same document.

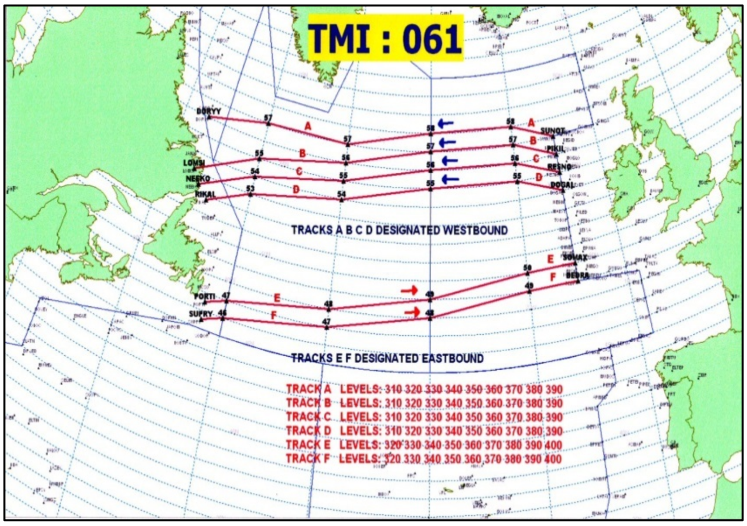
Attachment X5 (page 2 of 2)
— Air Traffic Flow Management arrangements —

4. During a volcanic contamination contingency situation Oceanic ANSPs will take cognisance of volcanic ash forecasts when planning the OTS. NAT organised tracks will not necessarily avoid areas forecast by the VAAC to be contaminated by volcanic ash. (see footnote). If Organised Tracks are established through forecast contaminated areas, a note will be included on the NAT Track Message to identify such tracks.

5. During volcanic ash contingency situations established track design and promulgation procedures will continue, as will the established oceanic clearance procedures. However, operators should be aware that the traffic situation is likely to be more random and complex than usual. Crews should be encouraged to contact ATC as early as possible to request clearance and clearances may take longer to formulate. The cleared flight profiles issued to flights are also more likely to contain changes to the requested lateral and vertical elements and crews should take particular care to check and confirm the clearance issued.

6. Especially during the Recovery Phase, when aircraft may be dispersed on either side of the NAT region, Oceanic ANSPs may design a non-standard OTS which supports both westbound and eastbound organised tracks to suit customer demand. An example of such a track system is shown:

Figure 3: Example of a structure a non-standard NAT OTS during recovery phase



***Footnote**: Aircraft penetration into contaminated areas is based on specific safety assessments that are expected to vary between aircraft operators. Therefore, ATM cannot take these into account in the OTS design. Designing an OTS through a contaminated area may also falsely lead operators to believe that operation on a published track within the contaminated area has been deemed safe without an (operator-specific) safety assessment.*

ATTACHMENT X6
—
CRISIS MANAGEMENT ARRANGEMENTS

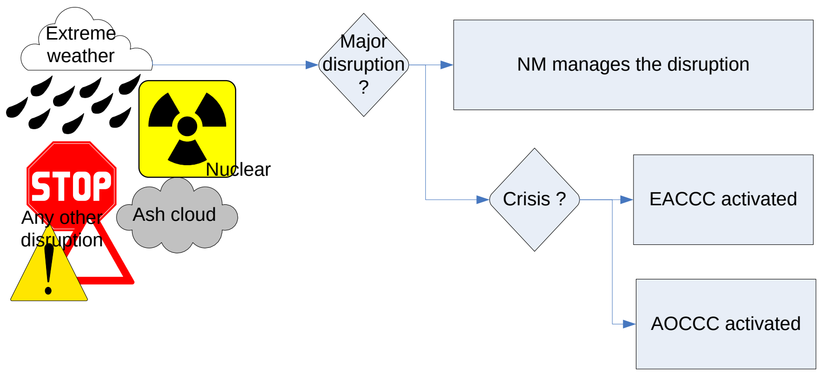
EUR Region – Eastern Part

Intentionally left blank.

EUR Region – Western Part

EUROCONTROL/Network Manager

1. In the EUROCONTROL/Network Manager's area of operations the Network Manager (NM) provides the best assistance it can to help to mitigate the impact of major network disruptions or crisis situations. It also provides tools and services which enable users to anticipate or react to events more effectively, based on the best available knowledge of the ATM situation.



2. NM is liaising with other regions both on a daily basis (E.G. with FAA ATCSCC) and ad-hoc.

EACCC:

3. Within the EUROCONTROL/Network Manager's area of operations the management of network crises is supported by a European Aviation Crisis Coordination Cell (the EACCC) where The Network Manager, with the support of the EACCC, is responsible for coordinating the management of response to the network crisis, in accordance with the EACCC Rules of Procedure, involving close cooperation with corresponding structures in Member States.

NOP Portal

4. The Network Operations Portal (NOP) is designed for ATM professionals. It provides real-time information on air traffic operations. The NOP enables partners to anticipate or react to events more effectively.

- Access to public NOP: ~~public NOP~~ https://www.public.nm.eurocontrol.int/PUBPORTAL/gateway/spec/index.html

Attachment X6 (page 2 of 2)
— Crisis Management Arrangements —

- Access to protected NOP: ~~protected NOP~~ https://www.nm.eurocontrol.int/PORTAL/gateway/spec/index.html

Teleconferences

5. During crisis situations teleconferences are normally convened to facilitate collaboration and information sharing with operational stakeholders as well as coordination within the EACCC. In addition EACCC Chair may decide to invite State Focal Points and, depending on the nature of the crisis, experts from relevant fields of expertise.

European crisis Visualisation Interactive Tool for ATFCM (EVITA)

6. EVITA is a collaborative online tool which allows users to visualise the impact of a crisis on air traffic in Europe.

7. In the event of a volcanic ash event, EVITA:

- displays ash concentration data received from VAAC London and VAAC Toulouse;
- displays the coordinates of Danger Areas, as declared by States via NOTAM;
- displays local areas defined by aircraft operators;
- detects sectors, aerodromes and flights impacted by either ash concentration data or Danger Areas, or areas locally defined by aircraft operators.

NAT Region

Intentionally left blank.

ATTACHMENT X7

—

VOLCEX ARRANGEMENTS (GM IN DOC 9766)

Common to both EUR and NAT Regions

Two steering groups were formed by the European Air Navigation Planning Group (EANPG) Programme Coordinating Group (COG) and North Atlantic (NAT) Implementation Management Group (IMG) to ensure continuation of regular volcanic ash exercises, in accordance with Appendix F of Doc 9766 and VOLCEX Operating Instructions (OPINS), in the EUR and NAT Regions.

European and North Atlantic Volcanic Ash Exercises Steering Group (EUR/NAT VOLCEX/SG)

i. Volcanic ash exercises called VOLCEX are conducted once per year with a rotation simulating a volcanic eruption in EUR NW (Iceland), EUR SW (Azores or Canarias) and EUR SE (Italy or Greece)

ii. Planning meetings are conducted in order to determine the Exercise Leader, objectives of the exercise, exercise scenario and attributes, reporting timelines.

iii. Debrief meetings are conducted in order to determine lessons learned and recommendations, where some recommendations may include proposed changes to the VACP

iv. Steering Group meetings occur with one of the meetings above once per year to determine the exercise schedule for the next two years

v. ToRs, Exercise Directives, exercise reports, summary of discussions of meetings as well as future work programme can be found on the ICAO portal under the group VOLCEXSG

Volcanic Ash Exercises Steering Group for the (far) Eastern part of the EUR Region (EUR (EAST) VOLCEX/SG)

vi. Volcanic ash exercises called VOLKAM are conducted once per year of a volcano located in Kamchatka or Kurile Islands, Russian Federation using predominant wind profile with westerly component that impacts the northern Pacific (NOPAC) routes and possibly Pacific Organized Track System (PACOTS)

vii. Planning meetings are conducted in order to determine objectives of the exercise, exercise scenario and attributes as well as reporting timelines

viii. Debrief meetings are conducted in order to determine lessons learned and recommendations. The recommendations are used mainly to update the draft document called *Assistance for Operations when Volcanic Ash Impacts NOPAC, PACOTS and trans-east routes*

ix. Steering Group meetings occur with the above meetings to determine the exercise schedule for the next two years as well as update the task list

x. ToRs, Exercise Directives, exercise reports, summary of discussions of meetings as well as future work programme can be found on the ICAO portal under the group EEVOLCEXSG

Summary reports of volcanic ash exercises are provided to the NAT IMG, NAT SPG, ~~EANPG~~EASPG METG, ~~EANPG~~EASPG ~~COG~~PCG and ~~EANPG~~EASPG.

ATTACHMENT X8

—

REGIONAL REGULATIONS, MEANS OF COMPLIANCE AND GUIDANCE MATERIAL (REFERENCES)

EUR Region – Eastern Part

1. Though there are no sub-regional regulations in the EUR Region – Eastern Part, documentation containing contact information; sequence of events during a volcanic ash event; examples of VONA, VAA/VAG, SIGMET, NOTAM and special air-report on volcanic ash; re-route procedures and teleconference instructions are provided at the following website: http://www.icao.int/EURNAT/Pages/welcome.aspx (select EUR/NAT Documents; EUR Documents; Volcanic Ash EUR East).

Field Cod

EUR Region – Western Part

EU Regulations, Directives, AMC, GM, etc

1. Within the area of applicability of EU regulations (28 EU Member States and States having agreed to implement EU regulations[14]) a number of regulations, directives and tools relevant for VA contingency operations exist:

a) Commission regulation (EU) No 965/2012 (*Air Operations*)

- AMC/GM to Annex III (PART-ORO)

  GM2 ORO.GEN.200(a)(3) Management system

  Risk management of flight operations with known or forecast volcanic ash contamination

b) Commission regulation (EU) No 1178/2011 (*Air Crew*)

- AMC/GM to Annex VII (PART-ORA)

  GM3 ORA.GEN.200(a)(3) Management system

  Risk management of flight operations with known or forecast volcanic ash contamination (applies to approved training organisations = ATOs)

c) Commission regulation (EU) No 452/2014 (*Third Country Operators*)

d) Commission regulation (EU) No 677/2011 (*ATM Network Function*) as amended by No 970/2014

- Chapter IV; Network Crisis Management

e) EASA Safety Information Bulletin concerning Flight in Airspace with Contamination of Volcanic Ash can be found:

- via EASA website http://ad.easa.europa.eu/sib-docs/page-1
- Or in the Crisis Management portlet of the protected EUROCONTROL/Network Manager/Network Operations Portal: ~~https://www.nm.eurocontrol.int/auth/html~~ https://www.nm.eurocontrol.int/PORTAL/gateway/spec/index.html

[14] *According to EU Regulation 216/2008 (EASA Basic Regulation), Iceland, Norway, Switzerland and Liechtenstein are considered as "participating States".*

Attachment X8 (page 2 of 4)

— Regional Regulations, Means of Compliance and Guidance Material —

User's guide available via http://www.eurocontrol.int/network-operations/library

Field Cod

Additional National Regulations

2. Apart from those special provisions applicable within a whole ICAO Region or sub-Region, national provisions, regulations and/or guidance material may apply. ~~Operators are advised to carefully review the references given below before planning flights into the airspace of the State(s)listed below:~~

~~Germany:~~

~~Guidance for the use of German airspace, being complementary to this EUR/VACP has been published by the German Federal Ministry of Transport and Digital Infrastructure as **AICIFR 08** (*latest revision by 16 Oct 2014*).~~

SRA application in the EUR region

3. As part of the overall decision making process regarding the operation of aircraft into airspace or at aerodromes forecast or known to be contaminated with VA, some States will restrict the operator's decision-making process based on its SRA even if the latter had accepted by the operator's regulatory authorities.

4. For further details and guidance see national AIP/AICs and EASA SiB concerning Flight in Airspace with Contamination of Volcanic Ash

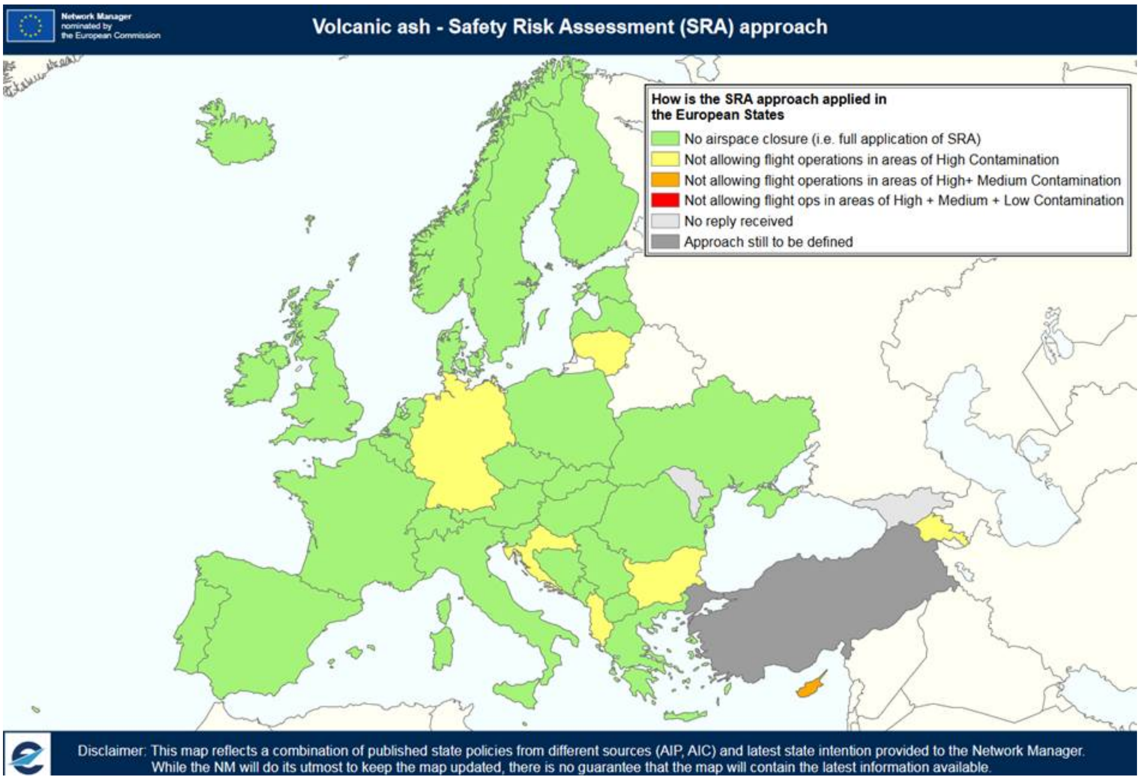
The latest update of the SRA acceptance by States is available in the Crisis Management portlet of the protected EUROCONTROL/Network Manager Network Operations Portal: at ~~https://www.nm.eurocontrol.int/auth/html.~~ https://www.nm.eurocontrol.int/PORTAL/gateway/spec/index.html.

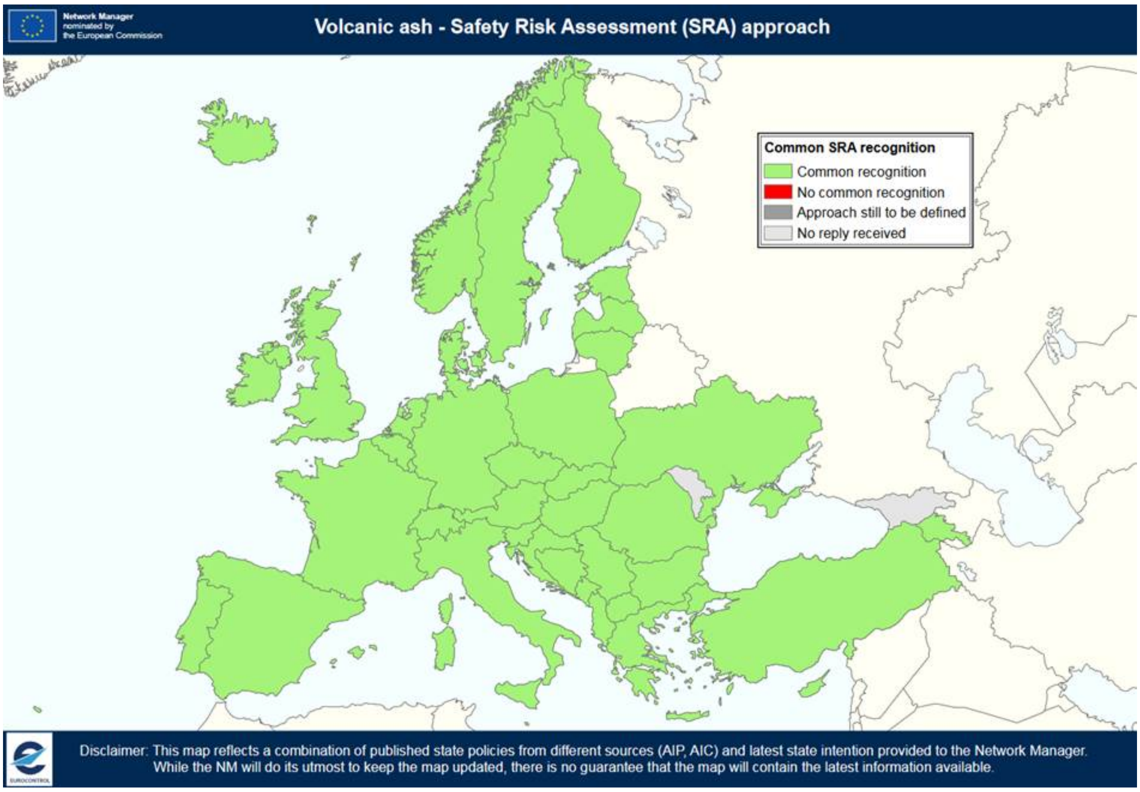
5.

~~An example, not to be used for operational purposes, of SRA acceptance by States is as shown:~~

Attachment X8 (page 3 of 4)

— Regional Regulations, Means of Compliance and Guidance Material —





Attachment X8 (page 4 of 4)

— Regional Regulations, Means of Compliance and Guidance Material —

NAT Region

Intentionally left blank.

TERMINOLOGY, DEFINITIONS AND ACRONYMS

Terminology

Appendices, according to ICAO Practice, comprise material grouped separately for convenience but forming part of the main body of the document.

Attachments, according to ICAO Practice, comprise material supplementary to the main body of the document, or included as a guide to the application of the provisions in the document. Information contained in an Attachment is applicable to individual Regions or sub-Regions, and may contain variations from the main body text.

Supplementary information, in this document, means additional information on volcanic activity available beyond that prescribed by ICAO SARPs.

Definitions

ATFM (Air Traffic Flow Management): '*a service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC capacity is utilised to the maximum extent possible, and that the traffic volume is compatible with the capacities declared by the appropriate ATS authority.*' (PANS-ATM [Doc 4444] refers).

ATM (Air Traffic Management): '*the dynamic, integrated management of air traffic and airspace including air traffic services, airspace management and air traffic flow management — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.*' (PANS-ATM [Doc 4444] refers).

ATM Community: (Air Traffic Management Community): '*the aggregate of organizations, agencies or entities that may participate, collaborate and cooperate in the planning, development, use, regulation, operation and maintenance of the ATM system.*' (Doc 9854 refers).

Acronyms

ACC	Area Control Centre
AIS	Aeronautical Information Service
ANP	Air Navigation Plan
ANSP	Air Navigation Service Provider
ASHTAM	a special Notice to Airmen (NOTAM) on volcanic ash
ATC	Air Traffic Control
ATFM	Air Traffic system capacity and Flow Management (*see also definition*).
ATM	Air Traffic Management (*see also definition*).
ATS	Air Traffic Service
CDM	Collaborative Decision Making
COG	EANPG Programme Coordinating Group
EACCC	European Aviation Crisis Coordination Cell
EANPG	European Air Navigation Planning Group
EASA	European Aviation Safety Agency

EASPG	European Aviation System Planning Group
EGT	Exhaust Gas Temperature
EUR	(ICAO) European (Region)
EVITA	European Crisis Visualization Interactive Tool for ATFCM (Air Traffic Flow and Capacity Management)
FIC	Flight Information Centre
IAVW	International Airways Volcano Watch
IAVW Handbook	Doc 9766
MWO	Meteorological Watch Office
NAT	(ICAO) North Atlantic (Region)
NAT SPG	North Atlantic Systems Planning Group
NOTAM	Notice to Airmen
OEM	Original Equipment Manufacturer
OTS	Organised Track System
PANS-ATM	*Procedures for Air Navigation Services – Air Traffic Management* (Doc 4444)
PCG	EASPG Programme Coordination Group
SARPs	Standard and Recommended Practices
SIGMET	Significant Meteorological information
SMS	Safety Management System
SRA	Safety Risk Assessment
VAA	volcanic ash advisories, in alphanumeric form
VAAC	Volcanic Ash Advisory Centre
VACP	Volcanic Ash Contingency Plan
VAG	volcanic ash advisories, in graphic form
VO	Volcano Observatory
VONA	Volcano Observatory Notice for Aviation

REFERENCED DOCUMENTS

SARPs

Guidance

— END —

APPENDIX K — PROPOSAL FOR AMENDMENT TO THE *NORTH ATLANTIC OPERATIONS AND AIRSPACE MANUAL* (NAT DOC 007)

(*paragraph 5.5.2 refers*)

NAT Doc 007

NORTH ATLANTIC OPERATIONS AND AIRSPACE MANUAL

~~V.2021-1 (Applicable from February 2021)~~V.2021-2 (Applicable from July 2021)

Prepared by the ICAO European and North Atlantic Office

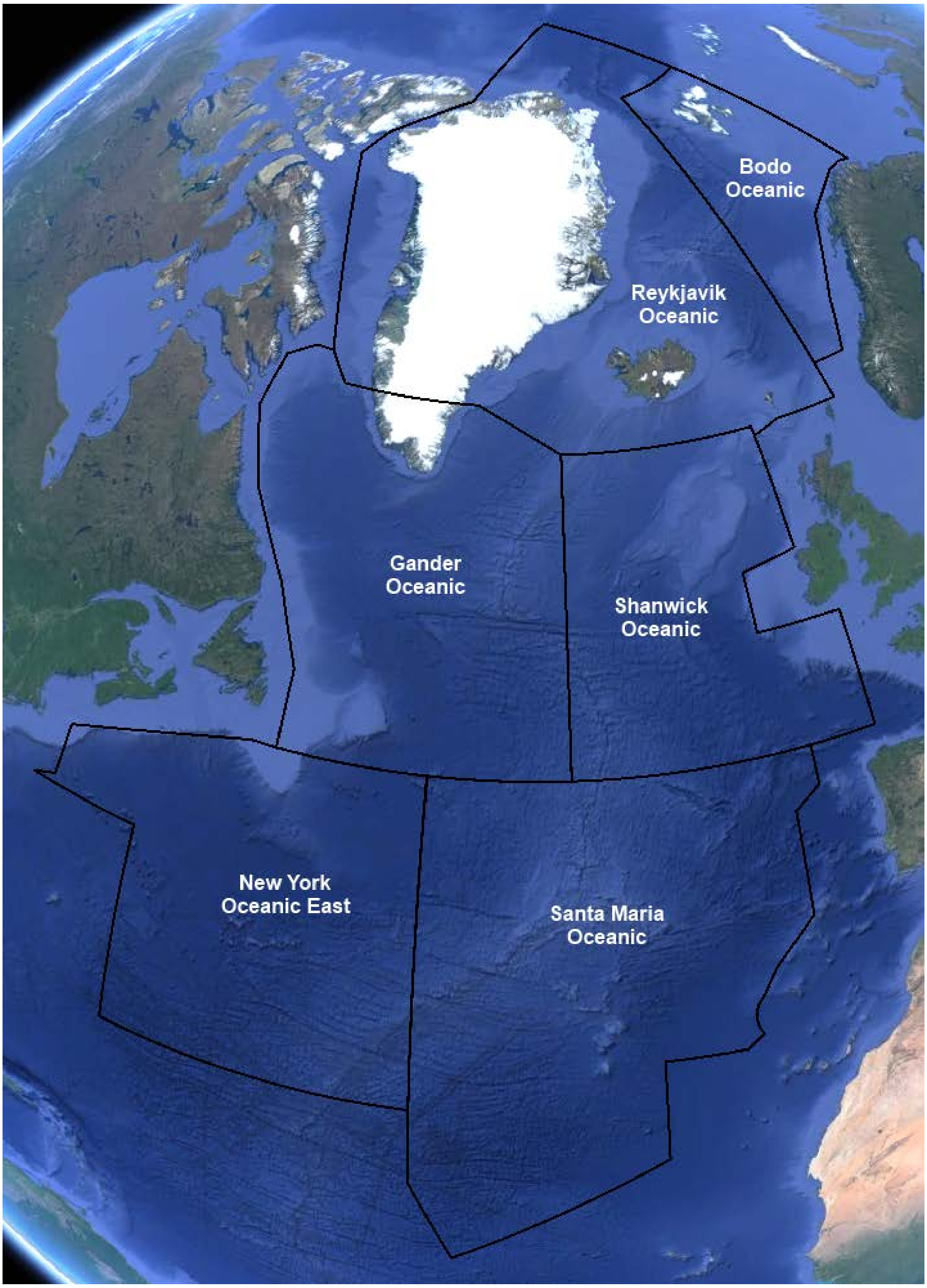
on behalf of the North Atlantic Systems Planning Group (NAT SPG)

EUROPEAN AND NORTH ATLANTIC OFFICE OF ICAO

International Civil Aviation Organization (ICAO)
European and North Atlantic (EUR/NAT) Office
3 bis, Villa Emile Bergerat
92522, Neuilly-sur-Seine CEDEX
FRANCE

e-mail : icaoeurnat@~~paris.~~icao.int
Tel : +33 1 46 41 85 85
Fax : +33 1 46 41 85 00
Web : http://www.icao.int/EURNAT/

Figure 0-1 – The North Atlantic High Level Airspace (NAT HLA)



(Prior to February 2016 designated as "NAT MNPS Airspace")

EXCLUSION OF LIABILITY

FOREWORD

This Document has been produced with the approval and on behalf of the North Atlantic (NAT) Systems Planning Group (SPG); the North Atlantic regional planning body established under the auspices of the International Civil Aviation Organisation (ICAO). This Group is responsible for developing the required operational procedures; specifying the necessary services and facilities; and defining the aircraft and operator approval standards employed in the NAT region.

Further information on the functions and working methods of the NAT SPG, together with the NAT Regional Safety Policy Statement, are contained in the NAT SPG Handbook (NAT DOC 001) which is available in the European and North Atlantic (EUR/NAT) Office public pages on the ICAO website (www.icao.int/EURNAT/).

This Document is for guidance only. Regulatory material relating to North Atlantic aircraft operations is contained in relevant ICAO Annexes, PANS/ATM (Doc.4444), Regional Supplementary Procedures (Doc.7030), State AIPs and current NOTAMs, which should be read in conjunction with the material contained in this Document.

The airspace of the North Atlantic which links Europe and North America is the busiest oceanic airspace in the world. In 2017 approximately 730,000 flights crossed the North Atlantic (*ref NAT SPG/54 – WP/08 - OUTCOMES OF NAT EFFG/33 AND NAT EFFG/34*). For the most part in the North Atlantic, Direct Controller Pilot Communications (DCPC) and ATS Surveillance are unavailable. Aircraft separation assurance and hence safety are nevertheless ensured by demanding the highest standards of horizontal and vertical navigation performance/accuracy and of operating discipline.

The vast majority of North Atlantic flights are performed by commercial jet transport aircraft in the band of altitudes FL290 – FL410. To ensure adequate airspace capacity and provide for safe vertical separations, Reduced Vertical Separation Minima (RVSM) is applied throughout the ICAO NAT region.

A large portion of the airspace of the NAT, which, incidentally, contains the majority of these NAT crossings routes, is designated as the NAT High Level Airspace (NAT HLA) between FL 285 and 420 inclusive. Within this airspace a formal approval process by the State of Registry of the aircraft or the State of the operator ensures that aircraft meet defined NAT HLA Standards and that appropriate flight crew procedures and training have been adopted. The lateral dimensions of the NAT HLA include the following Control Areas (CTAs):

REYKJAVIK, SHANWICK (excluding SOTA & BOTA), GANDER, SANTA MARIA OCEANIC, BODO OCEANIC and NEW YORK OCEANIC EAST.

Some idea of these dimensions can be obtained from the maps at and those in Chapters 2 and 3. However, for specific dimensions, reference should be made to ICAO Regional Air Navigation Plan and Doc.7030 - NAT/RAC (available at www.icao.int/EURNAT/).

Note that “NAT HLA” is a re-designation of the airspace formerly known as the “North Atlantic Minimum Navigational Performance Specifications Airspace (NAT MNPSA),” but excludes those portions of SHANWICK OCA which form the SOTA and BOTA areas and includes the BODO OCEANIC FIR. This re-designation is the third of the milestones of the “MNPS to PBN Transition Plan” for the North Atlantic region and is effective from 04 February 2016. Approvals initially issued to operate in the NAT MNPSA are referred to as “NAT MNPS” approvals and approvals issued to operate in the NAT HLA are referred to as “NAT HLA” approvals.

Although aircraft and flight crews may fly above the NAT HLA without the requisite of a NAT HLA approval, it is important that flight crews of such aircraft have both an understanding of the operational procedures and systems employed in the NAT HLA and specific knowledge of any active organized route structures.

The bulk of this Document provides information for Aircraft Operating Agencies, flight crews and Dispatchers planning and conducting operations in or above the NAT HLA and it also offers guidance to the State Regulators responsible for the approval/certification/or licensing of such aircraft operators, flight crews or dispatchers. It combines the guidance material contained prior to 2010 separately in the "North Atlantic MNPS Airspace Operations Manual", and the ICAO "Guidance Material for Air Navigation in the North Atlantic Region.

Aircraft without NAT HLA or RVSM approvals may, of course, also fly across the North Atlantic below FL285. However, due consideration should be given to the particular operating environment. Especially by pilots/operators of single and twin engine aircraft. Weather conditions can be harsh; there are limited VHF radio communications and ground-based navigation aids; and the terrain can be rugged and sparsely populated. International General Aviation (IGA) flights at these lower levels constitute a very small percentage of the overall NAT traffic but they account for the vast majority of Search and Rescue operations. Specific guidance for the pilots and operators of such flights was previously contained in the North Atlantic International General Aviation (NAT IGA) Operations Manual published by the FAA on behalf of the ICAO North Atlantic Systems Planning Group (NAT SPG). However, with effect from Edition 2013, such guidance has been subsumed into this document.

The resulting consolidated guidance document provided herewith is included in the ICAO NAT Regional Library and is designated as NAT Document 007 (NAT Doc 007). The Document can be accessed/downloaded from the European and North Atlantic (EUR/NAT) Office public pages on the ICAO website, following "EUR & NAT Documents", then "NAT Documents", in folder "NAT Doc 007".

This website will also include, any noted post publication errata (changes) or addenda (additions) to the current edition.

A separate document, "NAT Region Updates Bulletin", is also available from the website. This advises operators of any recent changes to procedures or associated operational information which may affect their conduct and planning of operations in the ICAO North Atlantic (NAT) region.

Edited by European and North Atlantic Office of ICAO
3 bis, Villa Emile Bergerat
92522 Neuilly-sur-Seine Cedex
FRANCE

Tel: +33 1 4641 8585
Fax: +33 1 4641 8500
Email: ~~icaoeurnat@paris.icao.int~~icaoeurnat@icao.int

To assist with the editing of this Manual and to ensure the currency and accuracy of future editions it would be appreciated if readers would submit their comments/suggestions for possible amendments/additions, to the ICAO EUR/NAT Office at the above Email address.

In October 2012 UK NATS completed a publication titled 'Track Wise-Targeting Risk within the Shanwick OCA'. It was produced in collaboration with the Safety Partnership Agreement. It is available as a DVD or can be viewed on-line via You-Tube. Like this Manual, it is aimed at flight crews, dispatchers and others concerned in flight operations in the North Atlantic. It follows the progress of a westbound NAT flight through the Shanwick OCA as well as exampling contingency and emergencies situations. While the operational procedures elements are specific to Shanwick, the majority of the DVD considers issues common to the whole ICAO NAT region. It is available at no charge to bona fide operators on application to: customerhelp@nats.co.uk.

The complete DVD can be accessed from the European and North Atlantic (EUR/NAT) Office public pages on the ICAO website (www.icao.int/EURNAT/), following "EUR & NAT Documents", then "NAT Documents", then selecting "Trackwise for on-line U-Tube viewing". It is also available on YouTube™, looking for "**Trackwise - Targeting Risk Within The Shanwick OCA**", or directly at https://www.youtube.com/watch?v=EJTjwW5ZYas

As part of the continuing development within the operating environment of NAT HLA, trials take place in the NAT from time to time, in support of various separation reduction and safety initiatives. Some of these trials require the assistance of operators and flight crews. For a listing of current initiatives and trials (if any) and participation details etc., reference should be made to the AIP of NAT ATS provider States. Information on some of these trials may also be found by looking for "NAT Documents" in the European and North Atlantic (EUR/NAT) Office public pages on the ICAO website (www.icao.int/EURNAT/).

EXPLANATION OF CHANGES

Edition 2020-v1 - Content Modifications/Additions Incorporated

This modification includes changes to Foreword, Definitions, *paragraphs 1.5, 1.8, 1.11, 2.2, 3.2, 3.4, 4.1, 6.1, 6.8, 8.5, 10.1, 10.2, 10.3, 13.4 and 16.2 and Attachment 6, Attachment 10.*

Edition 2020-v2 - Content Modifications/Additions Incorporated

This modification includes changes to sections 3.2.1.b and 6.8.1 concerning operation of transponders and HLA approvals in the Shanwick OCA South East Corner.
2020-v2.1: Section 10.2.1 Note 2: Correction of waypoint name, LASNO replaced by GELPO.

Edition 2021-v1 - Content Modifications/Additions Incorporated

This modification includes changes to:
- sections 3.2.1.a), Figure 3-1, 4.2.11, 16.3.10, 16.6.6, 7.1.1, 7.3.1 concerning removal of HO NDB, NOROTS and NCA and deletion of “turbojet” in PANS- ATM with reference to Mach number technique; and
- sections 4.2.12, 6.1.1, 6.1.2, 6.1.3, 6.1.4, 6.1.5, 6.1.27, 6.1.28, 6.1.31, 6.6.17, 16.2.5, 16.6.16, 16.6.19 concerning clarifications on the NAT Region HF requirements.

Edition 2021-v2 - Content Modifications/Additions Incorporated

This modification includes changes to:
- sections 1.8.3 to 1.8.5 regarding data link requirements,
- section 1.10 regarding PBCS operations;
- section 8.2.15 regarding service applied in Gander and Shanwick airspace for provision of climbs;
- section 8.5.20 to 8.5.22 regarding Uplink Message Latency Monitor Function;
- section 13.4 Weather Deviation Procedures;
- Attachment 8 Charts for ATS surveillance coverage in NAT updated; and
- Attachment 10 Checklist for dispatchers, under Mandatory ADS-B Carriage, Northern Boundary coordinates corrected.

ABBREVIATIONS

ACARS	Aircraft Communications Addressing and Reporting System
ACAS	Airborne Collision Avoidance System
ACC	Area Control Centre
ADF	Automatic Direction Finding
ADS	Automatic Dependant Surveillance
ADS-B	Automatic Dependant Surveillance - Broadcast
ADS-C	Automatic Dependant Surveillance - Contract
AFTN	Aeronautical Fixed Telecommunication Network
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AIRAC	Aeronautical Information Regulation and Control
AIS	Aeronautical Information Service
ARINC	ARINC - formerly Aeronautical Radio Incorporated
ATA	Actual Time of Arrival
ATC	Air Traffic Control
ATM	Air Traffic Management
ATS	Air Traffic Services
BOTA	Brest Oceanic Transition Area
BRNAV	Basic Area Navigation
CAR	Caribbean
CDL	Configuration Deviation List
CDM	Collaborative Decision Making
CDR	ConDitional Route
CDU	Control Display Unit
CMA	Central Monitoring Agency
CPDLC	Controller Pilot Data Link Communications
CTA	Control Area
DCL	Departure Clearance (via Data Link)
DCPC	Direct Controller/Pilot Communications
DME	Distance Measuring Equipment
DR	Dead Reckoning
EDTO	Extended Diversion Time Operations
ELT	Emergency Locator Transmitter
ETA	Estimated Time of Arrival
ETOPS	Extended Range Twin-engine Aircraft Operations
EUR	Europe

FAA	Federal Aviation Administration
FANS 1/A	Future Air Navigation System 1 or A. (Respectively, Boeing and Airbus Proprietary Air-Ground ATC Data Link Communications Systems)
FDE	Fault Detection and Exclusion
FDR	Flight Data Records
FIR	Flight Information Region
FL	Flight Level
FLAS	Flight Level Allocation Scheme
FMC	Flight Management Computer
FMS	Flight Management System
GLONASS	Global Orbiting Navigation Satellite System
GMU	GPS (Height) Monitoring Unit
GNE	Gross Navigation Error
GNSS	Global Navigation Satellite System
GP	General Purpose
GPS	Global Positioning System
HF	High Frequency
HMU	Height Monitoring Unit
HSI	Horizontal Situation Indicator
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
INS	Inertial Navigation System
IRS	Inertial Reference System
JAA	Joint Aviation Authorities
kHz	Kilohertz
LAT	Latitude
LEO	Low Earth Orbit (in reference to satellites e.g Iridium Constellation)
LONG	Longitude
LRNS	Long Range Navigation System
MASPS	Minimum Aircraft System Performance Specifications
MEL	Minimum Equipment List
MET	Meteorological
MHz	Megahertz
MMEL	Master Minimum Equipment List
MNPS	Minimum Navigation Performance Specifications
MNT	Mach Number Technique
NAM	North America
NAR	North American Route

NAT	North Atlantic
NAT HLA	North Atlantic High Level Airspace
NAT SPG	North Atlantic Systems Planning Group
NDB	Non Directional Beacon
NM	Nautical Mile
NOAA	National Oceanic and Atmospheric Administration
NOTA	Northern Oceanic Transition Area
NOTAM	Notice to Airmen
OACC	Oceanic Area Control Centre
OCA	Oceanic Control Area
OESB	Oceanic Errors Safety Bulletin
OTS	Organized Track System
PBCS	Performance-Based Communication and Surveillance
PDC	Pre Departure Clearance
PRM	Preferred Route Message
RA	Resolution Advisory (per ACAS/TCAS)
RAIM	Receiver Autonomous Integrity Monitoring
RMI	Radio Magnetic Indicator
RNP	Required Navigation Performance
R/T	Radio Telephony
RVSM	Reduced Vertical Separation Minimum
SAM	South America
SELCAL	Selective Calling
SID	Standard Instrument Departure
SLOP	Strategic Lateral Offset Procedures
SMS	Safety Management System
SOTA	Shannon Oceanic Transition Area
SSB	Single Sideband
SSR	Secondary Surveillance Radar
TAS	True Airspeed
TCAS	Traffic (Alert and) Collision Avoidance System
TLS	Target Level of Safety
TMI	Track Message Identification
UTC	Co-ordinated Universal Time
VHF	Very High Frequency
VOR	VHF Omni-directional Range
WAH	When Able Higher

WATRS	West Atlantic Route System
WPR	Waypoint Position Report

DEFINITIONS

ATS Surveillance service	Term used to indicate a service provided directly by means of an ATS Surveillance system.
ATS Surveillance system	Generic term meaning variously, ADS-B, PSR, SSR or any comparable ground-based system that enables the identification of aircraft.
Conflict	A situation that occurs when it is predicted that the spacing between aircraft, an aircraft and a defined airspace, or an aircraft and terrain, may or will reduce below the prescribed minimum.
Doc 7030	North Atlantic (NAT) Regional Supplementary Procedures (AKA NAT Supps)
Multilateration	A group of equipment configured to provide position derived from the secondary surveillance radar (SSR) transponder signals (replies or squitters) primarily using time difference of arrival (TDOA) techniques. Additional information, including identification, can be extracted from the received signals.
North Atlantic Operations Bulletin (NAT OPS Bulletin)	NAT Ops Bulletins are used to distribute information on behalf of the North Atlantic Systems Planning Group (NAT SPG) for the purpose of providing guidance to North Atlantic (NAT) operators on material relevant to their operations.
Oceanic Entry Point	The Oceanic Entry point is generally a “named” waypoint, on or close to the FIR boundary where the aircraft enters an oceanic control area. Note: For aircraft entering the Reykjavik CTA from Edmonton, at or north of 82N, the Oceanic Entry Point can be a Lat/Long position on the boundary.
Oceanic Exit Point	The Oceanic Exit point is generally a “named” waypoint, on or close to the FIR boundary where the aircraft leaves the last oceanic control area. Note: Routes involving more than one OCA may result in multiple Oceanic Entry and Exit Points.
Procedural Control	Term used to indicate that information derived from an ATS Surveillance system is not required for the provision of air traffic control service. (PANS-ATM)

TABLE OF CONTENTS

CHAPTER 1

OPERATIONAL APPROVAL AND AIRCRAFT SYSTEM REQUIREMENTS FOR FLIGHT IN THE NAT HLA

Flight crews *may fly across the North Atlantic within NAT High Level Airspace (HLA) only if they are in possession of the appropriate NAT HLA and RVSM* approvals *issued by the State of Registry of the aircraft or by the State of the operator. The Minimum Equipment List (MEL) for operations must be strictly observed.*

1.1 GENERAL

1.1.1 With effect from 04 February 2016 the airspace previously designated as NAT MNPSA was re-designated as NAT HLA. NAT HLA is that volume of airspace between flight level (FL) 285 and FL 420 within the oceanic control areas of Bodo Oceanic, Gander Oceanic, New York Oceanic East, Reykjavik, Santa Maria and Shanwick, excluding the Shannon and Brest Ocean Transition Areas. State approvals for NAT MNPSA operations granted prior to that date will be valid for NAT HLA operations. Except that those approvals issued prior to 01 January 2015 and based upon the earlier "6.3 NMs" MNPS standard will not be valid beyond January 2020. Any NAT MNPS approvals granted using PBN specifications for navigation equipment performance will continue to be valid beyond that date.

1.1.2 It is implicit in the concept of the NAT HLA that all flights within the airspace achieve the highest standards of horizontal and vertical navigation performance and accuracy. Formal monitoring programmes are undertaken to quantify the achieved performances and to compare them with standards required to ensure that established Target Levels of Safety (TLS) are met.

Note: Collision Risk Modelling is used to estimate risk in each of the three dimensions (i.e. lateral, longitudinal and vertical). Target maxima set for these estimates are expressed in terms of potential collisions per flight hour and are known as "Target Levels of Safety (TLSs)".

1.1.3 Aircraft operating within the NAT HLA are required to meet specified navigation performance in the horizontal plane through the carriage and proper use of navigation equipment that meets identified standards and has been approved as such by the State of Registry or State of the operator for the purpose. Such approvals encompass all aspects affecting the expected navigation performance of the aircraft, including the designation of appropriate cockpit/flight deck operating procedures.

1.1.4 All aircraft intending to operate within the NAT HLA must be equipped with altimetry and height-keeping systems which meet RVSM Minimum Aircraft System Performance Specifications (MASPS). RVSM MASPS are contained in *ICAO Doc 9574* and detailed in designated FAA document, *AC91-85* (latest edition). These documents can be downloaded from:

www.faa.gov/air_traffic/separation_standards/rvsm/documents/AC_91-85A_7-21- 2016.pdf and www.skybrary.aero/bookshelf/books/157.pdf respectively.

1.1.5 The ultimate responsibility for checking that a NAT HLA/RVSM flight has the necessary approval(s) rests with the pilot in command. In the case of most regular scheduled flights this check is a matter of simple routine but flight crews of special charter flights, private flights, ferry and delivery flights are advised to pay particular attention to this matter. Routine monitoring of NAT traffic regularly reveals examples of flight crews of non-approved flights, from within these user groups, flight planning or requesting clearance within the NAT HLA. All such instances are prejudicial to safety and are referred to relevant State Authorities for further action.

1.1.6 While not a specific element of NAT HLA approval, flight crews and operators are reminded that for flights over the NAT, *ICAO SARPS in Annex 6 (Operation of Aircraft), Part I, Chapter 6 and Part II, Chapter 2* requires carriage of Emergency Locator Transmitters (ELTs) by all commercial and IGA aircraft, respectively.

Exceptions - Special Operations

1.1.7 NAT ATS providers may approve moving or stationary temporary airspace reservations within the NAT HLA, for the benefit of State or Military Aircraft Operating Agencies to accommodate Military Exercises, Formation Flights, Missile Firing or UAV Activities. Procedures are established in respect of the requests for and management of such reservations. Whenever such reservations might impinge upon other flights in the NAT region, relevant AIS is published, including, if appropriate, annotations on the NAT track message.

1.1.8 Manned Balloon flights can be operated in or through the NAT region. They are, however, required to avoid the NAT HLA and must be meticulously co-ordinated with affected ATS Authorities in advance allowing sufficient time for all parties involved to properly plan for the flight.

1.2 APPROVAL

1.2.1 All flights within the NAT HLA must have the approval of either the State of Registry of the aircraft, or the State of the operator. Aircraft operating in RVSM airspace are required to be compliant with the altimetry Minimum Aircraft System Performance Specifications (MASPS) and hold an issued approval. Approval for NAT HLA operations will require the checking by the State of Registry or State of the operator, of various aspects affecting navigation performance. These aspects include: the navigation equipment used, together with its installation and maintenance procedures; plus the flight crew navigation procedures employed and the flight crew training requirements.

1.2.2 Since the NAT HLA is now designated as RVSM airspace at all levels, all NAT flight crews/operators must be State approved specifically for NAT RVSM operations and each aircraft intended to be flown in the NAT HLA must have State RVSM Airworthiness approval.

1.2.3 There are times when NAT HLA and/or RVSM approval documentation may need to be shown to “suitably authorised persons”, e.g. during a ramp inspection or on similar occasions.

1.2.4 In order to adequately monitor the NAT HLA, State aviation authorities should maintain a database of all NAT HLA and RVSM approvals that they have granted. States must also provide data on RVSM approved airframes to the North Atlantic Regional Monitoring Agency (RMA), which is maintained by the North Atlantic Central Monitoring Agency (NAT CMA). The CMA database facilitates the tactical monitoring of aircraft approval status and the exclusion of non-approved users.

1.2.5 In the case of approvals for IGA operations, the following points are emphasised:

a) aircraft NAT HLA and RVSM approvals constitute a package covering equipment standards, installation, maintenance procedures and flight crew training;

b) State aviation authorities should consider limiting the validity period of approvals; and

c) State aviation authorities should maintain detailed records of all NAT HLA and RVSM approvals.

1.3 HORIZONTAL NAVIGATION REQUIREMENTS FOR UNRESTRICTED NAT HLA OPERATIONS

Longitudinal Navigation

1.3.1 Time-based longitudinal separations between subsequent aircraft following the same track (in-trail) and between aircraft on intersecting tracks in the NAT HLA are assessed in terms of differences in ATAs/ETAs at common points. The time-based longitudinal separation minima currently used in the NAT HLA are thus expressed in clock minutes. The maintenance of in-trail separations is aided by the application of the Mach Number Technique (MNT) (See Chapter 7). However, aircraft clock errors resulting in waypoint ATA errors in position reports can lead to an erosion of actual longitudinal separations between aircraft. It is thus vitally important that the time-keeping device intended to be used to indicate waypoint passing times is accurate, and is synchronised to an acceptable UTC time signal before commencing flight in the NAT HLA. In many modern aircraft, the Master Clock can only be reset while the aircraft is on the ground. Thus the pre-flight procedures for any NAT HLA operation must include a UTC time check and resynchronisation of the aircraft Master Clock (typically the FMS). Lists of acceptable time sources for this purpose have been promulgated by NAT ATS provider States. A non-exhaustive list is shown in Chapter 8 of this Document.

Lateral Navigation

<u>Equipment</u>

1.3.2 There are two navigational equipment requirements for aircraft planning to operate in the NAT HLA. One refers to the navigation performance that should be achieved, in terms of accuracy. The second refers to the need to carry standby equipment with comparable performance characteristics (*ICAO Annex 6 (Operation of Aircraft)* refers).

1.3.3 The navigation system accuracy requirements for NAT MNPSA/HLA operation should only be based on the PBN specifications, RNP 10 (PBN application of RNAV 10) or RNP 4. Although when granting consequent approval for operations in MNPSA/NAT HLA, States should take account of the RNP 10 time limits for aircraft equipped with dual INS or inertial reference unit (IRU) systems. All approvals issued after 04 February 2016 must be designated as “NAT HLA” approvals.

*Note 1 – With respect to RNAV 10/RNP 10 operations and approvals the nomenclature “RNAV 10 (RNP 10)” is now used throughout this document for consistency with ICAO PBN Manual Doc.9613. As indicated in the PBN Manual RNAV 10 has, and is being, designated and authorized as “RNP 10” irrespective of the fact that such “RNP 10” designation is inconsistent with formal PBN RNP and RNAV specifications, since “RNP 10” already issued operational approvals and “RNP 10” currently designated airspaces in fact **<u>do not</u>** include any requirements for on-board performance monitoring and alerting. The justification for continuing to use this “RNP 10” nomenclature being that renaming current “RNP 10” routes and/or operational approvals, etc., to an “RNAV 10” designation would be an extensive and expensive task, which is not cost-effective. Consequently, any existing or new RNAV 10 operational approvals will continue to be designated “RNP 10”, and any charting annotations will be depicted as “RNP 10”.*

Note 2 – RNP 10 time limits are discussed in (Doc 9613) Part B, Volume II Chapter 1.

1.3.4 Additionally, in order for the 50 NM lateral separation minimum to be utilized in the New York Oceanic East the following navigation performance criteria must also be met by aircraft with RNAV 10 (RNP 10) approvals:

a) the proportion of the total flight time spent by aircraft 46 km (25 NM) or more off the cleared track shall be less than 9.11 × 10-5; and

b) the proportion of the total flight time spent by aircraft between 74 and 111 km (40 and 60 NM) off the cleared track shall be less than 1.68 × 10-5.

1.3.5 And similarly the additional criteria which must be met by aircraft approved as RNP 4 are as follows:

a) the proportion of the total flight time spent by aircraft 28 km (15 NM) or more off the cleared track shall be less than 5.44 × 10-5; and

b) the proportion of the total flight time spent by aircraft between 44 and 67 km (24 and 36 NM) off the cleared track shall be less than 1.01 × 10-5.

1.3.6 When granting approval for operations in the NAT HLA, States of Registry should also ensure that in-flight operating drills are approved which include mandatory navigation cross-checking procedures aimed at identifying navigation errors in sufficient time to prevent the aircraft inadvertently deviating from the ATC-cleared route.

1.3.7 Long Range Navigation Systems, namely INS, IRS or GNSS, have demonstrated the requisite navigation accuracy required for operations in the NAT HLA. Consequently, State approval of unrestricted operation in the NAT HLA may presently be granted to an aircraft equipped as follows:

a) **with at least two** fully serviceable Long Range Navigation Systems (LRNSs). A LRNS may be one of the following:

- one Inertial Navigation System (INS);
- one Global Navigation Satellite System (GNSS); or
- one navigation system using the inputs from one or more Inertial Reference System (IRS) or any other sensor system complying with the NAT HLA requirement.

Note 1: Currently the only GNSS system fully operational and for which approval material is available, is GPS.

Note 2: In USA, FAA Advisory Circular (AC) 20-138 provides guidance on airworthiness approval for positioning and navigation systems, to include GPS. AC 90-105 provides guidance on operational approval for RNP operations in oceanic airspace, to include the requirements for RNP 10 (RNAV 10) applicable to NAT HLA operations.

Note 3: Currently equivalent approval material for GLONASS is not under development but it will need to be available prior to approval of any GLONASS equipped aircraft for NAT HLA operations.

b) each LRNS must be capable of providing to the flight crew a continuous indication of the aircraft position relative to desired track.

c) it is also highly desirable that the navigation system employed for the provision of steering guidance is capable of being coupled to the autopilot.

Note: Some aircraft may carry two independent LRNS but only one FMCS. Such an arrangement may meet track keeping parameters but does not provide the required redundancy (in terms of continuous indication of position relative to track or of automatic steering guidance) should the FMCS fail; therefore, in order to obtain NAT HLA certification, dual FMCS is required to be carried. For example: a single INS is considered to be one LRNS; and an FMCS with inputs from one or more IRS/ISS is also considered to be a single LRNS.

Flight Crew Training

1.3.8 It is essential that flight crews obtain proper training for NAT HLA and RVSM operations in line with procedures described in other chapters of this document.

1.4 ROUTES FOR USE BY AIRCRAFT NOT EQUIPPED WITH TWO LRNS

Routes for Aircraft with Only One LRNS

1.4.1 A number of special routes have been developed for aircraft equipped with only one LRNS and carrying normal short-range navigation equipment (VOR, DME, ADF), which require to cross the North Atlantic between Europe and North America (or vice versa). It should be recognised that these routes are within the NAT HLA, and that State approval must be obtained prior to flying along them. These routes are also available for interim use by aircraft normally approved for unrestricted NAT HLA operations that have suffered a partial loss of navigation capability and have only a single remaining functional LRNS. Detailed descriptions of the special routes known as 'Blue Spruce Routes' are included in Chapter 3 of this Document. Other routes also exist within the NAT HLA that may be flown by aircraft equipped with only a single functioning LRNS. These include routings between the Azores and the Portuguese mainland and/or the Madeira Archipelago and also routes between Northern Europe and Spain/Canaries/Lisbon FIR to the east of longitude 009° 01' W (viz.T9). Other routes available for single LRNS use are also established in the NAT HLA, including a route between Iceland and the east coast of Greenland and two routes between Kook Islands on the west coast of Greenland and Canada.

1.4.2 If this single LRNS is a GPS it must be approved in accordance with FAA TSO-C129 or later standard as Class A1, A2, B1, B2, C1 or C2, or with equivalent EASA documentation ETSO- C129a. Some States may have additional requirements regarding the carriage and use of GPS (e.g. a requirement for FDE RAIM) and flight crews should check with their own State of Registry to ascertain what, if any, they are. These above mentioned documents can be found at:

www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgWebcomponents.nsf and
www.easa.europa.eu/ws_prod/g/doc/Agency_Mesures/Certification Spec/CS-ETSO.pdf.

Field

Routes for Aircraft with Short-Range Navigation Equipment Only

1.4.3 Aircraft that are equipped only with short-range navigation equipment (VOR, DME, ADF) may operate through the NAT HLA but only along routes G3 or G11. However, once again formal State approval must be obtained. (See Chapter 3 for details of these routes.)

1.4.4 The letter 'X' shall be inserted in Item 10 of the ATS flight plan to denote that a flight is approved to operate in NAT HLA. The filed ATS flight plan does not convey information to the controller on any NAT HLA approval limitations. Therefore, it is the responsibility of the pilot in command to take account of aircraft or flight crew limitations and if appropriate, decline any unsanctioned ATC clearances.

1.5 SPECIAL ARRANGEMENTS FOR OPERATION IN NAT HLA BY NON-NAT HLA CERTIFIED AIRCRAFT

1.5.1 Aircraft that do not meet NAT HLA requirements may be allowed to operate in NAT HLA if the following conditions are satisfied:

a) The aircraft is being provided with ATS surveillance service

b) Direct controller-pilot VHF voice communication is maintained; and

c) The aircraft has a certified installation of equipment providing it the ability to navigate along the cleared track.

Note 1 – Flight crews operating in the NAT HLA under these provisions should familiarize themselves with NAT HLA operations and procedures as well as ATS Surveillance and VHF service areas as published in state AIPs. They should also have a current copy of the OTS message that is in effect for the time of their flight for situational awareness.

Note 2 – See section 1.8 for data link requirements.

1.5.2 Aircraft not approved to operate in NAT HLA and not meeting the provisions in 1.5.1 may be cleared to climb or descend through NAT HLA, traffic permitting.

1.5.3 Details of other special arrangements may be found in AIP of each ATS provider State.

1.6 SPECIAL ARRANGEMENTS FOR NON-RVSM APPROVED AIRCRAFT

To Climb/Descend Through RVSM Levels

1.6.1 NAT HLA approved aircraft that are not approved for RVSM operation will be permitted, subject to traffic, to climb/descend through RVSM levels in order to attain cruising levels above or below RVSM airspace. Flights should climb/descend continuously through the RVSM levels without stopping at any intermediate level and should “Report leaving” current level and “Report reaching” cleared level (N.B. this provision contrasts with the regulations applicable for RVSM airspace operations in Europe, where aircraft not approved for RVSM operations are not permitted to effect such climbs or descents through RVSM levels.). Such aircraft are also permitted to flight plan and operate at FL430 either Eastbound or Westbound above the NAT HLA.

To Operate at RVSM Levels

1.6.2 ATC may provide special approval for a NAT HLA approved aircraft that is not approved for RVSM operation to fly in the NAT HLA provided that the aircraft:

a) is on a delivery flight; or

b) was RVSM approved but has suffered an equipment failure and is being returned to its base for repair and/or re-approval; or

c) is on a mercy or humanitarian flight.

1.6.3 Operators requiring such special approval should request prior approval by contacting the initial Oceanic Area Control Centre (OACC), normally not more than 12 hours and not less than 4 hours prior to the intended departure time, giving as much detail as possible regarding acceptable flight levels and routings. Operators should be aware, due to the requirements to provide non-RVSM separation, that requested levels and/or routes may not always be available (especially when infringing active OTS systems). The special approval, if and when received, should be clearly indicated in Item 18 of the ICAO flight plan. Operators must appreciate that the granting of any such approval does not constitute an oceanic clearance, which must be obtained from ATC, by the flight crew, in the normal manner.

1.6.4 This service, as explained above, will not be provided to aircraft without approval for NAT HLA operations. It must be noted that the provision of this service is intended exclusively for the purposes listed above and is not the means for an operator or flight crew to circumvent the RVSM approval process. Operators or flight crews are required to provide written justification for the request, upon completion of the flight plan, to the NAT Central Monitoring Agency (CMA). Any suspected misuse of the exceptions rule above, regarding RVSM operation, will be reported and will therefore be subject to follow-up action by the State of Registry or State of the operator as applicable.

1.6.5 Some flight planning systems cannot generate a flight plan through RVSM airspace unless the “W” designator is inserted in item 10 (equipment). For a flight which has received this special approval, it is of utmost importance that the “W” is removed prior to transmitting the ICAO flight plan to ATC. ATC will use the equipment block information to apply either 1000 ft or 2000ft separation. Additionally, flight crews of any such non-RVSM flights operating in RVSM airspace should include the phraseology “Negative RVSM” in all initial calls on ATC frequencies, requests for flight level changes, read-backs of flight level clearances within RVSM airspace and read-back of climb or descent clearances through RVSM airspace.

1.7 ATS SURVEILLANCE SERVICE AREAS IN THE NAT REGION

1.7.1 ATS Surveillance services (radar, ADS-B and Multilateration) are provided within some portions of the NAT HLA, where radar- and/or ADS-B and/or Multilateration coverage exists. The ATS Surveillance services are provided in accordance with the ATS Surveillance services procedures in the PANS ATM (DOC 4444).

1.7.2 All aircraft operating as IFR flights anywhere within the NAT region are required to be equipped with a pressure-altitude reporting SSR transponder and may therefore benefit from such radar and multilateration air traffic services, currently offered in parts of the NAT region.

1.7.3 ADS-B services are provided within portions of the NAT region (see Chapter 10). Eligibility and procedures for ADS-B service in the NAT are based upon the provisions in the Doc 7030 section 5.5.

1.7.4 North Atlantic States providing ADS-B Air Traffic Services maintain a common exclusion list of aircraft that are known to not satisfy the conditions promulgated by Doc 7030. The purpose of the exclusion list is to ensure that ADS-B reports received from such aircraft are not utilized by the air traffic control system for separation services.

1.7.5 Aircraft operators wishing to receive an exemption from the procedures specified in Doc 7030 for an individual flight shall apply for an exemption to the ATS unit(s) in accordance with AIP directives. Any approvals for such exemptions may be contingent on specific conditions such as routing, flight level and time of day.

1.8 DATA LINK REQUIREMENTS

1.8.1 The NAT Data Link Mandate (DLM) requires aircraft to be equipped with, and operating, CPDLC and ADS-C in the NAT region. Currently, the mandate incorporates FL290 to FL410 inclusive.

1.8.2 The DLM is not applicable to aircraft operating in:

- Airspace north of 80° North;
- New York Oceanic East flight information region (FIR);
- Airspace where an ATS surveillance service is provided by means of radar, multilateration and/or ADS-B, coupled with VHF voice communications as depicted in State Aeronautical Information Publications (AIP), provided the aircraft is suitably equipped (transponder/ADS-B extended squitter transmitter) (see *Note 1* below).

1.8.3 Certain categories of flights may be allowed to plan and operate through the mandated airspace with non-equipped aircraft, namely non-equipped flights that file STS/FFR, HOSP, HUM, MEDEVAC SAR, or STATE in Item 18 of the flight plan. (Depending on the tactical situation at the time of flight, however, such flights may not receive an ATC clearance which fully corresponds to the requested flight profile).~~. (See also "**NAT OPS Bulletin 2017-001**" available at www.icao.int/EURNAT/, following "EUR & NAT Documents", then "NAT Documents", then "NAT OPS Bulletins").~~

1.8.4 Any aircraft not equipped with FANS 1/A (or equivalent) systems may request to climb or descend through the NAT DLM airspace. Such requests, as outlined below, will be considered on a tactical basis.

• Altitude reservation (ALTRV) requests will be considered on a case by case basis~~ (as is done today regarding NAT HLA airspace)~~, irrespective of the equipage status of the participating aircraft.

• If a flight experiences an equipment failure AFTER DEPARTURE which renders the aircraft unable to operate FANS 1/A (or equivalent) CPDLC and/or ADS-C systems, requests to operate in the NAT DLM airspace will be considered on a tactical basis. Such flights must notify ATC of their status PRIOR TO ENTERING the airspace.

• If a FANS 1/A data link equipment failure occurs while the flight is OPERATING WITHIN NAT DLM AIRSPACE, ATC must be immediately advised. Such flights may be re-cleared so as to avoid the airspace, but consideration will be given to allowing the flight to remain in the airspace, based on tactical considerations.

• If a flight experiences an equipment failure PRIOR to departure which renders the aircraft non-DLM compliant, the flight should re-submit a flight plan so as to remain clear of the NAT regional DLM airspace.

~~1.8.3~~1.8.5 Charts providing an indication of the likely extent of the NAT ATS Surveillance airspace are included in Attachment 8. Details will be promulgated in the future via State AIP.

Note 1: Details in State Aeronautical Information Publications (AIP).

1.9 PERFORMANCE MONITORING

1.9.1 The horizontal (i.e. latitudinal and longitudinal) and vertical navigation performance of operators within the NAT HLA is monitored on a continual basis. If a deviation is identified, follow- up action after flight is taken, both with the operator and the State of Registry of the aircraft involved, to establish the cause of the deviation and to confirm the approval of the flight to operate in NAT HLA and/or RVSM airspace. The overall navigation performance of all aircraft in the NAT HLA is compared to the standards established for the region, to ensure that the relevant TLSs are being maintained. (See Chapter 11).

1.9.2 A NAT regional monitoring programme to assess actual communication and surveillance performance against RCP and RSP specifications is being undertaken to monitor individual aircraft performance and to determine whether and what, if any, corrective action is required by contributing entities (Operators, ANSPs, CSPs, SSPs, etc.) to ensure achievement of the system performance required for continued PBCS based separation operations.

1.10 PBCS OPERATIONS

1.10.1 ~~On 29 March 2018~~ Performance Based separation minima as ~~low~~small as ~~of 42.6km (23~~19 NM~~)~~ lateral and ~~, 5 minutes and 30/93km (~~14~~50~~ NM~~)~~ longitudinal predicated on PBCS and PBN, in accordance with ICAO Doc 4444 Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM) has been~~were~~ implemented in the ICAO NAT Region. Operators should consult the AIS of relevant NAT Provider States for the detailed application of these separation minima in each of the NAT OCAs. To benefit from these separations Operators must obtain State Approvals in accordance with Annex 6 to file in the flight plan RCP/RSP capabilities including aircraft equipage where RCP and/or RSP specifications are prescribed for the communications and/or surveillance capabilities supporting this ATS provision. Guidance material for implementation of communication and surveillance capability supporting these separation minima is contained in the Performance Based Communication and Surveillance (PBCS) Manual (Doc 9869) and the Global Operational Data Link (GOLD) Manual (Doc 10037).

1.10.2 Within the OTS the 42.6km (23NM) lateral separation minimum is implemented by applying 42.6km (23 NM) lateral spacing through whole and half degrees of latitude between PBCS designated NAT OTS Tracks between flight levels FL 350-390 inclusive, except when the OTS occurs in the New York OCA East. In the OTS this PBCS-based separation implementation supersedes and replaces the previous trials of RLatSM. In addition to requiring RNP-4 Approval, Operators must appreciate that unlike the filing criteria for the half degree spaced RLatSM Tracks, the simple equipage and operation of CPDLC and ADS-C will not be a sufficient criteria for planning and flying on the designated PBCS-based OTS Tracks. To utilize these tracks the aircraft must have formal State Authorization for filing RCP 240 and RSP180. ~~It should be noted that in recognition that necessary Statements of Compliance from the aircraft/avionics manufacturers nor CSP level of service contracts to support such authorizations may not be immediately available for all aircraft types, a maximum of three PBCS tracks will be published until 28 March 2019 or until the 90% of OTS traffic are filing PBCS designators, whichever occurs first.~~

1.10.3 Application of the reduced lateral and longitudinal separation minima in the NAT Region is dependent on a smooth functioning FANS 1/A data link system. Various known data link related deficiencies in aircraft systems and poor data link performance have a detrimental effect on the air traffic control system and impede aircraft operator's efforts to obtain performance-based communication and surveillance (PBCS) authorizations. Many of these known deficiencies have already been fixed by aircraft manufacturers and software upgrades are available. To ensure the best possible functioning of the NAT air traffic control system, it is of utmost importance that aircraft operators always operate the latest available FANS 1/A related software version in aircraft that fly in the NAT high level airspace (HLA) and that the aircraft systems are configured in an optimal manner. Meanwhile, implementation of improvements and corrections is also a priority undertaking for the ground and network segments of the overall FANS 1/A system

1.10.4 NAT OPS Bulletin 2019_003 provides a list of recommended data link performance improvement options and recommended software versions for NAT data link operations. Aircraft operators are advised to review this OPS Bulletin to identify if some of the issues identified in the Bulletin apply to their operations. The bulletin will be updated on regular basis.

1.10.5 Some NAT ANSPs have implemented~~The intention of~~ the message latency monitor function which is designed to prevent pilots from acting on a CPDLC uplink message that has been delayed in the network. The most serious of such cases would be the pilot executing a clearance that was no longer valid. Because aircraft implementations are varied, it is impossible for ATC to tailor the uplink of the message SET MAX UPLINK DELAY VALUE TO ~~[*delayed message parameter*]~~ 300 SEC to different aircraft types. It has therefore been decided among the NAT ~~Air Navigation Service Providers (~~ANSPs~~)~~ to uplink this message to all CPDLC connected aircraft immediately after they enter each control area. An aircraft may therefore receive this message multiple times during a flight. Refer to section 8.5.20 for pilot procedures concerning this function.

Note: When operating in the NAT airspace, aircraft operators can expect a value of 300 seconds for the delayed message parameter which had been agreed by the NAT ANSPs on a trial basis

~~Also, one of the safety requirements in RCP 240 that are allocated to the aircraft system is Safety Requirement #15 (SR-15):~~

~~*When the aircraft system receives a message whose timestamp exceeds ETRCMP, the aircraft system shall provide appropriate indication.*~~

~~To support SR-15, ATC can uplink the CPDLC free text message SYSU-6 (UM169) SET MAX UPLINK DELAY VALUE TO [delayed message parameter] SEC to prompt the pilot to enter the specified latency value into the aircraft avionics (refer to the Global Operational Data Link Manual (GOLD) ICAO Doc 10037 Appendix A table A.4.13).~~

~~The intention of the message latency monitor function is to prevent pilots from acting on a CPDLC uplink message that has been delayed in the network. The most serious of such cases would be the pilot executing a clearance that was no longer valid.~~

~~Because aircraft implementations are varied, it is impossible for ATC to tailor the uplink of the message SET MAX UPLINK DELAY VALUE TO [*delayed message parameter*] SEC to different aircraft types. It has therefore been decided among the NAT Air Navigation Service Providers (ANSPs) to uplink this message to~~

Formatted
Formatted

~~all CPDLC connected aircraft immediately after they enter each control area. An aircraft may therefore receive this message multiple times during a flight.~~

~~*Pilot Procedures*~~

~~Pilots shall be familiar with aircraft functionality that concerns the CPDLC uplink message latency monitor.~~

~~When the pilot receives the uplink CPDLC message SET MAX UPLINK DELAY VALUE TO [delayed message parameter] SEC he/she shall:~~

~~a) Send a positive response to ATC as prompted by the avionics (ACCEPT [ROGER]) regardless of whether the aircraft supports the latency monitor.~~

~~Note 1: It is important that pilots respond to the SET MAX UPLINK DELAY VALUE TO [delayed message parameter] SEC uplink message to avoid having open unanswered CPDLC messages in the system. This also applies to aircraft that have deficient message latency monitor functionality or no such functionality at all.~~

~~Note 2: The Global Operational Data Link Manual specifies that the pilot should append the response downlink with the free text message TIMER NOT AVAILABLE when the message latency monitor function is not available in the aircraft (refer to GOLD Table 4-1).~~

~~b) If the aircraft is equipped with a correctly functioning message latency monitor, enter the specified uplink delay into the avionics in accordance with the aircraft procedures. Some avionics will automatically set the delay value in accordance with the uplink message and do not allow for a manual input.~~

~~Note 3: If an aircraft is instructed to log off and then log on again mid-flight, ATC may send the message SET MAX UPLINK DELAY VALUE TO [delayed message parameter] SEC again once the logon is completed.~~

~~When a pilot receives a CPDLC uplink message with an indication that the message has been delayed the pilot shall:~~

~~a) Revert to voice communications to notify the ATS unit of the delayed message received and to request clarification of the intent of the CPDLC message; and~~

~~b) Respond appropriately to close the message as per the instructions of the controller.~~

~~1.10.4 c) **The pilot must not act on the delayed uplink message until clarification has been received from the controller.**~~

1.11 TRIALS AND FUTURE DEVELOPMENTS

1.11.1 The ICAO North Atlantic Systems Planning Group undertakes a continuous programme of monitoring the safety and efficiency of flight operations throughout the NAT region. Plans are thereby developed to ensure the maintenance and further enhancement of the safety and traffic capacity of the airspace. The NAT SPG has produced a document providing a comprehensive overview of expected development of North Atlantic flight operations. This document, "Future ATM Concept of Operations for the North Atlantic Region" (NAT Doc 005) is available at www.icao.int/EURNAT/, following "EUR & NAT Documents", then "NAT Documents", in folder "NAT Doc 005".

1.11.2 Presently such plans include a gradual transition to a PBN system of navigation performance specification. The detailed transition plan is available on the ICAO EUR/NAT website where updates are reflected. In preparation, from January 2015 onward, any new approvals to operate in MNPS airspace have been based on RNP10 or RNP4 navigation specifications and in support, MNPS airspace was redesigned and renamed in February 2016 to NAT High Level Airspace (HLA).

1.11.3 The evolution of MNPS airspace to NAT HLA in conjunction with the Data Link Mandate and the PBN based navigational requirements will improve flight safety allowing for the use of reduced lateral and longitudinal separation standards. This will enhance airspace capacity and provide more fuel efficient profiles for operators.

1.11.4 All planned or anticipated changes will involve consultation and coordination with the airspace users. Advanced notification of any changes will be provided by the appropriate ANSP(s).

CHAPTER 2

THE ORGANISED TRACK SYSTEM (OTS)

2.1 GENERAL

2.1.1 As a result of passenger demand, time zone differences and airport noise restrictions, much of the North Atlantic (NAT) air traffic contributes to two major alternating flows: a westbound flow departing Europe in the morning, and an eastbound flow departing North America in the evening. The effect of these flows is to concentrate most of the traffic uni-directionally, with peak westbound traffic crossing the 30W longitude between 1130 UTC and 1900 UTC and peak eastbound traffic crossing the 30W longitude between 0100 UTC and 0800 UTC.

2.1.2 The flight levels normally associated with the OTS are FL310 to FL400 inclusive. These flight levels, and their use have been negotiated and agreed by the NATS ATS providers and are published as the Flight Level Allocation Scheme (FLAS). (See Attachment 5). The FLAS also determines flight levels available for traffic routing partly or wholly outside of the OTS as well as flights operating outside of the valid time periods of the OTS; often referred to as "transition times'.

2.1.3 The hours of validity of the two Organised Track Systems (OTS) are as follows:

(Westbound) Day-time OTS	1130	UTC	to	1900	UTC	at	30°W
(Eastbound) Night-time OTS	0100	UTC	to	0800	UTC	at	30°W

Note: Changes to these times can be negotiated between Gander and Shanwick OACCs and the specific hours of validity for each OTS are indicated in the NAT track message. For flight planning, operators should take account of the times as specified in the relevant NAT track message(s). Tactical extensions to OTS validity times can also be agreed between OACCs when required, but these should normally be transparent to operators.

2.1.4 Use of the OTS tracks is not mandatory Aircraft may flight plan on random routes which remain clear of the OTS or may fly on any route that joins, leaves, or crosses the OTS. Operators must be aware that while ATC will make every effort to clear random traffic across the OTS at requested levels, re-routes or significant changes in flight level from those planned are very likely to be necessary during most of the OTS traffic periods. A comprehensive understanding of the OTS and the FLAS may assist flight planners in determining the feasibility of flight profiles.

2.2 CONSTRUCTION OF THE ORGANISED TRACK SYSTEM (OTS)

General processes

2.2.1 The appropriate OACC constructs the OTS after determination of basic minimum time tracks; with due consideration of airlines' preferred routes and taking into account airspace restrictions such as danger areas and military airspace reservations. The night-time OTS is produced by Gander OACC and the day-time OTS by Shanwick OACC (Prestwick), each incorporating any requirement for tracks within the New York, Reykjavik, Bodø and Santa Maria Oceanic Control Areas (OCAs). OACC planners co-ordinate with adjacent OACCs and domestic ATC agencies to ensure that the proposed system is viable. They also take into account the requirements of opposite direction traffic and ensure that sufficient track/flight level profiles are provided to satisfy anticipated traffic demand. The impact on domestic route structures and the serviceability of transition area radars and navaids are checked before the system is finalised. Random routes and OTS tracks eastbound typically start with a "named" oceanic entry point, followed by Lat/Long waypoints, and typically end with 2 "named" waypoints, the first being the oceanic exit point, and the second being a "named" waypoint inside domestic airspace. Random routes and OTS tracks westbound typically start with a “named” oceanic entry point, followed by Lat/Long waypoints, and typically end with a “named” waypoint that is the oceanic exit point.

2.2.2 When the expected volume of traffic justifies it, tracks may be established to accommodate the EUR/CAR traffic axis. Extra care is required when planning these routes as they differ slightly from the 'core tracks' in that they may cross each other (using vertical separations via different flight level allocations), and in some cases may not extend from coast-out to coast-in (necessitating random routing to join or leave).

Note 1: The “named” waypoint inside domestic airspace ensures application of oceanic North Atlantic separations beyond the common boundary allowing time for domestic agency to establish identification, establish direct controller pilot communications via VHF voice, and to issue instructions as necessary

Note 2: OTS tracks can start at “named” waypoints or Lat/Long waypoints in NAT oceanic airspace (i.e. not at oceanic entry point or exit point). OTS track design of this nature is most commonly seen within New York East and Reykjavik OCAs.

Collaborative Decision Making Process

2.2.3 Operators proposing to execute NAT crossings during the upcoming OTS period are encouraged to contribute to the OTS planning process. A comprehensive set of Collaborative Decision Making (CDM) procedures for NAT track design is now employed.

2.2.4 To ensure emphasis is placed on operators' preferred routes, the CDM process begins with the Preferred Route Message (PRM) system. All NAT operators (both scheduled and non-scheduled) are urged to provide information by AFTN message to the appropriate OACCs regarding optimum routing for any/all of their flights intending to operate during upcoming peak traffic periods. Such information should be provided, in the correct format, as far in advance as possible, but not later than 1900 UTC for the following day-time OTS and 1000 UTC for the following night-time OTS. The details for submitting operators’ preferred routes in respect of day-time westbound flights are specified in the UK AIP. The filing of night-time eastbound preferred routings is an element of the NavCanada Traffic Density Analyser (TDA) tool (see Chapter 16).

2.2.5 Subsequently, following the initial construction of the NAT tracks by the publishing agencies, the proposed tracks are published on an internet site for interested parties to view and discuss. One hour is allocated for each of the proposals during which any comments will be considered by the publishing agency and any changes which are agreed are then incorporated into the final track design. This internet site is currently operated by NAV CANADA. Access to this site is by password which any bona fide NAT operator may obtain on application to NAV CANADA - see Canada AIP for details. Requests for access should be sent to noc@navcanada.ca.

Split Westbound Structure

2.2.6 On occasions, when a strong westerly Jetstream closely follows the Great Circle of the dominant NAT traffic flow between London and New York, the resulting daytime Westbound minimum time tracks can be located both north and south of this great circle. In such cases, Shanwick may publish a "split" track structure, leaving at least two adjacent exit points and landfalls at the Eastern NAT boundary for use by the daytime eastbound traffic flow (an example of such a structure is shown in Example 1/Figure 2 below).

2.3 THE NAT TRACK MESSAGE

2.3.1 The agreed OTS is promulgated by means of the NAT track message via the AFTN to all interested addressees. A typical time of publication of the day-time OTS is 2200 UTC and of the night-time OTS is 1400 UTC.

2.3.2 This message gives full details of the coordinates of the organised tracks as well as the flight levels that are expected to be in use on each track. In most cases there are also details of domestic entry and exit routings associated with individual tracks (e.g. NAR). In the westbound (day-time) system the track most northerly, at its point of origin, is designated Track 'A' (Alpha) and the next most northerly track is designated Track 'B' (Bravo) etc. In the eastbound (night-time) system the most southerly track, at its point of origin, is designated Track 'Z' (Zulu) and the next most southerly track is designated Track 'Y' (Yankee), etc. Examples of both eastbound and westbound systems and NAT track messages are shown in this chapter.

2.3.3 The originating OACC identifies each NAT track message, within the Remarks section appended to the end of the NAT track message, by means of a 3-digit Track Message Identification (TMI) number equivalent to the Julian calendar date on which that OTS is effective. For example, the OTS effective on February 1st will be identified by TMI 032. (The Julian calendar date is a simple progression of numbered days without reference to months, with numbering starting from the first day of the year.) If any subsequent NAT track amendments affecting the entry/exit points, route of flight (coordinates) or flight level allocation are made, the whole NAT track message will be re-issued. The reason for this amendment will be shown in the Notes and a successive alphabetic character, i.e. ‘A’, then ‘B’, etc., will be added to the end of the TMI number (e.g. TMI 032A).

2.3.4 The remarks section is an important element of the NAT track message. Included is essential information for operators that may vary greatly from day to day. The Remarks may also include details of special flight planning considerations, reminders of ongoing initiatives (e.g., Data Link Mandate or PBCS trials), planned amendments to NAT operations, or active NOTAMS referencing airspace restrictions. The remarks section of both the Westbound and Eastbound OTS Messages will identify any designated PBCS tracks. The Eastbound OTS Message will also include important information on appropriate clearance delivery frequency assignments.

2.4 OTS CHANGEOVER PERIODS

2.4.1 To ensure a smooth transition from night-time to day-time OTSs and vice-versa, a period of several hours is interposed between the termination of one system and the commencement of the next. These periods are from 0801 UTC to 1129 UTC: and from 1901 UTC to 0059 UTC.

2.4.2 During the changeover periods some restrictions to flight planned routes and levels are imposed. Eastbound and westbound aircraft operating during these periods should file flight level requests in accordance with the Flight Level Allocation Scheme (FLAS) as published in the *UK and Canada AIPs* and shown at Attachment 5.

2.4.3 It should also be recognised that during these times there is often a need for clearances to be individually co-ordinated between OACCs and cleared flight levels may not be in accordance with those flight planned. If, for any reason, a flight is expected to be level critical, operators are recommended to contact the initial OACC prior to filing of the flight plan to ascertain the likely availability of required flight levels.

2.5 EXAMPLES OF DAY-TIME WESTBOUND AND NIGHT-TIME EASTBOUND NAT TRACK MESSAGES AND ASSOCIATED TRACK SYSTEMS

Example 1 — Example of Westbound NAT Track Message

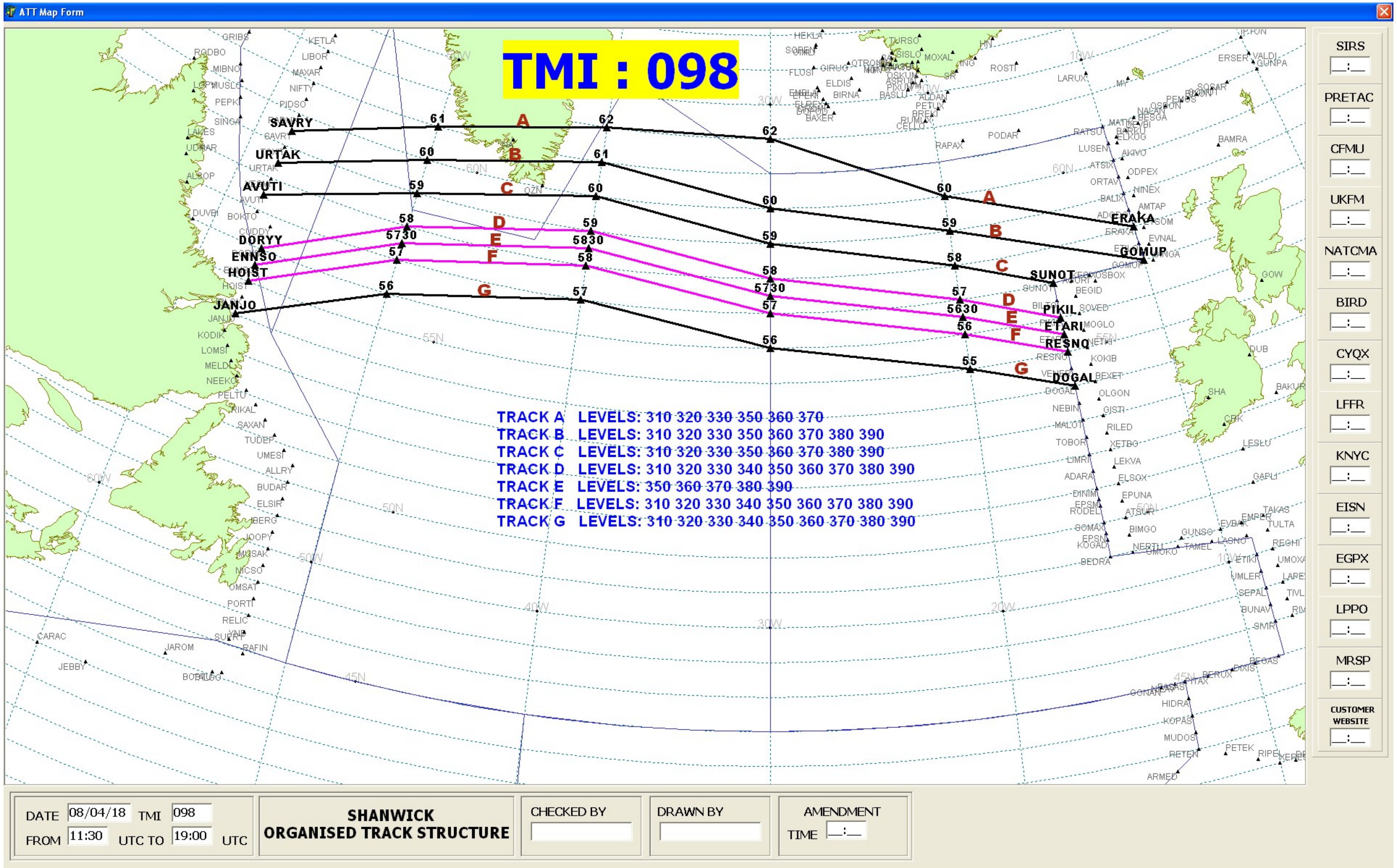
TZA179 082009
FF BIRDZQZZ BIKFYXYX
082009 EGGXZOZX
(NAT-1/3 TRACKS FLS 310/390 INCLUSIVE
APR 09/1130Z TO APR 09/1900Z
PART ONE OF THREE PARTS-
A ERAKA 60/20 62/30 63/40 63/50 MAXAR
EAST LVLS NIL
WEST LVLS 310 320 330 350 360
EUR RTS WEST ETSOM
NAR -
B GOMUP 59/20 61/30 62/40 62/50 PIDSO
EAST LVLS NIL
WEST LVLS 310 320 330 350 360 380
EUR RTS WEST GINGA
NAR -
C SUNOT 58/20 60/30 61/40 61/50 SAVRY
EAST LVLS NIL
WEST LVLS 310 320 330 340 360 380
EUR RTS WEST NIL
NAR -
END OF PART ONE OF THREE PARTS)

TZA181 082010
FF BIRDZQZZ BIKFYXYX
082009 EGGXZOZX
(NAT-2/3 TRACKS FLS 310/390 INCLUSIVE
APR 09/1130Z TO APR 09/1900Z
PART TWO OF THREE PARTS-
D PIKIL 57/20 57/30 56/40 54/50 NEEKO
EAST LVLS NIL
WEST LVLS 310 320 330 340 350 360 370 380 390
EUR RTS WEST NIL
NAR -
E RESNO 56/20 56/30 55/40 53/50 RIKAL
EAST LVLS NIL
WEST LVLS 310 320 330 340 350 360 370 380 390
EUR RTS WEST NIL
NAR -
F VENER 5530/20 5530/30 5430/40 5230/50 SAXAN
EAST LVLS NIL
WEST LVLS 350 360 370 380 390
EUR RTS WEST NIL
NAR -
G DOGAL 55/20 55/30 54/40 52/50 TUDEP
EAST LVLS NIL
WEST LVLS 310 320 330 340 350 360 370 380 390
EUR RTS WEST NIL
NAR -
END OF PART TWO OF THREE PARTS)

TZA182 082010
FF BIRDZQZZ BIKFYXYX
082010 EGGXZOZX
(NAT-3/3 TRACKS FLS 310/390 INCLUSIVE
APR 09/1130Z TO APR 09/1900Z
PART THREE OF THREE PARTS-
H MALOT 54/20 54/30 53/40 51/50 ALLRY
EAST LVLS NIL
WEST LVLS 310 320 330 340 350 360 370 380 390
EUR RTS WEST NIL
NAR -
REMARKS.
1. TMI IS 099 AND OPERATORS ARE REMINDED TO INCLUDE THE
TMI NUMBER AS PART OF THE OCEANIC CLEARANCE READ BACK.
2.OPERATORS ARE REMINDED THAT ADS-C AND CPDLC IS MANDATED FOR
LEVELS 350-390 IN NAT AIRSPACE.
3. PBCS OTS LEVELS 350-390. PBCS TRACKS AS FOLLOWS
TRACK E
TRACK F
TRACK G
END OF PBCS OTS
4.FOR STRATEGIC LATERAL OFFSET AND CONTINGENCY PROCEDURES FOR
OPS IN
NAT FLOW REFER TO NAT PROGRAMME COORDINATION WEBSITE
WWW.~~PARIS.~~ICAO.INT/EURNAT/.

SLOP SHOULD BE STANDARD PROCEDURE, NOT
JUST FOR AVOIDING WX/TURB.
5.80 PERCENT OF GROSS NAVIGATION ERRORS
RESULT FROM POOR COCKPIT
PROCEDURES. CONDUCT EFFECTIVE WAYPOINT
CHECKS.
6.OPERATORS ARE REMINDED THAT CLEARANCES
MAY DIFFER FROM THE
FLIGHT PLAN, FLY THE CLEARANCE.
7.UK AIP. ENR 2.2.4.2 PARA 5.2 STATES THAT NAT
OPERATORS SHALL FILE
PRM'S.
8.FLIGHTS REQUESTING WESTBOUND OCEANIC
CLEARANCE VIA ORCA DATALINK
SHALL INCLUDE IN RMK/ FIELD THE HIGHEST
ACCEPTABLE FLIGHT LEVEL WHICH
CAN
BE MAINTAINED AT OAC ENTRY POINT.
9.ALL ADSC CPDLC EQUIPPED FLIGHTS NOT
LOGGED ON TO A DOMESTIC ATSU
PRIOR TO ENTERING THE SHANWICK OCA MUST
INITIATE A LOGON TO EGGX
BETWEEN 10
AND 25 MINUTES PRIOR TO OCA ENTRY.-
END OF PART THREE OF THREE PARTS)

Figure 2-0-1 — Example of Day-Time Westbound NAT Organised Track System



Example 2 — Example of Eastbound NAT Track Message

TZA466 241302
FF BIRDZQZZ
241302 CZQXZQZX
(NAT-1/3 TRACKS FLS 320/400 INCLUSIVE
APR 25/0100Z TO APR 25/0800Z
PART ONE OF THREE PARTS-
R ALLRY 51/50 52/40 52/30 53/20 MALOT GISTI
EAST LVLS 320 330 340 350 360 370 380 390 400
WEST LVLS NIL
EUR RTS EAST NIL
NAR N389B N383B-
S BUDAR 5030/50 5130/40 5130/30 5230/20 TOBOR RILED
EAST LVLS 350 360 370 380 390
WEST LVLS NIL
EUR RTS EAST NIL
NAR N365A N359B N355B-
T ELSIR 50/50 51/40 51/30 52/20 LIMRI XETBO
EAST LVLS 320 330 340 350 360 370 380 390 400
WEST LVLS NIL
EUR RTS EAST NIL
NAR N333B N329B N323A-

END OF PART ONE OF THREE PARTS)

TZA468 241302
FF BIRDZQZZ
241302 CZQXZQZX
(NAT-2/3 TRACKS FLS 320/400 INCLUSIVE
APR 25/0100Z TO APR 25/0800Z
PART TWO OF THREE PARTS-
U JOOPY 49/50 50/40 50/30 51/20 DINIM ELSOX
EAST LVLS 320 330 340 350 360 370 380 390 400
WEST LVLS NIL
EUR RTS EAST NIL
NAR N269A N261A-
V NICSO 48/50 49/40 49/30 50/20 SOMAX ATSUR
EAST LVLS 320 330 340 350 360 370 380 390 400
WEST LVLS NIL
EUR RTS EAST NIL
NAR N211E N197A-
W PORTI 47/50 48/40 48/30 49/20 BEDRA NERTU
EAST LVLS 320 330 350 360 380 390 400
WEST LVLS NIL
EUR RTS EAST NIL
NAR N155A N139A-
X SUPRY 46/50 47/40 47/30 48/20 48/15 OMOKO GUNSO
EAST LVLS 320 330 350 360 380 390 400
WEST LVLS NIL
EUR RTS EAST NIL
NAR N93A N75A-
Y RAFIN 45/50 46/40 46/30 47/20 47/15 ETIKI REGHI
EAST LVLS 320 330 350 360 380 390 400
WEST LVLS NIL
EUR RTS EAST NIL
NAR N59C N45D-

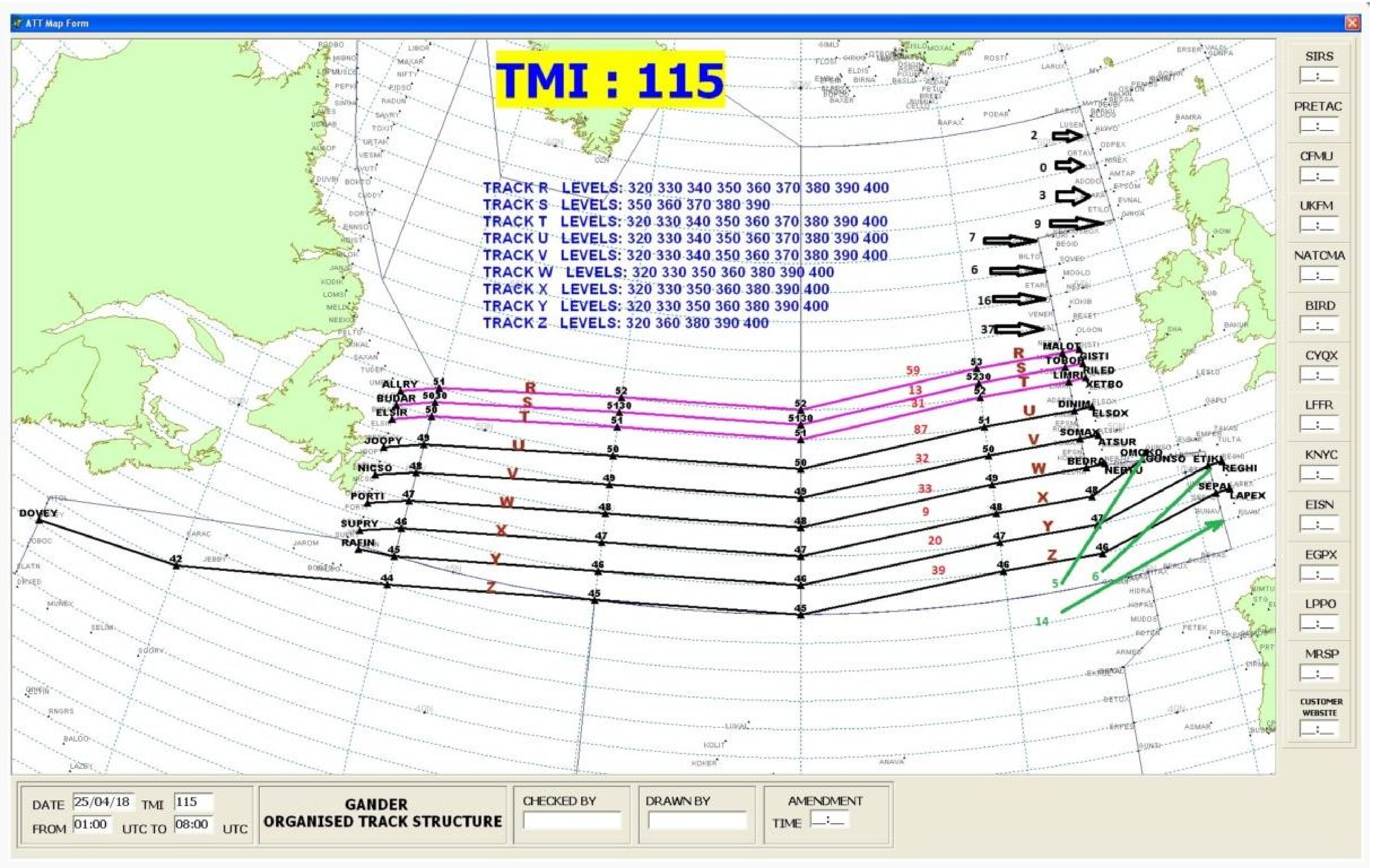
END OF PART TWO OF THREE PARTS)

TZA471 241303
FF BIRDZQZZ
241303 CZQXZQZX
(NAT-3/3 TRACKS FLS 320/400 INCLUSIVE
APR 25/0100Z TO APR 25/0800Z
PART THREE OF THREE PARTS-
Z DOVEY 42/60 44/50 45/40 45/30 46/20 46/15 SEPAL LAPEX
EAST LVLS 320 360 380 390 400
WEST LVLS NIL
EUR RTS EAST NIL
NAR NIL-
REMARKS:
1.TMI IS 115 AND OPERATORS ARE REMINDED TO INCLUDE THE TMI
NUMBER
AS PART OF THE OCEANIC CLEARANCE READ BACK.
2.OPERATORS ARE REMINDED THAT ADS-C AND CPDLC ARE MANDATED
FOR LEVELS
350-390 I
NAT AIRSPACE.
3.PBCS OTS LEVELS 350-390. PBCS TRACKS AS FOLLOWS

TRACK R
TRACK S
TRACK T
END OF PBCS TRACKS.
4.CLEARANCE DELIVERY FREQUENCY ASSIGNMENTS
FOR AIRCRAFT OPERATING
FROM AVPUT TO TALGO INCLUSIVE:AVPUT TO LIBOR
132.02,MAXAR TO VESMI
134.2,AVUTI
TO JANJO 128.7,KODIK TO TUDEP 135.45,UMESI TO
JOOPY 135.05, MUSAK TO SUPRY 128.45,RAFIN TO TALGO
119.42.
5.80 PERCENT OF NAVIGATIONAL ERRORS RESULT FROM
POOR COCKPIT PROCEDURES
ALWAYS CARRY OUT PROPER WAYPOINT PROCEDURES.
6.OPERATORS ARE ADVISED THAT VERSION 24 OF THE
GANDER DATA LINK
OCEANIC CLEARANCE DELIVERY CREW PROCEDURES IS
NOW VALID AND
AVAILABLE AS NAT OPS BULLETIN 2015-004 ON THE
WWW.~~PARIS.~~ICAO.INT/EURNAT/
WEBSITE.
7.OPERATORS ARE REMINDED THAT EASTBOUND
AIRCRAFT INTENDING TO
OPERATE IN THE OTS ARE REQUIRED TO COMPLY WITH
NAR FLIGHT PLANNING
RULES AS DEFINED IN THE CANADA FLIGHT
SUPPLEMENT OR WITH ROUTES AS
CONTAINED IN
THE DAILY BOSTON ADVISORY.
8.FL320 EXPIRES AT 30W AT 0600Z FOR TRACK X, Y, AND
Z.-

END OF PART THREE OF THREE PARTS)

Figure 2-0-2 — Example of Night-Time Eastbound NAT Organised Track System



CHAPTER 3

ROUTES, ROUTE STRUCTURES, AND TRANSITION AREAS WITHIN OR ADJACENT TO THE NAT HLA

3.1 GENERAL

3.1.1 Routes, route structures, and transition areas within and adjacent to the NAT HLA are detailed below.

3.2 ROUTES WITHIN THE NAT HLA

3.2.1 Routes within the NAT HLA (illustrated in Figure 3-1) are as follows:

a) *Blue Spruce Routes require state approval for NAT HLA operations, and are listed below:

- MOXAL – RATSU (for flights departing Reykjavik Airport)
  (VHF coverage exists. Non HF equipped aircraft can use this route)
- OSKUM – RATSU (for flights departing Keflavik Airport)
  (VHF coverage exists. Non HF equipped aircraft can use this route)
- RATSU – ALDAN – KFV (Keflavik)
  (VHF coverage exists. Non HF equipped aircraft can use this route)
- ATSIX – 61°N 12°34'W – ALDAN – KFV
  (HF is required on this route)
- GOMUP – 60°N 15°W – 61°N 16°30'W – BREKI – KFV
  (HF is required on this route)
- KFV – EPENI – 63°N 30°W – 61°N 40°W – OZN
  (VHF coverage exists. Non HF equipped aircraft can use this route)
- KFV – SOPEN – DA (Kulusuk) – SF (Kangerlussuaq) – YFB
  (VHF coverage exists. Non HF equipped aircraft can use this route)
- SF (Kangerlussuaq) – DARUB – YXP
  (VHF coverage exists. Non HF equipped aircraft can use this route)
- OZN – 59°N 50°W – AVUTI (FL290 to FL600) - PRAWN – YDP
  (VHF coverage exists. Non HF equipped aircraft can use this route)
  OZN – 59°N 50°W – CUDDY (FL290 to FL600) - PORGY
  (VHF coverage exists. Non HF equipped aircraft can use this route)
- OZN – 58°N 50°W – HOIST – YYR
  (VHF coverage exists. Non HF equipped aircraft can use this route)

State approval for NAT HLA operations is required for operations along Blue Spruce routes.

b) routes between Northern Europe and Spain/Canaries/Lisbon FIR. (T9*#, T290*#,T13, T213 and T16. State approval for NAT HLA operations is required.);

c) *routings between the Azores and the Portuguese mainland (T25) and between the Azores and the Madeira Archipelago;

d) routes between Iceland and Constable Pynt on the east coast of Greenland and between Kook Islands on the west coast of Greenland and Canada;

e) defined routes of short stage lengths where aircraft equipped with normal short-range navigation equipment can meet the NAT HLA track-keeping criteria as follows:

- G3- VALDI - MY (Myggenes) - ING – KFV
- G11 - PEMOS - MY (Myggenes)

State approval for NAT HLA approval is required for operations on G3 and G11.

*Note 1: *routes/routings identified with an asterisk in sub paragraphs (a), (b), (c) and (d) above may be flight planned and flown by approved aircraft equipped with normal short-range navigation equipment (VOR, DME, ADF) and at least one approved fully operational LRNS.*

Note 2: #routes T9 and T290 may be flight planned and flown by approved aircraft equipped with and operating ADS-B (1090 Mhz ADS-B 'out' capability), VHF and capable of RNP2 (Continental).

3.3 ROUTE STRUCTURES ADJACENT TO THE NAT HLA

North American Routes (NARs)

3.3.1 The North American Routes (NARs) consist of a numbered series of predetermined routes which provide an interface between NAT oceanic and North American domestic airspace. The NAR System is designed to accommodate major airports in North America. (For further information see Chapter 4).

3.3.2 Full details of all NAR routings (eastbound and westbound) together with associated procedures are published in two saleable documents:

- the United States Chart Supplement – Northeast U.S., currently available through the following:
  https://www.faa.gov/air_traffic/flight_info/aeronav/productcatalog/supplementalcharts/AirportDirectory/
  with an electronic version currently available through the following link:
  https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dafd/

and

- the Canada Flight Supplement

It should be noted that these routes are subject to occasional changes and are re-published/updated on a regular AIRAC 56-day cycle

US East Coast Transitions

3.3.3 Aircraft operators are encouraged to refer to FAA Air Traffic Control System Command Center Advisory Database (www.fly.faa.gov) for NAT Advisory Message, published daily, for specified transitions from select U.S. airports to the NAT Entry Points. Additionally, route advisories are published, as necessary, to address special route requirements eastbound and westbound through the New York Oceanic FIR/CTA.

Routes between North America and the Caribbean area

3.3.4 The West Atlantic Route System (WATRS) resides within the New York OCA West, the Miami oceanic airspace, and the San Juan oceanic airspace. Details of these routes and associated procedures are contained in the United States AIP.

Shannon Oceanic Transition Area (SOTA) and Northern Oceanic Transition Area (NOTA)

3.3.5 Parts of the Shanwick OCA are designated as the Shannon Oceanic Transition Area (SOTA) and the Northern Oceanic Transition Area (NOTA).

3.3.6 SOTA:

5100N 01500W- 5100N 00800W – 4830N 00800W – 4900N 01500W – 5100N 01500W

FL060 TO FL600 INCLUSIVE

NOT INCLUDED IN NAT HLA*

**Note: Flights transitioning through SOTA and requiring an oceanic clearance FL285 to FL420 inclusive must meet NAT HLA requirements.*

3.3.7 NOTA:

5400N 01500W – 5700N 01500W – 5700N 01000W – 5434N 01000W – 5400N 01500W

FL 060 TO FL600 INCLUSIVE

NAT HLA FL285 TO FL420.

3.3.8 Air Traffic Services are provided by Shannon ACC using the call sign SHANNON CONTROL. Full details of the service provided and the procedures used are contained in AIP Ireland.

Brest Oceanic Transition Area (BOTA)

3.3.9 Part of the Shanwick OCA is designated as the Brest Oceanic Transition Area (BOTA).

3.3.10 BOTA:

4834N 00845W – 4830N 00800W – 4500N 00800W – 4500N 00845W – 4834N 00845W

FL060 TO FL600 INCLUSIVE

NOT INCLUDED IN NAT HLA*

**Note: Flights transitioning through BOTA and requiring an oceanic clearance FL285 to FL420 inclusive must meet NAT HLA requirements.*

3.3.11 Air Traffic service is provided by the Brest ACC, call sign BREST CONTROL.

Gander Oceanic Transition Area (GOTA)

3.3.12 Part of the Gander OCA is designated as the Gander Oceanic Transition Area (GOTA):

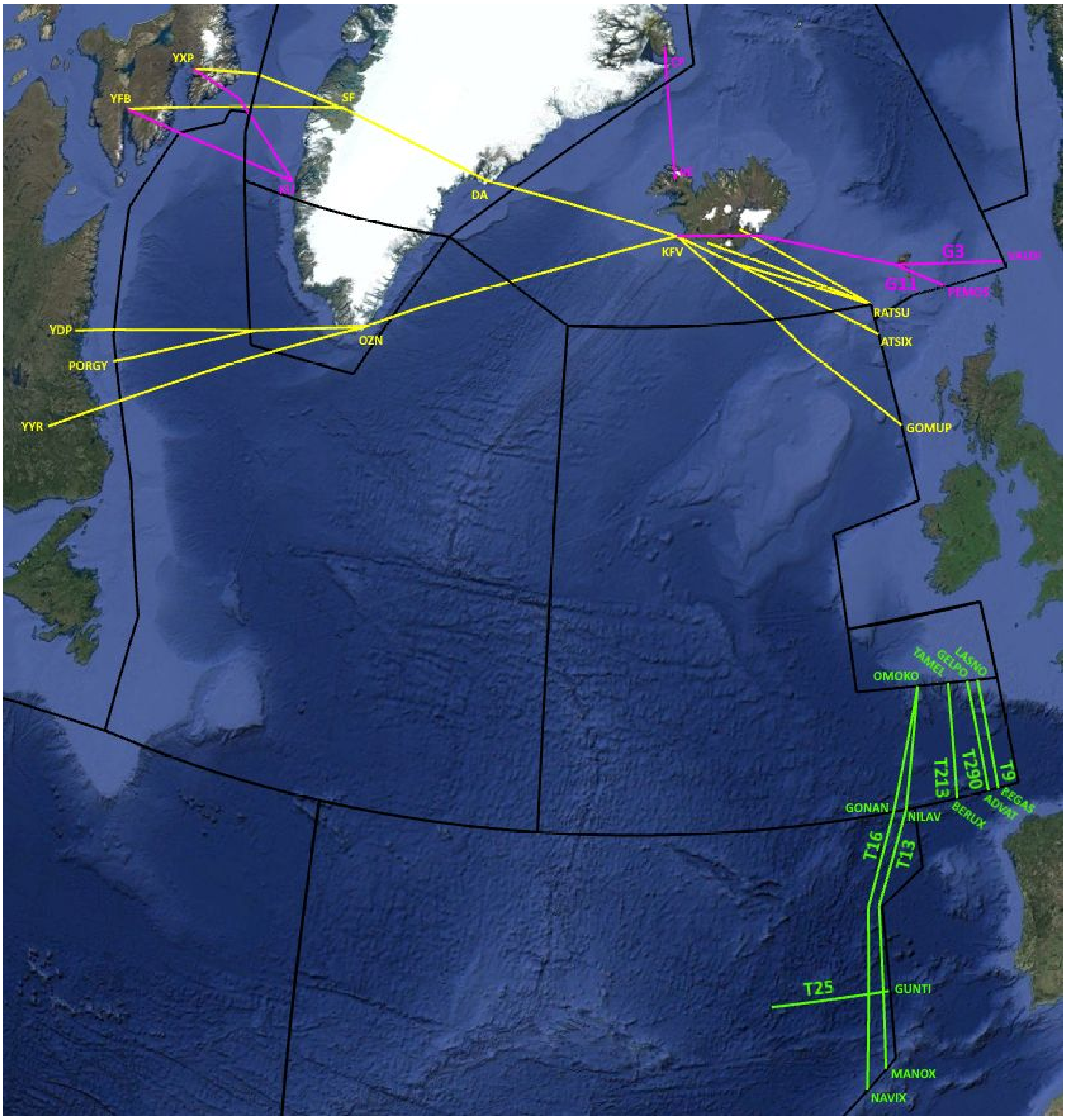
6530N 060W east to the Reykjavik ACC boundary, southeast along the Reykjavik boundary to 6330N 05540W, east to 6330N 055W, southwest to 5352N 05458W, northwest along the Gander boundary to PRAWN, north to MOATT, northwest to 61N 063W, then north along the Montreal ACC boundary to the Edmonton ACC boundary.

FL290 to FL600 inclusive

NAT HLA FL285 to FL420

3.3.13 Air Traffic service is provided by the Gander ACC, call sign GANDER CENTRE. Full details of the service provided and the procedures used are contained in Canada Flight Supplement (CFS).

3.4 FIGURE 3-1 – OTHER ROUTES AND STRUCTURES WITHIN THE NAT HLA



CHAPTER 4

FLIGHT PLANNING

4.1 FLIGHT PLAN REQUIREMENTS

General

4.1.1 Doc 7030, in conjunction with State AIPs, provides detailed routing constraints reference flight planning in the NAT. Refer to Doc 7030 and relevant State AIP for details. General rules are paraphrased below.

4.1.2 All flights which generally route in an eastbound or westbound direction should normally be flight planned so that specified ten degrees of longitude (20°W, 30°W, 40°W etc.) are crossed at whole or half degrees of latitude; and all generally northbound or southbound flights should normally be flight planned so that specified parallels of latitude spaced at five degree intervals (65°N, 60°N, 55°N etc.) are crossed at whole degrees of longitude. Exceptions apply in the case of flights routing north of 70°N, these are noted below.

4.1.3 In those areas defined in State AIPs, operators that meet the requirements specified in the AIP can flight plan their user-preferred trajectories without the need to cross ten degrees of longitude at a whole or half degree of latitude.

4.1.4 Additionally, relevant State AIPs may detail areas of ATS Surveillance coverage and VHF voice coverage. These areas may allow flight planning between defined entry and exit points without requiring adherence to the above provisions.

Routings

4.1.5 During the hours of validity of the OTS, operators are encouraged to flight plan as follows (keeping in mind equipment requirements for operations on PBCS tracks and within DLM airspace):

- in accordance with the OTS; or
- along a route to join or leave an outer track of the OTS; or
- on a random route to remain clear of the OTS, either laterally or vertically.

4.1.6 Nothing in the paragraph above prevents operators from flight planning through/across the OTS. While ATC will make every effort to clear random traffic across the OTS at published levels, re-routes or significant changes in flight level are likely to be necessary during most of the OTS traffic periods.

4.1.7 Outside of the OTS periods, operators flying against the pending OTS may flight plan any random routing, except:

- Eastbound flights that cross 30°W less than one hour prior to the pending Westbound OTS (i.e. after 1029 UTC);
- or Westbound flights that cross 30°W less than one hour prior to the pending Eastbound OTS (i.e. after 2359 UTC),

should plan to remain clear of the pending OTS structure.

4.1.8 Flight crews of all NAT flights at or above FL290, even those that will transit the NAT either above the NAT HLA, or laterally clear of the OTS, must carry a copy of the NAT track message, including any amendments. In the case of amendments, Note One of the NAT track message will generally contain a brief explanation of the amendment and, if warranted, a revised TMI with an alpha suffix.

Note: A revised TMI with an alpha suffix will be issued for changes to: any track coordinate(s), including named points; published track levels; or named points within European routes west. A TMI revision will not be issued for changes to other items such as NARs.

Flight Levels

4.1.9 Flight planning in the NAT between FL290 and FL410 inclusive is restricted by the Data Link Mandate. Chapter 1 indicates equipment required within this level band.

4.1.10 Flights which are planned to remain entirely clear of the OTS or which join or leave an OTS track (i.e. follow an OTS track for only part of its published length), are all referred to as Random Flights. Flight crews intending to fly on a random route or outside the OTS time periods may plan any flight level(s) in accordance with the NAT FLAS.

Note 1: This FLAS is published in the UK and Canadian AIPs and described in Attachment 5.

Note 2: Arrangements for routes T9 and T290 are published in the UK AIP at ENR 3.5.

4.1.11 Flights which are planned to follow an OTS track for its entire length (during the OTS periods) may plan any of the levels published for that track, keeping in mind PBCS and DLM requirements.

Note: PBCS tracks will be identified in Note 3 of the OTS message. Operators planning to operate in the altitude band FL350-390 on the PBCS OTS are subject to equipage and authorization requirements as outlined in NAT OPS Bulletin, "Implementation of Performance Based Separation Minima".

4.1.12 Operators may include climbs in the flight plan, although each change of level during flight must be requested from ATC by the flight crew. Approval of such requests will be entirely dependent upon potential traffic conflicts. ATC may not always be able to accommodate requested flight level changes and prudent pre-flight fuel planning should take this into consideration.

4.1.13 If a flight is expected to be level critical, operators should contact the initial OACC prior to filing of the flight plan to determine the likely availability of specific flight levels.

Flight Plans

4.1.14 Correct completion and addressing of the ICAO flight plan is extremely important as errors can lead to delays in data processing and the subsequent issuing of clearances to the flights concerned. Detailed explanations of how to correctly complete a flight plan with respect to the NAT portion of a flight are contained in Chapter 16 of this Manual.

4.1.15 Operators are reminded that they must indicate their aircraft and flight crew capabilities (e.g. RNP, RNAV, RCP240 and RSP180 authorization, RVSM, FANS 1/A data link, ADS- B and NAT HLA approval) in the flight plan. Separation criteria and safety improvement initiatives in the NAT region are made available to all appropriately equipped flights based on filed flight plan information. This also supports planning for future initiatives by providing more accurate information regarding the actual capabilities of the fleet operating in the ICAO NAT region.

4.2 FLIGHT PLANNING REQUIREMENTS ON SPECIFIC ROUTES

Flight Planning on the Organised Track System

4.2.1 If (and only if) the flight is planned to operate along the entire length of one of the organised tracks (as detailed in the NAT track message), from oceanic entry point to oceanic exit point. Item 15 of the flight plan may be defined by using the abbreviation 'NAT' followed by the track letter assigned to the track.

4.2.2 Flights wishing to join or leave an organised track at some intermediate point are considered to be random route aircraft and full route details must be specified in the flight plan. The track letter must not be used to abbreviate any portion of the route in these circumstances.

4.2.3 The planned Mach number and flight level for the organised track should be specified at either the last domestic reporting point prior to oceanic airspace or the organised track commencement point.

4.2.4 Each point at which a change of Mach number or flight level is planned must be specified by geographical coordinates in latitude and longitude or as a named waypoint and followed in each case by the next significant point.

4.2.5 For flights operating along the whole length of one of the organised tracks, estimates are only required for the commencement point of the track and oceanic FIR boundaries.

Flight Planning on Random Route Segments in a Predominantly East - West Direction

4.2.6 Doc 7030 states that flights operating between North America and Europe shall generally be considered as operating in a predominantly east-west direction. However, flights planned between these two continents via the North Pole shall be considered as operating in a predominantly north-south direction. Except in those areas defined in State AIPs where operators meeting specified requirements can flight plan their user-preferred trajectories, the following applies:

- For flights operating at or south of 70°N, the planned tracks shall normally be defined by significant points formed by the intersection of half or whole degrees of latitude with meridians spaced at intervals of 10 degrees from the Greenwich meridian to longitude 70°W.

- For flights operating north of 70°N and at or south of 80°N, the planned tracks shall normally be defined by significant points formed by the intersection of parallels of latitude expressed in degrees and minutes with meridians normally spaced at intervals of 20 degrees from the Greenwich meridian to longitude 60°W, using the longitudes 000W, 020W, 040W and 060W.

- For flights operating at or south of 80°N, the distance between significant points shall, as far as possible, not exceed one hour's flight time. When the flight time between successive significant points is less than 30 minutes, one of these points may be omitted. Additional significant points should be established when deemed necessary due to aircraft speed or the angle at which the meridians are crossed, e.g.:

  a) at intervals of 10 degrees of longitude (between 5°W and 65°W) for flights operating at or south of 70°N; and

  b) at intervals of 20 degrees of longitude (between 10°W and 50°W) for flights operating north of 70°N and at or south of 80°N.

- For flights operating north of 80°N, the planned tracks shall normally be defined by points of intersection of parallels of latitude expressed in degrees and minutes with meridians expressed in whole degrees. The distance between significant points shall normally equate to not less than 30 and not more than 60 minutes of flying time.

Flight Planning on Random Routes in a Predominantly North - South Direction

4.2.7 Except in those areas defined in State AIPs where operators meeting specified requirements can flight plan their user-preferred trajectories, the following applies:

- For flights whose flight paths at or south of 80°N are predominantly oriented in a north- south direction, the planned tracks shall normally be defined by significant points formed by the intersection of whole degrees of longitude with specified parallels of latitude which are spaced at intervals of 5 degrees.

- For flights operating north of 80°N, the planned tracks shall be defined by points of intersection of parallels of latitude expressed in degrees and minutes with meridians expressed in whole degrees. The distance between significant points shall normally equate to not less than 30 and not more than 60 minutes of flying time.

Flight Planning to Enter or Leave the NAT Region via the North American Region

4.2.8 To provide for the safe and efficient management of flights to/from the NAT region, a transition route system is established in the NAM region (North American Routes - NARs). This system details particular domestic routings associated with each oceanic entry or landfall point. These routes are promulgated to expedite flight planning; reduce the complexity of route clearances and minimize the time spent in the route clearance delivery function. The NAR System is designed to accommodate major airports in North America where the volume of North Atlantic (NAT) traffic and route complexity dictate a need to meet these objectives. It consists of a series of pre-planned routes from/to coastal fixes and identified system airports. Most routes are divided into two portions:

Common Portion — that portion of the route between a specified coastal fix and specified Inland Navigation Fix (INF). (*Note: Eastbound NARS only have a common portion).*

Non-common Portion — that portion of the route between a specified INF and a system airport.

4.2.9 The routes are prefixed by the abbreviation “N,” with the numbering for the common portions orientated geographically from south to north. The odd numbers have eastbound application while the even numbers apply to westbound. An alpha character may follow the one to three digit identifying code indicating an amendment. Together it forms the route identifier. The alpha numeric identifier is associated with the common routes only and not with the non-common route portions.

4.2.10 The use of NARs is not compulsory for every oceanic exit point. The East-bound NAT track message includes recommended NARs for each track which enters oceanic airspace through Canadian domestic airspace. The West-bound NAT track message carries the annotation “NAR Nil” for each track with the exception of tracks terminating at CARAC, JAROM, or RAFIN where NARs must be filed. Operators may file on any one of the destination appropriate NARs published from that relevant coastal fix.

Note: West-bound NAR details are listed in the Canada Flight Supplement and Moncton FIR issues daily NOTAMS showing “recommended NARs”. Operators may file them if desired.

4.2.11 Canadian Domestic route schemes and the US East Coast Link Routes are also published. All of these linking structures are referenced in Chapter 3 of this Manual and account must be taken of any such routing restrictions when planning flights in this category.

Flight Planning to Operate Without Using HF Communications

4.2.12 When operating outside of VHF coverage the carriage of fully functioning HF is mandatory throughout the NAT, however some exceptions may apply, refer to State AIPs for further details. Aircraft with only functioning VHF communications equipment should plan their route according to the information contained in the appropriate State AIPs and ensure that they remain within VHF coverage of appropriate ground stations throughout the flight.

Flight Planning to Operate with a Single Functioning LRNS

4.2.13 Information on specific routes that may be flight planned and flown by aircraft equipped with normal short-range navigation equipment (VOR, DME, ADF) and at least one approved fully operational LRNS can be found in Chapter 3.

Flight Planning to Operate with Normal Short-Range Navigation Equipment Only

4.2.14 Two routes providing links between Iceland and the ICAO EUR region (G3 and G11) (see Chapter 3) are designated as special routes of short stage lengths where it is deemed that aircraft equipped with normal short-range navigation equipment can meet the NAT HLA track-keeping criteria. Nevertheless, State approval for NAT HLA operations is still required in order to fly along these routes.

CHAPTER 5

OCEANIC ATC CLEARANCES

5.1 GENERAL

5.1.1 There are three elements to an oceanic clearance: Route, Level, and Speed (if required). These elements serve to provide for the three basic elements of separation: lateral, vertical, and longitudinal.

5.1.2 Oceanic clearances are required for all flights within NAT controlled airspace (at or above FL60). Flight crews should request oceanic clearances from the ATC responsible for the first OCA within which they wish to operate, following the procedures and the time-frame laid down in appropriate AIPs and NAT OPS Bulletins. Such clearances are applicable only from that entry point.

5.1.3 To assist in optimum airspace utilisation, when requesting an oceanic clearance the flight crew should:

- Advise of any required changes to oceanic flight planned level, track, or speed
- Advise the maximum acceptable flight level at the oceanic boundary
- Advise of preferred alternative NAT track if applicable.

5.1.4 Specific information on how to obtain oceanic clearance from each NAT OACC is published in State AIPs and NAT OPS Bulletins.

5.1.5 When flight crews are requesting oceanic clearance, they are required to maintain contact on the control frequency, unless having received permission to leave the frequency.

5.1.6 If an aircraft encounters an in-flight equipment failure relevant to the airspace enroute to the NAT oceanic airspace, then the flight crew must advise ATC when requesting an oceanic clearance.

5.1.7 The flight crew should monitor the forward estimate for oceanic entry, and if this changes by **3 minutes or more**, unless providing position reports via ADS-C, pass a revised estimate to ATC. As planned longitudinal spacing by these OACCs is based on the estimated times over the oceanic entry fix or boundary, failure to adhere to this ETA amendment procedure may jeopardise planned separation between aircraft, thus resulting in a subsequent re-clearance to a less economical track/flight level for the complete crossing. Any such failure may also penalise following aircraft.

5.1.8 If any of the route, flight level or speed in the clearance differs from that flight planned, requested or previously cleared, attention may be drawn to such changes when the clearance is delivered (whether by voice or by data link). Flight crews should pay particular attention when the issued clearance differs from the flight plan. *(N.B. a significant proportion of navigation errors investigated in the NAT involve an aircraft which has followed its flight plan rather than its differing clearance).*

5.1.9 If the entry point of the oceanic clearance differs from that originally requested and/or the oceanic flight level differs from the current flight level, the flight crew is responsible for requesting and obtaining the necessary domestic re-clearance to ensure that the flight is in compliance with its oceanic clearance when entering oceanic airspace.

5.1.10 If flight crews have not received their oceanic clearance prior to reaching the OCA boundary, they must follow the guidance provided in the appropriate State AIP.

5.1.11 Unless otherwise stated the oceanic clearance issued to each aircraft is at a specified flight level and cruise Mach number. Subsequent en route changes to flight level or Mach number should not be made without prior ATC clearance, except in an urgency situation. (e.g. encountering unanticipated severe turbulence).

5.2 CONTENTS OF CLEARANCES

5.2.1 An abbreviated clearance is issued by Air Traffic Services when clearing an aircraft to fly along the whole length of an organised track. The flight crew should confirm the current NAT track message by using the TMI number (including any appropriate alpha suffix) in the readback. There is no requirement for the flight crew to read back the NAT track coordinates. If any doubt exists as to the TMI or the NAT track coordinates, the flight crew should request the complete track coordinates. Similarly, if the flight crew cannot correctly state the TMI, confirmation will include NAT track coordinates in full and a full read back of those coordinates will be required.

5.2.2 If the term, “via flight plan route” is used when issuing an oceanic clearance, the flight crew is required to readback the full coordinates of the flight plan route, from the oceanic entry point to the exit point.

5.2.3 Attachment 6 provides examples and explanations of clearances and instructions possible in the NAT region. Operators and flight crews, especially those new to NAT operations, are encouraged to review the examples.

5.3 OCEANIC CLEARANCES FOR WESTBOUND FLIGHTS ROUTING VIA 61°N 010°W

5.3.1 The provision of air traffic service at RATSU (61°N 010°W) has been delegated by Shanwick to Reykjavik. Flights intending to enter NAT oceanic airspace via RATSU (61°N 010°W) should not call Shanwick for an oceanic clearance. The required oceanic clearance will be issued by Reykjavik Control. There are three points established at the boundary of delegated airspace from Scottish to Reykjavik, BESGA, DEVBI and BARKU on routes to RATSU. Reykjavik will issue oceanic clearances from those points. Aircraft that have not received their oceanic clearance prior to those points shall enter Reykjavik airspace at the domestic cleared flight level while awaiting such oceanic clearance.

5.4 OCEANIC FLIGHTS ORIGINATING FROM THE NAM, CAR OR SAM REGIONS AND ENTERING THE NAT HLA VIA THE NEW YORK OCA EAST

5.4.1 For flights planning to enter the NAT directly from the New York Oceanic East FIR, the IFR clearance to destination received at the departure aerodrome constitutes the route portion of the oceanic clearance. Once airborne, and prior to entry into the NAT, aircraft will be assigned an altitude and a speed (if required) by New York Center. The receipt of all three elements of an oceanic clearance: route, flight level, and speed constitutes the complete oceanic clearance. A subsequent change to any element(s) of the oceanic clearance does not alter the others.

Example: *Flight from Santo Domingo to Madrid:*

> *The route portion of the clearance received via PDC or DCL from Santo Domingo should be flown unless amended. San Juan ACC will confirm requested altitude and speed prior to issuing the remainder of the oceanic clearance. All three required elements of an oceanic clearance have been received.*

Example: *Flight from New York (KFJK) to Madrid (LEMD):*

> *The route and altitude portions of the clearance received via PDC from Kennedy Clearance should be flown unless amended. Prior to entering oceanic airspace, New York Center confirms requested speed and issues clearance. All three elements of an oceanic clearance have been received.*

5.4.2 Flights entering Canadian Domestic airspace from the New York Oceanic East FIR and then subsequently entering the NAT require a complete oceanic clearance.

Note: There is considerable confusion around which agency is responsible to deliver the oceanic clearance when the flight is operating in New York Oceanic airspace which has been delegated to either Moncton or Gander ACCs. (See Figure 5-1.)

Example: *Flight enters New York Oceanic at SLATN, JOBOC, or DOVEY and does not enter airspace delegated to Moncton ACC or Gander ACC:*

> *The route portion of the clearance received via PDC or DCL should be flown unless amended. New York ATC will confirm requested altitude and speed prior to issuing the remainder of the oceanic clearance. The TMI is required during the readback if on an organized track.*

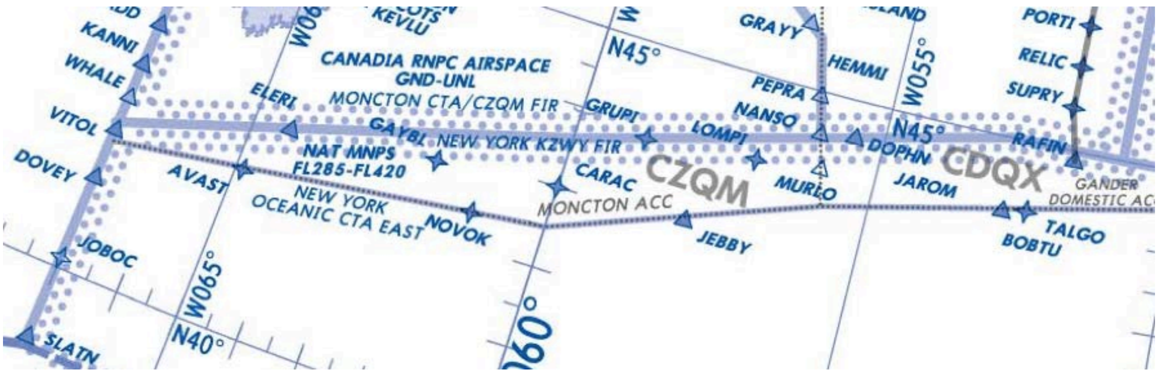
Example: *Flight enters airspace delegated to Moncton ACC and exits back into New York Oceanic via (AVAST, NOVOK, or JEBBY) never entering Gander Domestic ACC airspace;*

> *The route portion of the clearance received via PDC or DCL should be flown unless amended. Moncton ATC will confirm requested altitude and speed prior to issuing the reminder of the clearance.*

Example: *Flight enters airspace delegated to Gander ACC (DOPHN, JAROM, BOBTU) via either Moncton ACC or via New York Oceanic and enters NAT airspace through either Gander or New York:*

> *Full oceanic clearance should be requested with Gander Oceanic via ACARS or voice as appropriate.*

Figure 5-1



5.4.3 Flights entering the southern portion of New York East FIR from Piarco CTA will be issued all three components of the oceanic clearances prior to entering New York OCA.

5.4.4 In cases where aircraft have been cleared via a NAT track, the TMI number will be confirmed prior to reaching the NAT track entry fix.

5.5 CLEARANCES INCLUDING VARIABLE FLIGHT LEVEL

5.5.1 Clearances which include variable flight level may be requested and granted, traffic permitting. Clearance requests for a variable flight level may be made by voice or CPDLC.

5.5.2 Within the NAT, on occasion when traffic permits, aircraft are cleared for a cruise climb or to operate within a block of flight levels. The operational difference between cruise climbs and block of flight levels is in accordance with the following:

- **Cruise climb: Only climb or maintain a level, NEVER DESCEND**

- **Block of flight levels: Climb and/or descend freely within the assigned block of flight levels.**

*Note***:** *ICAO defines cruise climb as follows: "An aeroplane cruising technique resulting in a net increase in altitude as the aeroplane mass decreases*".

5.5.3 A block of flight levels should be requested when a flight crew wants to operate with a "flexible" vertical profile and gradually climb as the aircraft weight decreases and the optimum flight level increases, or when the aircraft's altitude varies up or down due to factors such as turbulence or icing. Consideration should be given to:

- The limitation of aircraft conducting a cruise climb not being able to descend under any circumstances may not always be feasible;
- ATC will still make the most efficient use of airspace with the block of levels by adjusting the clearance as levels are cleared; and
- Unlike cruise climbs, ATC might be able to coordinate with adjacent units the block of levels profile via AIDC (ATC Interfacility Data Communication).

5.6 ERRORS ASSOCIATED WITH OCEANIC CLEARANCES

5.6.1 Errors associated with oceanic clearances fall into several categories of which the most significant are ATC System Loop errors and Waypoint Insertion errors.

Communication Errors

5.6.2 A communication error is any error caused by a misunderstanding between the flight crew and the controller regarding the assigned flight level, speed, or route to be followed. Such errors can arise from: incorrect interpretation of the NAT track message by dispatchers; errors in coordination between OACCs; or misinterpretation by flight crews of oceanic clearances or re-clearances. Errors of this nature, which are detected by ATC from flight crew position reports will normally be corrected. However, timely ATC intervention cannot always be guaranteed, especially as it may depend on the use of third-party relayed HF, GP/VHF or SATVOICE communications.

Waypoint Insertion Errors

5.6.3 Experience has shown that many of the track-keeping errors in the NAT HLA occur as a result of flight crews programming the navigation system(s) with incorrect waypoint data. These are referred to as Waypoint Insertion Errors. They frequently originate from:

- failure to observe the principles of checking waypoints to be inserted in the navigation systems, against the cleared route;

- failure to load waypoint information correctly; or

- failure to cross-check on-board navigation systems.

5.6.4 Many of the navigation error occurrences are the product of one or more of the foregoing causes. It is therefore extremely important that flight crew double check each element of the oceanic clearance on receipt, and at each waypoint, since failure to do so may result in inadvertent deviation from cleared route and/or flight level.

5.6.5 More detailed guidance on this subject is contained in Chapter 8 and Chapter 14.

CHAPTER 6

COMMUNICATIONS AND POSITION REPORTING PROCEDURES

6.1 ATS COMMUNICATIONS

Equipage Requirements

6.1.1 Operations in the NAT outside VHF coverage require the carriage of two long range communication systems, one of which must be HF. SATVOICE and CPDLC (appropriate to route of flight) may satisfy the requirement of the second-long range communication system. Due to coverage limitations, an Inmarsat CPDLC or SATVOICE system does not qualify as a long range communication system when operating north of 80N. Aircraft that are equipped with both Inmarsat (J5) and Iridium (J7) data link capability should use Iridium when north of 80N.

6.1.2 Flights planning to operate outside VHF coverage may request waivers from the HF requirement provided the flight falls into one of the following categories:

- Air carriers with HF unserviceable wishing to return to base for repairs, or
- Ferry or delivery flights, or
- Special event flights

6.1.3 Relief from the HF requirement in accordance with 6.1.2 may be granted by the Air Traffic Control Centers serving the route of flight provided the aircraft has at least two other long-range communication systems appropriate for route of flight.

Note: See State AIPs for details.

HF Voice Communications

6.1.4 It is important that flight crews appreciate that routine[*] air/ground ATS voice communications in the NAT region are conducted via aeronautical radio stations (hereafter referred to as radio stations) staffed by radio operators **who have no executive ATC authority.** Messages are relayed by the ground station to/from the air traffic controllers in the relevant OACC. This is the case, whether communications are via HF, GP/VHF or SATVOICE.

6.1.5 There are six radio stations in the NAT: Bodø Radio (Norway), Gander Radio (Canada), Iceland Radio (Iceland), New York Radio (USA), Santa Maria Radio (Portugal) and Shanwick Radio (Ireland).

6.1.6 Even with the growing use of data link communications a significant volume of NAT air/ground communications are conducted using voice on SSB HF frequencies and GP VHF frequencies. To support air/ground ATC communications in the North Atlantic region, twenty-four HF frequencies have been allocated, in bands ranging from 2.8 to 18 MHz. Additionally, Shanwick Radio, Santa Maria Radio, and Iceland Radio operate a number of Regional and Domestic Air Route Area (RDARA) frequencies in accordance with operating requirements and agreements between the stations.

6.1.7 There are a number of factors which affect the optimum frequency for communications over a specific path. The most significant is the diurnal variation in intensity of the ionisation of the refractive layers of the ionosphere. Hence frequencies from the lower HF bands tend to be used for communications

[*] *See 6.1.11 c) and 6.1.24*

during night-time and those from the higher bands during day-time. Generally, in the North Atlantic frequencies of less than 6 MHz are utilised at night and frequencies of greater than 5 MHz during the day.

6.1.8 The 24 NAT frequencies are organized into six groups known as Families. The families are identified as NAT Family A, B, C, D, E and F. Each family contains a range of frequencies from each of the HF frequency bands. A number of stations share families of frequencies and co-operate as a network to provide the required geographical and time of day coverage. A full listing of the frequencies operated by each NAT radio station is contained in the **"HF Management Guidance Material for the North Atlantic Region**" (NAT Doc 003), available at www.icao.int/EURNAT/, following "EUR & NAT Documents", then "NAT Documents", in folder "NAT Doc 003".

6.1.9 Each individual flight may be allocated a primary and a secondary HF frequency before the oceanic boundary.

6.1.10 Radio operators usually maintain a listening watch on more than one single frequency therefore it is useful for flight crews to state the frequency used when placing the initial call to the radio station.

HF Phraseology applicable when using data link

6.1.11 The integrity of the ATC service remains wholly dependent on establishing and maintaining HF or VHF voice communications with each ATS unit along the route of flight. The procedures in this section are applicable only in NAT airspace and pertain only to ATS data link operations.

6.1.12 Prior to or upon entering each NAT oceanic CTA, the flight crew should contact the appropriate aeronautical radio station.

6.1.13 If the flight enters an oceanic CTA followed by another oceanic CTA, the flight crew should, on initial contact:

a) not include a position report;

b) after the radio operator responds, request a SELCAL check and state the next CTA;

c) The radio operator will assign primary and secondary frequencies, perform the SELCAL check and designate the position and frequencies to contact the aeronautical radio station serving the next oceanic CTA. If the communications instructions are not issued at this stage, the crew should assume that the frequencies to use prior or upon entering the next CTA will be delivered at a later time by CPDLC or voice.

Example (Initial contact from an eastbound flight entering GANDER Oceanic)

GANDER RADIO, AIRLINE 123, SELCAL CHECK, SHANWICK NEXT
AIRLINE 123, GANDER RADIO, HF PRIMARY 5616 SECONDARY 2899, AT 30 WEST CONTACT SHANWICK RADIO HF PRIMARY 8891 SECONDARY 4675, (SELCAL TRANSMITTED)
GANDER RADIO, AIRLINE 123, SELCAL OKAY, HF PRIMARY 5616 SECONDARY 2899. AT 30 WEST CONTACT SHANWICK RADIO, HF PRIMARY 8891 SECONDARY 4675

6.1.14 If the flight will exit an oceanic CTA into continental airspace or airspace where the primary means of communication is VHF voice and an ATS surveillance service is available, on initial contact with the oceanic CTA, the flight crew should:

a) not include a position report;

b) after the radio operator responds, request a SELCAL check;

Example (Initial contact from an eastbound flight about to enter SHANWICK Oceanic)
SHANWICK RADIO, AIRLINE 123, SELCAL CHECK
AIRLINE 123, HF PRIMARY 2899 SECONDARY 5616 (SELCAL TRANSMITTED)
SHANWICK RADIO, AIRLINE 123, SELCAL OKAY, HF PRIMARY 2899 SECONDARY 5616.

c) For flights on T9 and T290, monitor VHF channel 128.360 as advised by Shanwick Radio. Exceptionally, in the event of navigational non-conformance or in an emergency, controllers may communicate directly with the flight. Controllers will use the callsign “Shanwick Control”.

6.1.15 Depending on which data link services are offered in the oceanic CTA and the operational status of those services, the aeronautical radio operator will provide appropriate information and instructions to the flight crew.

6.1.16 If a data link connection cannot be established, maintain normal voice communication procedures. In the event of data link connection failure in a NAT CTA after a successful logon revert to voice and notify the appropriate radio station. Inform the OAC in accordance with established problem reporting procedures.

Note: Flights on Tango 9 or Tango 290 should contact Shanwick Radio on HF voice.

6.1.17 To reduce frequency congestion, flight crews of flights using ADS-C should not additionally submit position reports via voice unless requested by aeronautical radio operator.

6.1.18 ADS-C flights are exempt from all routine voice meteorological reporting; however, the flight crew should use voice to report unusual meteorological conditions such as severe turbulence to the aeronautical radio station.

6.1.19 For any enquiries regarding the status of ADS-C connections, flight crew should use CPDLC. Should the ATS unit fail to receive an expected position report, the controller will follow guidelines for late or missing ADS-C reports.

6.1.20 When leaving CPDLC/ADS-C or ADS-C-only airspace, the flight crew should comply with all communication requirements applicable to the airspace being entered.

6.1.21 If the flight crew does not receive its domestic frequency assignment by 10 minutes prior to the flight’s entry into the next oceanic CTA, the flight crew should contact the aeronautical radio station and request the frequency, stating the current CTA exit fix or coordinates.

Note: Flights on Tango 9 or Tango 290 should contact Shanwick Radio on HF voice.

SELCAL

6.1.22 When using HF, SATVOICE, or CPDLC, flight crews should maintain a listening watch on the assigned frequency, unless SELCAL equipped, in which case they should ensure the following sequence of actions:

a) provide the SELCAL code in the flight plan; (any subsequent change of aircraft for a flight will require refiling of the flight plan or submitting a modification message (CHG) which includes the new registration and SELCAL);

b) check the operation of the SELCAL equipment, at or prior to entry into oceanic airspace, with the appropriate radio station. (This SELCAL check must be completed prior to commencing SELCAL watch); and

c) maintain thereafter a SELCAL watch.

6.1.23 It is important to note that it is equally essential to comply with the foregoing SELCAL provisions even if SATVOICE or CPDLC are being used for routine air/ground ATS communications. This will ensure that ATC has a timely means of contacting the aircraft.

6.1.24 Flight management staff and flight crews of aircraft equipped with SELCAL equipment should be made aware that SELCAL code assignment is predicated on the usual geographical area of operation of the aircraft. If the aircraft is later flown in geographical areas other than as originally specified by the aircraft operator, the aircraft may encounter a duplicate SELCAL code situation. Whenever an aircraft is to be flown routinely beyond the area of normal operations or is changed to a new geographic operating area, the aircraft operator should contact the SELCAL Registrar and request a SELCAL code appropriate for use in the new area.

6.1.25 When acquiring a previously owned aircraft equipped with SELCAL, many aircraft operators mistakenly assume that the SELCAL code automatically transfers to the purchaser or lessee. This is not true. As soon as practical, it is the responsibility of the purchaser or lessee to obtain a SELCAL code from the Registrar, or, if allocated a block of codes for a fleet of aircraft, to assign a new code from within the block of allocated codes.

6.1.26 Issues associated with duplicate SELCALS should be made to the SELCAL registrar, Aviation Spectrum Resources, Inc. (ASRI). The SELCAL registrar can be contacted via the AFTN address KDCAXAAG, and by including "ATTN. OPS DEPT. (forward to SELCAL Registrar)" as the first line of message text or via online at https://www.asri.aero/selcal/ .

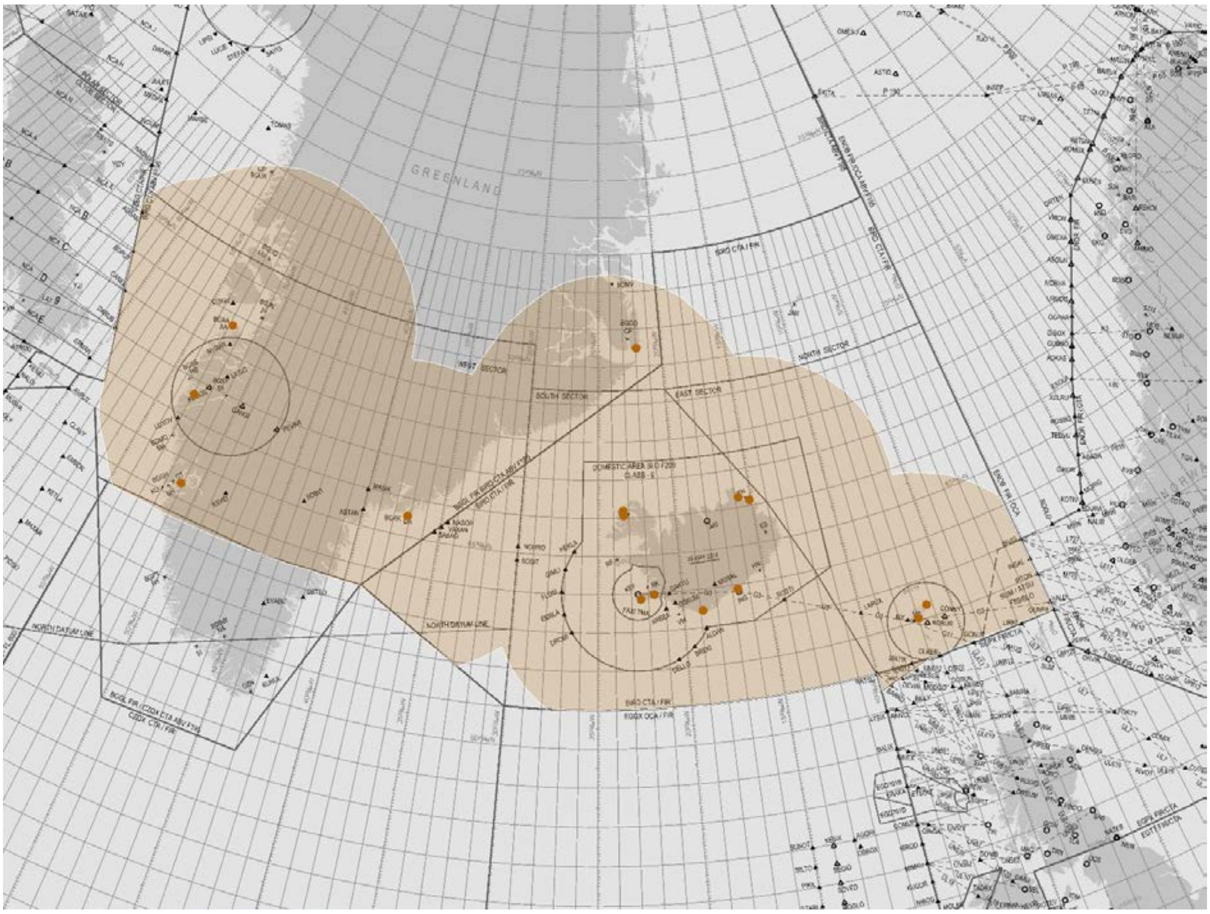
VHF Voice Communications

6.1.27 Radio stations are also responsible for the operation of General Purpose VHF (GP/VHF) outlets. North Atlantic flights may use these facilities for all regular and emergency communications with relevant OACCs, except that VHF Channel 128.360 may not be used for routine communication on routes Tango 9 and Tango 290. Such facilities are especially valuable in the vicinity of Iceland, Faroes and Greenland since VHF is not as susceptible to sunspot activity as HF. Outlets are situated at Prins Christian Sund, which is operated by Gander Radio, and at Kangerlussuaq (Nuuk), Kulusuk, several locations in Iceland and the Faroes, via Iceland Radio. Theoretical VHF coverage charts are shown at Attachment 4. It is important for the flight crew to recognise that when using GP/VHF, as with HF and SATVOICE, these communications are with a radio station and the flight crew is not normally in direct contact with ATSU. However, contact between the flight crew and ATC can be arranged, for example via patch-through on HF or GP/VHF frequencies by Iceland Radio and Shanwick Radio.

6.1.28 Reykjavik centre operates a number of Direct Controller Pilot Communications (DCPC) VHF stations in Iceland, Faroe Islands and Greenland. At jet flight levels the coverage is approximately 250 NM as indicated in the map below. Those stations are used to provide tactical procedural control and ATS Surveillance services within the South, East and West sectors of the Reykjavik area. The callsign of the Reykjavik centre is *"Reykjavik Control"* or just *"Reykjavik"* and indicates that the flight crew is communicating directly with an air traffic controller. The callsign of Iceland radio is *"Iceland radio"* and indicates that the flight crew is communicating with a radio operator who is relaying messages between the flight crew and the appropriate control facility.

Note: Due to technical data link interoperability requirements, CPDLC uplink messages refer to Iceland Radio as "Iceland Radio Center". This is done to enable the flight crew of capable aircraft to automatically load the specified frequency into the aircraft communication system.

Figure 6-1



SATVOICE Communication

6.1.29 The Aeronautical Mobile Satellite (Route) Service (AMS(R)S), more commonly referred to as SATVOICE, can be used as a supplement to HF & CPDLC communications throughout the NAT region for any routine, non-routine or emergency ATS air/ground communications. NAT ATS provider State AIPs contain the necessary telephone numbers and/or short-codes for air-initiated call access to radio stations and/or direct to OACCs. Since oceanic traffic typically communicates with ATC through radio facilities, routine SATVOICE calls should be made to such a facility rather than the ATC Centre. Only when the urgency of the communication dictates otherwise should SATVOICE calls be made to the ATC Centre. SATVOICE communication initiated due to HF propagation difficulties does not constitute urgency and should be addressed to the air-ground radio facility. The use of SATVOICE is described in The *SATVOICE Operations Manual* (ICAO Doc 10038).

6.1.30 The provisions governing the use of SATVOICE for ATS communications in the NAT region are contained in Doc.7030. These provisions include that even when using SATVOICE, flight crews must simultaneously operate SELCAL or maintain a listening watch on the assigned HF/VHF frequency.

6.1.31 Operators must also recognise that they are bound by their own State of Registry's regulations regarding carriage and use of any and all long-range ATS communications equipment. Some States do not authorise the carriage of SATVOICE as redundancy for HF equipage.

Data Link Communications

6.1.32 Data link communications have been gradually introduced into the NAT for position reporting (via ADS-C & CPDLC) and air/ground ATC communications using FANS 1/A CPDLC. Operational procedures are specified in ICAO Doc 10037, "Global Operational Data Link (GOLD) Manual".

AIS publications of the NAT ATS provider States should be consulted to determine the extent of current implementation in each of the North Atlantic OCAs.

6.1.33 When operating CPDLC, the aircraft data link system provides indication to flight crews of any degraded performance which results from a failure or loss of connectivity. The flight crew should then notify the ATS unit of the failure as soon as practicable. Timely notification is essential to ensure that the ATS unit has time to assess the situation and apply a revised separation standard, if necessary.

6.1.34 Similar to SATVOICE usage, flight crews electing to use Data link communications for regular ATS communications in the ICAO NAT region remain responsible for operating SELCAL (including completion of a SELCAL Check), or maintaining a listening watch on the assigned HF frequency outside VHF coverage. As stated in section 2.1.4 of the *ICAO Global Operational data Link (GOLD) Manual* (Doc 10037) ANSPs are required to notify operators, using the AIP or other appropriate AIS, the detail of all the supported data link services. Such notification will include advice when the aircraft SATCOM system is not serviceable. In such circumstances, when the planned route of flight is to extend beyond VHF coverage, the ANSP may restrict the use of CPDLC and ADS-C, even within VHF coverage areas, if so Operators should then ensure that the relevant CPDLC/ADS-C descriptors (J5/P2/D1) are not filed.

6.1.35 Flights equipped with CPDLC and /or ADS-C should ensure that the data link system is logged on to the appropriate OACC. This applies even when the aircraft is provided with ATS Surveillance services. With the introduction of PBCS separation, establishing and maintaining a data link connection becomes even more important since an active data link connection is one of the requirements for the application of the separation. CPDLC provides communication redundancy and controllers will in many cases use CPDLC for communication even though the flight crew is maintaining a listening watch on the assigned DCPC VHF frequency. ADS-C furthermore enables ATC to perform route conformance monitoring for downstream waypoints.

6.2 INTER-PILOT AIR-TO-AIR VHF FACILITY 123.450 MHZ AND EMERGENCY FREQUENCY 121.5 MHZ

6.2.1 The frequency 121.5 MHz should be continuously monitored by all aircraft operating in the NAT region so as to be prepared to offer assistance to any other aircraft advising an emergency situation.

6.2.2 An air-to-air VHF frequency has been established for world-wide use when aircraft are out of range of VHF ground stations which utilise the same or adjacent frequencies. This frequency, 123.450 MHz, is intended for pilot-to-pilot exchanges of operationally significant information *(N.B. It is not to be used as a "chat" frequency*).

6.2.3 123.450 MHz may be used to relay position reports via another aircraft in the event of an air-ground communications failure.

6.2.4 This frequency (123.450 MHz) may also be used by flight crews to contact other aircraft when needing to coordinate offsets required in the application of the Strategic Lateral Offset Procedures (SLOP).

6.2.5 If necessary initial contact for relays or offset coordination can be established on 121.5 MHz, although great care must be exercised should this be necessary, in case this frequency is being used by aircraft experiencing or assisting with an ongoing emergency.

6.2.6 Therefore in order to minimise unnecessary use of 121.5 MHz, it is recommended that when possible aircraft additionally monitor 123.450 MHz when flying through NAT airspace.

6.3 POSITION REPORTING

Time and Place of Position Reports

6.3.1 Unless otherwise requested by ATC, position reports from flights on routes which are not defined by designated reporting points should be made at the significant points listed in the flight plan.

6.3.2 ATC may require any flight to report its position at any intermediate waypoints when deemed necessary.

6.3.3 In requiring aircraft to report their position at intermediate points, ATC is guided by the requirement to have positional information at approximately hourly intervals and also by the need to accommodate varying types of aircraft and varying traffic and MET conditions.

6.3.4 Unless providing position reports via ADS-C, if the estimated time for the 'next position', as last reported to ATC, has changed by **three minutes or more**, a revised estimate must be transmitted to the ATS unit concerned as soon as possible.

6.3.5 Flight crews must always report to ATC as soon as possible on reaching any new cruising level.

Contents of Position Reports

6.3.6 For flights outside domestic ATS route networks, position should be expressed in terms of latitude and longitude except when flying over named reporting points. Except in those areas defined in State AIPs where operators meeting specified requirements can flight plan their user-preferred trajectories, flights whose tracks are predominantly east or west, latitude should be expressed in degrees and minutes, longitude in degrees only. For flights whose tracks are predominantly north or south, latitude should be expressed in degrees only, longitude in degrees and minutes. However, it should be noted that when such minutes are zero then the position report may refer solely to degrees.

6.3.7 All times should be expressed in four digits giving both the hour and the minutes UTC.

6.3.8 Radio operators may simultaneously monitor and operate more than one frequency. Therefore, when initiating an HF voice contact it is helpful if the flight crew include advice on the frequency being used (see examples below).

"Operations Normal" Reports

6.3.9 When "operations normal" reports are transmitted by flight crews, they should consist of the prescribed call followed by the words "OPERATIONS NORMAL".

Standard Message Types

6.3.10 Standard air/ground message types and formats are used within the NAT region and are published in State AIPs and Atlantic Orientation charts. To enable ground stations to process messages in the shortest possible time, flight crew should observe the following rules:

a) use the correct type of message applicable to the data transmitted;

b) state the message type in the contact call to the ground station or at the start of the message;

c) adhere strictly to the sequence of information for the type of message;

d) **all times** in any of the messages should be expressed in hours and minutes **UTC**.

6.3.11 The message types are shown below with examples:

POSITION

Pilot:	*"Shanwick Radio, Swissair 100, Position on 8831"*
Radio operator:	*"Swissair 100, Shanwick Radio"*
Pilot:	*"Shanwick Radio, Swissair 100, RESNO at 1235, Flight Level 330, Estimating 56 North 020 West at 1310, Next 56 North 030 West"*

POSITION REPORT AND REQUEST CLEARANCE

Pilot:	*"Shanwick Radio, American 123, Request Clearance on 8831"*
Radio operator:	*"American 123, Shanwick Radio"*
Pilot:	*"Shanwick Radio, American 123, 56 North 020 West at 1308, Flight Level 330, Estimating 56 North 030 West at 1340, Next 56 North 040 West. Request Flight Level 350"*

REQUEST CLEARANCE

Pilot:	*"Shanwick Radio, Speedbird 212, Request Clearance on 3476"*
Radio operator:	*"Speedbird 212, Shanwick Radio"*
Pilot:	*"Shanwick Radio, Speedbird 212, Request Flight Level 370"*

REVISED ESTIMATE

Pilot:	*"Shanwick Radio, Speedbird 212, Revised Estimate on 3476"*
Radio operator:	*"Speedbird 212, Shanwick Radio"*
Pilot:	*"Shanwick Radio, Speedbird 212, 57 North 040 West at 0305"*

MISCELLANEOUS

Plain language – free format

6.4 "WHEN ABLE HIGHER" (WAH) REPORTS

6.4.1 Prior advice to ATC of the time or position that a flight will be able to accept the next higher level can assist ATC in ensuring optimal usage of available altitudes. A WAH report must be provided by all flights entering the NAT HLA portion of the New York OCA and entering the Santa Maria OCA. Due to the higher number of climb requests on the generally longer NAT route segments that transit New York and Santa Maria OCAs and also because of the greater frequency of crossing traffic situations here, the strategy of issuing "coast-out to coast-in" conflict-free clearances is not employed by these two oceanic control centres. Here, air traffic control of a more tactical nature is exercised. The provision of WAH reports in these circumstances allows the controllers to more effectively utilise their airspace and provide aircraft more fuel efficient profiles. Provision of WAH reports on entering other NAT OCAs is optional or they may be requested by any OACC.

6.4.2 When required or when otherwise provided, upon entering an oceanic FIR, flight crews should include in the initial position report the time or location that the flight will be able to accept the next higher altitude. The report may include more than one altitude if that information is available.

Example: *"Global Air 543, 40 North 040 West at 1010, Flight Level 350,*
Estimating 40 North 050 West at 1110, 40 North 060 West Next.
Able Flight Level 360 at 1035, Able Flight Level 370 at 1145,
Able Flight Level 390 at 1300"

6.4.3 Information thus provided of the aircraft's future altitude "ability" will not automatically be interpreted by ATC as an advance "request" for a climb. It will be used as previously indicated to assist ATC in planning airspace utilisation. However, should the flight crew wish to register a request for one or more future climbs, this may be incorporated in the WAH report by appropriately substituting the word "Request" for the word "Able".

Example: *"Global Air 543, 42 North 040 West at 1215, Flight Level 330, Estimating 40 North 050 West at 1310, 38 North 060 West Next. Request Flight Level 340 at 1235, Able Flight Level 350 at 1325, Request Flight Level 360 at 1415"*

6.4.4 Although optimal use of the WAH reports is in conjunction with a Position Report, a WAH report can be made or updated separately at any time.

Example: *"Global Air 543, Able Flight Level 360 at 1035, Request Flight Level 370 at 1145, Able Flight Level 390 at 1300"*

6.4.5 It should be noted that ATC acknowledgement of a WAH report (and any included requests) is NOT a clearance to change altitude.

6.5 METEOROLOGICAL REPORTS

6.5.1 In accordance with ICAO Annex 3 - *Meteorological Service for International Air Navigation*, aircraft are no longer required to provide voice reports of MET observations of wind speed and direction nor outside air temperature.

6.5.2 When an ATS unit establishes an event contract with an aircraft to provide ADS–C position reports, it may also establish an additional periodic report contract (e.g. with a 30 mins interval). Such ADS–C periodic reports, unlike event reports, contain wind and temperature data and thereby satisfy the MET authorities' requirements for the provision of MET data. However, it must be appreciated that any such automated MET Reports do not include information on any observations of special or non-routine significant meteorological phenomena, such as moderate/severe turbulence or icing, volcanic ash, thunderstorms, etc. Therefore, any flight crew providing position reports via data link, who encounters any such significant meteorological phenomena should report this information via voice or, if appropriate, via a CPDLC free text downlink message. The format to be used for the reporting of such observations should, where appropriate, be by reference to geographical coordinates.

6.5.3 *VOLMET Services*

This is a 24 hour, 365 day-a-year continuous voice broadcast of weather information consisting of SIGMETS for the NAT region, terminal forecasts and actual weather observations for the principal airports in North America & Europe provided by Gander, New York and Shanwick. Consult State AIPs and ICAO DOC 003 HF Guidance Material for broadcast information.

6.6 HF COMMUNICATIONS FAILURE

6.6.1 Rules and procedures for the operation of an aircraft following a radio communications failure (RCF) are established to allow ATC to anticipate that aircraft's subsequent actions and thus for ATC to be able to provide a service to all other flights within the same vicinity, so as to ensure the continued safe separation of all traffic. The general principles of such rules and procedures are set out in Annexes 2 and 10 to the ICAO Convention. States publish in their AIPs specific RCF rules and regulations to be followed within their particular sovereign airspace.

6.6.2 It must be recognised that there is in general an underlying premise in “normal” radio communications failure procedures that they are for use when a single aircraft suffers an on-board communications equipment failure. Within the NAT region and some adjacent domestic airspace (e.g. Northern Canada), where HF Voice is used for air-ground ATC communications, ionospheric disturbances resulting in poor radio propagation conditions can also interrupt these communications. While it is impossible to provide guidance for all situations associated with an HF communications failure, it is, however, extremely important to differentiate between two distinct circumstances: - firstly, an on-board communications equipment failure, resulting in an individual aircraft losing HF communications with ATC and; secondly, the occurrence of poor HF propagation conditions (commonly referred to as “HF Blackouts”), which can simultaneously interrupt HF air-ground communications for many aircraft over a wide area.

6.6.3 In the case of an on-board communications equipment failure, even though ATC loses contact with that aircraft, it can anticipate that aircraft’s actions and, if necessary, modify the profiles of other aircraft in the same vicinity in order to maintain safe separations.

6.6.4 However, the occurrence of poor HF propagation conditions can simultaneously interrupt HF air-ground communications for many aircraft over a wide area and ATC may then be unable to make any interventions to assure safe traffic separations using HF. Notwithstanding the growing use of Data link and SATVOICE for regular air-ground ATS communications in the NAT region, all flight crews must recognise that, pending the mandatory carriage and use of such means, an HF blackout will impact the ability of ATC to ensure the safe separation of all traffic. **Hence, even if using other than HF for regular communications with ATC, flight crews should still exercise appropriate caution when HF blackout conditions are encountered.**

6.6.5 The following procedures are intended to provide general guidance for aircraft which experience a communications failure while operating in, or proposing to operate in, the NAT region. These procedures are intended to complement and not supersede State procedures/regulations.

General Provisions

1. The flight crew of an aircraft experiencing a two-way ATS communications failure should operate the SSR Transponder on identity Mode A Code 7600 and Mode C.

2. When so equipped, an aircraft should use SATVOICE to contact the responsible radio station via special telephone numbers/short codes published in State AIPs (see also NAT Doc 003, “High Frequency Management Guidance Material for the NAT Region” which can be downloaded from the www.icao.int/EURNAT/, following “EUR & NAT Documents”, then “NAT Documents”). However, it must be appreciated that pending further system developments and facility implementations the capability for Ground (ATC)-initiated calls varies between different NAT OACCs.

3. If the aircraft is not equipped with SATVOICE then the flight crew should attempt to use VHF to contact any (other) ATC facility or another aircraft, inform them of the difficulty, and request that they relay information to the ATC facility with which communications are intended.

4. The inter-pilot air-to-air VHF frequency, 123.450 MHz, may be used to relay position reports via another aircraft. *(N.B. The emergency frequency 121.5 MHz should not be used to relay regular communications, but since all NAT traffic is required to monitor the emergency frequency, it may be used, in these circumstances, to establish initial contact with another aircraft and then request transfer to the inter-pilot frequency for further contacts).*

5. In view of the traffic density in the NAT region, flight crews of aircraft experiencing a two-way ATS communications failure should broadcast regular position reports on the inter-pilot frequency (123.450 MHz) until such time as communications are re-established.

Communications Procedures for Use in the Event of an On-board HF Equipment Failure

6.6.6 Use SATVOICE communications, if so equipped. (See General Provisions 2. above).

6.6.7 If not SATVOICE equipped try VHF relay via another aircraft (See 6.6.5).

Communications Procedures for Use during Poor HF Propagation Conditions

6.6.8 Poor HF propagation conditions are the result of ionospheric disturbances. These are usually caused by sun-spot or solar flare activity creating bursts of charged particles in the solar wind which can spiral down around the Earth's magnetic lines of force and distort or disturb the ionised layers in the stratosphere which are utilised to refract HF radio waves. As with the Aurora Borealis, which is of similar origin, these ionospheric disturbances most commonly occur in regions adjacent to the Magnetic Poles. Since the Earth's North Magnetic Pole is currently located at approximately 87N 150W, flights through the North Atlantic and Northern Canada regions can, on occasion, experience resulting HF communications difficulties.

6.6.9 SATVOICE communications are unaffected by most ionospheric disturbances. Therefore, when so equipped, an aircraft may use SATVOICE for ATC communications (See 6.6.5).

6.6.10 If not SATVOICE equipped, in some circumstances it may be feasible to seek the assistance, via VHF, of a nearby SATVOICE equipped aircraft to relay communications with ATC (See 6.6.5).

6.6.11 Whenever aircraft encounter poor HF propagation conditions that would appear to adversely affect air-ground communications generally, it is recommended that all flight crews then broadcast their position reports on the air-to-air VHF frequency 123.450 MHz. Given the density of traffic in the NAT region and the fact that in such poor propagation conditions ATC will be unable to maintain contact with all aircraft, it is important that even those aircraft that have been able to establish SATVOICE contact also broadcast their position reports.

6.6.12 If for whatever reason SATVOICE communications (direct or relayed) are not possible, then the following procedures may help to re-establish HF communications. Sometimes these ionospheric disturbances are very wide-spread and HF air-ground communications at all frequencies can be severely disrupted throughout very large areas (e.g. simultaneously affecting the whole of the NAT region and the Arctic.). However, at other times the disturbances may be more localised and/or may only affect a specific range of frequencies.

6.6.13 In this latter circumstance, HF air-ground communications with the intended radio station may sometimes continue to be possible but on a frequency other than either the primary or secondary frequencies previously allocated to an aircraft. Hence, in the event of encountering poor HF propagation conditions flight crews should first try using alternative HF frequencies to contact the intended radio station.

6.6.14 However, while the ionospheric disturbances may be severe, they may nevertheless only be localized between the aircraft's position and the intended radio station, thus rendering communications with that station impossible on any HF frequency. But the radio stations providing air-ground services in the NAT region do co-operate as a network and it may, even then, still be possible to communicate with another radio station in the NAT network on HF and request that they relay communications. Efforts should therefore be made to contact other NAT radio stations via appropriate HF frequencies.

6.6.15 Nevertheless, as previously indicated, there are occasions when the ionospheric disturbance is so severe and so widespread that HF air-ground communications with any radio station within the NAT region network are rendered impossible.

Rationale for Lost Communications Operational Procedures

6.6.16 Because of the density of oceanic traffic in the NAT region, unique operational procedures have been established to be followed by flight crews whenever communications are lost with ATC. If communications with the relevant OACC are lost at any time after receiving and acknowledging a clearance then the aircraft must adhere strictly to the routing and profile of the last acknowledged clearance until exiting the NAT region. Flight crews must not revert to their filed flight plan.

Operational Procedures following Loss of HF Communications Prior to Entry into the NAT

On-Board HF Communications Equipment Failure

6.6.17 Due to the potential length of time in oceanic airspace, it is strongly recommended that a flight crew, experiencing an HF communications equipment failure:

- Prior to departure
  - Coordinate with the initial NAT OAC according to flight planned route to determine if eligible for HF relief waiver as outlined in 6.1.1
  - Include any coordinated HF waiver relief details in section 18 of the flight plan
- After departure and prior to entering the NAT
  - Coordinate with the initial NAT OAC according to flight planned route to determine if eligible for HF relief waiver as outlined in 6.1.1

6.6.18 If, however, an oceanic clearance cannot be obtained, the individual aircraft suffering radio communications equipment failure should enter oceanic airspace at the first oceanic entry point, level and speed contained in the filed flight plan and proceed via the filed flight plan route to landfall. **The initial oceanic level and speed included in the filed flight plan must be maintained until landfall.** Any subsequent climbs included in the filed flight plan **must not** be executed.

HF Blackout

6.6.19 In the case of aircraft that lose ATC communications as a result of poor propagation conditions (HF Blackouts) when approaching NAT airspace through domestic airspace where ATC communications are also conducted via HF (e.g. entering the NAT through Northern Canadian airspace into the Reykjavik OCA), it is probably less advisable to execute unscheduled landings. These poor propagation conditions are very likely to affect many aircraft simultaneously and multiple diversions of “lost comms” aircraft might create further difficulties and risks.

6.6.20 As with the equipment failure situation, aircraft approaching the NAT and losing ATC communications as a result of poor HF radio propagation conditions should, if already in receipt of an oceanic clearance, follow the routing specified in that clearance and maintain the **initial** cleared level and speed throughout the oceanic segment i.e. through to landfall.

6.6.21 However, in these HF Blackout circumstances, if no oceanic clearance has been received, the aircraft must remain at the last cleared domestic flight level, not only to the ocean entry point but also throughout the whole subsequent oceanic segment (i.e. until final landfall). This is in stark contrast to the equipment failure case. In such HF Blackouts, flight crews must not effect level changes to comply with filed flight plans. Such aircraft should, maintain the last cleared level and, enter oceanic airspace at the first oceanic entry point and speed contained in the filed flight plan, then proceed via the filed flight plan route to landfall.

6.6.22 The rationale here must be appreciated. In such circumstances it is likely that ATC will have simultaneously lost HF communications with multiple aircraft in the same vicinity. Should flight crews then wrongly apply the “normal” radio failure procedures and “fly the flight plan”, there is a possibility that two such aircraft may have filed conflicting flight paths/levels through the subsequent oceanic airspace, and without communications with either aircraft, ATC would then be unable to intervene to resolve the conflict. Since safe aircraft level separation assurance has already been incorporated into the current domestic clearances, **it is consequently imperative that under such (domestic and oceanic) HF-blackout circumstances, all aircraft electing to continue flight into NAT oceanic airspace without a received and acknowledged oceanic clearance, should adhere to the flight level in the last received domestic clearance. No level changes should be made to comply with a filed oceanic level that is different from that of the domestic clearance in effect at the time that ATC air-ground communications were lost.**

Operational Procedures following Loss of HF Communications after Entering the NAT

6.6.23 If the HF communications equipment failure occurs or HF Blackout conditions are encountered after entering the NAT then : -

> The flight crew must proceed in accordance with the last received and acknowledged oceanic clearance, including level and speed, to the last specified oceanic route point (normally landfall). After passing this point, the flight crew should conform with the relevant AIP specified State procedures/regulations and if necessary rejoin the filed flight plan route by proceeding, via the published ATS route structure where possible, to the next significant point contained in the filed flight plan. *Note: the relevant State procedures/regulations to be followed by an aircraft in order to rejoin its filed flight plan route are specified in detail in the appropriate State AIP.*

6.6.24 Aircraft with a destination within the NAT region should proceed to their clearance limit and follow the ICAO standard procedure to commence descent from the appropriate designated navigation aid serving the destination aerodrome at, or as close as possible to, the expected approach time. Detailed procedures are promulgated in relevant State AIPs.

Summary of Operational Procedures Required following Loss of Air/Ground ATS Communications in the NAT Region

6.6.25 The foregoing detailed operational procedures can be simply summarised as follows :

- Equipment Failure before receiving an oceanic clearance:-
  Divert or fly the flight plan route, speed and initial planned oceanic level to landfall.
- Blackout encountered (in an HF comms Domestic ATC environment) before receiving an oceanic clearance:-
  Continue at Domestic cleared level and follow flight planned route and speed to landfall.
- Equipment Failure or Blackout after receiving an oceanic clearance:-
  Fly that clearance to landfall.

In all cases, after landfall rejoin, or continue on, the flight planned route, using appropriate State AIP specified procedures for the domestic airspace entered.

6.7 CONTINGENCY SITUATIONS AFFECTING ATM PROVISION IN THE NAT REGION

6.7.1 In the anticipation of situations arising which might result in the partial or total disruption of Air Traffic Services within the NAT region, NAT ATS providers have developed arrangements which would, in such events, be put in place to ensure, as far as possible, the continued safety of air navigation. Such arrangements include required actions by flight crews and operators of affected flights. These arrangements are detailed in the “**Air Traffic Management Operational Contingency Plan –North Atlantic Region**” (NAT Doc 006) which can be downloaded from www.icao.int/EURNAT/, following

"EUR & NAT Documents", then "NAT Documents", in folder "NAT Doc 006 - NAT Contingency Plan". Operators and flight crews planning and conducting operations in North Atlantic region should ensure their familiarity with these arrangements and in particular with the actions expected of flight crews in such contingency situations.

6.7.2 The plan is presented in two parts. The first deals with contingency arrangements necessary when only one NAT ATS unit is affected. While the second addresses events which are likely to affect more than one facility within the NAT region, for example the contamination of the airspace by volcanic ash. Where available, information is also provided outlining the steps taken by ANSPs to deal with any long-term unavailability of an ATC facility.

6.8 OPERATION OF TRANSPONDERS

6.8.1 All aircraft operating as IFR flights in the NAT region shall be equipped with a pressure-altitude reporting SSR transponder. Unless otherwise directed by ATC, pilots flying in NAT airspace will operate transponders continuously in Mode A/C Code 2000, except that the last assigned code will be retained for a period of 30 minutes after entry into NAT airspace or after leaving a radar service area. Pilots should note that it is important to change from the last assigned domestic code to Code 2000 since the original domestic code may not be recognised by the subsequent Domestic Radar Service on exit from the oceanic airspace. However, because of the limited time spent in the NAT HLA, when flying on route Tango 9 or Tango 290 the change from the last assigned domestic code to Code 2000 should be made Northbound 10 minutes after passing BEGAS or ADVAT and Southbound 10 minutes after passing LASNO or GELPO.

6.8.2 It should be noted that this procedure does not affect the use of the special purpose codes (7500, 7600 and 7700) in cases of unlawful interference, radio failure or emergency. However, given the current heightened security environment flight crews must exercise CAUTION when selecting Codes not to inadvertently cycle through any of these special purpose codes and thereby possibly initiate the launching of an interception.

6.8.3 Reykjavik ACC provides a radar control service in the south-eastern part of its area and consequently transponder codes issued by Reykjavik ACC must be retained throughout the Reykjavik OCA until advised by ATC.

6.9 AIRBORNE COLLISION AVOIDANCE SYSTEMS (ACAS)

6.9.1 Turbine-engined aircraft having a maximum certificated take-off mass exceeding 5,700 kg or authorized to carry more than 19 passengers are required to carry ACAS II in the NAT region. The technical specifications for ACAS II are contained in ICAO Annex 10 Volume IV. Compliance with this requirement can be achieved through the implementation of traffic alert and collision avoidance system (TCAS) Version 7.1 as specified in RTCA/DO-185B or EUROCAE/ED-143.

6.9.2 Flight crews should report all ACAS/TCAS Resolution Advisories which occur in the NAT region to the controlling authority for the airspace involved. (See Chapter 13.)

CHAPTER 7

APPLICATION OF MACH NUMBER TECHNIQUE

7.1 DESCRIPTION OF TERMS

7.1.1 Mach Number Technique (MNT) is a technique whereby aircraft operating successively along suitable routes are cleared by ATC to maintain a Mach number for a portion of the enroute phase of flight.

7.2 OBJECTIVE

7.2.1 MNT is used to improve the utilisation of airspace on long route segments where ATC has only position reports to ensure longitudinal separation between flights is maintained. When two or more aircraft are operating along the same route at the same flight level and maintaining the same Mach number, the time interval between them is more likely to remain constant than by using any other method.

7.3 PROCEDURES IN NAT OCEANIC AIRSPACE

7.3.1 Oceanic clearances include assigned Mach numbers (when required) which are to be maintained. Aircraft capable of maintaining an assigned Mach must flight plan their requested Mach number. ATC uses assigned Mach number along with position reports to calculate estimated times along the cleared route. These times are used as the basis for longitudinal separation and for coordination with adjacent units.

7.3.2 ATC will try to accommodate flight crew/dispatcher requested or flight planned Mach numbers when issuing oceanic clearances. It is rare that ATC will assign a Mach number more than 0.01 faster or 0.02 slower than that requested.

7.3.3 The monitoring and maintenance of longitudinal separation is dependent upon the provision of accurate times in position reports.

7.3.4 **The assigned Mach number must be maintained.** If an immediate temporary change in the Mach number is essential (due to turbulence for example), ATC must be so informed.

7.3.5 Flight crews should maintain their last assigned Mach number during climbs in oceanic airspace. If due to aircraft performance this is not feasible ATC should be advised at the time of the request for the climb.

7.4 PROCEDURE AFTER LEAVING OCEANIC AIRSPACE

7.4.1 After leaving oceanic airspace flight crews maintain their assigned Mach number in domestic controlled airspace unless and until the appropriate ATC unit authorises a change.

CHAPTER 8

NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

8.1 INTRODUCTION

8.1.1 The aircraft navigation systems necessary for flying in the NAT HLA are capable of high-performance standards. However, it is essential that stringent cross-checking procedures are employed, both to ensure that these systems perform to their full capabilities and to minimise the consequences of equipment failures and possible human errors.

8.1.2 ICAO specifies the navigation system performance required for operations within a given airspace. This concept is referred to as "Performance Based Navigation" (PBN). Within this philosophy some navigation specifications, in addition to stating the accuracies to be achieved, also require on-board automatic integrity monitoring and alerting functions. Such specifications are referred to as RNP-X, where X represents an accuracy of 95% containment in X NMs. However, specifications requiring the same accuracies but not requiring on-board monitoring/alerting are referred to as RNAV-X.

8.1.3 Large numbers of aircraft worldwide are now in receipt of "RNP 10" approvals. To conform with the PBN standard terminology, as indicated above, this system should actually be designated as "RNAV10". However, it has been recognised that re-classifying such a widespread existing approval designation would create significant difficulties for both operators and State regulators. Consequently, it has been agreed that this designation of "RNP 10" will remain as such, even though the navigation specifications here are, in PBN terminology, effectively "RNAV10".

8.1.4 With current technology, on-board automatic performance monitoring can only be carried out using GNSS. Hence GNSS is mandatory for true RNP airspace (e.g. RNP 4) but is not required for RNAV airspace, including that historically and still designated as "RNP 10".

Note: For more detailed information on RNP see ICAO Document Doc 9613 – 'Performance Based Navigation Manual'.

8.1.5 Regardless of how sophisticated or mature a system is, it is still essential that stringent navigation and cross checking procedures are maintained if Gross Navigation Errors (GNEs) are to be avoided. A GNE within NAT airspace is defined as a deviation from cleared track of 10 NM or more

8.1.6 All reported navigation errors in North Atlantic airspace are thoroughly investigated. Records show that navigation equipment or system technical failures are now fortunately rare. However, when they do occur they can sometimes be subtle or progressive, resulting in a gradual and perhaps not immediately discernible degradation of performance. Chapter 11 of this Manual provides guidance on detection and recovery when such problems are encountered.

8.1.7 About half of NAT flights route via an OTS track and a large portion of the remaining random flights follow routes that at some point approach within one or two degrees of the outermost OTS tracks. One consequence of this is that a single digit error in the latitude of one significant point of an aircraft's route definition will very likely lead to a conflict with another aircraft which is routing correctly via the resulting common significant point. The risk of an actual collision between two aircraft routing via a common point, as is the case when such errors are made, is further exacerbated by the improved technical accuracy of the modern navigation and height keeping equipment employed.

8.1.8 The importance of employing strict navigation system operating procedures designed to avoid the insertion of wrong waypoints or misunderstandings between the flight crew and ATC over cleared routes cannot be over-emphasised.

8.1.9 Many of the procedures listed in this chapter are not equipment specific and others may not be pertinent to every aircraft. For specific equipment, reference should be made to Manufacturers' and operators' handbooks and manuals.

8.1.10 There are various references in this material to two flight crew members; however, when carried, a third flight crew member should be involved in all cross check procedures to the extent practicable.

8.1.11 Maintenance of a high standard of navigation performance is absolutely essential to the maintenance of safety in the NAT HLA.

Sample Oceanic Checklist

8.1.12 ICAO North Atlantic Working Groups composed of industry, ATC and state regulators have created a Sample Oceanic Checklist. This checklist represents lessons learned from decades of NAT operations and internationally accepted best practices. It is provided as guidance and is not intended to replace an operator’s oceanic checklist. However, all operators are strongly encouraged to review the Sample Oceanic Checklist, either for guidance in developing their own checklist or as a means of assessing the thoroughness of their checklist. Operators can tailor the NAT checklist to their specific needs and approvals. This checklist focuses on an orderly flow and ways to reduce oceanic errors. The details behind, and the rationale for, the proposed actions listed in the sample checklist are described in the Expanded Check List. These checklists, along with the NAT Oceanic Errors Safety Bulletin, are available on the ICAO website at www.icao.int/EURNAT/, following “EUR & NAT Documents”, then “NAT Documents”, in folder “NAT OPS Bulletins”.

8.2 GENERAL PROCEDURES

Presentation of Navigation Information

8.2.1 A significant proportion of navigation errors result from the use of incorrect data. To minimize the problem, source data must be clearly legible under the worst cockpit lighting conditions and presented in a format suitable for error-free use in the cockpit environment. In this context, the following considerations apply:

a) on navigation charts, all position coordinates, e.g. ramp position, ATC waypoints, radio navaid positions, etc., should ideally be printed in dark blue or black numerals against a white background. Where such coordinates would normally appear against a locally tinted background, they should be enclosed in a white box. Absolutely no information should be overprinted on top of position coordinates. In situations where groups of position co-ordinates must appear in close proximity to each other, the position to which each set of coordinates applies should be clearly indicated by means of a leader;

b) navigational documents, such as NAT track messages or flight plans, should be double-spaced or "boxed", to minimize the possibility of line slippage when the information is read; and

c) it is advisable to provide flight crews with a simple plotting chart of suitable scale (1 inch equals 120 NM has been used successfully on NAT routes) in order to facilitate a visual presentation of the intended route that, otherwise, is defined only in terms of navigational co- ordinates.

Importance of Accurate Time

8.2.2 Longitudinal separations between subsequent aircraft following the same track and between aircraft on intersecting tracks are assessed in terms of differences in ETAs/ATAs at common waypoints. Aircraft clock errors resulting in position report time errors can therefore lead to an erosion of actual longitudinal separations between aircraft. It is thus vitally important that prior to entry into the NAT HLA the time reference system to be used during the flight is accurately synchronised to UTC and that the calculation of waypoint ETAs and the reporting of waypoint ATAs are always referenced to this system. Pre-flight Procedures for any NAT HLA flight must include a UTC time check and resynchronisation of the aircraft master clock. Lists of acceptable time sources for this purpose have been promulgated by NAT ATS provider States.

8.2.3 The following are examples of acceptable time standards:

- GPS (Corrected to UTC) - Available at all times to those flight crews who can access time via approved on-board GPS (TSO-C129 or later standard) equipment.
- WWV - National Institute of Standards (NIST - Fort Collins, Colorado). WWV operates continually H24 on 2500, 5000, 10,000, 15,000 and 20,000 kHz (AM/SSB) and provides UTC (voice) once every minute.
- CHU - National Research Council (NRC - Ottawa, Canada) - CHU operates continually H24 on 3330, 7850 and 14,670 kHz (SSB) and provides UTC (voice) once every minute (English even minutes, French odd minutes).
- Telephone Talking Clock Facility - English (+16137451576) or French (+16137459426)
- BBC - British Broadcasting Corporation (United Kingdom). The BBC transmits on a number of domestic and world-wide frequencies and transmits the Greenwich time signal (referenced to UTC) once every hour on most frequencies, although there are some exceptions.

8.2.4 Further details of these and other acceptable time references can be found in AIS documentation of the NAT ATS provider States. In general, the use of any other source of UTC that can be shown to the State of the operator or the State of Registry of the aircraft to be equivalent, may be allowed for this purpose.

The Use of a Master Document

8.2.5 Navigation procedures must include the establishment of some form of master working document to be used on the flight deck. This document may be based upon the flight plan, navigation log, or other suitable document which lists sequentially the waypoints defining the route, the track and distance between each waypoint, and other information relevant to navigation along the cleared track. When mentioned subsequently in this guidance material, this document will be referred to as the 'Master Document'.

8.2.6 Misuse of the Master Document can result in GNEs occurring and for this reason strict procedures regarding its use should be established. These procedures should include the following:

a) Only one Master Document is to be used on the flight deck. However, this does not preclude other flight crew members maintaining a separate flight log.

b) On INS equipped aircraft a waypoint numbering sequence should be established from the outset of the flight and entered on the Master Document. The identical numbering sequence should be used for storing waypoints in the navigation computers.

c) For aircraft equipped with FMS data bases, FMS generated or inserted waypoints should be carefully compared to Master Document waypoints and cross checked by both flight crew members.

d) An appropriate symbology should be adopted to indicate the status of each waypoint listed on the Master Document.

8.2.7 The following is a typical example of Master Document annotation. An individual operator’s procedures may differ slightly but the same principles should be applied:

a) The waypoint number is entered against the relevant waypoint coordinates to indicate that the waypoint has been inserted into the navigation computers.

b) The waypoint number is circled, to signify that insertion of the correct coordinates in the navigation computers has been double-checked independently by another flight crew member.

c) The circled waypoint number is ticked, to signify that the relevant track and distance information has been double-checked.

d) The circled waypoint number is crossed out, to signify that the aircraft has overflown the waypoint concerned.

8.2.8 All navigational information appearing on the Master Document must be checked against the best available prime source data. When a re-route is necessary, some regulators recommended that a new Master Document is prepared for the changed portion of the flight. In cases where the original Master Document is to be used, the old waypoints must be clearly crossed out and the new ones carefully entered in their place. The checks listed in the previous paragraph must be carried out in respect of all new or revised waypoints.

8.2.9 When ATC clearances or re-clearances are being obtained, headsets should be worn. The inferior clarity of loud-speakers has, in the past, caused errors during receipt. Two qualified flight crew members should monitor such clearances; one of them recording the clearance on the Master Document as it is received, the other cross-checking the receipt and read-back. All waypoint coordinates should be read back in detail, adhering strictly to standard ICAO phraseology, except where approved local procedures make this unnecessary. Detailed procedures pertaining to abbreviated clearances/read-backs are contained in the appropriate AIPs, and in this Manual at Chapter 5 - Oceanic ATC Clearances.

Position Plotting

8.2.10 An aeronautical chart can provide a visual presentation of the intended route which is defined otherwise only in terms of navigational coordinates. Plotting the intended route on such a chart may reveal errors and discrepancies in the navigational coordinates which can then be corrected immediately, before they reveal themselves in terms of a deviation from the ATC cleared route. As the flight progresses, plotting the aircraft's present position on this chart will also serve the purpose of a navigation cross check, provided that the scale and graticule are suitable.

8.2.11 As the flight progresses in oceanic airspace, plotting the aircraft's position on a chart will help to confirm (when it falls precisely on track) that the flight is proceeding in accordance with its clearance. However, if the plotted position is laterally offset, the flight may be deviating unintentionally, and this possibility should be investigated at once.

8.2.12 Plotting the aircraft’s progress on a chart can be a useful tool for contingency situations. In the event of a total loss of long range navigation capability, a completed plotting chart will assist in the necessary reversion to dead reckoning. In other contingency situations it can help in assessing separation assurance from other tracks or from high terrain (e.g over Greenland).

8.2.13 The chart must be of a scale appropriate for plotting. Many company Progress Charts are of the wrong scale or too small. It has been noted that the use of plotting charts that are small can lead to oceanic errors. EAG Chart AT (H) 1; No 1 AIDU (MOD) Charts AT(H)1, 2, 3 & 4 and the Jeppesen North/Mid Atlantic Plotting Charts are all useful compromises between scale and overall chart size; while the *NOAA/FAA North Atlantic Route Chart* has the advantage, for plotting purposes, of a 1° latitude/longitude graticule.

Provision of Climbs

8.2.14 Tactical ATS surveillance control and tactical procedural control are exercised in some areas of the NAT HLA. However, oceanic clearances for many NAT flights are of a strategic nature. Although such strategic clearances normally specify a single flight level for the entire crossing, there is often scope for enroute climb re-clearances as fuel burn-off makes higher levels more optimal. Controllers will accommodate requests for climbs whenever possible. When so re-cleared, flight crews should initiate the climb without delay (unless their discretion was invited or unless a conditional clearance was issued) and those aircraft not using CPDLC/ADS-C should **always** report to ATC immediately upon **leaving** the old and on **reaching** the new cruising levels.

~~8.2.14~~8.2.15 Gander and Shanwick have instituted a procedure whereby flight crews transiting their Oceanic Control Areas (OCA) will be advised if higher flight levels become available for their flight. The functionality in the ATM System will routinely interrogate a flight's vertical profile to determine if higher flight levels have become available. When this occurs the Oceanic controller will verify the separation, complete all necessary coordination, and adhere to all safety related procedures before advising the flight that a climb is available, if requested.

Relief Flight Crew Members

~~8.2.15~~8.2.16 Long range operations may include the use of relief flight crew. In such cases it is necessary to ensure that procedures are such that the continuity of the operation is not interrupted, particularly in respect of the handling and treatment of the navigational information.

8.3 PRE-FLIGHT PROCEDURES

RNP Approval Status

8.3.1 In order for an aircraft to be cleared to fly in airspace where a particular RNP authorization is required, or take advantage of any preferred handling provided to RNP aircraft, the aircraft's RNP approval status must be accurately reflected in Item 18 of the ATC flight plan. Flight crews shall also verify that the corresponding RNP value is entered in the Flight Management Computer, either by default or through manual input, in order to enable aircraft navigation system monitoring and alerting against the most stringent oceanic RNP capability filed in the ATC flight plan

Inertial Navigation Systems

Insertion of Initial Latitude and Longitude

8.3.2 Unless inertial navigation systems are properly aligned on the ground, to include inputting the exact aircraft position, systematic errors will be introduced. These errors can be corrected while the aircraft is on the ground but it is not possible to adequately recover from them while the aircraft is in flight, despite any indications to the contrary. Correct insertion of the initial position must therefore be checked before inertial systems are aligned and the position should be recorded in the flight log and/or Master Document. It is recommended that subsequent 'silent' checks of the present position and of the inertial velocity outputs (e.g. ground speed registering zero) be carried out independently by both flight crew members during (an early stage of) the pre-flight checks and again just before the aircraft is moved. Any discrepancies should be investigated.

8.3.3 With regard to the insertion of the initial coordinates while on the ramp, the following points should be taken into account:

- in some inertial systems, insertion errors exceeding about one degree of latitude will illuminate a malfunction light. It should be noted that very few systems provide protection against longitude insertion errors.
- at all times, but particularly in the vicinity of the Zero Degree E/W (Greenwich) Meridian or near to the Equator, care should be taken to ensure that the coordinates inserted are correct. (i.e. E/W or N/S).

<u>*System Alignment*</u>

8.3.4 The alignment of inertial systems must be completed and the equipment put into navigation mode prior to releasing the parking brake at the ramp. Some systems will align in about 10 minutes, others can take 15 minutes or more; expect alignment to take longer in extreme cold or at higher latitudes or when the aircraft (and hence the inertial platform) is buffeted by winds or rocked during cargo loading. A rapid realignment feature is sometimes provided but should only be used if, during an intermediate stop, it becomes necessary to increase the system accuracy. The aircraft must be stationary during rapid realignment which typically will take about one minute.

GNSS (GPS) Systems

8.3.5 As with all LRNS operations, GPS LRNS operations must be approved by the State of the operator (or the State of Registry for International General Aviation operations) as part of the NAT HLA operational approval. When both the LRNSs required for unrestricted NAT HLA operations are GPSs the approval of their operation will include the requirement to carry out Pre-Departure Satellite Navigation Prediction Programme (as shown below). When only one of the two LRNSs required is a GPS, or for multi-sensor navigation systems, State Authorities vary as to whether they require their operators to conduct such pre-departure programmes.

<u>*Satellite Availability*</u>

8.3.6 The following specify the numbers of satellites required:

- Four satellites are required to determine 3-D position;
- For Receiver Autonomous Integrity Monitoring (RAIM) purposes, five satellites are required to detect the presence of a single faulty satellite;
- For Fault Detection and Exclusion (FDE) purposes, six satellites are required to identify a faulty satellite and exclude it from participating in further navigation solution calculations.

Note 1: An FDE algorithm is normally associated with a RAIM algorithm.

Note 2: The above numbers of satellites (for RAIM and FDE purposes only) may in each case be reduced by one if barometric aiding is used.

<u>*Satellite Navigation Prediction*</u>

8.3.7 When so required, operators intending to conduct GPS navigation in the NAT HLA must utilise a Satellite Navigation Availability Prediction Programme specifically designated for the GPS equipment installed. This prediction programme must be capable of predicting, prior to departure for flight on a "specified route"*, the following:

a) Any loss of navigation coverage (meaning that less than 3 satellites will be in view to the receiver); and
b) Any loss of the RAIM/FDE function and its duration.

*Note: *"specified route" is defined by a series of waypoints (to perhaps include the route to any* *required alternate), with the time between waypoints based on planned speeds. Since flight planned ground speeds and/or departure times may not be met, the pre-departure prediction must be performed for a range of expected ground speeds.*

8.3.8 This prediction programme must use appropriate parameters from the RAIM/FDE algorithm employed by the installed GPS equipment. In order to perform the predictions this programme must provide the capability to manually designate satellites that are scheduled to be unavailable. Such information is not included in the GPS almanac or ephemeris data in the navigation message (i.e. the GPS receiver does not receive this information). Information on GPS satellite outages is promulgated via the U.S. NOTAM Office. The KNMH transmitting station (US Coast Guard Station, Washington D.C.) is responsible for release (in NOTAM format) of information relating to the operating condition of the GPS constellation satellites. These NOTAMs can be obtained through direct query to the USA data bank, via the AFTN, using the following service message format: SVC RQ INT LOC = KNMH addressed to KDZZNAXX. Such information can also be found on the US Coast Guard Web site at www.navcen.uscg.gov."

8.3.9 When GPS is being used as a supplementary navigation means or when GPS is only one of the two LRNSs required for NAT HLA approval (e.g. when the second LRNS is an IRS/INS installation) or in the case of multi-sensor navigation systems, then some States of Registry may not require the operator to conduct pre-flight RAIM/FDE prediction checks.

Operational Control Restrictions

The Capability to Determine a GPS Position

8.3.10 When so required, prior to departure, the operator must use the prediction programme to first demonstrate that forecast satellite outages will not result in a loss of navigation coverage (i.e. the capability to determine position) on any part of the specified route of flight. If such outages are detected by the programme, the flight will need to be re-routed, delayed or cancelled.

Determination of the Availability of RAIM/FDE

8.3.11 Once the position determination function is assured (i.e. no loss in navigation coverage for the route has been predicted), the operator must run the RAIM/FDE outage prediction programme. Any continuous outage of RAIM/FDE capability of greater than 51 minutes in the NAT HLA (or greater than 25 minutes for flights on RLatSM tracks) means again that the flight should be re-routed, delayed or cancelled. It is understood that some prediction programmes carry out both these checks together.

Note: Derivation of the 51& 25 minute limits – At the instant the RAIM/FDE capability is lost, it is assumed that the GPS navigation solution proceeds to direct the aircraft away from track at a speed of 35 knots. With the current NAT HLA nominal track spacing of 60 nautical miles (30 NMs for RLatSM tracks), it is further assumed that aircraft on adjacent tracks have a lateral "safety buffer" of 30 nautical miles (15 NMs for RLatSM tracks). At 35 knots it will take an aircraft 51(or 25) minutes to exit this "safety buffer". It should be noted that this is a very conservative methodology and it is thought unlikely that a RAIM/FDE outage alone could cause such errant navigation behaviour The equivalent outage limit for RNAV 10 (RNP 10) operations is 34 minutes.

Loading of Initial Waypoints

8.3.12 The manual entry of waypoint data into the navigation systems must be a co-ordinated operation by two persons, working **in sequence and independently**: one should key in and insert the data, and subsequently the other should recall it and confirm it against source information. **It is not sufficient for one flight crew member just to observe or assist another flight crew member inserting the data**. (See Chapter 15 for waypoint verification procedures)

8.3.13 The ramp position of the aircraft, plus at least two additional waypoints, or, if the onboard equipment allows, all the waypoints relevant to the flight, should be loaded while the aircraft is at the ramp. However, it is more important initially to ensure that the first enroute waypoint is inserted accurately.

Note: For aircraft equipped with GPS, the position provided by each of the aircraft's GPS receivers should be compared to the ramp coordinates. A difference between GPS and ramp position greater than 100 meters should be investigated before departure.

8.3.14 During flight, at least two current waypoints beyond the leg being navigated should be maintained in the Control Display Units (CDUs) until the destination ramp coordinates are loaded. Two flight crew members should be responsible for loading, recalling and checking the accuracy of the inserted waypoints; one loading and the other subsequently recalling and checking them independently. However, this process should not be permitted to engage the attention of both flight crew members simultaneously during the flight. Where remote loading of the units is possible, this permits one flight crew member to cross-check that the data inserted automatically is indeed accurate.

8.3.15 An alternative and acceptable procedure is for the two flight crew members silently and independently to load their own initial waypoints and then cross-check them. The flight crew member responsible for carrying out the verification should work from the CDU display to the Master Document rather than in the opposite direction. This may lessen the risk of the flight crew member 'seeing what is expected to be seen' rather than what is actually displayed.

Flight Plan Check

8.3.16 The purpose of this check is to ensure complete compatibility between the data in the Master Document and the calculated output from the navigation systems. Typical actions could include:

a) checking the distance from the ramp position to the first waypoint. Some systems will account for the track distance involved in an ATC SID; in others, an appropriate allowance for a SID may have to be made to the great circle distance indicated in order to match that in the Master Document. If there is significant disagreement, rechecking initial position and waypoint coordinates may be necessary.

b) selecting track waypoint 1 to waypoint 2 and doing the following:
   - checking accuracy of the indicated distance against that in the Master Document;
   - checking, when data available, that the track displayed is as listed in the Master Document. (This check will show up any errors made in lat/long designators (i.e. N/S or E/W).)

c) similar checks should be carried out for subsequent pairs of waypoints and any discrepancies between the Master Document and displayed data checked for possible waypoint insertion errors. These checks can be coordinated between the two flight crew members checking against the information in the Master Document.

d) when each leg of the flight has been checked in this manner it should be annotated on the Master Document by means of a suitable symbology as previously suggested (See "The Use of a Master Document" above).

e) some systems have integral navigation databases and it is essential that the recency of the database being used is known. It must be recognised that even the coordinates of waypoint positions contained in a data base have been keyed in at some point by another human. The possibility of input errors is always present. **Do not assume the infallibility of navigation databases and always maintain the same thorough principles which are applied in the checking of your own manual inputs.**

Leaving the Ramp

8.3.17 Movement of the aircraft prior to completion of inertial systems alignment may, depending on system characteristics, result in faulty inertial system operation. Prior to leaving the ramp Zero Ground Speed indications from the LRNS should be confirmed. Any excessive Ground Speeds noted while on chocks should be resolved by checking fault codes, the currency of data bases and RAIM (if GPS is employed).

8.3.18 Inertial groundspeeds should also be checked during taxi. A significantly erroneous reading and/or malfunction codes should be investigated prior to takeoff. Flight crews of aircraft with electronic map displays should confirm the derived position agrees with the actual position on the airfield.

8.3.19 Many modern aircraft are equipped with FMS navigation systems (i.e. Flight Management Computers fed by multiple navigation sensors.). Once the FMS is put into 'Nav' mode, the system decides on the most appropriate (i.e. accurate) navigation sensors to use for position determination. If GPS is part of the solution, then the position is normally predominantly based on GPS inputs with the IRS/INS in a supporting role. It may therefore be difficult to know exactly what component of the navigation solution (IRS, GPS, DME etc.) is being used to derive position at any one time. With an FMS-based system, or a GPS stand-alone system, the “Leaving the Ramp” checks should be designed to provide assurance that the navigation information presented is indeed 'sensible'.

8.4 IN FLIGHT PROCEDURES

En Route to Oceanic Entry

8.4.1 During the initial part of the flight, while en route to oceanic entry, ground navaids should be used to verify the performance of the LRNSs. Large or unusual ‘map shifts’ in FMS output, or other discrepancies in navigation data, could be due to inertial platform misalignment or initialisation errors. Position updates to the FMS will not correct these errors despite possible indications to the contrary. If such a situation is encountered when INS/IRS are the primary LRNSs then it would be unwise to continue into the NAT HLA. Flight crews should consider landing in order to investigate the cause and then perhaps be in a position to correct the problem.

8.4.2 A compass heading check should also be performed and the results recorded. This check is particularly helpful when using inertial systems. The check can also aid in determining the most accurate compass if a problem develops later in the crossing.

ATC Oceanic Clearance and Subsequent Re-clearances

8.4.3 Where practicable, two flight crew members should listen to and record every ATC clearance and both agree that the recording is correct. Standard Operating Procedures (SOPs) for LRNS must include independent clearance copy, data entry (coordinates and/or named waypoints), and independent crosschecks to verify that the clearance is correctly programmed. These procedures must also be used when enroute changes are entered. Any doubt should be resolved by requesting clarification from ATC.

8.4.4 In the event that a re-clearance is received when temporarily only one flight crew member is on the flight deck, unless the re-clearance is an ATC instruction that requires immediate compliance, any flight profile, Mach number or routing changes should not be executed, nor should the Navigation or Flight Management Systems be updated, until the second flight crew member has returned to the Flight Deck and a proper cross-checking and verification process can be undertaken.

8.4.5 If the ATC oceanic cleared route is identical to the flight planned track, it should be drawn on the plotting chart and verified by the other flight crew member.

8.4.6 If the aircraft is cleared by ATC on a different track from that flight planned, some regulators recommend that a new Master Document be prepared showing the details of the cleared track. Overwriting of the existing flight plan can cause difficulties in reading the waypoint numbers and the new coordinates. For this purpose, it is helpful if a blank pro-forma Master Document (flight plan) is carried with the flight documents. One flight crew member should transcribe track and distance data from the appropriate reference source onto the new Master Document pro-forma and this should be checked by another flight crew member. If necessary, a new plotting chart may be used on which to draw the new track. The new document(s) should be used for the oceanic crossing. If the subsequent domestic portion of the flight corresponds to that contained in the original flight plan, it should be possible to revert to the original Master Document at the appropriate point.

8.4.7 Experience has clearly shown that when ATC issues an initial oceanic clearance that differs from the flight plan, or subsequently during the flight issues a re-clearance involving re-routing and new waypoints, there is a consequential increase in the risk of errors being made. Indeed, errors associated with re-clearances continue to be the most frequent cause of Gross Navigation Errors in the North Atlantic HLA. Therefore, in both of these circumstances the situation should be treated virtually as the start of a new flight and the procedures employed with respect to the following, should all be identical to those procedures employed at the beginning of a flight (see paragraph 8.3.16 above):

a) copying the ATC re-clearance;

b) amending the Master Document;

c) loading and checking waypoints;

d) extracting and verifying flight plan information, tracks and distances, etc.; and

e) preparing a new plotting chart.

8.4.8 When reviewing the causes of navigation errors, the NAT CMA has noted that numerous operator reports make reference to flight crew breaks in their explanation of the circumstances of the error. In all dimensions, errors are more likely to occur where a clearance or re-route, speed or level change has been communicated to a flight crew and either not been actioned completely, or has been incorrectly or incompletely processed before a relief flight crew member has started duty. Operators' SOPs are generally consistent in regard to the importance of properly handing over, and taking control, and if adopted with due diligence, would forestall the development of an error. However, human factors often confound the best laid SOPs, and distraction or human failings can contribute to the omission of all, or a part of, the process handed over by the departed flight crew member for subsequent action. Flights requiring flight crew augmentation present specific issues as regards to flight crew relief. With the requirement to have the aircraft commander and the designated co-pilot on duty for critical stages of the flight i.e.: take off and landing, sometimes flight crew changes then occur during times when critical information is being received such as oceanic clearances or conditional clearances and/or company communications such as re-dispatch etc. It is imperative that during these flight crew changes, a thorough turnover briefing takes place so that the incoming flight crew is aware of all clearances and requirements for the segment of the flight, especially those involving conditional re-clearances such as a change of level at specific points or times.

8.4.9 Strict adherence to all the above procedures should minimise the risk of error. However, flight deck management should be such that one flight crew member is designated to be responsible for flying the aircraft while the other flight crew member carries out any required amendments to documentation and reprogramming of the navigation systems - appropriately monitored by the flight crew member flying the aircraft, as and when necessary.

Approaching the Ocean

8.4.10 Prior to entering the NAT HLA, the accuracy of the LRNSs should be checked by any means available. For example, INS position can be checked by reference to enroute or proximate VOR/DMEs, etc. However, with a modern FMS, the system decides which LRNS is to be used, and indeed, the FMS may be taking information from DMEs (and possibly VORs) as well as the LRNS carried. Even if the FMS is using GPS, it is still worthwhile to carry out a 'reasonableness' check of the FMS/GPS position, using (for example) DME/VOR distance and bearing.

Note: It should be recognized, however, that "distance & bearing" checks in the western portion of the North Atlantic can be problematic. It has been noted that the navigation information data bases used on-board aircraft; in Flight Planning Systems; and in ATS Ground Systems do not always define the same (large) Magnetic Variation for the same location in this airspace.

8.4.11 When appropriate and possible, the navigation system which, in the opinion of the flight crew, has performed most accurately since departure should be selected for automatic navigation steering.

8.4.12 In view of the importance of following the correct track in oceanic airspace, it is advisable at this stage of flight that, if carried, a third or equivalent flight crew member should check the clearance waypoints which have been inserted into the navigation system, using source information such as the NAT track message or data link clearance if applicable.

8.4.13 Flight crews should attempt to determine the offsets (if any) being flown by aircraft immediately ahead on the same track one flight level above and one flight level below. They should then select an offset which differs from the other aircraft. If this is not possible, or practical, then flight crews should randomly choose one of the flight path options. See Chapter 8 for rationale and more details.

Entering the NAT HLA and Reaching an Oceanic Waypoint

8.4.14 When passing waypoints, the following checks should be carried out:

a) just prior to the waypoint, check the next two waypoints in each navigation system against the Master Document.

b) at the waypoint, check the distance to the next waypoint, confirm that the aircraft turns in the correct direction and takes up a new heading and track appropriate to the leg to the next waypoint.

c) before transmitting the position report to ATC, verify the waypoint coordinates against the Master Document and those in the steering navigation system. When feasible the position report "next" and "next plus 1" waypoint coordinates should be read from the CDU of the navigation system coupled to the autopilot.

8.4.15 Even if automatic waypoint position reporting via data link (e.g. ADS-C) is being used to provide position reports to ATC the above checks should still be performed.

8.4.16 Flight crews should also be aware that in the NAT region ADS-C conformance monitoring is commonly employed. ATC establishes event contracts that will result in automatic alerts whenever the aircraft diverges from its cleared profile. Unless previously advised by the flight crew of the need for such a divergence, flight crews should expect ATC to query the situation. Standardised CPDLC alert messages have been developed for use here.

Routine Monitoring

8.4.17 It is important to remember that there are a number of ways in which the autopilot may unobtrusively become disconnected from the steering mode. Therefore, regular checks of correct engagement with the navigation system should be made.

8.4.18 A position check should be made at each waypoint and the present position plotted 10 minutes after passing each waypoint. For a generally east-west flight, this 10 minute point will be approximately 2 degrees of longitude beyond the oceanic waypoint. It may therefore in fact be simpler to plot a present position 2 degrees of longitude after each 10 degree waypoint. There may be circumstances, (e.g. when, due to equipment failure, only one LRNS remains serviceable) in which additional plots midway between each waypoint may be justified.

8.4.19 It is good practice to cross check winds midway between oceanic waypoints by comparing the flight plan, LRNS and upper milli-bar wind charts data. Such a cross check will also aid flight crews in case there is a subsequent contingency situation requiring the use of dead reckoning.

8.4.20 The navigation system not being used to steer the aircraft should display cross-track distance and track angle error. Both of these should be monitored, with cross-track distance being displayed on the HSI where feasible.

Approaching Landfall

8.4.21 When the aircraft is within range of land based navaids, and the flight crew is confident that these navaids are providing reliable navigation information, consideration should be given to updating the LRNSs. Automatic updating of the LRNSs from other navaids should be closely monitored, and before entry into airspace where different navigation requirements have been specified (e.g. RNP5 in European BRNAV airspace), flight crews should use all aids (including VORs and DMEs) to confirm that the in-use navigation system is operating to the required accuracy. If there is any doubt regarding system accuracy, the appropriate ATC unit should be informed.

8.5 SPECIAL IN-FLIGHT PROCEDURES

CPDLC Route Clearance Uplinks

8.5.1 CPDLC route clearance uplinks allow the flight crew to LOAD the CPDLC route clearance uplink directly into the FMS without having to manually enter waypoints possibly introducing navigational errors. All ANSPs in the NAT are progressing to have full functionality soon.

8.5.2 As per ICAO Doc 10037 GOLD Manual there are 4 possible CPDLC route clearance uplinks that can be used as described in the table below:

CPDLC Route Clearance Uplink	**GOLD Description**	**Route Discontinuity**
UM74 / RTEU-2	PROCEED DIRECT TO [position]*	No
UM79 / RTEU-6	CLEARED TO [position] VIA [route clearance]	Yes if [position] is not part of FMS flight plan
UM80 / RTEU-7	CLEARED [route clearance]	Entire FMS routing is replaced
UM83 / RETU-9	AT [position] CLEARED [route clearance]	After [position] entire FMS routing is replaced

*Not loadable by some Airbus aircraft

8.5.3 Flight crews should ensure that the CPDLC route clearance uplink properly “loads” before sending WILCO.

8.5.4 There has been flight crew misunderstanding on some aircraft for those CPDLC uplinks that contain [route clearance]. The “details” of the [route clearance] are not displayed to the flight crew until they LOAD the uplink into the FMS. For example, prior to loading the CPDLC uplink UM79 / RTEU-6, the display to the flight crew is “CLEARED TO [position] VIA ROUTE CLEARANCE. This has been misinterpreted to mean “Cleared directly to the position” and thus not abiding by the “route clearance” which may contain several other waypoints.

8.5.5 To mitigate the display ambiguity, flight crews should always LOAD the CPDLC uplink first to ensure proper load and to be able to verify the routing on the FMS before sending WILCO and executing the clearance.

8.5.6 Weather data (winds and temperature) may be lost after executing the CPDLC route clearance uplink. Flight crews should replace the data as required to ensure proper ADS-C reporting.

8.5.7 Flight crews should revert to voice if in doubt about any CPDLC uplink.

Strategic Lateral Offset Procedures (SLOP)

8.5.8 While ATC clearances are designed to ensure that separation standards are continually maintained for all traffic, errors do occur. Neither flight crews nor controllers are infallible. Gross Navigation Errors (usually involving whole or half latitude degree mistakes in route waypoints) are made, and aircraft are sometimes flown at flight levels other than those expected by the controller. Ironically, when such errors are made, the extreme accuracies of modern navigation and height keeping systems themselves increase the risk of a collision. Within an ATS Surveillance environment where VHF communications are available, controllers alerted to such errors will intervene using VHF voice communications. In areas (surveillance or otherwise) where VHF voice communication is not available, controllers rely on voice and data link position reports augmented by ADS-C and ADS-B transmissions to monitor conformance. Controllers, when alerted to errors, will intervene using HF, CPDLC, SATVOICE or any other means available. Given the potential delay in intervention, it has been determined that encouraging aircraft operating in the NAT to fly self-selected lateral offsets provides an additional safety margin and mitigates the risk of traffic conflict when non-normal events (such as aircraft navigation errors, height deviation errors and turbulence induced altitude-keeping errors) do occur. Collision risk is significantly reduced by application of these offsets. These procedures are known as "Strategic Lateral Offset Procedures (SLOP)".

8.5.9 This procedure provides for offsets within the following guidelines:

a) an aircraft may fly offsets right of centreline up to a maximum of 2 NM; *and*

b) offsets **left** of centreline are **not permitted**.

8.5.10 Distributing aircraft laterally and equally across all available positions adds an additional safety margin and reduces collision risk. SLOP is now **a standard operating procedure** for the entire NAT region and flight crews **are required** to adopt this procedure as is appropriate. In this connection, it should be noted that:

a) Aircraft without automatic offset programming capability must fly the centreline.

b) Aircraft able to perform offsets in tenths of nautical mile should do so as it contributes to risk reduction.

c) It is recommended that flight crews of aircraft capable of programming automatic offsets should randomly select flying centreline or an offset. In order to obtain lateral spacing from nearby aircraft (i.e. those immediately above and/or below), flight crews should use whatever means are available (e.g. ACAS/TCAS, communications, visual acquisition, GPWS) to determine the best flight path to fly.

d) An aircraft overtaking another aircraft should offset within the confines of this procedure, if capable, so as to minimize the amount of wake turbulence for the aircraft being overtaken.

e) For wake turbulence purposes, flight crews should fly one of the offset positions. Flight crews may contact other aircraft on the air-to-air channel, 123.450 MHz, as necessary, to co-ordinate the best wake turbulence mutual offset option. *(Note. It is recognized that the flight crew will use their judgement to determine the action most appropriate to any given situation and that the pilot-in-command has the final authority and responsibility for the safe operations of the aircraft. See also Chapter 13).*

f) Flight crews may apply an offset outbound at the oceanic entry point and must return to centreline prior to the oceanic exit point unless otherwise authorized by the appropriate ATS authority or directed by the appropriate ATC unit.

g) There is no ATC clearance required for this procedure and it is not necessary that ATC be advised.

h) Voice Position reports should be based on the waypoints of the current ATC clearance and not the offset positions.

i) Aircraft shall not apply SLOP below F285 in the Reykjavik CTA and Bodo OCA.

j) The offset should be applied from the time the aircraft reaches its cruising level until top of descent.

Monitoring during Distractions from Routine

8.5.11 Training and drills should ensure that minor emergencies or interruptions to normal routine are not allowed to distract the flight crew to the extent that the navigation system is mishandled.

8.5.12 If during flight the autopilot is disconnected (e.g. because of turbulence), care must be taken when the navigation steering is re-engaged to ensure that the correct procedure is followed. If the system in use sets specific limits on automatic capture, the across-track indications should be monitored to ensure proper recapture of the programmed flight path/profile.

8.5.13 Where flight crews have set low angles of bank, perhaps 10° or less, say for passenger comfort considerations, it is essential to be particularly alert to possible imperceptible departures from cleared track.

Avoiding Confusion between Magnetic and True Track Reference

8.5.14 To cover all navigation requirements, some operators produce flight plans giving both magnetic and true tracks. However, especially if flight crews are changing to a new system, there is a risk that at some stage (e.g. during partial system failure, re-clearances, etc.), confusion may arise in selecting the correct values. Operators should therefore devise procedures which will reduce this risk, as well as ensuring that the subject is covered during training.

8.5.15 Flight crews who decide to check or update their LRNSs by reference to VORs should remember that in the Canadian Northern Domestic airspace these may be oriented with reference to true north, rather than magnetic north.

Navigation in the Area of Compass Unreliability

8.5.16 As aircraft move towards the Earth’s North magnetic pole the horizontal field strength reduces and the ability of the compass to accurately sense magnetic North is reduced. It is generally recognised that when the horizontal magnetic field strength falls below 6000 nanotesla, the magnetic compass can no longer be considered to be reliable. Moreover, when the horizontal magnetic field strength falls below 3000 nanotesla, the magnetic compass is considered to be unusable. Areas of Canadian airspace include areas where the magnetic compass is unusable. Enroute charts for the North Atlantic and North Polar areas show the areas where the compass is either unreliable or unusable.

8.5.17 In areas where the compass is unreliable or unusable, basic inertial navigation requires no special procedures. Different manufacturers may offer their own solutions to the special problems existing in such areas. However, such solutions should not involve the use of charts and manual measurement of direction.

8.5.18 Some State authorities require operators obtain specific approval and/or training prior to operations in areas of compass unreliability. Operators should confirm this prior to flights in those areas.

Deliberate Deviation from Track

8.5.19 Deliberate temporary deviations from track are sometimes necessary, usually to avoid severe weather. Whenever possible, ATC approval should be obtained before deviating from the assigned track (See Chapter 13). Nevertheless, such deviations have often been the source of gross errors as a consequence of failing to re-engage the autopilot with the navigation system. It should also be noted that selection of the 'turbulence' mode of the autopilot on some aircraft may have the effect of disengaging it from the aircraft navigation system. After use of the turbulence mode, extra care should be taken to ensure that the desired track is recaptured by the steering navigation system.

Uplink Message Latency Monitor Function

8.5.20 The uplink message latency monitor function is designed to prevent pilots from acting on a CPDLC uplink message that has been delayed in the network. Some NAT ANSPs uplink the latency monitor message to all CPDLC connected aircraft immediately after they enter each control area. An aircraft may therefore receive this message multiple times during a flight.

8.5.21 When the pilot receives the uplink CPDLC message SET MAX UPLINK DELAY VALUE TO 300 SEC he/she shall:

a) Send a positive response to ATC as prompted by the avionics (ACCEPT [ROGER]) regardless of whether the aircraft supports the latency monitor function.

Note 1: It is important that pilots respond to the SET MAX UPLINK DELAY VALUE TO 300 SEC uplink message to avoid having open unanswered CPDLC messages in the system. This also applies to aircraft that have deficient message latency monitor functionality or no such functionality at all.

Note 2: The Global Operational Data Link Manual specifies that the pilot should append the response downlink with the free text message TIMER NOT AVAILABLE when the message latency monitor function is not available in the aircraft (refer to GOLD Table 4-1).

b) If the aircraft is equipped with a correctly functioning message latency monitor, enter the specified uplink delay into the avionics in accordance with the aircraft procedures. Some avionics will automatically set the delay value in accordance with the uplink message and do not allow for a manual input.

Note 3: If an aircraft is instructed to log off and then log on again mid-flight, ATC may send the message SET MAX UPLINK DELAY VALUE TO 300 SEC again once the logon is completed.

8.5.22 When a pilot receives a CPDLC uplink message with an indication that the message has been delayed the pilot shall:

a) Revert to voice communications to notify the ATS unit of the delayed message received and to request clarification of the intent of the CPDLC message; and

b) Respond appropriately to close the message as per the instructions of the controller.

c) **The pilot must not act on the delayed uplink message until clarification has been received from the controller.**

~~8.5.19~~

8.6 HORIZONTAL NAVIGATION PERFORMANCE MONITORING

8.6.1 The navigation performance of operators within the NAT HLA is monitored on a continual basis. The navigation accuracy achieved by NAT HLA aircraft is periodically measured and additionally all identified instances of significant deviation from cleared track are subject to thorough investigation by the NAT Central Monitoring Agency (CMA), currently operated on behalf of ICAO by the UK National Air Traffic Services Limited. http://natcma.com/.

8.6.2 Flight crews and operators are encouraged to cooperate as fully as possible with the CMA in its investigations of any deviations, since the objective here is to support regional safety management function. These investigations are not conducted for regulatory/punitive purposes.

8.6.3 The CMA also maintains a database of all NAT HLA approvals. The CMA runs a continuous monitoring process to compare this approvals list with the records of all aircraft flying in the NAT HLA. The approval status of any aircraft involved in a track deviation is specifically checked against the database and in any cases of doubt the State of the operator or the State of Registry is contacted. Chapter 10 provides full details of the monitoring processes.

CHAPTER 9

RVSM FLIGHT IN THE NAT HLA

9.1 GENERAL

9.1.1 The aircraft altimetry and height keeping systems necessary for flying in RVSM airspace are capable of high-performance standards. However it is essential that stringent operating procedures are employed, both to ensure that these systems perform to their full capabilities and also to minimise the consequences of equipment failures and possible human errors. Should any of the required components fail, ATC must be so informed.

9.1.2 In the event of severe turbulence, RVSM procedures may be suspended.

Pre-Flight

9.1.3 For flight through the NAT HLA the aircraft and the operator must have the appropriate State approvals for both NAT HLA and RVSM operations. The flight crew must be qualified for flight in RVSM airspace and all aircraft intending to operate within the NAT HLA must be equipped with altimetry and height-keeping systems which meet RVSM Minimum Aircraft System Performance Specifications (MASPS). RVSM MASPS are contained in ICAO Doc 9574 (Manual on implementation of a 300m (1,000ft) Vertical Separation Minimum between FL290 and FL410 inclusive) and detailed in FAA Advisory Circular (AC) 91-85 which can currently be accessed through: http://www.faa.gov/documentlibrary/media/advisory_circular/AC_91-85A. Also, further guidance from EASA on where to find information related to Airborne RVSM Equipment and Performance Requirements is contained within CS-ACNS (Certification Specification and Acceptable Means of Compliance for Airborne Communications, Navigation and Surveillance), in the Eurocontrol Library, at http://www.eurocontrol.int/articles/library.

9.1.4 A 'W' must be entered into Item 10 of the ICAO flight plan to indicate that the aircraft is approved for flight at RVSM levels.

9.1.5 For operations in NAT HLA, flight crews are required to perform standard pre-flight checks of altimeters.

9.1.6 Special arrangements exist for non-RVSM approved aircraft/operators to climb or descend through NAT RVSM airspace; and in very specific circumstances arrangements may be made for non-approved aircraft to fly at RVSM levels in the NAT region. Both such arrangements are explained in Chapter 1 (See Special Arrangements for Non-RVSM Approved Aircraft – Section 1.6).

In-Flight – Before Operating in the NAT HLA

9.1.7 Most flights will approach the NAT HLA through European or North American RVSM airspaces. It is therefore expected that continuous monitoring of the serviceability of the aircraft's height keeping systems will have been undertaken. Nevertheless, in view of the significant change of operating environment (i.e. to indirect surveillance and communications) it is recommended that a final confirmation of the aircraft systems serviceability is performed immediately prior to entering the NAT HLA. Check to ensure the two primary altimeters are reading within 200 feet of each other (or lesser value if specified in your aircraft's flight manual). Conduct this check while at level flight. You should also note the stand-by altimeter reading. The readings of the primary and standby altimeters should be recorded to be available for use in any possible contingency situations.

In-Flight – Entering and Flying in the NAT HLA

9.1.8 One automatic altitude-control system should be operative and engaged throughout the cruise. This system should only be disengaged when it is necessary to re-trim the aircraft, or when the aircraft encounters turbulence and operating procedures dictate.

9.1.9 When passing waypoints, or at intervals not exceeding 60 minutes (whichever occurs earlier), or on reaching a new cleared flight level, a cross-check of primary altimeters should be conducted. If at any time the readings of the two primary altimeters differ by more than 200 ft, the aircraft's altimetry system should be considered defective and ATC must be so informed.

9.1.10 To prevent unwanted TCAS/ACAS warnings or alerts, when first approaching any cleared flight level in NAT RVSM airspace, flight crews should ensure that the vertical closure speed is not excessive. It is considered that, with about 1500 ft to go to a cleared flight level, vertical speed should be reduced to a maximum of 1500 ft per minute and ideally, to between 1000 ft per minute and 500 ft per minute. Additionally, it is important to ensure, by manually overriding if necessary, that the aircraft neither undershoots nor overshoots the cleared level by more than 150 ft.

9.1.11 It must also be recognised that even under normal operations when using such indirect communication methods, there does exist the potential for misunderstanding between flight crew and controller regarding the detail of any issued clearances or re-clearances. Occasionally, such "ATC Loop Errors" can lead to an aircraft being flown at a level other than that expected by the controller. In such circumstances separation safety margins may be eroded. To avoid possible risks from any of the foregoing situations, it is therefore essential in the NAT HLA that **flight crews not using CPDLC/ADS-C always report to ATC immediately on leaving the current cruising level and on reaching any new cruising level**.

9.2 EQUIPMENT FAILURES

9.2.1 The following equipment failures must be reported to ATC as soon as practicable following their identification:

a) loss of one or more primary altimetry systems; or

b) failure of all automatic altitude-control systems

9.2.2 The aircraft should then follow the appropriate procedure described in Chapter 12 – "Procedures in the Event of Navigation System Degradation or Failure", or as instructed by the controlling ATC unit.

9.3 VERTICAL NAVIGATION PERFORMANCE MONITORING

9.3.1 The vertical navigation performance of operators within the NAT HLA is monitored on a continual basis by the NAT CMA. Such monitoring includes both measurement of the technical height-keeping accuracy of RVSM approved aircraft and assessment of collision risk associated with all reported operational deviations from cleared levels. Chapter 11 deals more fully with this matter.

CHAPTER 10

ATS SURVEILLANCE SERVICES IN THE NAT HLA

10.1 GENERAL

10.1.1 ATS Surveillance services are provided within the NAT HLA where radar, ADS-B or multilateration coverage exists in accordance with ATS Surveillance procedures in the PANS ATM (Doc 4444). (See Attachment 8)

10.1.2 Although ADS-B coverage exists throughout the NAT, ADS-B equipage is not mandated except on routes Tango 9 and Tango 290.

10.2 OPERATION OF SSR TRANSPONDERS

10.2.1 All aircraft operating as IFR flights in the NAT region shall be equipped with a pressure-altitude reporting SSR transponder. Where radar services are provided in the NAT region, transponder codes issued by the control unit must be retained while operating in radar airspace and for a period of 30 minutes after entry into NAT airspace or after exiting a radar service area. After the 30 minute time frame, transponders must be operated continuously in Mode A/C code 2000.

Note 1: Because of the limited time spent in NAT HLA when flying on Route Tango 9, change to code 2000 should be made 10 minutes after passing BEGAS northbound and 10 minutes after passing LASNO southbound.

Note 2: Tango 290, the change from the last assigned domestic code to Code 2000 Northbound 10 minutes after passing ADVAT, and Southbound 10 minutes after passing GELPO.

Note 3: All eastbound flights routing Reykjavik – Shanwick – Scottish shall squawk Mode A Code 2000 ten minutes after entering EGGX airspace.

10.2.2 This procedure does not affect the use of the special purpose codes (7500, 7600 and 7700) in cases of unlawful interference, radio failure or emergency.

Note: Flight crews should exercise caution when selecting codes so as not to inadvertently cycle through any of the special purpose codes.

10.3 OPERATION OF ADS-B TRANSMITTERS

10.3.1 ADS-B services are already available in some continental airspaces immediately adjacent to the NAT region as well as within some portions of the NAT HLA. ADS-B equipage is not mandated except on routes Tango 9 and Tango 290.

10.3.2 Eligibility for ADS-B service in the NAT is based upon the provisions in the Doc 7030 section 5.5.

Note: The following documents provide guidance for the installation and airworthiness approval of ADS-B OUT system in aircraft:

1. European Aviation Safety Agency (EASA) AMC 20-24 or CS-ACNS; or

2. FAA AC No. 20-165B — Airworthiness Approval of ADS-B; or

3. Configuration standards reflected in Appendix XI of Civil Aviation Order 20.18 of the Civil Aviation Safety Authority of Australia.

10.3.3 The Flight ID is the Aircraft Identification (ACID) and is used in both ADS-B and Mode S SSR technology. Up to seven characters long, it is usually set by the flight crew during pre-flight. The Flight ID is used by the ATC ground system to correlate the ADS-B information with the flight plan data and to identify the aircraft on the ATC situation display system. To allow correlation of a Flight ID to a flight plan, the Flight ID must exactly match the ACID entered in Item 7 of the ICAO flight plan. It is important that the Flight ID is correctly entered or ADS-B service may be denied.

Note: The way in which ADS-B avionics are integrated into the cockpit may prevent changing of Flight ID once airborne. Some avionics may be wired to a weight-on-wheels switch that detects when the aircraft is airborne so that the Flight ID field is not editable after take –off.

10.3.4 Aircraft operators wishing to receive an exemption from the procedures specified in 10.3.2 above for an individual flight shall apply for an exemption to the ATS unit(s) in accordance with AIP directives. Any approvals for such exemptions may be contingent on specific conditions such as routing, flight level and time of day.

10.3.5 Some DO-260 compliant ADS-B transmitters incorporate a single emergency bit for the squawk codes 7500, 7600 and 7700 and therefore do not indicate the nature of the emergency. Thus when activated, the flight crew will need to contact ATC to communicate the type of emergency. Such ADS-B transmitters are also unable to squawk ident while the general emergency mode is being transmitted.

CHAPTER 11

MONITORING OF AIRCRAFT SYSTEMS AND FLIGHT CREW PERFORMANCE

11.1 THE MONITORING PROCESS

11.1.1 To ensure compliance with minimum navigation and height-keeping performance specifications, ICAO has established procedures for systematic and periodic monitoring of the actually achieved aircraft systems performance. Formal reporting by flight crews, operators and ATS providers, of specified deviations from assigned track or flight level supports this.

11.1.2 The monitoring process comprises four distinct actions:

a) monitoring of aircraft navigation performance by the operator in co-operation with flight crews;

b) monitoring of operators by the State having jurisdiction over those operators in order to ensure that acceptable operating procedures are being applied by the operator while conducting authorised flight operations;

c) monitoring of actual aircraft systems performance in normal flight operations, as observed by means of ATS Surveillance by the ATC units of States providing service in the NAT region, and by other specialist systems designed to measure the technical height-keeping performance of aircraft; and

d) monitoring done on the basis of position and occurrence reporting.

11.1.3 Because of the large variety of circumstances existing in the relationship between States of Registry and their operators engaged in NAT operations, it is not expected that all States will be able to make similar or identical arrangements. It is however expected that all States concerned will make maximum effort to comply effectively with their responsibilities and in particular to co-operate with requests for information about a particular incident from an ATS provider or from the NAT CMA.

11.2 MONITORING OF HORIZONTAL NAVIGATION CAPABILITY

Monitoring by the Operators

11.2.1 Decisions regarding the monitoring of aircraft navigation performance are largely the prerogative of individual operators. In deciding what records should be kept, operators should take into account the stringent requirements associated with the NAT HLA. Operators are required to investigate all lateral deviations of 10 NM or greater, and it is imperative, whether these are observed on ground radar, via ADS reports or by the flight crew, that the cause(s) of track deviations be established and eliminated. **Therefore, it will be necessary to keep complete in-flight records so that an analysis can be carried-out.**

11.2.2 Operators should review their documentation to ensure that it provides all the information required to reconstruct any flight, if necessary, some weeks later. Specific requirements could include:

a) details of the initial position inserted into the Flight Management System, IRS or INS equipment plus the original flight planned track and flight levels;

b) all ATC clearances and revisions of clearance;

c) all reports (times, positions, etc.) made to ATC;

d) all information used in the actual navigation of the flight: including a record of waypoint numbers allocated to specific waypoints, plus their associated ETAs and ATAs;

e) comments on any problems (including that to do with matters concerning navigation) relating to the conduct of the flight, plus information about any significant discrepancies between INS/IRS displays, other equipment abnormalities and any discrepancies relating to ATC clearances or information passed to the aircraft following ground radar observations;

f) detailed records of any contingency manoeuvres/procedures undertaken by the flight crew;

g) sufficient information on accuracy checks to permit an overall assessment of performance. Records of terminal (i.e. residual) errors and of checks made against navigation facilities immediately prior to entering oceanic airspace; details of any manual updates made to IRS/INS units; and

h) where available, navigational and performance data contained in the aircraft's flight data recorders.

i) retention of aircraft flight data records whenever a flight crew or operator are aware of a possible report of a vertical or lateral deviation. Such records will assist in quantifying the magnitude and/or duration of any deviation.

11.2.3 It is also important that any forms which are used make it easy to examine key factors. For instance, documentation might include, for each flight, a question calling for flight crew assistance in this regard:
e.g. "Did a track error of 10 NM or more occur on this flight? Yes/No."

Monitoring of the Operator by the State

11.2.4 Decisions regarding the monitoring of operators by the State may be taken unilaterally, but hopefully there will be a co-operative process regarding those specifications to be achieved by the operator during planning, and when reviewing achieved performance. Much of this process will be concerned with procedures approved by the flight operations inspectorate and confirmed by means of monitoring, to ensure compliance.

Direct Action by ATS Provider States and the NAT CMA in the Monitoring Process

11.2.5 The navigation performance of operators within NAT HLA is monitored on a continual basis. The navigation accuracy achieved by NAT HLA aircraft is periodically measured and additionally all identified instances of significant deviation from cleared track are subject to thorough investigation by the NAT Central Monitoring Agency (CMA), currently operated on behalf of ICAO by the UK National Air Traffic Services Limited. The CMA also maintains a database of all NAT HLA approvals. The CMA runs a continuous monitoring process to compare this approvals list with the records of all aircraft flying in the NAT HLA. The approval status of any aircraft involved in a track deviation is specifically checked against the database and in any cases of doubt the State of Registry is contacted.

11.2.6 When a navigation error is identified, follow-up action after flight is taken, both with the operator and, where the deviation is 25 NM or more, the State of operator or State of Registry of the aircraft involved, to establish the circumstances and contributory factors. The format of the (navigation) Error Investigation Form used for follow-up action is as shown at Attachment 1. Operational errors can have a significant effect on the assessment of risk in the system. For their safety and the safety of other users, flight crews are reminded of the importance of co-operating with the reporting OACC in the provision of incident information.

11.2.7 The overall lateral navigation performance of all aircraft in the NAT HLA is continually assessed and compared to the standards established for the region, to ensure that the TLS is being maintained.

Monitoring of Lateral Deviations

11.2.8 The data collection process involves the continuous collection of data relating to all reported lateral deviations.

11.2.9 ANSPs capable of monitoring the boundaries of the NAT region collect data on flights within the NAT HLA, together with that on non-NAT HLA flights. The former data provides a direct input into the risk modelling of operations in the NAT HLA, while the latter provides a wider appreciation of navigation in the NAT region and allows follow-up action to be taken on a larger sample of flights believed to have experienced navigation errors.

11.2.10 When any lateral deviation of less than 25NM has been detected by the ATS provider State or has been reported to ATC by the flight crew, that ATS provider unit will, in co-operation with the operator, investigate its cause. It is important that all agencies react promptly to such reports of any lateral deviations. Investigations should be made at once so that consideration can be given to the need for swift remedial action. In order that deviation reports can receive prompt attention, each airline/operator should nominate a person to be responsible for receiving reports and to initiate investigations; the name and full address of this individual should be notified to each relevant ATS authority who distributes the name to the ANSPs.

11.3 MONITORING OF HEIGHT-KEEPING PERFORMANCE

11.3.1 The vertical navigation performance of operators within the NAT HLA is monitored on a continual basis by the NAT CMA. Such monitoring includes both measurement of the technical height-keeping accuracy of RVSM approved aircraft and assessment of collision risk associated with all reported operational deviations from cleared levels.

11.3.2 All identified operational situations or errors which lead to aircraft deviating from ATC cleared levels are subject to thorough investigation. Follow-up action after flight is taken with the operator of the aircraft involved, to establish the reason for the deviation or cause of the error and to confirm the approval of the flight to operate in NAT HLA and RVSM airspace. Operational errors, particularly those in the vertical plane, have a significant effect on risk in the system. For their safety and the safety of other users, flight crews are reminded of the importance of co-operating with the reporting OACC in the compilation of appropriate documentation including the completion of an 'Altitude Deviation Report Form', as illustrated at Attachment 2.

11.3.3 The detailed circumstances of all operational errors, both in the vertical and horizontal planes, are thoroughly reviewed by the CMA, together with the Scrutiny Group of the NAT SPG, which includes current NAT flight crews, controllers and State Regulators. Any lessons learned from this review, which may help to limit the possibility of recurrences of such errors, are communicated back to NAT operators and ATS authorities. The intent is to improve standard operating procedures, thereby reducing the future frequency of operational errors and thus contribute to the safety of the overall system.

11.3.4 At RVSM levels, moderate and severe turbulence may also increase the level of system risk and flight crews should report **ALL** occasions, while flying in the NAT HLA, whenever a vertical deviation of 300 ft or more occurs. The form at Attachment 2 may also be used for this purpose.

11.3.5 The overall vertical navigation performance of all aircraft in NAT RVSM airspace is continually assessed and compared to the standards established for the region, to assess whether the relevant TLS is being maintained.

Monitoring of Operational Height-keeping Performance

11.3.6 The introduction of RVSM airspace into the NAT region has increased the necessity for consistent and accurate reporting by flight crews and ATC units, of all deviations of 90 m (300 ft) or more from the cleared flight level, whatever the cause.

Monitoring of Technical Height-keeping Performance

11.3.7 The technical height-keeping accuracy of aircraft flying at RVSM levels is passively monitored during flight over a Height Monitoring Unit (HMU) located near to Strumble in Wales. Alternatively, individual aircraft can be monitored through temporary carriage of portable GPS (Height) Monitoring Units (GMUs). Furthermore, height monitoring data is available to the NAT CMA from the 3 European HMUs. This monitoring allows the height-keeping accuracies of aircraft types and individual operator's fleets to be assessed. Individual airframes which do not meet required performance standards can also be identified. On such occasions the operator and the State of Registry are advised of the problem and corrective action must be undertaken before further flights in RVSM airspace are conducted. Revised Minimum Monitoring Requirements for RVSM approval, as specified in ICAO Annex 6, became effective in November 2010. Operators are required to ensure that a minimum of two aircraft from each of its type groupings are monitored at least once every two years (See Annex 6 Part I para 7.2.7 and Part II para 2.5.2.7).

11.4 MONITORING OF ACAS II PERFORMANCE

11.4.1 ACAS II can have a significant effect on ATC. Therefore, there is a continuing need to monitor the performance of ACAS II in the developing ATM environment.

11.4.2 Following an RA event, or other significant ACAS II event, flight crews and controllers should complete an ACAS II RA report. Aircraft operators and ATS authorities should forward completed reports through established channels.

11.5 OVERALL NAVIGATION (AND SYSTEMS) PERFORMANCE

11.5.1 All information relating to horizontal and vertical navigation (and systems) performance within the NAT region is provided to the NAT SPG via the CMA. Regular statistical assessments of system safety determine whether or not the overall target level of safety (TLS) is being met. On those occasions that summary statistics show that the TLS, in either the horizontal or vertical planes, has been exceeded, the NAT SPG is informed; in which case the NAT SPG will take appropriate action.

11.6 TACTICAL MONITORING OF NAT HLA AND RVSM APPROVALS

11.6.1 Experience with the monitoring process indicates that a proportion of lateral deviations and other operational errors are attributable to aircraft operating in NAT HLA/RVSM airspace without the required approvals. It was for this reason that in 1990, to make random checks more effective, the NAT SPG introduced a programme of tactical monitoring to help identify aircraft operating within the NAT HLA without the required approval. In 1997, this procedure was extended to RVSM approvals, and currently Canada, Iceland and the United Kingdom participate in this programme. Flight crews who are uncertain of, or are unable to confirm their approval status, are issued a clearance to operate outside NAT HLA/RVSM airspace and a report is forwarded to the CMA for follow-up action.

11.7 OPERATIONAL ERROR REPORTING AND CENTRAL MONITORING AGENCY (CMA) ACTIVITIES

Background

11.7.1 In March 1980, the NAT SPG realised that after implementation of a 60 NM lateral separation minima, special importance would have to be placed on monitoring and assessment of navigation performance. It was therefore agreed that there was a need to collect, collate and circulate to States participating in the monitoring programme, data regarding navigation performance in the NAT region. To meet this requirement, the NAT CMA was established.

11.7.2 In the early 1990s, as a consequence of the planned implementation of RVSM in the NAT MNPSA, the NAT CMA acquired the responsibility for monitoring height-keeping performance. Initially, this was limited to collating data on operational errors but when the technical height-keeping programme came into being, the CMA became the data collection and collation centre. It has also become responsible, in conjunction with other Regional Monitoring Agencies, for setting the target monitoring requirements for the RVSM approval process.

11.7.3 In 2009, it was agreed to make adjustments to the NAT SPG working structure to accommodate the changes in emphasis to performance based requirements, as driven by the Global Air Navigation Plan (ANP), and to take account of the Global Aviation Safety Plan (GASP). At the same time, the NAT SPG approved a high level safety policy which would be applicable to its work. The NAT Safety Oversight Group (SOG) was formed. It is responsible for the continuous monitoring and improvement of the safety level of the air navigation system in the NAT region. It is composed of ATS provider and airspace user representatives and Regulators. It directs safety oversight and management in the NAT region.

11.7.4 The NAT Central Monitoring Agency (CMA) is responsible to the NAT SOG for certain aspects of operations monitoring and reporting in the NAT region.

11.7.5 The NAT Scrutiny Group is a separate body comprising the NAT CMA, Regulators plus ATS provider and airspace user representation, reporting to the NAT SOG. Its function is to ensure a correct categorisation of all reported occurrences in the NAT region for the purpose of mathematical analysis and other safety management activities.

Responsibilities

11.7.6 The NAT CMA is operated on behalf of the NAT SPG by United Kingdom National Air Traffic Services Limited (NATS) and is responsible for the collection, analysis and dissemination of all data relevant to vertical and horizontal navigation (and systems) performance in the NAT region. It provides participating States, ICAO and other selected operators and organisations with regular summaries of operational performance to promote awareness of NAT system safety, and with any other pertinent information.

11.7.7 Height monitoring by the CMA comprises collection of operational error data in the vertical dimension, and monitoring of aircraft technical height-keeping performance.

11.7.8 The NAT CMA will take follow-up action in the following circumstances:

a) when reports are received from ATS provider units, or other sources, that detail for any reason operational errors that have resulted in an aircraft being at a level 90 m (300 ft) or more from its cleared flight level. Follow–up action with the appropriate State of Registry will normally only be taken when the information contained in the reports is not sufficiently comprehensive to determine the cause of the deviation;

b) when reports are received from height monitoring systems indicating that aircraft altimetry system performance may not be compliant with the RVSM airworthiness requirements. i.e. measurements which are in magnitude equal to, or greater than, the following criteria:

- Total Vertical Error (TVE) : 90 m (300 ft);
- Altimetry System Error (ASE) : 75 m (245 ft); or
- Assigned Altitude Deviation (AAD) : 90 m (300 ft) and;

c) when receiving reports from ATS provider units of height deviations of 90 m (300 ft) or more resulting from turbulence, ACAS/TCAS manoeuvres or contingency action.

11.7.9 System risk monitoring in the NAT region is a continuous process. The vertical dimension occurrence reports as described in 11.7.8 above are used by the CMA in compiling monthly and quarterly summaries. Trends are presented graphically. The Quarterly summaries present a more detailed comparative presentation and various risk factors are quantified. An annual summary is also produced and is utilised in the development of an assessment of system vertical risk. In parallel with these processes and simultaneously, the CMA analyses reported lateral navigation errors, leading to similar quantifications of risk factors and an assessment of lateral dimension risk.

Follow-up Action on Observed, Reported, and Prevented Lateral Deviations

11.7.10 Different administrative arrangements exist within those States participating in monitoring programmes although follow-up action on lateral deviations should, in general terms, be as indicated in the following paragraphs.

11.7.11 For aircraft operating within the NAT HLA:

a) the observing ATC unit will inform the flight crew of the aircraft concerned of the observed error and also that an error report will be processed; any comment made by the flight crew at the time of notification should be recorded;

b) the operators (including military) and any other relevant ATC units and the CMA will be notified of the observed/prevented deviation, either directly by the observing ATC unit or by an agency designated by the State concerned, using the speediest means available and with the least possible delay; and

c) where an observed deviation is equal to or greater than 10 NM the appropriate State of Registry or the State of the operator will be sent a copy of the written confirmation along with a covering letter by the CMA seeking the State’s assistance in ensuring the full cooperation of the operator in the investigation.

11.7.12 For aircraft operating outside the NAT HLA:

a) the observing ATC unit should, if at all possible, inform the flight crew of the aircraft concerned of the observed error and also that an error report may be processed; any comment made by the flight crew at the time of notification should be recorded;

b) where the observed deviation from track is 20 NM or more, the procedure detailed in the previous paragraph (covering aircraft operating within the NAT HLA) will be followed; and

c) where the observed deviation from track is 10 NM or more but less than 20 NM, the observing ATC unit, or other agency designated by the State, will notify the CMA of the deviation with the least possible delay.

11.7.13 Further Follow-up Action by the Operator and/or State of Registry. Subsequent follow-up action on observed deviations of 25 NM or more, notified in accordance with the above provisions, should initially be conducted between the operator and a designated agency of the State having responsibility for the ATC unit which observed the deviation, on the understanding that:

a) the errors outlined in paragraph 11.7.12 c) above (i.e. deviations 10 NM or more but less than 20 NM occurring outside the NAT HLA) will not normally require further action;

b) the State of Registry or the State of the operator concerned may be requested to conduct a further investigation if deemed necessary;

c) all correspondence should be copied to the CMA; and

d) the EUR/NAT Office of ICAO will assist in those cases where no response is obtained from either the operator concerned or the State of Registry.

Other Reports to the CMA

11.7.14 Details of the following occurrences should also be reported to the CMA by the ATS provider units:

a) erosions of longitudinal separation between aircraft, within the NAT HLA, of 3 minutes or more;

b) occasions when action is taken to prevent a GNE;

c) lateral deviations from cleared route of less than 25NM

d) discrepancies of 3 minutes or more between an ETA/ATA at a waypoint; and

e) occasions when an operator is suspected of not being in possession of an NAT HLA/RVSM approval.

f) diversions or turnbacks, noting in particular whether the appropriate published contingency procedure was correctly adopted.

g) ACAS RAs

h) wake turbulence reports

i) incorrect application of the SLOP (e.g. a left offset).

CHAPTER 12

PROCEDURES IN THE EVENT OF NAVIGATION SYSTEM DEGRADATION OR FAILURE

12.1 GENERAL

12.1.1 Aircraft navigation systems are generally very accurate and very reliable; as a result, GNEs due to system failures are rare in the NAT HLA. However, when failures do occur, their potential effects on the aircraft's navigation capability can be subtle or progressive, resulting in a gradual and perhaps not immediately discernible degradation of performance. The risks that such errors pose can be significant and flight crews must employ rigorous procedures to ensure early detection of any possible errors and hence mitigation of the ensuing risk. The NAT CMA thoroughly investigates the circumstances of all reported GNEs in the NAT HLA. The majority are the result of human error, and diligent application by flight crews of operating procedures such as those described in Chapter 8 should help to minimise the frequency of such errors. 'Vigilance' must be the watchword when navigating in the NAT HLA. 'Complacency' has no place here.

12.1.2 For unrestricted operation in the NAT HLA an approved aircraft must be equipped with a minimum of **two fully serviceable** LRNSs. Aircraft may be approved for NAT HLA operations when equipped with only a single LRNS. However, such aircraft are only permitted to plan and fly routes specified for this purpose (see paragraph 12.2) and on other particular routings serving individual traffic axes e.g. the Tango routes, routings between the Iberian Peninsula and the Azores/Madeira and routes between Iceland and Greenland (See Chapter 3).

12.1.3 If abnormal navigation indications relating to INS or IRS systems occur after take-off, they should be analysed to discover their cause. Under no circumstances should a flight continue into oceanic airspace with unresolved navigation system errors, or with errors caused by inertial platform misalignment or initial position insertion.

12.1.4 Flight crew training and consequent approval for NAT HLA operations should include instruction on what actions are to be considered in the event of navigation system failures. This chapter provides guidance on the detection of failures and what flight crew action should be considered, together with details of the routes that may be used when the aircraft's navigation capability is degraded below that required for unrestricted operations in the NAT HLA.

Detection of Failures

12.1.5 Normally, navigation installations include comparator and/or warning devices, but it is still necessary for the flight crew to make frequent comparison checks. When an aircraft is fitted with three independent systems, the identification of a defective system should be straightforward. Any degradation of navigation capability should be reported to ATC immediately.

Methods of Determining which System is Faulty

12.1.6 With only two systems on board, identifying the defective unit can be difficult. If such a situation does arise in oceanic airspace any or all of the following actions should be considered:

a) checking malfunction codes for indication of unserviceability

b) obtaining a fix. It may be possible to use the following:

- the weather radar (range marks and relative bearing lines) to determine the position relative to an identifiable landmark such as an island; or
- the ADF to obtain bearings from a suitable long-range NDB, in which case magnetic

variation at the position of the aircraft should be used to convert the RMI bearings to true; or

- if within range, a VOR, in which case the magnetic variation at the VOR location should be used to convert the radial to a true bearing (except when flying in the Canadian Northern Domestic airspace where VOR bearings may be oriented with reference to true as opposed to magnetic north).

c) contacting a nearby aircraft on VHF, and comparing information on spot wind, or ground speed and drift.

d) if such assistance is not available, and as a last resort, the flight plan wind speed and direction for the current DR position of the aircraft, can be compared with that from navigation system outputs.

Action if the Faulty System Cannot be Identified

12.1.7 Occasions may still arise when distance or cross track differences develop between systems, but the flight crew cannot determine which system is at fault. The majority of operators feel that the procedure most likely to limit gross tracking errors under such circumstances is to fly the aircraft half way between the cross track differences as long as the uncertainty exists.

Guidance on What Constitutes a Failed System

12.1.8 Operations or navigation manuals should include guidelines on how to decide when a navigation system should be considered to have failed, e.g. failures may be indicated by a red warning light, or by self -diagnosis indications, or by an error over a known position exceeding the value agreed between an operator and its certifying authority.

Inertial System Failures

12.1.9 INSs have proved to be highly accurate and very reliable in service. Manufacturers claim a drift rate of less than 2 NM per hour; however in practice IRSs with laser gyros are proving to be capable of maintaining accuracy to better than 1NM per hour. This in itself can lead to complacency, although failures do still occur. Close monitoring of divergence of output between individual systems is essential if errors are to be avoided and faulty units identified.

GNSS Failures

12.1.10 GNSS are also very accurate and typically very reliable. Unlike inertial systems, GNSS failures can come about as a result of malfunctions off the aircraft, e.g., failures affecting the performance of one of more GNSS satellites. Some failures (e.g., loss of RAIM) may not affect navigation performance but rather affect the ability of the aircraft's GNSS equipment to monitor the reliability of the navigation solution. Similarly, a loss of fault detection and exclusion (FDE) capability may still allow accurate navigation but could also allow a defective satellite to provide faulty navigation data to the aircraft, without the flight crew's knowledge. In the event of loss of RAIM or FDE, flight crews should cross-check the aircraft GNSS position by any means available, both on and off the aircraft. Procedures for responding to an aircraft GNSS malfunction should be provided in aircraft flight manuals. Flight crews should inform ATC of any GNSS malfunction. ATC aircraft separation minimums may be affected by the GNSS malfunction.

Satellite Fault Detection Outage

12.1.11 If the GNSS receiver displays an indication of a fault detection function outage (i.e. RAIM/FDE is not available), navigation integrity must be provided by comparing the GNSS position with the position indicated by another LRNS sensor (i.e. other than GNSS), if the aircraft is so equipped. However, if the only sensor for the approved LRNS is GPS, then comparison should be made with a position computed by extrapolating the last verified position with airspeed, heading and estimated winds. If the positions do not agree within 10 NM, the flight crew should adopt navigation system failure procedures as subsequently described, until the exclusion function or navigation integrity is regained. The flight crew should follow flight manual procedures specified for this type of malfunction.

Fault Detection Alert

12.1.12 If the GNSS receiver displays a fault detection alert (i.e. a failed satellite), the flight crew may choose to continue to operate using the GNSS-generated position if the current estimate of position uncertainty displayed on the GNSS from the FDE algorithm is actively monitored. If this exceeds 10 NM, the flight crew should immediately begin using the following navigation system failure procedures, until the exclusion function or navigation integrity is regained. The flight crew should follow flight manual procedures specified for this type of alert.

12.2 LOSS OF NAVIGATION/FMS CAPABILITY

12.2.1 Some aircraft carry triplex equipment (3 LRNSs) and hence if one system fails, even before take-off, the two basic requirements for NAT HLA operations may still be met and the flight can proceed normally. The following guidance is offered for aircraft having state approval for unrestricted operations in the NAT HLA and which are equipped with only two operational LRNSs:

One System Fails Before Take-Off

12.2.2 The flight crew must consider:

a) delaying departure until repair is possible;

b) obtaining a clearance above or below the NAT HLA;

c) planning on the special routes known as the 'Blue Spruce' Routes, which have been established for use by aircraft suffering partial loss of navigation capability *(Note: As indicated in* Chapter 1*, these routes may also be flown by aircraft approved for NAT HLA operations but equipped with only a single LRNS)*. These Blue Spruce Routes are described in Chapter 3.

12.2.3 Such use of the foregoing routes is subject to the following conditions:

a) sufficient navigation capability remains to ensure that NAT HLA accuracy and the *ICAO Annex 6 (Part I para 7.2.9 and Part II para 2.5.2.9*) requirements for redundancy can be met by relying on short-range navaids;

b) a revised flight plan is filed with the appropriate ATS unit;

c) an appropriate ATC clearance is obtained.

(Further information on the requisite procedures to follow can be obtained from *Section ENR 1.8.2 in AIP Iceland and in Section NAT 1.19 in AIP Canada*.)

Note: Detailed information (including route definitions and operating procedures), which enables flight along other special routes within the NAT HLA, may be found in relevant AIPs. This is specifically so, for aircraft operating without two LRNSs between Iceland and Greenland and between Greenland and Canada.

One System Fails Before the OCA Boundary is Reached

12.2.4 The flight crew must consider:

a) landing at a suitable aerodrome before the boundary or returning to the aerodrome of departure;

b) diverting via one of the special routes described previously;

c) obtaining a re-clearance above or below the NAT HLA.

One System Fails After the OCA Boundary is Crossed

12.2.5 Once the aircraft has entered oceanic airspace, the flight crew should normally continue to operate the aircraft in accordance with the oceanic clearance already received, appreciating that the reliability of the total navigation system has been significantly reduced.

12.2.6 The flight crew should however,

a) assess the prevailing circumstances (e.g. performance of the remaining system, remaining portion of the flight in the NAT HLA, etc.);

b) prepare a proposal to ATC with respect to the prevailing circumstances (e.g. request clearance above or below the NAT HLA, turn-back, obtain clearance to fly along one of the special routes, etc.);

c) advise and consult with ATC as to the most suitable action;

d) obtain appropriate re-clearance prior to any deviation from the last acknowledged oceanic clearance.

12.2.7 When the flight continues in accordance with its original clearance (especially if the distance ahead within the NAT HLA is significant), the flight crew should begin a careful monitoring programme:

a) to take special care in the operation of the remaining system bearing in mind that routine methods of error checking are no longer available;

b) to check the main and standby compass systems frequently against the information which is still available;

c) to check the performance record of the remaining equipment and if doubt arises regarding its performance and/or reliability, the following procedures should be considered:

- attempting visual sighting of other aircraft or their contrails, which may provide a track indication;
- calling the appropriate OACC for information on other aircraft adjacent to the aircraft's estimated position and/or calling on VHF to establish contact with such aircraft (preferably same track/level) to obtain from them information which could be useful. (e.g. drift, groundspeed, wind details).

The Remaining System Fails After Entering the NAT HLA

12.2.8 The flight crew should:

a) immediately notify ATC;

b) make best use of procedures specified above relating to attempting visual sightings and establishing contact on VHF with adjacent aircraft for useful information;

c) keep a special look-out for possible conflicting aircraft, and make maximum use of exterior lights;

d) if no instructions are received from ATC within a reasonable period consider climbing or descending 500 feet, broadcasting action on 121.5 MHz and advising ATC as soon as possible.

Note: This procedure also applies when a single remaining system gives an indication of degradation of performance, or neither system fails completely but the system indications diverge widely and the defective system cannot be determined.

Complete Failure of Navigation Systems Computers

12.2.9 A characteristic of the navigation computer system is that the computer element might fail, and thus deprive the aircraft of steering guidance and the indication of position relative to cleared track, but the basic outputs of the IRS (LAT/LONG, Drift and Groundspeed) are left unimpaired. A typical drill to minimise the effects of a total navigation computer system failure is suggested below. It requires comprehensive use of the plotting chart.

a) use the basic IRS/GPS outputs to adjust heading to maintain mean track and to calculate ETAs.

b) draw the cleared route on a chart and extract mean true tracks between waypoints.

c) at intervals of not more than 15 minutes plot position (LAT/LONG) on the chart and adjust heading to regain track.

Note: EAG Chart AT (H) 1; No 1 AIDU (MOD) Charts AT(H)1, 2, 3 & 4; the Jeppesen North/Mid Atlantic Plotting Charts and the FAA North Atlantic Route Planning Chart are considered suitable for this purpose.

CHAPTER 13

SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

13.1 INTRODUCTION

13.1.1 Although all possible contingencies cannot be covered, the procedures in 13.2, 13.3 and 13.4 provide for the more frequent cases such as:

a) inability to comply with assigned clearance due to meteorological conditions, (13.4 refers);

b) en-route diversion across the prevailing traffic flow (for example, due to medical emergencies (13.2 and 13.3 refer)); and

c) loss of, or significant reduction in, the required navigation capability when operating in an airspace where the navigation performance accuracy is a prerequisite to the safe conduct of flight operations, or pressurization failure (13.2 and 13.3 refer).

Note. — Guidance on procedures to follow when an aircraft experiences a degradation in navigation capabilities can be found in Doc 4444, Chapter 5, section 5.2.2.

13.1.2 The pilot shall take action as necessary to ensure the safety of the aircraft, and the pilot's judgement shall determine the sequence of actions to be taken, having regard to the prevailing circumstances. Air traffic control shall render all possible assistance.

13.2 GENERAL PROCEDURES

Note. — Figure 13-1 provides an aid for understanding and applying the contingency procedures contained in paragraph 13.3.

13.2.1 If an aircraft is unable to continue the flight in accordance with its ATC clearance, a revised clearance shall be obtained, whenever possible, prior to initiating any action. If prior clearance cannot be obtained, the following contingency procedures should be employed until a revised clearance is received:

a) leave the cleared route or track by initially turning at least 30 degrees to the right or to the left, in order to intercept and maintain a parallel, same direction track or route offset 9.3 km (5.0 NM). The direction of the turn should be based on one or more of the following:

   1) aircraft position relative to any organized track or route system,

   2) the direction of flights and flight levels allocated on adjacent tracks,

   3) the direction to an alternate airport;

   4) any strategic lateral offset being flown, and

   5) terrain clearance;

b) the aircraft should be flown at a flight level and an offset track where other aircraft are less likely to be encountered.

c) maintain a watch for conflicting traffic both visually and by reference to ACAS (if equipped) leaving ACAS in RA mode at all times, unless aircraft operating limitations dictate otherwise;

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

e) keep the SSR transponder on at all times and, when able, squawk 7700, as appropriate;

f) as soon as practicable, the pilot shall advise air traffic control of any deviation from assigned clearance;

g) use whatever means is appropriate (i.e., voice and/or CPDLC) to communicate during a contingency or emergency;

h) if voice communication is used, the radiotelephony distress signal (MAYDAY) or urgency signal (PAN PAN) preferably spoken three times, shall be used, as appropriate;

i) when emergency situations are communicated via CPDLC, the controller may respond via CPDLC. However, the controller may also attempt to make voice communication contact with the aircraft;

Note.— Additional guidance on emergency procedures for controllers and radio operators, and flight crew in data link operations can be found in the Global Operational Data Link (GOLD) Manual *(Doc 10037).*

j) establish communications with and alert nearby aircraft by broadcasting, at suitable intervals on 121.5 MHz (or, as a backup, on the inter-pilot air-to-air frequency 123.450 MHz) and where appropriate on the frequency in use: aircraft identification, the nature of the distress condition, intention of the person in command, position (including the ATS route designator or the track code, as appropriate) and flight level; and

k) the controller should attempt to determine the nature of the emergency and ascertain any assistance that may be required. Subsequent ATC action with respect to that aircraft shall be based on the intentions of the pilot and overall traffic situation.

13.3 ACTIONS TO BE TAKEN ONCE OFFSET FROM TRACK

Note. — The pilot's judgement of the situation and the need to ensure the safety of the aircraft will determine the actions outlined in 13.3.2 a) or b), will be taken. Factors for the pilot to consider when diverting from the cleared route or track without an ATC clearance include, but are not limited to:

a) operation within a parallel track system,

b the potential for User Preferred Routes (UPRs) parallel to the aircraft's track or route,

c) the nature of the contingency (e.g. aircraft system malfunction) and

d) weather factors (e.g. convective weather at lower flight levels).

13.3.1 If possible maintain the assigned flight level until established on the 9.3 km (5.0 NM) parallel, same direction track or route offset. If unable, initially minimize the rate of descent to the extent that is operationally feasible.

13.3.2 Once established on a parallel, same direction track or route offset by 9.3 km (5.0 NM), either:

a) descend below FL 290, and establish a 150 m (500 ft) vertical offset from those flight levels normally used, then proceed as required by the operational situation or if an ATC clearance has been obtained, proceed in accordance with the clearance; or

Note. — Descent below FL 290 is considered particularly applicable to operations where there is a predominant traffic flow (e.g. east-west) or parallel track system where the aircraft's diversion path will likely cross adjacent tracks or routes. A descent below FL 290 can decrease the likelihood of: conflict with other aircraft, ACAS RA events and delays in obtaining a revised ATC clearance.

b) establish a 150 m (500 ft) vertical offset (or 300 m (1000 ft) vertical offset if above FL 410) from those flight levels normally used, and proceed as required by the operational situation, or if an ATC clearance has been obtained, proceed in accordance with the clearance.

Note. — Altimetry System Error may lead to less than actual 500 ft vertical separation when the procedures above are applied. In addition, with the 500 ft vertical offset applied, ACAS RAs may occur.

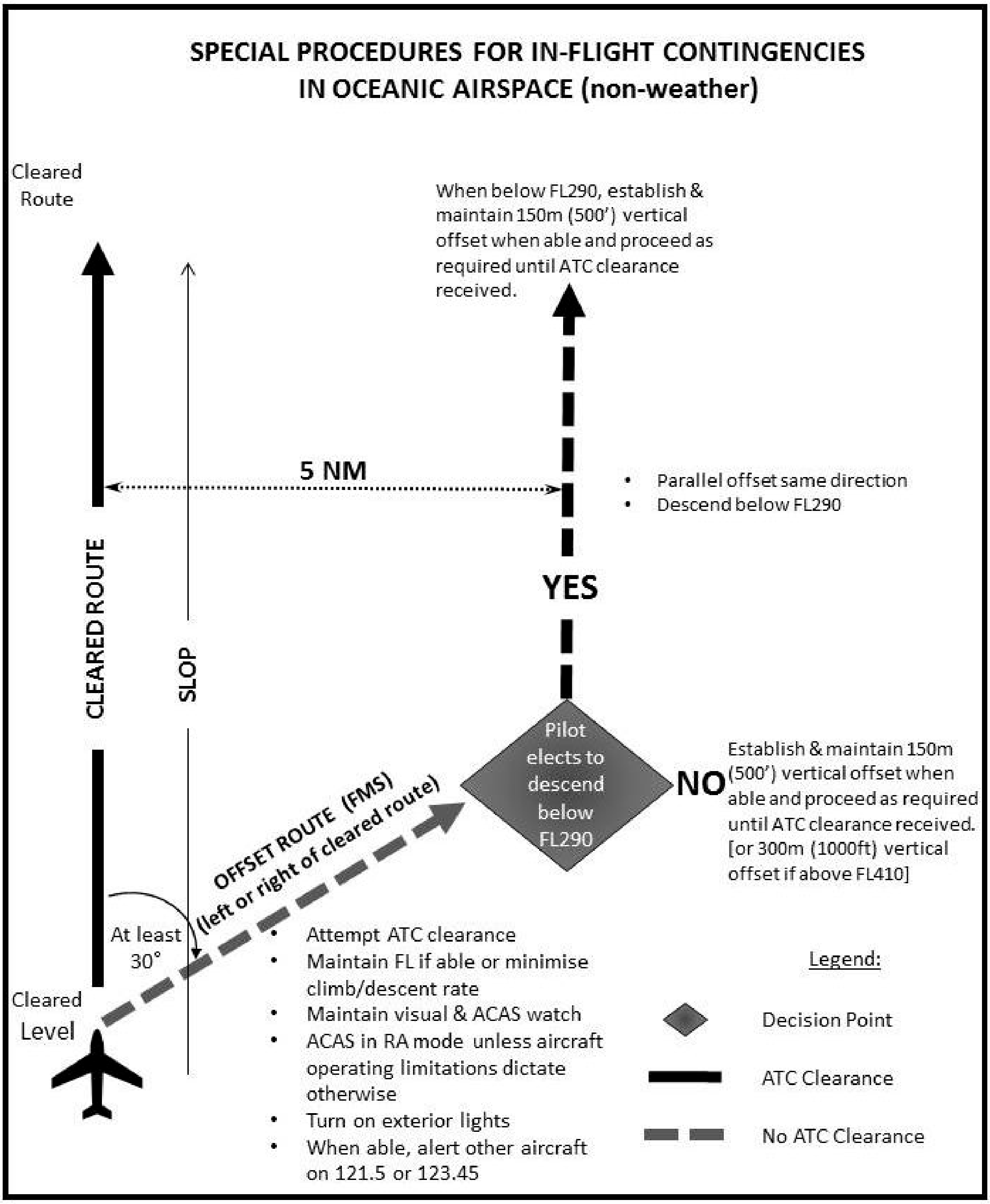


Figure 13-1. Visual aid for understanding and applying the contingency procedures guidance.

13.4 WEATHER DEVIATION PROCEDURES

General

Note.— The following procedures are intended for deviations around adverse meteorological conditions.

13.4.1 When weather deviation is required, the pilot should contact ATC via CPDLC or voice. A rapid response may be obtained by requesting a weather deviation using a CPDLC downlink message (Doc 4444, Appendix 5, Lateral Downlinks (LATD) refers) or stating "WEATHER DEVIATION REQUIRED" to indicate that priority is desired on the frequency and for ATC response. When necessary, the pilot should initiate the communications using CPDLC downlink message (Doc 4444, Appendix 5, Emergency/urgency downlink (EMGD) refers) or by using the urgency call "PAN PAN" (preferably spoken three times).

13.4.2 The pilot shall inform ATC when weather deviation is no longer required, or when a weather deviation has been completed and the aircraft has returned to its cleared route.

Actions To Be Taken When Controller-Pilot Communications Are Established

13.4.3 The pilot should contact ATC and request clearance to deviate from track or route, advising the extent of the deviation requested. The flight crew will use whatever means is appropriate (i.e., CPDLC and/or voice) to communicate during a weather deviation.

Note.— Pilots are advised to contact ATC as soon as possible with requests for clearance in order to provide time for the request to be assessed and acted upon.

13.4.4 ATC should take one of the following actions:

a) when appropriate separation can be applied, issue clearance to deviate from track or route; or

b) if there is conflicting traffic and ATC is unable to establish appropriate separation, ATC shall:

(1) advise the pilot of inability to issue clearance for the requested deviation;

(2) advise the pilot of conflicting traffic; and

(3) request the pilot's intentions.

13.4.5 The pilot should take the following actions:

a) comply with the ATC clearance issued; or

b) advise ATC of intentions and execute the procedures detailed in 13.4.6.

Actions To Be Taken If A Revised ATC Clearance Cannot Be Obtained

Note.— The provisions of this section apply to situations where a pilot needs to exercise the authority of a pilot-in-command under the provisions of Annex 2, 2.3.1.

13.4.6 If the aircraft is required to deviate from track or route to avoid adverse meteorological conditions and prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time. Until an ATC clearance is received, the pilot shall take the following actions:

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

b) establish communications with and alert nearby aircraft by broadcasting, at suitable intervals: aircraft identification, flight level, position (including ATS route designator or the track code) and intentions, on the frequency in use and on 121.5 MHz (or, as a backup, on the inter-pilot air-to-air frequency 123.450 MHz);

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

Note.— If, as a result of actions taken under the provisions of 13.4.6 b) and c), the pilot determines that there is another aircraft at or near the same flight level with which a conflict may occur, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict.

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

e) for deviations of less than 9.3 km (5 NM) from the originally cleared track or route remain at a level assigned by ATC;

f) for deviations greater than or equal to 9.3 km (5 NM) from the originally cleared track or route, when the aircraft is approximately 9.3 km (5 NM) from track or route, initiate a level change in accordance with Table 13-1;

g) if the pilot receives clearance to deviate from cleared track or route for a specified distance and, subsequently, requests, but cannot obtain a clearance to deviate beyond that distance, the pilot should apply a 300 ft vertical offset from normal cruising levels in accordance with Table 13-1 before deviating beyond the cleared distance.

h) when returning to track or route, be at its assigned flight level when the aircraft is within approximately 9.3 km (5 NM) of the centre line; and

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

Table 13-1

Originally cleared track or route centre line	Deviations ≥ 9.3 km (5.0 NM)	Level change
EAST 000° – 179° magnetic	LEFT RIGHT	DESCEND 300 ft (90 m) CLIMB 300 ft (90 m)
WEST 180° – 359° magnetic	LEFT RIGHT	CLIMB 300 ft (90 m) DESCEND 300 ft (90 m)

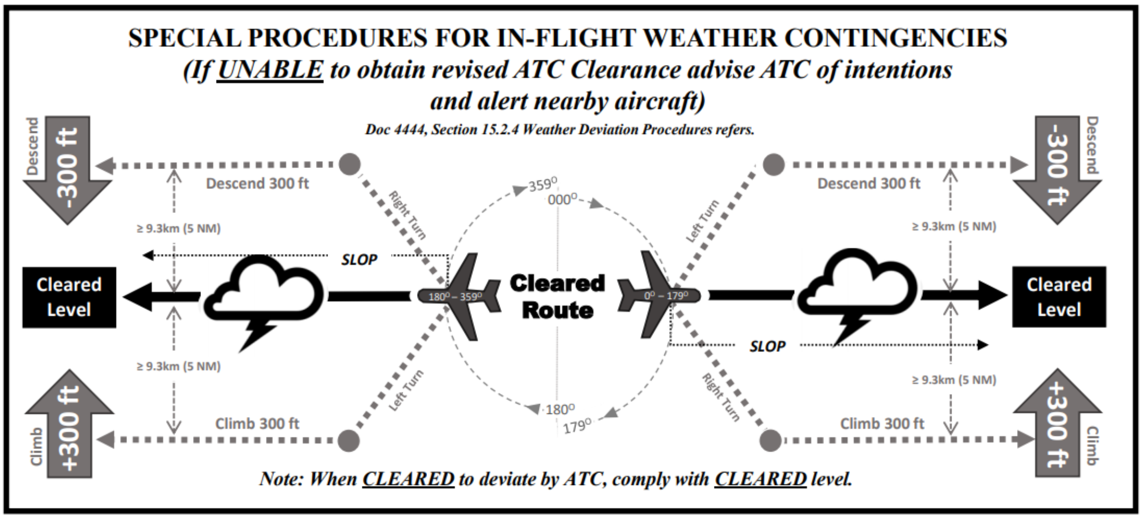


Figure 13-2. Visual aid for understanding and applying the weather contingency procedures guidance.

13.5 WAKE TURBULENCE

13.5.1 ICAO collects data on wake vortex encounters. Most encounters occur in terminal operations and indeed this is where the aircraft type wake categorization scheme is used to regulate separations. Wake vortex encounters are, however, also experienced enroute, although less frequently. To accommodate the predominantly uni-directional diurnal traffic flows through the NAT, on many routes all adjacent flights levels are simultaneously used for a given traffic flow. While this arrangement may not be unique, it is not one that is commonly employed in many other areas of the world. As a result many, if not most, enroute wake vortex encounters outside the NAT arise from opposite direction passings or route crossing situations. In the NAT enroute wake vortices are encountered more commonly from a preceding aircraft following the same track, usually at the next higher level. Such encounters can thus be of a prolonged duration and mitigating flight crew action is desirable/necessary. See Attachment 3 for the preferred wake vortex reporting form.

13.6 ACAS/TCAS ALERTS AND WARNINGS

13.6.1 All turbine-engined aircraft with a certificated take-off mass exceeding 5,700 Kgs or authorised to carry more than 19 passengers are required to be equipped with ACAS II in the NAT region. Only TCAS Version 7.1 meets the ICAO technical specifications for ACAS II as described in the current ICAO Annex 10 Volume IV.

13.6.2 The provisions relating to the carriage and use of ACAS II are contained in ICAO Annexes 2, 6, 10 & 11 and in the Procedures for Air Navigation Services (PANS) Ops & ATM. Operational procedures are fully detailed in PANS-OPS Doc 8168, Volume 1, Part VIII, Chapter 3.

13.6.3 All Resolution Advisories (RAs) should be reported to ATC:

a) verbally, as soon as practicable; and

b) in writing, to the Controlling Authority, after the flight has landed, using the necessary procedure and forms, including, when appropriate, the ‘Altitude Deviation Report Form’ shown at Attachment 2 to this Manual.

CHAPTER 14

GUARDING AGAINST COMMON ERRORS

14.1 INTRODUCTION

14.1.1 Careful monitoring procedures provide a good indication both of the frequency with which navigation errors occur and their causes. As a result of the accuracy and reliability of modern navigation systems, the errors which do occur are often the result of flight crew error.

14.1.2 Operational errors in the vertical plane also occur. Aircraft are sometimes flown at levels other than those for which ATC clearance has been issued. The potential collision risk of even a single incidence of flying at an un-cleared level can be significant. The NAT HLA risk estimates in the vertical plane, as a result of operational errors or un-cleared departures from flight level, exceed those arising from lateral gross navigation errors.

14.1.3 It is essential that flight crews do not take modern technology for granted. They should at all times, especially during periods of low workload, guard against complacency and over-confidence, by adhering rigidly to approved cockpit/flight deck procedures which have been formulated over many years, in order to help stop operational errors.

14.1.4 This chapter lists some of the errors that have been recorded in the NAT during recent years. Reconstructed scenarios exampling some such errors, together with some contingency situations, are also shown in an interactive DVD, "Track Wise – Targeting Risk within the Shanwick OCA". It follows the progress of a westbound NAT flight through the Shanwick OCA. While the operational procedures in the DVD are specific to Shanwick, the majority of the DVD considers issues common to the whole NAT region.

14.1.5 The complete DVD is available at no charge to *bona fide* operators on application to: customerhelp@nats.co.uk.. The content of the DVD can be accessed at no charge from the European and North Atlantic (EUR/NAT) Office public pages on the ICAO website (www.icao.int/EURNAT/), following "EUR & NAT Documents", then "NAT Documents", then selecting "Trackwise for on-line YouTube viewing". It is also available on YouTube™, looking for "**Trackwise - Targeting Risk Within The Shanwick OCA**", and also or directly at https://www.youtube.com/watch?v=EJTjwW5ZYas.

14.2 OPERATIONAL HEIGHT ERRORS

14.2.1 The most common height errors are caused by:

a) executing an un-cleared climb, which means proper separation can no longer be assured; aircraft following an ATC clearance are assured of separation from other potentially conflicting traffic;

b) misinterpreting an ATC acknowledgement of a request as a clearance; not being aware that when DCPC is unavailable and air/ground ATS communications are via a third party (whether radio operator or data link service provider) acknowledgements of requests do not constitute approval;

c) not climbing or descending as cleared; being cleared to change level after the next route waypoint but doing it immediately or being cleared to change level immediately and only doing it at a later time. Such instances are often, but by no means exclusively, associated with misinterpretation of CPDLC message sets (a flight crew training/familiarity issue) whereby the words AT or BY are interpreted differently from their intended meaning;

d) not following the correct contingency procedures; not being aware that there is a significant likelihood of conflict with other aircraft unless the appropriate contingency offset procedure is adopted;

e) entering the NAT HLA at a level different from that contained in the received oceanic clearance; not being aware that flight crews are responsible for requesting and obtaining any domestic ATC clearance necessary to climb (or descend) to the initial flight level specified in their received oceanic clearance, prior to reaching the oceanic boundary; not recognizing that entry into NAT HLA at the cleared oceanic level is entirely their responsibility.

14.3 LATERAL NAVIGATION ERRORS

Common Causes of Lateral Navigation Errors

14.3.1 The most common causes of lateral navigation errors, in approximate order of frequency, have been as follows:

a) having already inserted the filed flight plan route coordinates into the navigation computers, the flight crew have been re-cleared by ATC, or have asked for and obtained a re-clearance, but have then omitted to re-program the navigation system(s), amend the Master Document or update the plotting chart accordingly.

b) a mistake of one degree of latitude has been made in inserting a forward waypoint. There seems to be a greater tendency for this error to be made when a track, after passing through the same latitude at several waypoints (e.g. 57°N 50°W, 57°N 40°W, 57°N 30°W) then changes by one degree of latitude (e.g. 56°N 20°W). Other circumstances which can lead to this mistake being made include receiving a re-clearance in flight.

c) the autopilot has been inadvertently left in the heading or de-coupled mode after avoiding weather, or left in the VOR position after leaving the last domestic airspace VOR. In some cases, the mistake has arisen during distraction caused by SELCAL or by some flight deck warning indication.

d) an error has arisen in the ATC Controller/Pilot communications loop, so that the controller and the flight crew have had different understandings of the clearance. In some cases, the flight crew has heard not what was said, but what they were expecting to hear.

14.4 LESSONS LEARNED

- **Perform navigation cross-check procedures throughout the ocean crossing.** Do not relax or otherwise skip steps when it comes to following those procedures.
- **Avoid casual R/T procedures**. A number of GNEs have been the result of a misunderstanding between flight crew and controller as to the cleared route and/or flight level. Adhere strictly to proper R/T phraseology and do not be tempted to clip or abbreviate details of waypoint coordinates.
- **Make an independent check on the gate position**. Do not assume that the gate coordinates are correct without cross-checking with an authoritative source. Normally one expects co-ordinates to be to the nearest tenth of a minute. Therefore, ensure that the display is not to the hundredth, or in minutes and seconds. If the aircraft is near to the Zero Degree E/W (Greenwich) Meridian, remember the risk of confusing east and west.
- **Check LRNS positions before entering oceanic** airspace**.** Make a careful check of LRNS positions at or near to the last navigation facility – or perhaps the last but one.

- **Do not initiate an on-track un-cleared level change**. If a change of level is essential and prior ATC clearance cannot be obtained, treat this situation as a contingency and execute the appropriate contingency offset procedure, when possible before leaving the last cleared flight level. Inform ATC as soon as practicable.
- **Cross check waypoints by reading present position.** Do not assume that the aircraft is at a waypoint merely because the alert annunciator so indicates. Cross-check by reading present position.
- **Complete navigation cross checks with more than one flight crew member.** There are some tasks on the flight deck which can safely be delegated to one member of the flight crew, but navigation using automated systems is emphatically not one of them. All such cross-checks should be performed independently by at least two flight crew members.
- **Follow inertial system alignment procedures.** The inertial system alignment procedures for your aircraft must be followed precisely lest initialization errors ensue. Once airborne if you have any doubt about the accuracy of your inertial systems and do not have procedures to correct system problems, you should not enter the NAT HLA, unless your aircraft has other operable LRNS that meet HLA navigation performance requirements.
- **Confirm waypoint loading**. Before departure, at least two flight crew members should independently check that the following agree: computer flight plan, ICAO flight plan, track plotted on chart, and if appropriate, the NAT track message. In flight, involve two different sources in the cross-checking, if possible. Do not be so hurried in loading waypoints that mistakes become likely, and always check waypoints against the current ATC clearance. Always be aware that the cleared route may differ from that contained in the filed flight plan. Prior to entering the NAT HLA ensure that the waypoints programmed into the navigation computer reflect the oceanic clearance received and not any different previously entered planned or requested route.
- **Complete flight progress charts periodically.** Making periodic plots of position on a suitable chart and comparing with current cleared track, greatly helps in the identification of errors before getting too far from track.
- **Use basic DR navigation as a back-up.** Outside polar regions, provided that the magnetic course (track) is available on the flight log, a check against the magnetic heading being flown, plus or minus drift, is likely to indicate any gross tracking error.
- **Maintain situational awareness** Take advantage of every available means, both inside and outside of the aircraft, to ensure you are proceeding according to your ATC clearance. There are often ways in which an overall awareness of directional progress can be maintained; the position of the sun or stars; disposition of contrails; islands or coast-lines which can be seen directly or by using radar; radio navaids, and so forth. This is obvious and basic piloting, but some of the errors which have occurred could have been prevented if the flight crew had shown more of this type of awareness. **Do not assume.**
- **Advise ATC of any possible system degredation.** If the flight crew suspects that equipment failure may be leading to divergence from cleared track, it is better to advise ATC sooner rather than later.

In conclusion, navigation equipment installations vary greatly between operators; but lessons learned from past mistakes may help to prevent mistakes of a similar nature occurring to others in the future.

CHAPTER 15

THE PREVENTION OF LATERAL DEVIATIONS FROM TRACK

15.1 THE PROBLEM

15.1.1 Lateral deviations continue to occur in the NAT. The vast majority are attributable to flight crew error, following the filed flight plan route rather than the cleared route. Additionally, errors can be attributed to the insertion of incorrect waypoints or misunderstanding of ATC clearances.

15.2 THE SOLUTION

15.2.1 Procedures must be used to display and verify the DEGREES and MINUTES loaded into the Flight Management Computer (FMC) for the “un-named” (Lat/Long) waypoints defining the route contained in the oceanic clearance.

15.2.2 Regardless of FMC waypoint format and entry method, flight crew procedures should be designed to promote strong crew resource management techniques, to prevent opportunities for error occurring as a result of confirmation bias and to generally maintain an attitude of healthy suspicion. Accordingly, the waypoint verification procedures should be conducted as detailed below.

a) During pre-flight LRNS programming, both flight crew members independently verify the full latitude and longitude coordinates of “un-named” (Lat/Long) waypoints defining the expected route of flight within oceanic airspace as entered in the FMC.

b) Upon receipt of a revised oceanic clearance (i.e., one not conforming to the flight planned route), both flight crew members independently verify the full latitude and longitude coordinates of “un- named” (Lat/Long) waypoints defining the route contained in the revised oceanic clearance.

c) Approaching an oceanic waypoint, one flight crew member should verify the full latitude and longitude coordinates of that waypoint in the FMC, the NEXT and NEXT +1 waypoints, while the other flight crew member crosschecks the latitude and longitude coordinates against the master flight plan/oceanic clearance.

15.2.3 Lateral deviations from track could be virtually eliminated if all operators/flight crews adhere to approved operating procedures and cross-checking drills. This Manual provides a considerable amount of guidance and advice based on experience gained the hard way, but it is quite impossible to provide specific advice for each of the many variations of aircraft navigation systems.

15.2.4 Additionally, the following procedures are recommended as being a good basis for NAT HLA operating drills/checks:

a) Record the initialization position programmed into the navigation computer. This serves two purposes:
   - it establishes the starting point for the navigation computations; and
   - in the event of navigation difficulties it facilitates a diagnosis of the problem.

b) Ensure that your flight log has adequate space for the ATC cleared track coordinates, and always record them. This part of the flight log then becomes the flight deck Master Document for:
   - read back of clearance;

- entering the route into the navigation system;
- plotting the route on your chart.

c) Plot the cleared route on a chart with a scale suitable for the purpose (e.g. Aerad, Jeppesen, NOAA enroute charts). This allows for a visual check on the reasonableness of the route profile and on its relationship to the OTS, other aircraft tracks/positions, diversion airfields, etc.

d) Plot your Present Position regularly on your chart.

- this may seem old-fashioned but, since the present position output cannot normally be interfered with and its calculation is independent of the waypoint data, it is the one output which can be relied upon to detect gross tracking errors. **A position should be checked and preferably plotted approximately 10 minutes after passing each waypoint, and, if circumstances dictate, midway between waypoints. e.g. if one system has failed.**

e) Check the present, next and next+1 waypoint coordinates as shown on the Master Document against those in the steering CDU before transmitting position reports (in performing these checks review the LRNS stored coordinates in expanded Lat/Long format (not abbreviated ARINC 424 format).

f) Check the LRNS indicated magnetic heading and distance to the next waypoint against those listed on the Master Document.

15.2.5 The procedures outlined in this section will detect any incipient gross errors, providing that the recorded/plotted cleared route is the same as that provided by the controlling ATS authority. If there has been a misunderstanding between the flight crew and controller over the actual route to be flown, then the last drill above, together with the subsequent passing of the position report, will allow the ATS authority the opportunity to correct such misunderstanding before a hazardous track deviation can develop. The vast majority of instances of errors occur when the ATC cleared oceanic route segment differs (partly or wholly) from that included in the filed flight plan or that requested by the flight crew. Thorough and diligent checking and cross-checking, by more than one flight crew member, of the waypoints entered into the navigation computer, against the received oceanic clearance would eliminate most of these unnecessary and avoidable errors.

CHAPTER 16

GUIDANCE FOR DISPATCHERS

16.1 GENERAL

16.1.1 The NAT is essentially divided into two distinct areas for flight operation, i.e. the NAT HLA and non-NAT HLA airspace. Operations within the NAT HLA require the user to adhere to very specific operating protocols. Refer to Chapter 1 for a description of NAT airspace.

16.2 REGULATORY REQUIREMENTS AND CONSEQUENTIAL ROUTING LIMITATIONS

State Approvals (NAT HLA /RVSM)

16.2.1 Before planning any operations within the NAT HLA, operators must ensure that the specific State NAT HLA and RVSM approvals are in place. These requirements are addressed in Chapter 1.

16.2.2 Before planning any operations of ADS-B equipped aircraft into airspace where ADS-B operation is required, operators must ensure that the aircraft is approved for such flights. These requirements are addressed in Chapter 1.

Minimum Equipage (Navigation/Altimetry/Communications)

16.2.3 Chapter 1 discusses the minimum navigation equipage requirements for unrestricted flight in the NAT HLA.

16.2.4 The Minimum Aircraft Systems Performance Specifications for RVSM operations are common world-wide standards and are contained in ICAO Doc 9574 (Manual on a 300m (1 000ft) Vertical Separation Minimum between FL290 and FL410 inclusive.). They are also detailed in FAA Advisory Circular AC91-85A, and in EASA CS-ACNS documentation; which can currently be accessed respectively through (Chapter 9 also refers): http://www.faa.gov/air_traffic/separation_standards/rvsm/documents/AC_91-85A_7-21-2016.pdf, and http://www.eurocontrol.int/articles/library. However, notwithstanding the worldwide nature of RVSM MASPS, it must be recognised, as indicated in Chapter 1, that special provisions apply in the North Atlantic HLA and in consequence all NAT flight crews/operators must **be State approved specifically for NAT RVSM operations**.

16.2.5 Many NAT air/ground ATC communications are still conducted on single side-band HF frequencies. For operations in the NAT region fully functioning HF communications equipment is required when operating outside VHF coverage.

Special non-compliance routings

16.2.6 Aircraft not equipped with two functioning long range navigation systems may only fly through the NAT HLA via special designated routes. This is discussed in Chapter 1. Details of these special routes are contained in Chapter 3.

16.2.7 Aircraft not approved for NAT HLA /RVSM operations may climb and descend through NAT HLA/RVSM airspace and in very limited, specified circumstances a NAT HLA approved aircraft that is not approved for RVSM operations may be granted permission to flight plan and operate through the NAT HLA at RVSM levels. (See Chapter 1).

16.2.8 Routings that may be flight planned and operated through the NAT HLA by aircraft without functioning HF communications equipment may be limited by the State of Registry of the operator or by the ATC provider. This is discussed above in more detail in Chapter 4.

16.3 ROUTE PLANNING

Lateral separation minima & resulting route definition conventions

16.3.1 For much of the NAT HLA the lateral separation standard is generally 60 NM. Since 60 NM is equivalent to one degree of latitude along any meridian and given that the vast majority of flights through this airspace are generally eastbound or westbound, this standard is deemed to be met by tracks separated by one degree of latitude at common meridians. The letter ‘X’ must be included to show that the aircraft satisfies NAT HLA lateral navigation performance requirements

16.3.2 Outside ATS Surveillance coverage ATC depends upon aircraft supplied position reports for flight progress information. In order to provide separation assurance, ATC requires updates on the progress of flights at no more than hourly intervals. It has been determined that this criteria is met over a wide range of ground speeds if eastbound or westbound NAT flights report on passing each ten degrees of longitude. The criteria is also met by northbound or southbound flights reporting on passing each five degrees of latitude. In consequence, all flights which will generally route in an eastbound or westbound direction should normally be flight planned by specifying significant points at whole degrees of latitude at each crossed ten degrees of longitude (20°W, 30°W, 40°W etc.); and all generally northbound or southbound flights should normally be flight planned so that specified parallels of latitude spaced at five degree intervals (65°N, 60°N, 55°N etc.) are crossed at whole degrees of longitude. See Chapter 4.

OTS – Rationale, Structure, CDM & NAT Track Message

16.3.3 As a result of passenger demand, time zone differences and airport noise restrictions, much of the North Atlantic (NAT) air traffic contributes to two major alternating flows: a westbound flow departing Europe in the morning, and an eastbound flow departing North America in the evening. The effect of these flows is to concentrate most of the traffic uni-directionally, with peak westbound traffic crossing the 30W longitude between 1130 UTC and 1900 UTC and peak eastbound traffic crossing the 30W longitude between 0100 UTC and 0800 UTC.

16.3.4 The NAT HLA is consequently congested at peak hours and in order to provide the best service to the bulk of the traffic, a system of organised tracks is constructed to accommodate as many flights as possible within the major flows, on or close to their minimum time tracks and altitude profiles. Due to the energetic nature of the NAT weather patterns, including the presence of jet streams, consecutive eastbound and westbound minimum time tracks are seldom identical. The creation of a different organised track system is therefore necessary for each of the major flows. Separate OTS structures are therefore published each day for eastbound and westbound flows.

16.3.5 The construction of these OTS structures is accomplished through a formal process of cooperation between ATC and the operators, known as the Preferred Route Message system. Details of this process are explained in Chapter 2.

16.3.6 The resulting OTS structures are published (twice each day) in the form of a “NAT Track Message” via the AFTN. This Message and its correct interpretation are detailed in Chapter 2.

16.3.7 If orientation/location of the published OTS structure appear to be appropriate for the origin and destination of a particular flight, then the operator is encouraged to flight plan the NAT route segment via one of the published tracks.

Random Routings

16.3.8 Use of OTS tracks is not mandatory. The orientation/location of the published OTS may not be appropriate for the origin and/or destination of a particular flight. A NAT route segment that does not follow a published OTS track, in its entirety, is known as a “Random Route”. Aircraft may fly on random routes which remain clear of the OTS or may fly on any route that joins or leaves an outer track of the OTS. There is also nothing to prevent an operator from planning a route which crosses the OTS. However, in this case, operators must be aware that while ATC will make every effort to clear random traffic across the OTS at published levels, re-routes or significant changes in flight level from those planned are very likely to be necessary during most of the OTS peak traffic periods.

16.3.9 Outside of the OTS periods operators may flight plan any random routing, except that during the hour prior to each OTS period some additional restrictions apply. These are detailed in Chapter 4.

Adjacent Airspace, Route Structures, Links & Constraints

16.3.10 A large majority of flights through the NAT HLA enter and/or leave it via the North American region. To facilitate these flows of traffic, various transitional airspaces and linking route structures have been established in and through the adjacent NAM region. These are described in Chapter 3 above. Of particular significance is the NAR structure. Details of these routes and associated procedures are contained in the AIP of the relevant State authorities and/or via their websites. The necessary Internet Links to obtain this information are listed above in Chapter 3. Account must be taken of these route structures in planning any flight through the NAT region that starts or ends in the North American region.

16.4 ALTITUDE & SPEED

Flight Levels

16.4.1 During the OTS Periods (eastbound 0100-0800 UTC, westbound 1130-1900 UTC) aircraft intending to follow an OTS track for its entire length may plan at any of the levels as published for that track on the relevant current daily OTS Message. Aircraft following a “random route” (see above definition) or flying outside the OTS time periods, may plan any flight level(s) irrespective of direction (i.e. there is no need in the NAT HLA to plan in accordance with the ICAO Annex 2 Table of Cruising Levels). Planners should note however that the NAT provider State AIPs, both during the OTS time periods and outside them, reserve some appropriate direction levels for use by the opposite direction traffic flows that then predominate. The current usage allocation of flight levels in the NAT HLA is published in the UK and Canadian AIPs and shown at Attachment 5 below as the “North Atlantic Flight Level Allocation Scheme” (NAT FLAS). Hence, flight crews and planners should always consult the current AIPs and any supporting NOTAMs when flight planning random routes through the NAT HLA. If a flight is expected to be level critical, operators should contact the initial OACC prior to filing the flight plan to determine the likely availability of specific flight levels.

Mach Number

16.4.2 In the NAT HLA the Mach number technique is used to manage longitudinal separations between aircraft following the same track. Chapter 7 above provides more detailed information. Consequently, flight plans for the NAT HLA segment of flight must define aircraft speed in terms of a Mach number. This is true even if procedures dictate that aircraft speed be defined in terms of TAS for other (continental airspace) segments of that same flight. Oceanic clearances include a True Mach number to follow and because this is used by ATC to regulate longitudinal separations, no tolerance is permissible. Consequently, NAT flights should ***not*** be planned or flown on the assumption that LRC or ECON fuel regimes may be used.

16.5 FPL COMPLETION

16.5.1 It is important that all of the foregoing conventions and protocols are adhered to when planning a flight through the NAT HLA. Guidance on the flight planning requirements for specific routes is given in Chapter 4. Correct completion and addressing of the filed flight plan is extremely important. Non-observance of any of the NAT HLA planning principles, or even simple syntax errors in the filed FPL, can lead to delays in data processing and/or to the subsequent issuing of clearances to the flights concerned. Despite the growing use of automated flight planning systems a significant proportion of flight plans submitted in respect of flights through the North Atlantic region continue to contain errors. In some instances these errors are such that the flight plan is rejected and the operator is required to re-submit a corrected version. New and/or infrequent North Atlantic operators are earnestly recommended to make diligent reference to this document. Furthermore it should be noted that a free text editor is available on the EUROCONTROL website that can validate any proposed ICAO flight plan before filing. It will advise if a flight plan is acceptable for routes, altitudes and transitions. If the flight plan would be rejected, this editor will describe what is wrong, thereby allowing the operator to repair it before filing.

16.5.2 The guidance in the paragraphs that follow here refer to the ICAO model flight plan form as described in Chapter 4 of ICAO PANS/ATM Doc 4444.

16.5.3 If filing via an OTS track, particularly during peak traffic periods, it must be appreciated that ATC may not be able to clear the aircraft as planned. ATC will, if possible, first offer a clearance on the planned track but at a different flight level. If, however, no reasonable alternative level is available, or if the offered flight level is unacceptable to the flight crew, then ATC will clear the aircraft via another OTS track. When filing the ATC flight plan, the Dispatcher may enter the details of such an acceptable alternative track in Field 18 of the ICAO FPL. This will be taken into account by ATC if indeed having to clear the aircraft via a route other than that planned.

16.5.4 In order to signify that a flight is approved to operate in the NAT HLA, the letter ‘X’ shall be inserted, in addition to the letter ‘S’, within Item 10 of the flight plan. A ‘W’ must also be included in Item 10 to indicate that the flight is approved for RVSM operations.

16.5.5 For flights which intend to operate through the New York Oceanic East or West, or Santa Maria Oceanic FIRs, RNAV 10 (RNP 10) or RNP- 4 approval is required in order to benefit from the reduced lateral separations employed here. Any NAT HLA aircraft intending to fly within these airspaces should ensure that its RNP approval status is also included in the flight plan. Specifically such operators should annotate ICAO flight plan Item 10 (Equipment) with the letter “R” and annotate Item 18 (Other Information) with, as appropriate, “PBN/A1 (for RNAV 10 (RNP 10) approval) or PBN/L1 (for RNP 4 approval)” (see Chapter 4).

16.5.6 For Flights planning to operate through specified ADS-B service areas and wishing to benefit from that service the appropriate equipage and authorisation for ADS-B use should be indicated by filing the B1 or B2 descriptor as appropriate in Item 10b of the flight plan.

16.6 DISPATCH FUNCTIONS

General

16.6.1 All US FAR Part 121 carriers (domestic and flag operators) and many non-US carriers employ aircraft dispatchers or flight operations officers (hereafter referred to as dispatchers) to provide flight planning, flight watch and/or flight monitoring services. Most of the information presented here is included in other chapters of this manual but since this chapter deals with issues primarily important to dispatchers, the information is sometimes repeated here for emphasis and additional guidance.

16.6.2 Nothing in this chapter should be construed as to take precedence over appropriate government regulations or individual company policy.

16.6.3 The dispatcher is responsible for providing the pilot-in-command with information necessary to conduct a flight safely and legally under appropriate State civil aviation authority regulatory requirements. ICAO Annex 6 defines the requirement for an en route aircraft, but when operating under US FAR Part 121, and certain other State civil aviation rules, the dispatcher shares responsibility for exercising operational control with the pilot-in-command of the flight. A successful flight will always start with an intelligent, informed and conservative plan.

Flight Planning

Route Planning

16.6.4 The daily published OTS tracks provide near to optimum NAT segment routings for about half of all the flights between Europe and North America. For many other flights the location of the OTS structure on the day may constrain available random routings. Consequently, the development of a successful NAT flight plan almost always requires consideration of the detail of the relevant OTS structure. Operators can influence the OTS construction process by providing Preferred Route Messages and participating in this collaborative decision making (see Chapter 2).

16.6.5 The eastbound and westbound OTS structures are the subject of separate “NAT Track Messages” published via the AFTN. A detailed description of the NAT track message is provided in Chapter 2 above.

Planning on an OTS Track

16.6.6 Dispatchers must pay particular attention to defined coordinates, domestic entry and exit routings, allowable altitudes, track message identification number (TMI) and any other information included in the remarks section. They must also take care to be apprised of any amendments or corrections that may be subsequently issued. When such amendments are issued the TMI is appended with an alpha suffix (e.g. “123A”). Since NAT track messages are often manually entered into company flight planning systems, dispatchers should verify that all waypoints on flight plans comply with the current OTS message.

- The NAT region is implementing DLM in phases. To fly within the DLM airspace aircraft must be equipped with FANS 1/A or equivalent ADS-C and CPDLC. See Chapter 1.
- It is important for dispatchers to understand that transition routes specified in the NAT track message are as important as the tracks themselves. The transition route systems in North America – the North American Routes (NARs) and the US East Coast routes are described in Chapter 3. Dispatchers should comply with any specified transition route requirements in all regions. Failure to comply may result in rejected flight plans, lengthy delays and operating penalties such as in-flight re-routes and/or the flight not receiving requested altitudes.
- If (and only if) the flight is planned to operate along the entire length of one of the organized tracks, from oceanic entry point to oceanic exit point, as detailed in the NAT track message, should the intended track be defined in Item 15 of the ICAO flight plan using the abbreviation "NAT" followed by the code letter assigned to the track.
- The planned Mach number and flight level at the commencement point of the track should be specified at the organised track commencement point.
- Each point at which a change of Mach number or flight level is requested must be specified as geographical coordinates in latitude and longitude or as a named point.
- For flights operating along the entire length of an OTS track, estimated elapsed times (EET/ in Item 18) are only required for the commencement point of the track and for oceanic FIR

boundaries.

Planning a Random Route

16.6.7 A random route is any route that is not planned to operate along the entire length of the organised track from oceanic entry point to oceanic exit point. (See Chapter 4 for more information on filing a random route)

16.6.8 Random routes can be planned anywhere within the NAT HLA but the dispatcher should sensibly avoid those routes that conflict directly with the OTS. Examples of sensibly planned random routes include routes that:

- Remain clear of the OTS by at least 1 degree;
- Leave or join outer tracks of the OTS;
- Are above or below the OTS flight level stratum;
- Are planned on track coordinates before/after valid OTS times.

16.6.9 Care should be taken when planning random routes and it would be prudent to plan sufficient fuel to allow for potential re-routes or non-optimum altitudes. The following examples illustrate particular issues to consider.

Examples:

- Flights planned to initially operate below the NAT HLA/RVSM flight levels at FL280 on routes that pass under the OTS should not plan to climb until 1 degree clear of the OTS.
- Planning to join an outer track is allowable. However, the dispatcher should be aware that the clearance may not be given due to the adverse impact on track capacity. Leaving an outer track is seldom a problem as long as at least 1 degree of separation is subsequently maintained from other tracks.
- Random routes paralleling the OTS 1 or 2 degrees north or south can be as busy as the OTS itself.

16.6.10 Dispatchers planning NAT flights originating in south Florida or the Caribbean should consider the effect of traffic from South America operating north eastwards to the USA, when deciding on flight levels. Although the dispatcher should plan optimum flight levels, adequate fuel should be carried so that a NAT flight can accept a lower altitude (FL260 or FL280) until east of 70˚W.

16.6.11 Any flight planning to leave an OTS track after the oceanic entry point must be treated as a random route. The track letter must not be used to abbreviate any route segment description.

16.6.12 Flights operated against the peak traffic flows should plan to avoid the opposite direction OTS. Even if operating outside of the validity periods of the OTS some restrictions on routings may apply. These can affect Eastbound traffic crossing 30W at 1030 UTC or later; and Westbound traffic crossing 30W at 2400 UTC and later (See Chapter 4). If in any doubt it would be prudent to co-ordinate any such routes directly with appropriate OACCs.

Flight Levels

16.6.13 Flight dispatchers should be aware of the North Atlantic FLAS. This is subject to change and the current FLAS is published in the UK and Canadian AIPs and shown in Attachment 5.

16.6.14 Chapter 2 and Chapter 4 contain details on RVSM flight level guidance. Since all airspace adjoining the NAT HLA is now RVSM, transition problems are no longer a major issue for ATC or dispatchers. Nevertheless dispatchers should be aware that some "opposite direction" levels, which may be flight planned for the NAT segment of a flight, may not be similarly allowed in adjacent domestic areas. Guidance for RVSM flight procedures in the NAT HLA can be found in Chapter 9.

16.6.15 RVSM allows more flight levels for planning and therefore provides better opportunity to fly closer to an optimum route/profile. It is acceptable to plan and/or request climbs within the OTS but because of traffic volumes and the difference in aircraft performance it is wise to plan conservatively. Climbs on random routes that are totally north or south of the track system are more readily approved. Flight crews should be encouraged to request a climb as aircraft decreasing weight permits.

Communications

16.6.16 Operations in the NAT outside VHF coverage require the carriage of two long range communication systems, one of which must be HF. SATVOICE and CPDLC (appropriate to route of flight) may satisfy the requirement of the second-long range communication system.

16.6.17 Many operators now use ADS-C (Automatic Dependent Surveillance Contract) and CPDLC (Controller Pilot Data Link Communications) for oceanic position reporting and clearance updating. These features improve position reporting speed and accuracy. They also reduce the chance of errors. If the aircraft is equipped with FANS1 or FANSA it should be utilised during the NAT segment of the flight and the appropriate descriptor should be inserted into the filed flight plan.

16.6.18 SATVOICE, can be used as a supplement to HF communications throughout the NAT region (see Chapter 6). If the aircraft is SATVOICE equipped, the SATVOICE numbers (both radio stations and ATC) for the areas that the aircraft is planning to fly through, should be made available for the flight crew.

MEL Compliance

16.6.19 Dispatchers planning flights within the NAT HLA must ensure that the allocated aircraft has the minimum required navigation, communications and altitude alerting/reporting equipment on board. Flight procedures for minimum equipment and standards can be found in Chapter 8 and Chapter 11 of this Manual. Particular attention must be paid to MEL Items that may affect the aircraft. Be aware that the company MEL or Operations Specifications may be more restrictive than general NAT HLA requirements.

16.6.20 Even though a flight that suffers a failure of a system (or component) once enroute, is not directly mandated to abide by MEL restrictions, it is important that any failures that will affect either NAT HLA or RVSM operations be promptly advised to, and closely coordinated with, the appropriate ATS facility.

16.6.21 If an aircraft MEL (navigation, communications or altitude alerting/reporting system) prohibits operations in the NAT HLA it will be necessary to modify an aircraft's originally intended route of flight. An example would be an aircraft not equipped with two Long Range Navigation Systems (or LRNS's that are fully serviceable). This situation could occur before departure or once enroute but before entering the NAT HLA. Options that should be considered by the dispatcher are:

- operate above or below the NAT HLA;
- fly on special routes developed for aircraft equipped with limited LRNS equipment – see Chapter 1, Chapter 3, and Chapter 12.

ETOPS/EDTO

16.6.22 A large portion of NAT crossings are ETOPS operations. ETOPS rules require that one or more suitable enroute alternate airports are named prior to dispatch and then monitored while aircraft are enroute. Enroute alternate airports in the NAT region are limited to those in the Azores, Bermuda, Greenland and Iceland. In determining ETOPS alternate minima, the dispatcher must consider weather conditions, airport conditions (in addition to simple runway lengths), navigation approach aids, and the availability of ATS and ARFF facilities.

Note: The term EDTO (Extended Diversion Time Operations) is now used throughout Annex 6 Part I. Here it states that EDTO provisions for aeroplanes with two turbine engines do not differ from the previous provisions for extended range operations by aeroplanes with two turbine engines (ETOPS). Therefore, EDTO may be referred to as ETOPS in some documents

16.6.23 Recent changes have begun to attach additional conditions to 3-4 engine aircraft long range operations. In situations requiring the aircraft to operate long distances from adequate enroute airports, more stringent planning conditions may apply. Guidance can be obtained from appropriate government and industry websites.

Collaborative Decision Making (CDM) Tools

16.6.24 It would not be practical to list all available CDM tools and available websites here. Refer to the bibliography at the end of this manual for a more complete list. The following are some of the most important sites for managing the daily operation of flights.

- Nav Canada TDA (Traffic Density Analyser.) Website

  This tool was designed to introduce Collaborative Decision Making during the NAT OTS design phase. The OTS are posted in advance of formal publication so the user community can comment on whether or not they agree with the proposed OTS. A USER ID and password can be obtained from NAV CANADA. Track loading information is available and it is possible to view all filed flight plans on the OTS and random routes.

- Eurocontrol Website – Network Manager function

  This website contains a wealth of tactical information regarding restrictions, delays, weather problems, military activity, CDR routes, preferred routing schemes and transition routes.

  http://www.eurocontrol.int/network-operation

  There is a free text editor that will validate ICAO flight plan before filing and advise if the flight plan is acceptable for routes, altitudes and transitions. If the flight plan would be rejected, this editor will describe what is wrong, allowing the dispatcher to repair it before filing the ICAO flight plan.

- FAA Websites

  These websites contain complete FAR section, Airport information, airport capacity (real time) advisories with airport delays and status, NOTAMS, weather Information, RVSM and statistical data. They include www.faa.gov and www.fly.faa.gov . Also for CDM participants, the FAA Air Traffic Control System Command Center website (www.fly.faa.gov/flyfaa/usmap.jsp) is available.

Flight Monitoring

Oceanic ATC Clearances

16.6.25 The flight crew can obtain oceanic clearances by GP, VHF, HF, DCPC, or data link. Chapter 5 in this manual can be referenced for complete oceanic clearance requirements. Be aware that for some airports located close to oceanic boundaries oceanic clearances may be obtained before departure. Indeed on the east side of the NAT this will apply to departures from all Irish airfields, all UK airfields west of 2 degrees 30 minutes West and all French Airfields west of 0 degrees longitude. Flights leaving airports in Iceland, Faeroes, or Greenland will receive oceanic clearances prior to departure.

16.6.26 It is important for dispatchers to verify the contents of the oceanic clearance and check it against the filed route. If the flight has received a re-route or a different altitude the Dispatcher may provide the flight with re-analysis data for fuel consumption along the revised route.

Transponder

16.6.27 All aircraft operating as IFR flights in the NAT region shall be equipped with a pressure-altitude reporting SSR transponder (see Chapter 10).

Re-Routes

16.6.28 When traffic exceeds track capacity, ATS providers may not be able to accommodate a flight's filed altitude or routing. A different flight level on the planned route will be offered as the first option. If this is not possible, ATC will offer an alternative route. On an eastbound flight the flight crew should anticipate a preferred route within the domestic route structure appropriate to the oceanic exit point of the re-route. For westbound flights into Canada, ATC will normally attempt to route the flight back to its original route unless the flight crew requests a new domestic routing.

En route Contingencies

16.6.29 Dispatchers must also be aware of special procedures for In-Flight contingencies as published in Chapter 13 of this manual. They include procedures for use in the event that the aircraft is unable to maintain assigned altitude for weather, turbulence, aircraft performance or maintenance problems or loss of pressurization. The general concept of the in-flight contingency procedures is to parallel offset from the assigned track by 5 NM and descend below FL 290; or once on the 5 NM parallel offset, establish a 150 m (500 ft) vertical offset (or 300 m (1000 ft) vertical offset if above FL 410) from those flight levels normally used, and proceed as required by the operational situation.

16.6.30 Procedures for loss of communications and HF failure are contained in Chapter 6.

Dispatcher guidance for NAT RVSM operations.

References

16.6.31 The FAA Advisory Circular AC91-85A was developed by ICAO sponsored international working groups, to provide guidance on airworthiness and operations programmes for RVSM. ICAO has recommended that State CAA's use of AC91-85A or an equivalent State document for approval of aircraft and operators to conduct RVSM operations. Appendices 4 and 5 of AC91-85A contain practices and procedures for flight crews and dispatchers involved in RVSM operations. This particular dispatcher guidance, available at WWW.FAA.GOV/DOCUMENTLIBRARY/MEDIA/ADVISORY_CIRCULAR/AC_91-85A, was developed using those appendices as the reference

Flight Planning

NAT RVSM Airspace

This is defined as any airspace between FL 285 - FL 420 where 1,000 ft vertical separation is applied (i.e. FLs 290 thru 410 inclusive).

Limits of Operational Authorisation

At the flight planning stage, the dispatcher is responsible for selecting and filing a route that is consistent with the carrier's operational authorisation (e.g. Operations Specifications), taking account of all route, aircraft and weather considerations, flight crew constraints and other limitations.

MEL

When planning and filing to fly within NAT RVSM airspace, the dispatcher must ensure that the route meets the requirements of the paragraph above and that the aircraft also meets certain MEL provisions.

Maintenance Flights

NAT ATS providers have established a policy to enable an aircraft that is temporarily non-RVSM compliant to fly in NAT RVSM airspace for the purpose of positioning the aircraft at a maintenance facility (see Chapter 1). This policy may vary and requires prior co-ordination with appropriate ATC centres so that 2,000 ft separation can be applied between the non-compliant aircraft and other aircraft. These requests must be co-ordinated with each individual OACC. The dispatcher must be aware of the policy for such operations, as published in NOTAMS, AIPs and other appropriate documents. States of Registry also vary in their policies on Maintenance Ferry Flights. Dispatchers should ensure that they fully understand any additional restrictions or limitations that may be imposed by their State of Registry.

Delivery and Humanitarian Flights

ATS providers allow limited operations by aircraft not approved for RVSM but which are engaged on delivery or humanitarian flights. For such flights, the dispatcher must also comply with the policies published in State AIPs, NOTAMS and other appropriate documents. Co-ordinate directly with appropriate ATC facilities and the aircraft's State of Registry.

En Route Equipage Failures

Prior to entering NAT RVSM airspace

The following equipment is required to be operational:

i) two independent primary altimetry systems;

ii) one automatic altitude control system; and

iii) one altitude alerting device

If any required equipment fails prior to entering NAT RVSM airspace, the pilot-in-command will notify ATS and obtain a new oceanic clearance to fly above or below NAT RVSM airspace. The flight crew should accept the new clearance contingent upon review by the dispatcher. Dispatcher actions are based on the options, identified as OPTION 1 to OPTION 3, outlined later in this chapter.

After entering NAT RVSM airspace.

The appropriate State RVSM guidance material provides for flight crew and controller actions if RVSM required aircraft equipment fails after entry into NAT RVSM airspace, or the aircraft encounters turbulence that affects the aircraft's ability to maintain its level. Should any required RVSM equipment fail, or turbulence greater than moderate be encountered, then the pilot-in-command is expected to notify ATS of the intended course of action.

Pilot-in-command options are to:

(1) continue with the original clearance if ATC can apply another form of aircraft separation (i.e. lateral, longitudinal or 2,000 ft vertical separation); or

(2) request ATC clearance to climb above or descend below NAT RVSM airspace if ATC cannot provide adequate separation from other traffic; or

(3) execute contingency procedures to offset from track and flight level if ATC cannot provide adequate separation from other aircraft. The pilot-in-command will maintain any offsets until a revised ATC clearance can be obtained.

Dispatcher Actions

OPTION (1) – if the pilot-in-command elects for Option (1) then no Dispatcher's action is required.

OPTION (2) – if the pilot-in-command elects to follow Option (2) then the pilot-in-command should contact the dispatcher who will evaluate the clearance with due consideration for the effect on fuel consumption, time enroute, any MEL/CDL issues and/or other operational factors. The dispatcher shall make a recommendation to the pilot-in command on whether to continue on to the destination, or the dispatcher will amend the release to allow the aircraft to proceed to an intermediate airport or return back to the departure airport. The flight crew will then either confirm the new clearance with ATC or request a new clearance to another airport. The final decision rests with the pilot-in command.

OPTION (3) – if the pilot-in-command elects to follow Option (3), then when time permits, the pilot-in command will advise the dispatcher of any offset made from track or/and flight level. No action by the dispatcher is required since the effect on performance should be minimal.

Checklist for Aircraft Dispatch into NAT RVSM Airspace.

The dispatcher must:

i) Determine the minimum and maximum flight levels plus the horizontal boundaries of NAT RVSM airspace;

ii) Verify that the airframe is RVSM approved;

iii) Determine if any operating restrictions (e.g. speed or altitude limitations) apply to the aircraft for RVSM operation;

iv) Check the MEL for system requirements related to RVSM;

v) Check Field 10 (Equipment) of the ICAO ATS flight plan to ensure that it correctly reflects RVSM approval status. For North Atlantic operation, insertion of letter "W" indicates that the operator and aircraft are RVSM approved;

vi) Review reported and forecast weather enroute, with specific emphasis on conditions such as turbulence, which may affect an aircraft's ability to maintain its level; and

vii) Determine if TCAS/ACAS is operational.

Flight of non-RVSM compliant aircraft

The dispatcher must comply with any ATS requirements regarding flight of non-RVSM compliant aircraft for maintenance, aircraft delivery or humanitarian flights (See Chapter 1).

CHAPTER 17

FLIGHT OPERATIONS BELOW THE NAT HLA

17.1 INTRODUCTION

17.1.1 This guidance is meant to assist international general aviation (IGA) flight crews with flight planning and operations across the North Atlantic. It is not intended to be a detailed listing of procedures or air regulations of the various States that provide air traffic service in the North Atlantic (NAT) region, and does not in any way replace the information contained in various national Aeronautical Information Publications (AIP's). Flight crews must consult relevant AIPs and Notices to Airmen (NOTAMs) when planning the flight and prior to departure.

17.2 ENVIRONMENTAL CONSIDERATIONS

Below FL290

17.2.1 For flights at F290 and below, the North Atlantic weather can be far from benign. Extreme seasonal weather variations and rapidly changing weather conditions including severe icing, severe turbulence, and heavy precipitation are common, particularly in winter. Changes are often so rapid that they are difficult, if not impossible, to forecast. These harsh weather conditions, along with the rugged terrain and sparsely populated areas, make preparation, including route and emergency situation planning, important components for a successful flight. Attachment 7 provides further details of the general North Atlantic climate and the weather conditions and associated operational issues in particular areas.

17.3 NORTH ATLANTIC FLIGHT OPERATIONS

17.3.1 Most of the airspace in oceanic FIRs/CTAs is high seas airspace within which the Rules of the Air (ICAO Annex 2) apply without exception. The majority of the airspace is also controlled airspace, and instrument flight rules (IFR) apply when above FL 055.

17.3.2 This controlled airspace includes:

1. New York Oceanic East, Gander Oceanic, Shanwick Oceanic, Santa Maria Oceanic, Reykjavik Oceanic, GOTA and NOTA, and Bodø;
2. Bodø Oceanic above FL 195 and when operating more than 100 NM seaward from the shoreline;
3. Nuuk FIR when operating above FL 195:
4. Faroes Islands above 7500 ft;
5. Jan Mayen 2000 ft above ground level.

17.3.3 Canada, Denmark and Iceland require that the flight crew and aircraft be IFR rated for trans-oceanic flight, regardless of the altitude to be flown. It is highly unlikely that the flight will remain VMC when transiting the Atlantic.

17.4 REQUIREMENTS

17.4.1 Regulatory requirements are established by all States providing Air Traffic services in the NAT. It is the responsibility of all operators to comply with these requirements and any others that may be separately imposed by the State of Registry of the aircraft or the State of the operator. Most eastbound trans-Atlantic flights by light aircraft commence their oceanic crossing from Canada. Transport Canada Aviation

Regulations (CARs) detail requirements for all flights beginning their trans-Atlantic crossing from Canada. Flights entering the NAT from any ANSP must review requirements as listed in each State AIP.

17.5 OPERATIONAL CONSIDERATIONS

Sparsely Settled Areas

17.5.1 The potential dangers associated with operating in sparsely settled areas should not be underestimated. The fact is that in sparely settled areas, aircraft operations require special considerations. In this area radio aids to navigation, weather information, fuel supplies, aircraft servicing facilities, accommodations and food are usually limited and often non-existent.

17.5.2 In addition to the regulations concerning flight crew qualifications and experience, it is recommended that the flight crew have:

a) flight experience with significant cross country, night and actual instrument time;

b) experience in using the same navigational equipment that will be used to cross the Atlantic; and

c) experience in the same type of aircraft that will be used to cross the Atlantic.

Icing Conditions

17.5.3 Freezing levels at or near the surface can be expected at any time of year over the NAT region. The dangers of airframe and/or engine icing must always be taken into account, so flight crews/planners should be prepared to wait for favourable conditions. If the flight is to be conducted when there is a threat of icing, keep clear of clouds, unless the aircraft is certified for operations in icing conditions. Remember, as a general rule, the freezing level should be 3,000 feet AGL or higher to allow for ridding the aircraft of ice, if it becomes necessary.

17.6 FLIGHT PLANNING

17.6.1 It is rare to be able to conduct a flight across the Atlantic and remain in visual meteorological conditions (VMC) for the entire flight. VFR flight in this airspace deprives the flight crew of the flexibility of using the altitudes above FL055. The higher altitudes may enable a smoother flight, free of precipitation, icing or turbulence

17.6.2 IFR Flights (i.e. those operating in the NAT region at FL060 or above), or VFR Flights intending to cross an international border, need to file an ICAO flight plan. Detailed instructions for completion of the ICAO flight plan are found in the ICAO Document 4444, Appendix 2; and in State AIPs. Chapter 4 also provides necessary guidance, with particular emphasis on NAT flight requirements.

17.6.3 Generally all eastbound or westbound aircraft in the NAT region must flight plan so that specified tens of degrees of longitude (60°W, 50°W, 40°W, 30°W, etc.) as applicable, are crossed at whole or half degrees of latitude. Generally northbound or southbound aircraft must flight plan so that specified parallels of latitude spaced at five degree intervals (65°N, 60°N, 55°N, 50°N, etc.) are crossed at whole degrees of longitude. More detailed information can be found in NAT provider State AIPs.

17.6.4 Plan the flight using current aeronautical charts, the latest edition of pertinent flight supplements, and NOTAMs, both domestic and international.

Note: Flight crews should familiarize themselves with the nature of the terrain over which the flight is to be conducted. If unfamiliar with the area, the flight crew should consult the aviation authority officials at appropriate local aviation field offices before departure. Such officials, as well as flight crews and *operators, can provide a great deal of useful advice, especially on the ever-changing supply situation, the location and condition of possible emergency landing strips, potential hazards, and enroute weather conditions. Pre-flight planning must ensure the availability of fuel, food, and services that may be required at intermediate stops and at destination.*

17.6.5 Planning a trans-Atlantic flight for the summertime will allow the flight crew/operator to take advantage of the most favourable conditions. Not only are the ground (and water) temperatures less menacing, but also the amount of available daylight is considerably greater.

17.6.6 Depth perception is poor at night. North of 60°N Latitude, which includes the most common trans- Atlantic routes flown by general aviation aircraft, there are only about 4 hours of daylight during December. To this is added an additional complication: VFR flights at night are prohibited in Greenland. Given also the increased possibility of storms during the winter it is earnestly recommended that flight crews plan to make trans-Atlantic flights preferably during the summer months.

17.7 PHYSIOLOGICAL FACTORS

17.7.1 Crossing the North Atlantic in a general aviation aircraft is a long and physically demanding task. Provisions must be made to eat, drink, and take care of all necessary bodily functions.

17.8 CLEARANCES

17.8.1 All flights planned at or above FL055 in oceanic CTAs (outside of southern Greenland) are required to obtain an IFR clearance prior to entering the NAT.

Note: The airspace over Greenland above FL195 is controlled by Gander OACC south of 63°30'N and Reykjavik OACC north of 63°30'N.

17.8.2 When operating on an IFR clearance, any change of altitude requires re-clearance from ATC. Clearances for VMC climb or descent will not be granted. Changes in true airspeed must be coordinated. Review specific AIPs for details. Weather deviations of a mileage that exceeds the limits outlined in the Strategic Lateral Offset Procedure (SLOP) i.e. 2 NM, requires a re-clearance from ATC. If a flight crew cannot obtain a clearance in a timely manner and needs to execute pilot-in-command authority for safety of flight, they shall so inform ATC of the maneuver as soon as practicable.

17.8.3 Obtaining a Clearance

Flight crews are required to obtain a clearance from the ATS unit responsible for their area of operation and to follow the procedures specified in appropriate AIPs. Where possible, clearance to enter controlled airspace should be obtained prior to take-off, as communication problems are often encountered at low altitudes.

Canada –

Oceanic clearances for eastbound IGA NAT flights, departing from many of the airports in Eastern Canada, are obtained from the control tower or the flight service station at the aerodrome of departure prior to departure. Eastbound IGA NAT over-flights may obtain their oceanic clearance directly from Gander ACC, Moncton ACC, Montreal ACC, through a flight service station, or from Gander Clearance Delivery.

United Kingdom/Ireland –

At some airports situated close to oceanic boundaries, the oceanic clearance can be obtained before departure e.g. Prestwick, Shannon, Glasgow, Dublin. Westbound aircraft operating within the UK FIR should request oceanic clearance from Shanwick Oceanic on VHF at least 30 minutes before point of entry.

Aircraft unable to get clearance on VHF should request clearance on NARTEL HF (North Atlantic Enroute HF RTL Network). Aircraft unable to contact Shanwick, as detailed above, should request the ATC authority for the airspace in which they are operating to relay their request for oceanic clearance to Shanwick. Flights planned to enter the Reykjavik OCA from the Scottish FIR east of 10°W, should request oceanic clearance from Reykjavik via Iceland Radio or data link.

United States –

Prior to entering oceanic airspace you must receive a specific oceanic clearance, detailing the oceanic entry point, route, landfall (or oceanic exit point), and airways to destination. The routing portion of the oceanic clearance shall be considered to be the routing received in the clearance at the originating aerodrome prior to takeoff. The final altitude, and if required, speed assignment, shall be the last assigned clearance issued by ATC prior to progressing the Oceanic entry fix. If you do not receive an oceanic clearance approaching the oceanic entry fix, **REQUEST ONE.**

Norway –

Flights planning to enter Bodo Oceanic should request oceanic clearance from Bodo on VHF or via data link.
Flights planning to enter Reykjavik Oceanic at or south of 63N000W (ISVIG), should request oceanic clearance from Iceland Radio or via data link.

Portugal –

Flights departing from Azores Islands will receive the oceanic clearance in a three step process. The appropriate Tower must be informed of the intended flight level for oceanic crossing and will issue an initial flight level clearance. After departure, Santa Maria Radar will assure the climb to the approved final level. The pilot will only receive the oceanic route and speed clearance later on, usually through Santa Maria Radio on HF.

Departing aerodromes within the NAT Region –

Flights departing aerodromes within the NAT region should request oceanic clearance from the tower/AFIS serving the aerodrome before departure.

17.9 NAVIGATION

17.9.1 Navigation in the North Atlantic, or in any oceanic area for that matter, is considerably more difficult than over land. There are no landmarks, and short range navigational aids (VOR/NDB) are few and far between. Aircraft must be equipped with some type of Long Range Navigation (LRNS) equipment. (See applicable AIPs and ICAO Annexes for details.)

17.10 ROUTE CONCERNS

17.10.1 There are a few VOR/NDB routes in the North Atlantic. These routes are sometimes known as "Blue Spruce" routes and are depicted on navigation charts from Jeppesen and other sources. Details are also included in this Manual in Chapter 12 and in relevant national AIPs. Other than on the Blue Spruce routes, there is little NAVAID coverage at the low altitudes in the NAT.

17.11 COMMUNICATIONS

17.11.1 The following text highlights a number of issues particular to air-ground ATS communications in the NAT region. Further referral should be made to Chapter 6.

17.11.2 As mentioned earlier, VHF radio coverage is very limited in the NAT. Charts in Attachment 4, depict theoretical VHF coverage at FL100, FL200 and FL300. Radio equipment should be tested prior to departure. For VHF equipment this is best done by calling the tower or ACC on the proper frequency for a ground radio check. HF equipment can be tested by calling the nearest Aeronautical Radio or Flight Service Station for a ground radio check. If contact cannot be made on the initial test frequency, try others. If no contact is made, have the equipment checked. Do not leave the ground until everything is working satisfactorily.

17.11.3 Flight crews should be aware that on most occasions when they communicate with Oceanic Air Traffic Control Centres on HF and, on some occasions VHF, they do not talk directly to controllers. Radio Communicator staff, i.e., Aeronautical Radio Inc. (ARINC) or an international flight service station (IFSS), relay messages between aircraft and ATC. Such units are not always co-located with an ACC. For example, Shanwick Radio is in the Republic of Ireland while Shanwick Control is based at Prestwick, Scotland. Also, it is important to note that controller workload associated with low level IGA flights is usually high, so some delays can be expected for responses to requests for a change of flight level, route, etc.

17.11.4 Remember, flights above FL055 must be operated under IFR procedures and therefore a continuous listening watch on appropriate frequency must be maintained.

17.11.5 An HF SELCAL device will ease the strain of a continuous listening watch on the designated HF R/T Frequency. Ensure that the SELCAL code selected in the aircraft is valid for the NAT region (see Chapter 6). Also ensure that the Code is included in Item 18 of the filed ICAO flight plan.

17.11.6 Aeronautical Mobile Satellite (Route) Service (AMS(R)S), more commonly referred to as SATVOICE, may be used for any routine, non-routine or emergency ATS air/ground communications throughout the NAT region. Remember to carry the SATCOM numbers for the areas (both ATC and radio) you are flying through. Requirements and procedures for use are detailed in Chapter 6.

17.11.7 A listening watch should be maintained on the 121.5 MHz emergency frequency unless communications on another frequency prevents it. 121.5 MHz is not authorized for *routine* use.

> *Note- All civilian and military aircraft flying in the Elk area, as shown in the Chart in Attachment 7,* ***must*** *maintain listening watch on 121.5 MHz or 126.7 MHz.*

Communications failures

17.11.8 Procedures to follow in the event of radio communications failures in the NAT region **are not** those which are used in domestic airspaces. Chapter 6 and relevant national AIPs provide detail of the procedures to follow here.

17.11.9 Although HF coverage exists throughout the NAT, there are a few associated problems. Depending on atmospheric conditions, it can be relatively noisy with the signal fading in and out. Sometimes several attempts are required to successfully transmit or receive a single message. Additionally, sunspot activity can completely disrupt HF communications for considerable periods of time, varying from a few minutes to several hours. Notices are published whenever disruptive sunspot activity is expected. It may be possible to relay VHF or UHF communications through other aircraft operating in the NAT. 123.450 MHz should be used for air-to-air communications. Do not plan to use other aircraft as primary means of communication. There is no guarantee there will be another aircraft within range when needed. Consider this an emergency procedure and plan accordingly.

17.12 SURVEILLANCE

17.12.1 Radar and or ADS-B coverage in the NAT region is limited. All aircraft operating as IFR flights in the NAT region shall be equipped with a pressure-altitude reporting SSR transponder. Some radar sites that do cover portions of the NAT are secondary radar equipped only. In any emergency situation (lost, out of fuel, engine failure, etc.) your chances of survival are vastly increased if you are radar or ADS-B identified and SAR services can be vectored to your position. NAT ATS Surveillance is discussed in Chapter 10 and coverage charts are shown at Attachment 8 and in individual national AIPs.

17.13 SEARCH & RESCUE (SAR)

17.13.1 SAR alert procedures are initiated when:

a) no communication has been received from an aircraft within a period of thirty minutes after the time a communication should have been received, or from the time an unsuccessful attempt to establish communication with such aircraft was first made, whichever is the earlier, or when

b) an aircraft fails to arrive within thirty minutes of the estimated time of arrival last notified to or estimated by air traffic services units, whichever is the later except when,

c) no doubt exists as to the safety of the aircraft and its occupants.

17.13.2 Flight crews should request advisories or assistance at the earliest indication that something may be wrong. Most search and rescue facilities and international air carriers monitor VHF 121.5 continuously. SAR aircraft are generally equipped with homing devices sensitive to VHF 121.5 Mhz. If unable to reach any facility, flight crews should attempt contact with other aircraft on the NAT air-to-air frequency 123.450 MHz or distress frequency 121.5 MHz. Most international carriers are also able to receive Emergency Locator Transmitter (ELTs) transmissions. In the event that manual activation of your ELT is possible, the ELT should be activated and left on continuously. The 406 MHz beacon provides a more accurate position and identification data, improving SAR response efficiency.

17.13.3 With excellent satellite coverage of the region, SAR services can ordinarily determine the general location of an aircraft in distress, provided that the ELT functions. Search and recovery may be conducted by various craft. Helicopters operate out to a maximum of 300 NM from base without air to air re-fueling and the latter is a very scarce enhancement. Long range SAR aircraft can localize an ELT, but their time on task in the area, on low level visual search, should that be necessary, is only in the order of 2 to 3 hours. A 24 hour search would require 8 aircraft and a visual search for a single seat life raft, even with a comparatively good datum, is a needle-in-a-haystack problem. Oceanic Air Traffic Control Centres will contact rescue coordination centres with all available details. SAR coordination centres may request other aircraft assistance while also utilizing surface craft in the area. This would often include ships or boats. The further section below on aircraft ditching provides more insights.

Hypothermia

17.13.4 Hypothermia is the most significant danger to the survivors of any ditching or forced/precautionary landing in the NAT region. The causes, symptoms and preventative measures are covered in detail in Attachment 7.

17.14 IN-FLIGHT CONTINGENCIES

17.14.1 Do not deviate from your current flight plan unless you have requested and obtained approval from the appropriate air traffic control unit, or unless an emergency situation arises which necessitates immediate action. After such emergency authority is exercised, the appropriate air traffic services unit must be notified of the action taken and that the action has been taken under emergency authority.

17.14.2 Make all position reports, as required, and report any problems to Air Traffic Control agencies as soon as possible. It is also good policy to report fuel remaining in hours and minutes when passing position or other relevant flight information.

17.14.3 If you encounter difficulty, report immediately on the appropriate VHF/HF frequency or on VHF 121.5. Don't delay in making this call, as it could take SAR forces up to four hours to reach your position.

17.14.4 Remember that commercial airline traffic over the North Atlantic is heavy. Do not hesitate to enlist the assistance of these aircraft in relaying a position report or discussing a problem. The VHF frequency 123.450 MHz is for exclusive use as an air-to-air communications channel. The bulk of this commercial traffic uses the Organised Track Structure (Chapter 2). During daylight hours a Westbound OTS is in effect and at night an Eastbound structure is used. The location/coordinates of these structures changes each day. Knowledge of the location of the OTS structure which is active during your flight may provide re-assurance of the proximity of such assistance. The moral support alone may be enough to settle nerves and return the thought processes to normal.

17.14.5 The weather at your destination should be well above IFR minimums and forecast to remain so or improve. After 10 to 14 hours at altitude, your ability to handle marginal weather conditions may be in serious doubt. Therefore, your personal weather minimums should be well above the published minimums. Alternate airports should be chosen with the same care.

ATTACHMENT 1

SAMPLE OF ERROR INVESTIGATION FORM

(Name and address of reporting agency):	
Please complete Parts 2 and 3 (and Part 4 if applicable) of this investigation form. A copy, together with copies of all relevant flight documentation (fuel flight plan, ATC flight plan and ATC clearance) should then be returned to the above address and also to: the North Atlantic Central Monitoring Agency, -c/o National Air Traffic Services - Room G41 - Scottish & Oceanic Area Control Centre, Sherwood Road,- Prestwick, Ayrshire - KA9 2NR	
Part 1 – General Information	
Operator's name	
Aircraft identification	
Date/time of observed deviation	
Position (latitude and longitude)	
Observed by (ATC unit)	
Aircraft flight level	

Part 2 – Details of Aircraft and Navigation Equipment Fit

Number Type	**INS**	**GNSS**	**IRS/FMS**	**OTHER (please specify)**
Single Dual Triple				
Model No				
Navigation system Programme No				
State which system coupled to autopilot				
Aircraft Registration and Model/Series				

Part 3 – Detailed description of incident
Please give your assessment of the actual track flown by the aircraft and the cause of the deviation (continue on a separate sheet if required)

<table>
<tr><th colspan="14">Part 4 – Only to be completed in the event of Partial or Full Navigation failure</th></tr>
<tr><td>Indicate the number of equipment units which failed</td><td colspan="3">INS</td><td colspan="3">GNSS</td><td colspan="3">IRS/FMS</td><td colspan="4">OTHER</td></tr>
<tr><td>Circle estimated longitude at which equipment failed</td><td>60°W</td><td>55°W</td><td>50°W</td><td>45°W</td><td>40°W</td><td>35°W</td><td>30°W</td><td>25°W</td><td>20°W</td><td>15°W</td><td>10°W</td><td>5°W</td><td>0°E/W</td></tr>
<tr><td>Give an estimate of the duration of the equipment failure</td><td colspan="13">Time of failure :
Time of exit from NAT HLA:
Duration of failure in NAT</td></tr>
<tr><td>At what time did you advise ATC of the failure</td><td colspan="13"></td></tr>
</table>

Thank you for your co-operation

ATTACHMENT 2

ALTITUDE DEVIATION REPORT FORM

MESSAGE FORMAT FOR A REPORT TO THE CENTRAL MONITORING AGENCY OF AN ALTITUDE DEVIATION OF 300 FT OR MORE, INCLUDING THOSE DUE TO ACAS/TCAS ADVISORIES, TURBULENCE AND CONTINGENCY EVENTS

1. REPORT OF AN ALTITUDE DEVIATION OF 300 FT OR MORE
2. REPORTING AGENCY
3. DATE AND TIME
4. LOCATION OF DEVIATION
5. RANDOM / OTS[1]
6. FLIGHT IDENTIFICATION AND TYPE
7. FLIGHT LEVEL ASSIGNED
8. OBSERVED / REPORTED[1] FINAL FLIGHT LEVEL[2] MODE “C” / PILOT REPORT[1]
9. DURATION AT FLIGHT LEVEL
10. CAUSE OF DEVIATION
11. OTHER TRAFFIC
12. CREW COMMENTS WHEN NOTIFIED
13. REMARKS[3]

1. State one of the two choices.

2. In the case of turbulence, state extent of deviation from cleared flight level.

3. In the event of contingency action, indicate whether prior clearance was given and if contingency procedures were followed

When complete send this form to:

North Atlantic Central Monitoring
Agency c/o National Air Traffic
Services
Room G41
Scottish & Oceanic Area Control Centre,
Sherwood Road,
Prestwick, Ayrshire - KA9 2NR

natcma@nats.co.uk

ATTACHMENT 3

WAKE TURBULENCE REPORT FORM

For use by pilots involved in Wake Vortex incidents which have occurred in the NAT HLA.

This information is requested by the North Atlantic Central Monitoring Agency and will be forwarded for inclusion in the UK National Air Traffic Services Limited Wake Vortex database.

SECTION A

<table>
<tr><td colspan="2">DATE OF OCCURRENCE</td><td>TIME (UTC)

*DAY/NIGHT</td><td colspan="3">OPERATOR</td><td>FLIGHT NUMBER</td></tr>
<tr><td colspan="3">AIRCRAFT TYPE & SERIES</td><td colspan="2">REGISTRATION</td><td colspan="2">AIRCRAFT WEIGHT (KG)</td></tr>
<tr><td colspan="2">ORIGIN & DESTINATION</td><td>POSITION IN LAT & LONG</td><td colspan="4">CLEARED TRACK CO-ORDINATES</td></tr>
<tr><td colspan="2">FLIGHT LEVEL</td><td>SPEED/MACH NBR.</td><td colspan="3">FLIGHT PHASE:

*CRUISE/CLIMB/DESCENT</td><td>WERE YOU TURNING?

*YES/NO</td></tr>
<tr><td>DID YOU APPLY A TRACK OFFSET?

*YES/NO</td><td colspan="3">SIZE OF TRACK OFFSET?

Nautical Miles</td><td colspan="3">WAS ATC INFORMED?

*YES/NO</td></tr>
<tr><td>MET

CONDITIONS IMC

VMC</td><td colspan="3">ACTUAL WEATHER

WIND VISIBILITY
CLOUD
TEMPERATURE</td><td colspan="3">DEGREE OF TURBULENCE

*LIGHT/MODERATE/SEVERE</td></tr>
<tr><td colspan="7">OTHER SIGNIFICANT WEATHER?</td></tr>
</table>

(*Circle the appropriate

reply only) SECTION B

1 What made you suspect Wake Vortex as the cause of the disturbance? ____________________

____

____

____

2 Did you experience vertical acceleration? *YES/NO
If YES please describe briefly ____________________

____

3 What was the change in attitude? (please estimate angle)
Pitch__________º Roll__________º Yaw__________º

4 What was the change in height if any?__________ *INCREASE/DECREASE

Page 1 of 2

5	Was there buffeting?	*YES/NO
6	Was there stick shake?	*YES/NO
7	Was the Autopilot engaged?	*YES/NO
8	Was the Auto throttle engaged?	*YES/NO
9	What control action was taken?	

Please describe briefly

10	Could you see the aircraft suspected of causing the wake vortex?	*YES/NO
11	Did you contact the aircraft suspected of causing the vortex?	*YES/NO
12	Was the aircraft suspected of causing the vortex detected by ACAS/TCAS?	*YES/NO

If YES to any of questions 10 to 12, what type of aircraft was it?

and where was it relative to your position?

(Estimated separation distance)

Were you aware of the preceding aircraft before the incident?

*YES/NO OTHER INFORMATION

13 Have you any other comments that you think may be useful?

Signed

Name (BLOCK CAPITALS) DATE

(*Circle the appropriate reply only)

When complete send this form to:

North Atlantic Central Monitoring Agency
c/o National Air Traffic Services
Room G41
Scottish & Oceanic Area Control Centre,
Sherwood Road,
Prestwick, Ayrshire - KA9 2NR

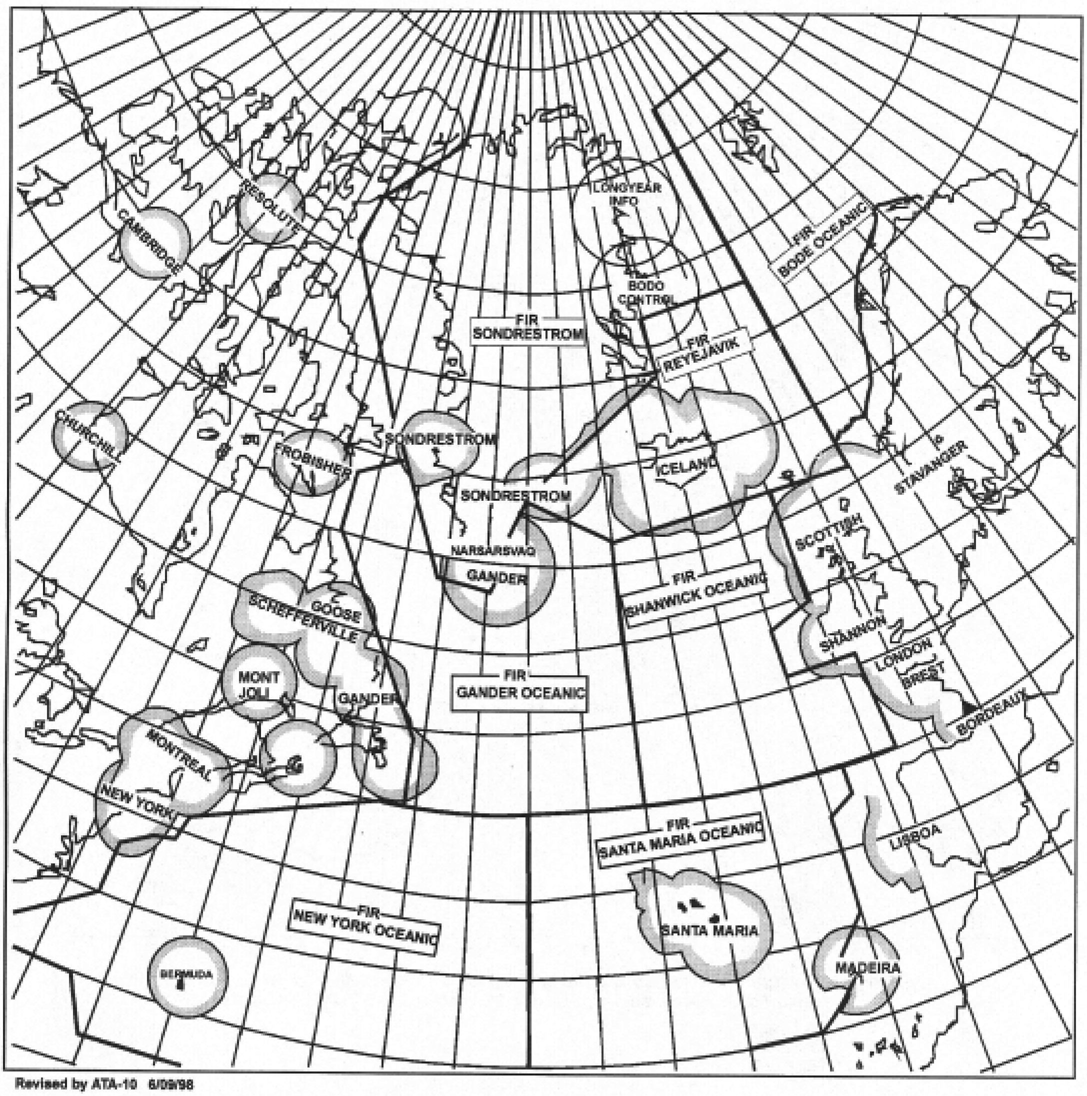
natcma@nats.co.uk

ATTACHMENT 4

VHF AIR/GROUND COMMUNICATIONS COVERAGE EXISTING IN THE NAT REGION

Chart #1

VHF RADIO COVERAGE IN THE NAT REGION AT FL100 (Map is not applicable anymore, UPDATED VERSION NEEDED)



NOTE-

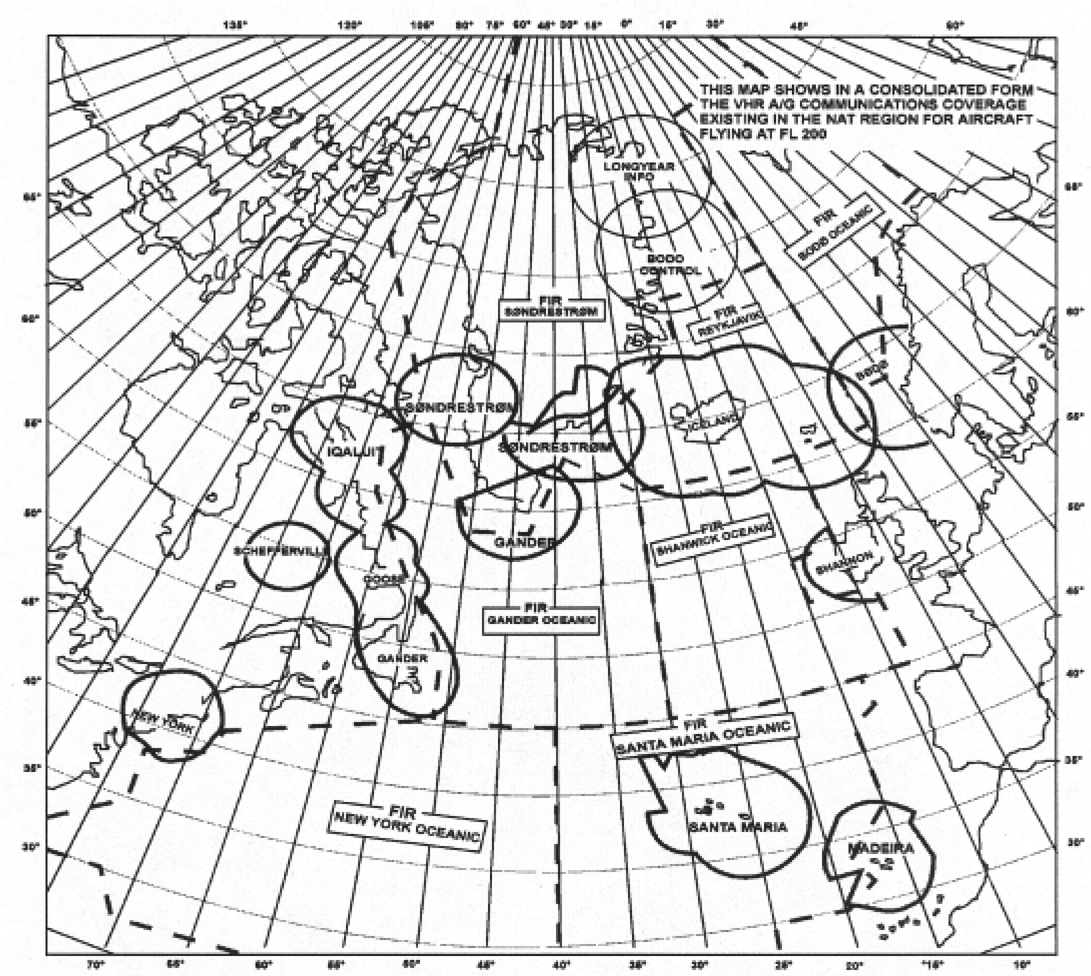
[1] The VHF cover depicted in the transition area between the NAT and the EUR regions *has only been shown to complete the picture of the communications cover. The VHF air/ground communication stations at Stavanger, Scottish, London, Brest, Bordeaux, and Lisboa do not form part of the communication system serving the NAT* region.

[2] The VHF cover provided by the Oaqatoqaq and Kulusuk stations in Greenland (Søndrestrøm) serves Søndrestrøm FIC only (below FL195)

[3] NARSARSVAQ information serves Søndrestrøm FIC only (below FL195).

Chart #2

VHF RADIO COVERAGE IN THE NAT REGION AT FL200 ***(Map is not applicable anymore, UPDATED VERSION NEEDED)***



The VHF coverage provided by the QAQATOQAQ and KULUSUK stations in Greenland (Søndre Strømfjord), serves Søndre Strømfjord FIC only (below FL 195).

***NOTE** 1: The VHF cover depicted in the transition area between the NAT and the EUR* regions *has only been shown to complete the picture of the communication cover. The VHF air/ground communication stations at Stavanger, Scottish, London, Brest, Bordeaux, and Lisboa do not form part of the communication system serving the NAT* region.

Chart #3

VHF RADIO COVERAGE IN THE NAT REGION AT FL300 ***(Map is not applicable anymore, UPDATED VERSION NEEDED)***

ATTACHMENT 5

NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

Flight Level Availability

1. *Introduction*

Following statistical analysis and discussions NAT FLAS was developed to:

(i) Utilise additional levels, made available by RVSM expansion.

(ii) Standardise the flight level profiles available for eastbound traffic, originating in the New York/ Santa Maria areas, during the eastbound flow, with a view to incorporating the functionality of ADT links.

(iii) Ensure that economic profiles are available for westbound aircraft routing from Reykjavik OACC.

The procedures entail the establishment of a Night Datum Line, south of which is reserved principally for traffic originating in New York/ Santa Maria.

The procedures entail the establishment of a North Datum Line, on or north of which is reserved for late running westbound traffic from Reykjavik to Gander.

Aircraft operators are advised that the altitude scheme described herein should primarily be used for flight planning using the flight levels specified in this document, relative to their particular flight(s). However, final altitude assignments will be assigned tactically by ATC, reference traffic, and that any requested altitude profile changes will be processed and approved if available.

Procedures

2. *General*

The westbound OTS signal is published by Shanwick using FL310 to FL390. Gander publishes the eastbound OTS signal using FL310 to FL400. However, FL310 will only be used for “New York Tracks” which are eastbound OTS tracks that originate in the New York area and are separated from the main OTS by more than one degree at 030°W.

The activation times of the westbound OTS shall be published as 1130z to 1900z at 30W.

The activation times of the eastbound OTS shall be published as 0100z to 0800z at 30W.

3. *Delegated Opposite Direction Levels (ODLs)*

Gander will accept FL310 as a westbound level H24 subject to eastbound CAR/SAM traffic, as described in “*Eastbound Traffic originating in New York/Santa Maria, during the eastbound OTS*” shown below.

During the westbound OTS, FL330 is delegated to Shanwick for westbound traffic.

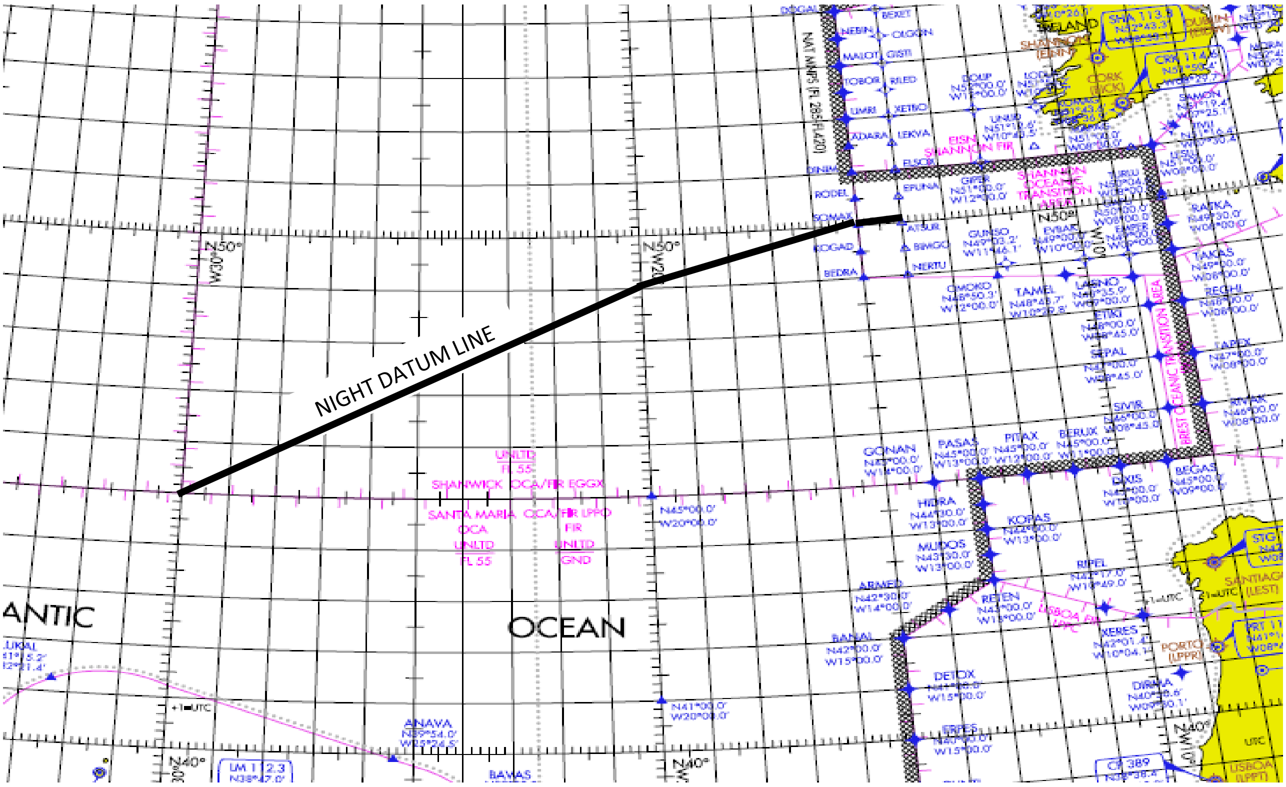
Night Datum Line, is established with the following coordinates:

45N030W 49N020W SOMAX ATSUR.

North of the Night Datum Line FL340 and FL380 are delegated to Gander for eastbound traffic.

South of the Night Datum Line FL340 will not be used for Gander eastbound traffic.

To the south of the Night Datum Line or the eastbound OTS, whichever is further south, FL340 and FL380 will not be used for Gander eastbound traffic.

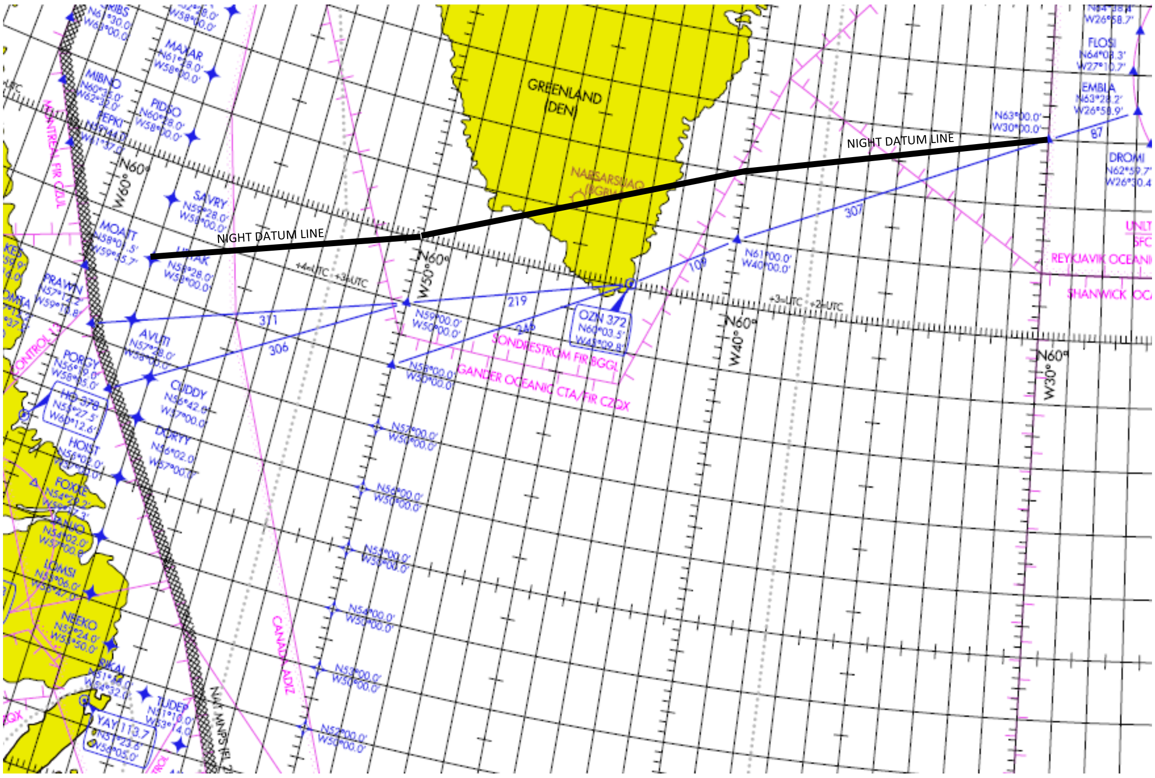


North Datum Line, is established between 0300Z and 0700Z with the following coordinates:

URTAK 60N050W 62N040W 63N030W

On and north of the North Datum Line FL380 is delegated to Reykjavik for westbound traffic.

In the event of a high volume of North Random Flights and/or OTS tracks the North Datum Line may be suspended to accommodate the dominant eastbound flow.



4. *Eastbound Traffic originating in New York/Santa Maria, during the eastbound OTS*

Eastbound traffic routing, both south of the Night Datum Line, and the main OTS, should flight plan using FL310, FL340, FL360 or FL380.

Eastbound traffic remaining south of the Night Datum Line should flight plan using FL310, FL340 FL380 or FL400.

The levels allocated to New York tracks entering Shanwick which cross, or route south of, the Night Datum Line, may be any combination of FL310, FL340, FL360, FL380, or as otherwise agreed between Santa Maria and New York. Additional levels will be allocated to New York tracks if the core OTS is located in that area.

For this procedure, "New York Tracks" are any eastbound OTS tracks which originate in the New York area and enter Gander or Shanwick OACC.

OTS Design & Use

For all westbound tracks which landfall at or north of AVUTI, Reykjavik require FL340 to be omitted from that track to allow profiles for aircraft originating in the Reykjavik OCA.

During the westbound OTS validity times, Shanwick shall not clear westbound aircraft which landfall at or north of AVUTI at FL340, except random flights that remain clear of the OTS and Gander OCA. Such flights may be cleared at FL340 without prior coordination with Reykjavik.

Note: The effect of this particular ATS co-ordination restriction on operators is that NAT flights originating from the Shanwick OCA which landfall at or between AVUTI and AVPUT should not be flight planned at FL340.

FL320 on eastbound OTS lying south of Shannon Oceanic Transition Area (SOTA) and which exit the Shanwick OCA at positions OMOKO or south, will be published as not being available as track levels after 0600z at 30W.

Note that Shanwick may tactically release FL320 back to Gander should there be insufficient demand on the TANGO routes, or that the demand on the eastbound tracks is sufficiently greater.

5. *Summary*

The availability of RVSM levels, between 0100z and 0800z (at 30W), is summarised in the following diagrams.

Diagram 1 below illustrates the use of the Night Datum line (coloured red) in a situation when there are no Gander eastbound NAT tracks in the vicinity.

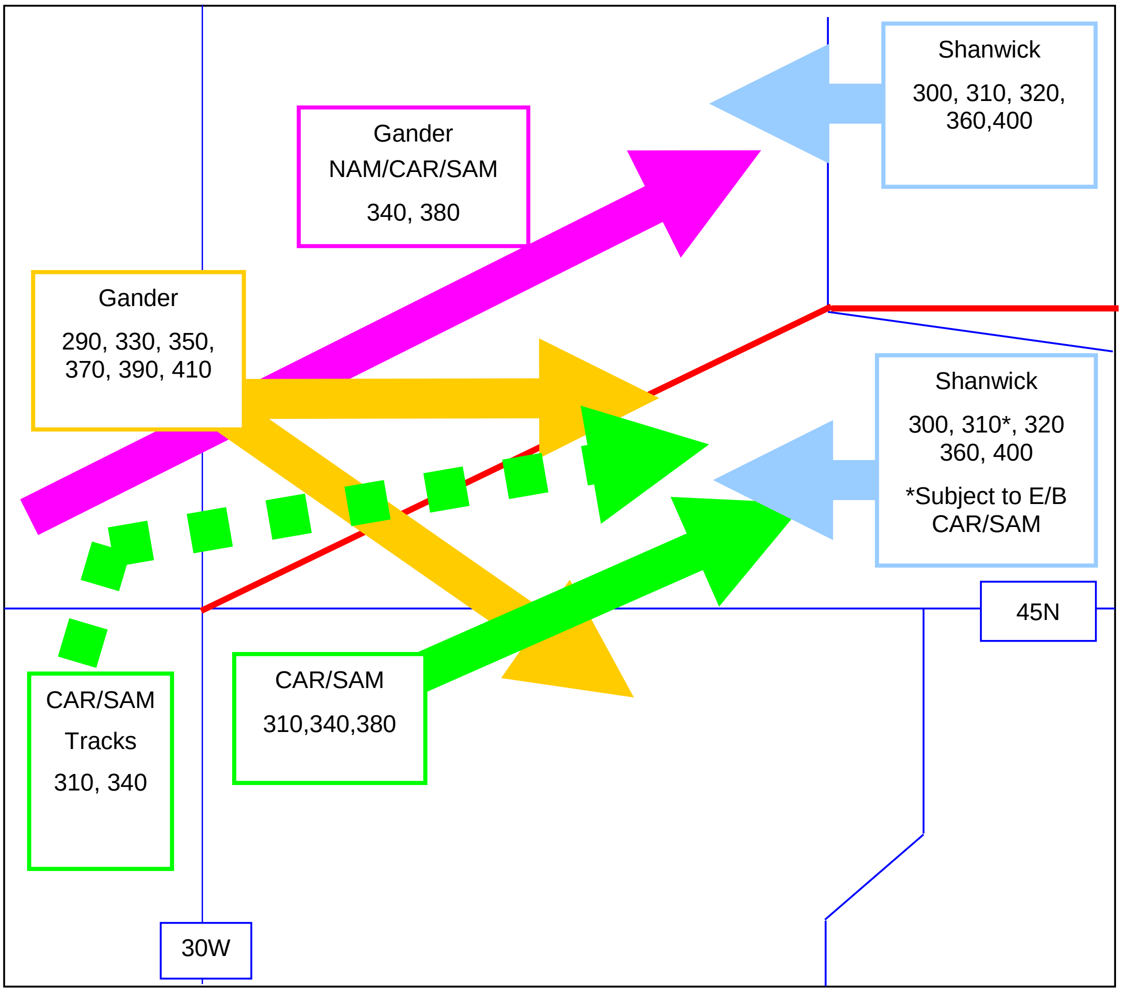


Diagram 1

Diagram 2 illustrates the situation when there are Gander eastbound NAT tracks in the vicinity.

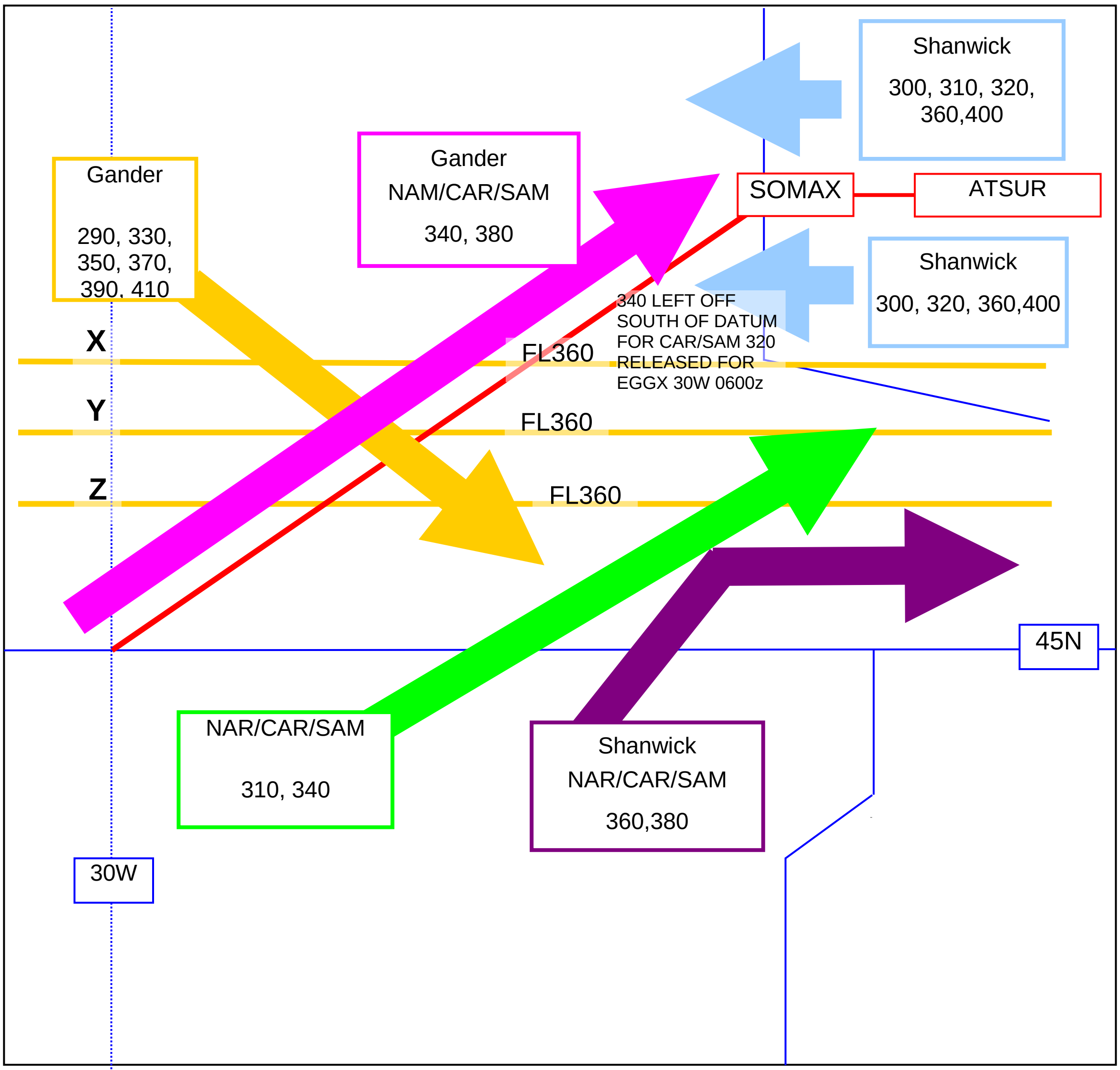


Diagram 2

6. *Transition* Periods

The time period between one set of OTS expiring and another set commencing is known as the transition period. The following procedures are in place to accommodate the majority of aircraft:

7. *Basic Principles:*

All times relate to 30W.

OTS Transition rules apply between 0801z to 1129z and 1901z to 0059z. During these times flight levels shall be applied in accordance with direction of flight other than as stated below.

8. *General principles:*

Westbound traffic crossing 30W, 2230z to 0059z, shall remain clear of the incoming OTS and shall not use delegated ODLs (FL340 and FL380). After 2230z, the OTS and ODLs (F340 and FL380) are released to Gander, who may clear eastbound aircraft, taking cognisance of, and giving priority to, already cleared westbound aircraft.

Eastbound traffic crossing 30W 1000z to 1129z, shall remain clear of the incoming OTS at FL350 and shall not use delegated ODL (FL330). After 1000z, the OTS (at FL330 and FL350) and ODL (FL330) are released to Shanwick, who may clear westbound aircraft, taking cognisance of, and giving priority to, already cleared eastbound aircraft.

Eastbound traffic, at FL370 and FL390, crossing 30W 1030z to 1129z, shall remain clear of the incoming OTS. After 1030z, the OTS (at FL370 and FL390) are released to Shanwick, who may clear westbound aircraft, taking cognisance of, and giving priority to, already cleared eastbound aircraft.

At the day-OTS end-time, Westbound aircraft crossing 30W up to 1900z, at ODL (FL330) or on the OTS, shall have priority over eastbound aircraft. Eastbound aircraft shall be cleared, taking cognisance of, and giving priority to, already cleared westbound aircraft.

At the night-OTS end-time, Eastbound aircraft crossing 30W up to 0800z, at ODLs (F340, FL380) or on the OTS, shall have priority over westbound aircraft. Westbound aircraft shall be cleared, taking cognisance of, and giving priority to, already cleared eastbound aircraft.

The table below summarises the above:

Level	Time	Direction
FL430	H24	Westbound. May be Flight Planned as eastbound by non-RVSM aircraft.
FL410	H24	Eastbound.
FL400	0801 – 2229 2230 – 0059 0100 – 0800	Westbound. Westbound (avoiding OTS). Eastbound OTS (subject to westbounds). Westbound (avoiding OTS). Eastbound (OTS).
FL390	1901 – 1029 1030 – 1129 1130 – 1900	Eastbound. Eastbound (avoiding OTS). Westbound OTS (subject to eastbounds). Eastbound (avoiding OTS). Westbound (OTS).
FL380	0300 – 0700 0801 – 2229 2230 – 0059 0100 – 0800	Westbound (ODL, on and to the North of the North datum line). Westbound. Eastbound (subject to westbounds). Eastbound (OTS and ODL).
FL370	1901 – 1029 1030 – 1129 1130 – 1900	Eastbound. Eastbound (avoiding OTS). Westbound OTS (subject to eastbounds). Eastbound (avoiding OTS). Westbound (OTS).
FL360	0801 – 2229 2230 – 0059 0100 – 0800	Westbound. Westbound (avoiding OTS.) Eastbound OTS (subject to westbounds). Westbound (avoiding OTS). Eastbound (OTS).
FL350	1901 – 0959 1000 – 1129 1130 –2000	Eastbound. Eastbound (avoiding OTS). Westbound OTS (subject to eastbounds). Eastbound (avoiding OTS). Westbound (OTS).
FL340	0801 – 2229 2230 – 0059 0100 – 0800	Westbound. Eastbound (subject to westbounds). Eastbound OTS (subject to westbounds). Eastbound (OTS and ODL).
FL330	1901 – 0959 1000 – 1129	Eastbound. Westbound (subject to eastbounds).

Level	Time	Direction
	1130 – 1900	Westbound (OTS and ODL).
FL320	0801 – 2229 2230 – 0059 0100 – 0800	Westbound. Westbound (avoiding OTS). Eastbound OTS (subject to westbounds). Westbound (avoiding OTS). Eastbound (OTS).
FL310	H24	Westbound. (ODL).
FL300	H24	Westbound.
FL290	H24	Eastbound.

ATTACHMENT 6

OCEANIC CLEARANCES DELIVERY/FORMAT/CONTENT

OCEANIC CLEARANCE

There are three elements to an oceanic clearance: Route, Level, and Speed (if required). These elements serve to provide for the three basic elements of separation: lateral, vertical, and longitudinal.

Specific information on how to obtain oceanic clearance from each NAT OACC is published in State AIPs. Various methods of obtaining oceanic clearances include:

a) use of published VHF clearance delivery frequencies;

b) by HF communications to the OACC through the appropriate radio station (in accordance with specified timeframes

c) a request via domestic or other ATC agencies;

d) by data link, when arrangements have been made with designated airlines to request and receive clearances using on-board equipment (ACARS). Detailed procedures for its operation may vary. Gander, Shanwick, Santa Maria and Reykjavik OACCs provide such a facility and the relevant operational procedures are published in national AIPs and also as NAT OPS Bulletins which are available for download from the ICAO Paris website (see ~~http://www.paris.icao.int/documents_open/subcategory.php?id=106).~~http://www.icao.int/EURNAT/) New York OACC uses the FANS 1/A CPDLC function to uplink oceanic clearances to all aircraft utilising CPDLC

Format of Oceanic Clearance messages delivered via voice

Oceanic clearances delivered via voice in the NAT region will normally have the following

format: "OCEANIC CLEARANCE [WITH A <list of ATC info>]. <atc unit> CLEARS

<ACID> TO

<clearance

limit>, VIA <route>, FROM <entry point> MAINTAIN <level> [<speed>] [.<free text>]"

Note - Fields in [ ] are optional. In particular when the delivered clearance conforms with the "as filed" or "as requested" clearance (RCL) the Element [WITH A <list of ATC info>] is omitted

The following <list of ATC info> will advise a difference in the clearance from the filed or requested details. It will normally be in accordance with the table below:

Condition	**List of ATC info**	**#**
The controller changes, deletes or adds a waypoint other than the entry point.	REROUTE	1
Flight level in the clearance message is not the same as the flight level in the RCL.	LEVEL CHANGE	2
Speed in the clearance message is not the same as the speed in the RCL.	SPEED CHANGE	3
The first waypoint in the clearance message is not the same as in the RCL.	ENTRY POINT CHANGE	4

The controller changes the clearance limit.	CLEARANCE LIMIT CHANGE	5

Multiple elements in the “<list of ATC info>” will normally be separated with the word “AND”.

Delivery method for Oceanic Clearance messages delivered via voice

In the first contact the Controller/Radio Operator will alert the Pilot to the intention to deliver an oceanic clearance, so that the Pilot can be prepared to accept and copy the detail. When the clearance to be delivered (CPL) differs in any way from the filed/requested flight plan (RCL) the controller/radio operator will denote in this first contact which of the elements have been changed. After the Pilot responds with his/her readiness to receive the detailed clearance, the controller/radio operator will provide the details of the clearance in the format described above.

Example exchange

1. *Controller/radio operator:*

“DLH458- (ATC /radio operator’s unit callsign) - OCEANIC CLEARANCE WITH A LEVEL CHANGE AND SPEED CHANGE.”

Pilot:

“(ATC/radio operator’s unit callsign) DHL485”

2. *Controller/radio operator:*

“REYKJAVIK OACC CLEARS DLH458 TO CYVR, VIA GUNPA 65 NORTH/010 WEST 69 NORTH/0 20 WEST 71 NORTH/030 WEST 72 NORTH/040 WEST 73 NORTH/060 WEST MEDPA, FROM GUNPA MAINTAIN F340 M083. UNABLE YOUR REQUESTED LEVEL. UNABLE YOUR REQUESTED SPEED”

REVISIONS/AMENDMENTS

When delivering any subsequent Revisions/Amendments to previous delivered clearances which include changes to the level and/or route and/or speed the controller/radio operator will utilise the following format and will provide a “heads-up” to the Pilot on first contact, as to which elements are being revised.

Format of an Oceanic Clearance Revision delivered via voice

“AMENDED <change> CLEARANCE. <atc unit> CLEARS <acid>,

<clearance>” where <change> can be one or more of the following:

LEVEL, ROUTE, SPEED.

Multiple <change> elements will normally be separated with the word “AND”.

Delivery Method for an Oceanic Clearance Revision delivered via voice

1. *Controller/radio operator:*

“DLH458- (ATC/radio operator’s unit callsign) - AMENDED LEVEL AND SPEED CLEARANCE.”

Pilot:

“(ATC /radio operator´s unit callsign) DLH458””

2. *Controller/radio operator:*

"REYKJAVIK OACC CLEARS DLH458, CLIMB TO F350, MAINTAIN M082, REPORT LEAVING, REPORT REACHING"

EXAMPLE CLEARANCES:

Following are examples of typical clearances that could be received by flights operating in NAT region oceanic airspace. These examples have been chosen with a view to explaining certain elements that are unique to the ICAO NAT region operational environment, or which have been shown to be subject to errors or misinterpretation.

Example 1 – Oceanic clearance to follow a NAT track when the details are "as filed" or "as requested".

Example 1a – Oceanic clearance delivered via voice (radio or clearance delivery), for a flight cleared on a NAT track GANDER OCEANIC CLEARS ABC123 TO PARIS CHARLES DE GAULLE VIA CARPE, NAT TRACK WHISKEY. FROM CARPE MAINTAIN FLIGHT LEVEL 330, MACH 082.	**Meaning** ABC123 is cleared to destination LFPG via oceanic entry point CARPE and NAT track W. The cleared oceanic flight level is FL330. The flight should ensure that an air traffic control clearance is obtained in sufficient time to allow the flight to cross CARPE at FL330. If the flight is unable to cross CARPE at FL330 air traffic control must be advised immediately. The assigned true Mach number is M082. The flight must maintain this Mach from CARPE until landfall at BEGID. Any required or unexpected deviation must be immediately reported to air traffic control.
Example 1b – Oceanic clearance delivered via voice (DCPC), for a flight cleared on a NAT track (abbreviated clearance) ABC123 CLEARED TO PARIS CHARLES DE GAULLE VIA CARPE, NAT TRACK WHISKEY. FROM CARPE MAINTAIN FLIGHT LEVEL 330, MACH 082.	**Meaning** ABC123 is cleared to destination LFPG via oceanic entry point CARPE and NAT track W. The cleared oceanic flight level is FL330. The flight should ensure that an air traffic control clearance is obtained in sufficient time to allow the flight to cross CARPE at FL330. If the flight is unable to cross CARPE at FL330 air traffic control must be advised immediately. The assigned true Mach number is M082. The flight must maintain this Mach from CARPE until landfall at BEGID. Any required or unexpected deviation must be immediately reported to air traffic control. The flight crew must include the TMI in the read back.

Example 1c – the same clearance delivered via data link using the ED/106 Standard CLX 1259 060224 CYQX CLRNCE 026 ABC123 CLRD TO LFPG VIA CARPE NAT W CARPE 54N050W 56N040W 57N030W 57N020W BILTO BEGID FM CARPE/1348 MNTN F330 M082 END OF MESSAGE	**Meaning** Data link clearance number 026, sent from the Gander Area Control Centre at 1259 UTC on 24 February 2006. ABC123 is cleared to destination LFPG via oceanic entry point CARPE and NAT track W. NAT track W is defined as CARPE, 54N050W, 56N040W 57N030W 57N020W BILTO to the landfall point BEGID. The clearance is based upon an expectation that ABC123 will reach CARPE at 1348. If the flight crew estimate differs from this time by 3 minutes or more, the flight should advise the current air traffic controller. The cleared oceanic flight level is FL330. The flight should ensure that an air traffic control clearance is obtained in sufficient time to allow the flight to cross CARPE at FL330. If the flight is unable to cross CARPE at FL330 air traffic control must be advised immediately. The assigned true Mach number is M082. The flight must maintain this Mach from CARPE until landfall at BEGID. Any required or unexpected deviation must be immediately reported to air traffic control.

Example 2 – Oceanic clearance to follow a random route when the details are "as filed" or "as requested".

Example 2a – Oceanic clearance delivered via voice (radio or clearance delivery) for a flight cleared on a random route. GANDER CENTRE CLEARS ABC456 TO LONDON HEATHROW VIA CRONO, 52 NORTH 050 WEST, 53 NORTH 040 WEST, 53 NORTH 030 WEST, 52 NORTH 020 WEST, LIMRI, XETBO. FROM CRONO MAINTAIN FLIGHT LEVEL 350, MACH 080.	**Meaning** ABC456 is cleared to destination EGLL via oceanic entry point CRONO, 52N050W, 53N040W, 53N030W, 52N020W, LIMRI to the landfall point XETBO. The cleared oceanic flight level is FL350. The flight should ensure that an air traffic control clearance is obtained in sufficient time to allow the flight to cross CRONO at FL350. If the flight is unable to cross CRONO at FL350 air traffic control must be advised immediately. The assigned true Mach number is M080. The flight must maintain this Mach from CRONO until landfall at XETBO. Any required or unexpected deviation must be immediately reported to air traffic control.

Example 2b – Oceanic clearance delivered via voice (DCPC) for a flight cleared on a random route. ABC456 CLEARED TO LONDON HEATHROW VIA CRONO, 52 NORTH 050 WEST, 53 NORTH 040 WEST, 53 NORTH 030 WEST, 52 NORTH 020 WEST, LIMRI, XETBO. FROM CRONO MAINTAIN FLIGHT LEVEL 350. MACH 080.	**Meaning** ABC456 is cleared to destination EGLL via oceanic entry point CRONO, 52N050W, 53N040W, 53N030W, 52N020W, LIMRI to the landfall point XETBO. The cleared oceanic flight level is FL350. The flight should ensure that an air traffic control clearance is obtained in sufficient time to allow the flight to cross CRONO at FL350. If the flight is unable to cross CRONO at FL350 air traffic control must be advised immediately. The assigned true Mach number is M080. The flight must maintain this Mach from CRONO until landfall at XETBO. Any required or unexpected deviation must be immediately reported to air traffic control.
Example 2c – the same clearance delivered via data link using the ED/106 Standard CLX 1523 060530 CYQX CLRNCE 118 ABC456 CLRD TO EGLL VIA CRONO RANDOM ROUTE CRONO 52N050W 53N040W 53N030W 52N020W LIMRI XETBO FM CRONO/1632 MNTN F350 M080 END OF MESSAGE	**Meaning** Data link clearance number 118, sent from the Gander Area Control Centre at 1523 UTC on 30 May 2006. ABC456 is cleared to destination EGLL via oceanic entry point CRONO and then a random route. The detailed route description is CRONO 52N050W 53N040W 53N030W 52N020W LIMRI to the landfall point XETBO. The clearance is based upon an expectation that ABC456 will reach CRONO at 1632. If the flight crew estimate differs from this time by 3 minutes or more, the flight should advise the current air traffic controller. The cleared oceanic flight level is FL350. The flight should ensure that an air traffic control clearance is obtained in sufficient time to allow the flight to cross CRONO at FL350. If the flight is unable to cross CRONO at FL350 air traffic control must be advised immediately. The assigned true Mach number is M080. The flight must maintain this Mach from CRONO until landfall at XETBO. Any required or unexpected deviation must be immediately reported to air traffic control.

Example 2d – Similar clearance, delivered via HF, relayed through ARINC ATC CLEARS ABC123 CLEARED DESTINATION AIRPORT UUDD DIRECT BALOO 36N060W 38N050W 43N045W 47N040W 52N030W 56N020W BALIX UP59 NINEX. MAINTAIN FLIGHT LEVEL 330. MAINTAIN MACH POINT EIGHT TWO.	**Meaning** ABC123 is cleared to Moscow via the route specified. The altitude, route and speed elements of the oceanic clearance are derived from the aircraft's current route, altitude and speed. These may change prior to entering or exiting oceanic airspace via an ATC clearance to do so. At all times, the aircraft is expected to maintain the route, altitude and speed last assigned by ATC.
Example 2e – Oceanic clearance delivered on ground for a flight departing from an airport within the NAT region (in this example BIKF) ABC456 CLEARED TO COPENHAGEN VIA OSKUM3A 62 NORTH 010 WEST GUNPA. CLIMB VIA SID TO FLIGHT LEVEL 290. MACH 080. SQUAWK 3457.	**Meaning** ABC456 is cleared to destination EKCH via standard instrument departure OSKUM3A, 62N010W, to the boundary point GUNPA. The initial cleared oceanic flight level is FL290, level revision will be issued during climb. The flight is to follow altitude restriction of the SID and after the last altitude restriction continue normal climb to FL290. The assigned true Mach number is M080. The flight must maintain this Mach after conversion until boundary at GUNPA. Any required or unexpected deviation must be immediately reported to air traffic control. The squawk code assigned is 3457.

Example 3 – Oceanic clearance, change to the flight plan route

| **Example 3a – Oceanic clearance delivered via voice (radio or clearance delivery), where the route differs from the flight plan route**
OCEANIC CLEARANCE WITH A REROUTE. GANDER OCEANIC CLEARS ABC456 TO LONDON HEATHROW VIA CRONO, 52 NORTH 050 WEST, 53 NORTH 040 WEST, 53 NORTH 030 WEST, 52 NORTH 020 WEST, LIMRI, XETBO. FROM CRONO MAINTAIN FLIGHT LEVEL 350, MACH 080. | **Meaning**
The route included in the oceanic clearance is not the same as the flight plan route.
ABC456 is cleared to destination EGLL via oceanic entry point CRONO, 52N050W, 53N040W, 53N030W, 52N020W, LIMRI to the landfall point XETBO.
The cleared oceanic flight level is FL350. The flight should ensure that an air traffic control clearance is obtained in sufficient time to allow the flight to cross CRONO at FL350. If the flight is unable to cross CRONO at FL350 air traffic control must be advised immediately.
The assigned true Mach number is M080. The flight must maintain this Mach from CRONO until landfall at XETBO. Any required or unexpected deviation must be immediately reported to air traffic control. |

Example3b –Oceanic clearance delivered via voice (DCPC), where the route differs from the flight plan route OCEANIC CLEARANCE WITH A REROUTE. ABC456 CLEARED TO LONDON HEATHROW VIA CRONO, 52 NORTH 050 WEST, 53 NORTH 040 WEST, 53 NORTH 030 WEST, 52 NORTH 020 WEST, LIMRI, XETBO. FROM CRONO MAINTAIN FLIGHT LEVEL 350, MACH 080.	**Meaning** The route included in the oceanic clearance is not the same as the flight plan route. ABC456 is cleared to destination EGLL via oceanic entry point CRONO, 52N050W, 53N040W, 53N030W, 52N020W, LIMRI to landfall point XETBO. The cleared oceanic flight level is FL350. The flight should ensure that an air traffic control clearance is obtained in sufficient time to allow the flight to cross CRONO at FL350. If the flight is unable to cross CRONO at FL350 air traffic control must be advised immediately. The assigned true Mach number is M080. The flight must maintain this Mach from CRONO until landfall at XETBO. Any required or unexpected deviation must be immediately reported to air traffic control.
Example 3c – the same clearance delivered via data link using the ED/106 Standard CLX 1523 060530 CYQX CLRNCE 118 ABC456 CLRD TO EGLL VIA CRONO RANDOM ROUTE CRONO 52N050W 53N040W 53N030W 52N020W LIMRI DOLIP M CRONO/1632 MNTN F350 M080 ATC/ ROUTE AMENDMENT END OF MESSAGE	**Meaning** Data link clearance number 118, sent from the Gander Area Control Centre at 1523 UTC on 30 May 2006. ABC456 is cleared to destination EGLL via oceanic entry point CRONO and then a random route. The detailed route description is CRONO 52N050W 53N040W 53N030W 52N020W LIMRI to landfall point XETBO. The clearance is based upon an expectation that ABC456 will reach CRONO at 1632. If the flight crew estimate differs from this time by 3 minutes or more, the flight should advise the current air traffic controller. The cleared oceanic flight level is FL350. The flight should ensure that an air traffic control clearance is obtained in sufficient time to allow the flight to cross CRONO at FL350. If the flight is unable to cross CRONO at FL350 air traffic control must be advised immediately. The assigned true Mach number is M080. The flight must maintain this Mach from CRONO until landfall at DOLIP. Any required or unexpected deviation must be immediately reported to air traffic control.

Example 3d – Revised oceanic clearance delivered via data link using the ED/106 Standard	**Meaning**
CLX 1558 060530 CYQX CLRNCE 135 ABC456 CLRD TO EGLL VIA CRONO RANDOM ROUTE	Data link clearance number 135 sent from the Gander Oceanic Area Control Centre at 1558 UTC on 30 May 2006. ABC456 is cleared to destination EGLL via oceanic entry point CRONO and then a random route.
CRONO 52N050W 53N040W 53N030W 53N020W LIMRI XETBO	The detailed route description is CRONO 52N050W 53N040W 53N030W 52N020W LIMRI to landfall point XETBO.
FM CRONO/1702 MNTN F340 M082 ATC/ ROUTE AMENDMENT LEVEL CHANGE MACH CHANGE	The clearance is based upon an expectation that ABC456 will reach CRONO at 1702. If the flight crew estimate differs from this time by 3 minutes or more, the flight should advise the current air traffic controller.
RECLEARANCE 1 END OF MESSAGE	The cleared oceanic flight level is FL340. The flight should ensure that an air traffic control clearance is obtained in sufficient time to allow the flight to cross CRONO at FL340. If the flight is unable to cross CRONO at FL340 air traffic control must be advised immediately.
	The assigned true Mach number is M082. The flight must maintain this Mach from CRONO until landfall at XETBO. Any required or unexpected deviation must be immediately reported to air traffic control.
	The cleared route, oceanic flight level and assigned true Mach number have been revised from those contained in the previously sent oceanic clearance.
	This is the first revision to the originally sent oceanic clearance.
Example 3e – Similar clearance, delivered via HF, relayed through ARINC	**Meaning**
ATC CLEARS ABC123 CLEARED DESTINATION AIRPORT UUDD DIRECT BALOO 36N060W 38N050W 43N045W 47N040W 52N030W 54N020W DOGAL BEXET. MAINTAIN FLIGHT LEVEL 330. MAINTAIN MACH POINT EIGHT TWO, ROUTE HAS BEEN CHANGED.	ABC123 is cleared to Moscow via the route specified. The altitude and speed elements of the oceanic clearance are derived from the aircrafts current altitude and speed. These may change prior to entering or exiting oceanic airspace via an ATC clearance to do so. At all times, the aircraft is expected to maintain the route, altitude and speed last assigned by ATC. In this particular case, the route of flight that is issued in the oceanic clearance is not the same as that filed in the FPL. The aircraft is advised of the fact that it is receiving an airborne reroute by the statement "ROUTE HAS BEEN CHANGED".

Example 4 – Re-route clearances

Example 4a –Revised route clearance delivered via voice (radio) ABC123 AMENDED ROUTE CLEARANCE SHANWICK OCEANIC RE-CLEARS ABC123 AFTER 57 NORTH 20 WEST TO REROUTE VIA 58 NORTH 015 WEST, GOMUP, GINGA.	**Meaning** The previously cleared route is to be followed until 57N020W. After passing 57N020W the flight is cleared direct to 58N015W, then direct to GOMUP and then direct to GINGA
Example 4b –Revised route clearance delivered via voice (DCPC) ABC123 AMENDED ROUTE CLEARANCE ABC123 AFTER PASSING 57 NORTH 20 WEST CLEARED REROUTE VIA 58 NORTH 015 WEST, GOMUP, GINGA.	**Meaning** The previously cleared route is to be followed until 57N020W. After passing 57N020W the flight is cleared direct to 58N015W, then direct to GOMUP and then direct to GINGA.
Example 4c – Revised route clearance delivered via CPDLC ABC123 ROUTE HAS BEEN CHANGED AT 44N030W CLEARED 47N020W OMOKO GUNSO	**Meaning** The previously cleared route is to be followed until 44N030W. After passing 44N030W the flight is cleared direct to 47N020W, then direct to OMOKO and then direct to GUNSO.
Example 4d – Revised route clearance delivered by CPDLC using UM79 ABC123 CLEARED TO 42N040W VIA ROUTE 42N020W 42N030W	**Meaning** The previously cleared route is to be followed until 42N020W. After passing 42N020W the flight is cleared direct to 42N030W, then direct to 42N040W

Example 5 – level clearances – no restrictions

Example 5a –Revised level clearance delivered via voice (radio) ABC456 AMENDED LEVEL CLEARANCE. SANTA MARIA OCEANIC CLEARS ABC456 CLIMB TO AND MAINTAIN FLIGHT LEVEL 340. REPORT LEAVING, REPORT REACHING. **Note- the instruction to “Report Leaving” is not a requirement, and may not always be included in clearances issued by New York ARTCC**	**Meaning** ABC456 is cleared to climb to and maintain FL340. If the instruction to “report leaving” is included, flight is to report leaving its current level. The flight is to report reaching FL340.
Example 5b –Revised level clearance delivered via voice (DCPC) ABC456 CLIMB TO AND MAINTAIN FLIGHT LEVEL 340. REPORT LEAVING, REPORT REACHING. **Note- the instruction to “Report Leaving” is not a requirement, and may not be included in all clearances**	**Meaning** ABC456 is cleared to climb to and maintain FL340. If the instruction to “report leaving” is included, flight is to report leaving its current level. The flight is to report reaching FL340.

Example 5c – the same clearance delivered via CPDLC CLIMB TO AND MAINTAIN F340 REPORT LEAVING F320 REPORT LEVEL F340 **Note- the instruction to "Report Leaving" is not a requirement, and may not always be included in clearances issued by New York ARTCC**	**Meaning** ABC456, which is currently at FL320, is cleared to climb to and maintain FL340. The flight is to send a CPDLC downlink message to report leaving FL320 and to send another CPDLC downlink message to report when the flight has levelled at FL340.

Example 6 – level clearances – with geographic restrictions/conditions

Example 6a –Revised level clearance delivered via voice (radio) – geographic restriction to reach level by POINT ABC123 AMENDED LEVEL CLEARANCE. SANTA MARIA OCEANIC CLEARS ABC123 CLIMB TO REACH FLIGHT LEVEL 320 BEFORE PASSING 41 NORTH 020 WEST. REPORT LEAVING, REPORT REACHING.	**Meaning** ABC123 is cleared to climb to and maintain FL320. Climb must be arranged so that the flight is level in sufficient time to cross 41N020W already level at FL320. The flight is to report leaving its current level and also to report reaching FL320.
Example 6b – clearance with the same intent, using different phraseology ABC123 AMENDED LEVEL CLEARANCE. GANDER OCEANIC CLEARS ABC123 CLIMB TO AND MAINTAIN FLIGHT LEVEL 320. CROSS 20 WEST LEVEL. REPORT LEAVING, REPORT REACHING.	**Meaning** ABC123 is cleared to climb to and maintain FL320. Climb must be arranged so that the flight is level in sufficient time to cross 41N020W level at FL320. The flight is to report leaving its current level and also to report reaching FL320.
Example 6c –Revised level clearance delivered via voice (DCPC) – geographic restriction to reach level by POINT ABC123 CLIMB TO REACH FLIGHT LEVEL 320 BEFORE PASSING 41 NORTH 020 WEST. REPORT LEAVING, REPORT REACHING.	**Meaning** ABC123 is cleared to climb to and maintain FL320. Climb must be arranged so that the flight is level in sufficient time to cross 41N020W already level at FL320. The flight is to report leaving its current level and also to report reaching FL320.
Example 6d - same clearance delivered via CPDLC CLIMB TO AND MAINTAIN F320 CROSS 41N020W AT F320 REPORT LEAVING F310 REPORT LEVEL F320	**Meaning** ABC123, which is currently at FL310, is cleared to climb to and maintain FL320. Climb must be arranged so that the flight is level in sufficient time to cross 41N020W already level at FL320. The flight is to send a CPDLC downlink message to report leaving FL310 and to send another CPDLC downlink message to report when the flight has levelled at FL320.

Example 6e – Revised level clearance delivered via voice (radio) – geographic restriction to maintain current level until POINT ABC456 AMENDED LEVEL CLEARANCE. SANTA MARIA OCEANIC CLEARS ABC456 MAINTAIN FLIGHT LEVEL 300. AFTER PASSING 41 NORTH 020 WEST CLIMB TO FLIGHT LEVEL 320. REPORT LEAVING, REPORT REACHING. **Note- the initial phrase “maintain flight level 300” is not a requirement, and may not always be included in such clearances delivered via voice**	**Meaning** ABC456, which is currently at FL300, is cleared to climb to and maintain FL320; however, climb must not commence until after the flight has passed 41N020W. The flight is to report leaving its current level and also to report reaching FL320. The initial phrase “MAINTAIN FLIGHT LEVEL 300” may be included to bring attention to the fact that the clearance is a conditional level clearance; the level change cannot commence until the specified condition has been met.
Example 6f – Revised level clearance delivered via voice (DCPC) – geographic restriction to maintain current level until POINT ABC456 MAINTAIN FLIGHT LEVEL 300. AFTER PASSING 41 NORTH 020 WEST CLIMB TO FLIGHT LEVEL 320. REPORT LEAVING, REPORT REACHING. **Note- the initial phrase “maintain flight level 300” is not a requirement, and may not always be included in such clearances delivered via voice**	**Meaning** ABC456, which is currently at FL300, is cleared to climb to and maintain FL320; however, climb must not commence until after the flight has passed 41N020W. The flight is to report leaving its current level and also to report reaching FL320. The initial phrase “MAINTAIN FLIGHT LEVEL 300” may be included to bring attention to the fact that the clearance is a conditional level clearance; the level change cannot commence until the specified condition has been met.
Example 6g – the same clearance delivered via CPDLC MAINTAIN F300 AT 41N020W CLIMB TO AND MAINTAIN F320 REPORT LEAVING F300 REPORT LEVEL F320	**Meaning** ABC456, which is currently at FL300, is cleared to climb to FL320; however, climb must not commence until the flight reaches 41N020W. The flight is to send a CPDLC downlink message to report leaving FL300 and to send another CPDLC downlink message to report when the flight has levelled at FL320. The initial message element “MAINTAIN F300” is intended to bring attention to the fact that the clearance is a conditional level clearance; the level change cannot commence until the specified condition has been met.

Example 7 – level clearances – with time restrictions/conditions

Example 7a – Revised level clearance delivered via voice (radio) –restriction to reach level by TIME ABC123 AMENDED LEVEL CLEARANCE. SANTA MARIA OCEANIC CLEARS ABC123 CLIMB TO FLIGHT LEVEL 320 TO BE LEVEL AT OR BEFORE 1337. REPORT LEAVING, REPORT REACHING.	**Meaning** ABC123 is cleared to climb to and maintain FL320. Climb must be arranged so that the flight is level at FL320 no later than 1337 UTC. The flight is to report leaving its current level and also to report reaching FL320.
Example 7b –Revised level clearance delivered via voice (DCPC) –restriction to reach level by TIME ABC123 CLIMB TO REACH FLIGHT LEVEL 320 AT OR BEFORE 1337. REPORT LEAVING, REPORT REACHING.	**Meaning** ABC123 is cleared to climb to and maintain FL320. Climb must be arranged so that the flight is level at FL320 no later than 1337 UTC. The flight is to report leaving its current level and also to report reaching FL320.
Example 7c – the same clearance delivered via CPDLC CLIMB TO REACH F320 BY 1337 REPORT LEAVING F310 REPORT LEVEL F320	**Meaning** ABC123, which is currently at FL310, is cleared to climb to and maintain FL320. Climb must be arranged so that the flight is level at FL320 no later than 1337 UTC. The flight is to send a CPDLC downlink message to report leaving FL310 and to send another CPDLC downlink message to report when the flight has levelled at FL320.
Example 7d – Revised level clearance delivered via voice (radio) –restriction to maintain current level until TIME ABC456 AMENDED LEVEL CLEARANCE. SANTA MARIA OCEANIC CLEARS ABC456 MAINTAIN FLIGHT LEVEL 300. AT 1337 OR AFTER CLIMB TO AND MAINTAIN FLIGHT LEVEL 320. REPORT LEAVING, REPORT REACHING. **Note- the initial phrase "maintain flight level 300" is not a requirement, and may not always be included in such clearances delivered via voice.**	**Meaning** ABC456, which is currently at FL300, is cleared to climb to and maintain FL320; however, climb cannot be commenced until 1337 UTC, or later. The flight is to report leaving its current level and also to report reaching FL320. The initial phrase "MAINTAIN FLIGHT LEVEL 300" may be included to bring attention to the fact that the clearance is a conditional level clearance; the level change cannot commence until the specified condition has been met.

Example 7e – Revised level clearance delivered via voice (DCPC) –restriction to maintain current level until TIME ABC456 MAINTAIN FLIGHT LEVEL300. AT OR AFTER 1337 CLIMB TO AND MAINTAIN FLIGHT LEVEL 320. REPORT LEAVING, REPORT REACHING. **Note- the initial phrase "maintain flight level 300" is not a requirement, and may not always be included in such clearances delivered via voice**	**Meaning** ABC456, which is currently at FL300, is cleared to climb to and maintain FL320; however, climb cannot be commenced until 1337 UTC, or later. The flight is to report leaving its current level and also to report reaching FL320. The initial phrase "MAINTAIN FLIGHT LEVEL 300" may be included to bring attention to the fact that the clearance is a conditional level clearance; the level change cannot commence until the specified condition has been met.
Example 7f – the same clearance delivered via CPDLC MAINTAIN F300 AT 1337 CLIMB TO AND MAINTAIN F320 REPORT LEAVING F300 REPORT LEVEL F320	**Meaning** ABC456, which is currently at FL300, is cleared to climb to FL320; however, climb must not commence until 1337 UTC. The flight is to send a CPDLC downlink message to report leaving FL300 and to send another CPDLC downlink message to report when the flight has levelled at FL320. The initial message element "MAINTAIN F300" is intended to bring attention to the fact that the clearance is a conditional level clearance; the level change cannot commence until the specified condition has been met.

Example 8 – time restrictions/conditions – reach a point no later than a specified time

Example 8a – time restriction delivered via voice (radio), speed amended – AT OR BEFORE ABC123 AMENDED SPEED CLEARANCE. REYKJAVIK OACC CLEARS ABC123 CROSS 63 NORTH 030 WEST AT OR BEFORE 1428.	**Meaning** ABC123 is to adjust its speed to ensure that the flight will reach 63N030W no later than 1428 UTC.
Example 8b – time restriction delivered via voice (DCPC), speed amended – AT OR BEFORE ABC123 AMENDED SPEED CLEARANCE. ABC123 CROSS 63 NORTH 030 WEST AT OR BEFORE 1428. **Note - the initial phrase "amended speed clearance" may not always be included in clearances issued via DCPC**	**Meaning** ABC123 is to adjust its speed to ensure that the flight will reach 63N030W no later than 1428 UTC.
Example 8c – the same clearance delivered via CPDLC CROSS 63N030W AT OR BEFORE 1428	**Meaning** ABC123 is to adjust its speed to ensure that the flight will reach 63N030W no later than 1428 UTC.

Example 8d – time restriction delivered by radio via voice (using different phraseology) – AT OR BEFORE, then a speed instruction GANDER OCEANIC CLEARS ABC123 CROSS 50 NORTH 040 WEST AT TIME 1428 OR BEFORE. AFTER 40 WEST RESUME MACH 082.	**Meaning** ABC123, which is currently assigned Mach 082, is to adjust its speed to ensure that the flight will reach 50N040W no later than 1428 UTC. After reaching 50N040W, the flight is to resume maintaining Mach 082.
Example 8e – the same clearance delivered via CPDLC ABC123 CROSS 50N040W AT OR BEFORE 1428 AFTER PASSING 50N040W MAINTAIN MACH 082	**Meaning** ABC123 is to adjust its speed to ensure that the flight will reach 50N040W no later than 1428 UTC. After passing 50N040W, the flight is to maintain Mach 082.

Example 9 – time restrictions/conditions – cross a point no earlier than a specified time

Example 9a–. time restriction delivered via voice (radio) – AT OR AFTER ABC456 AMENDED SPEED CLEARANCE. REYKJAVIK OACC CLEARS ABC456 CROSS 63 NORTH 030 WEST AT OR AFTER 1337.	**Meaning** ABC456 is to adjust its speed to ensure that the flight will not reach 63N030W earlier than 1337 UTC.
Example 9b–. time restriction delivered via voice (DCPC) – AT OR AFTER ABC456 AMENDED SPEED CLEARANCE. ABC456 CROSS 63 NORTH 030 WEST AT OR AFTER 1337. **Note - the initial phrase "amended speed clearance" may not always be included in clearances issued via DCPC**	**Meaning** ABC456 is to adjust its speed to ensure that the flight will not reach 63N030W earlier than 1337 UTC.
Example 9c – the same clearance delivered via CPDLC CROSS 63N030W AT OR AFTER 1337	**Meaning** ABC456 is to adjust its speed to ensure that the flight will not reach 63N030W earlier than 1337 UTC.
Example 9d – time restriction delivered by radio via voice (using different phraseology) – AT OR LATER, then a speed instruction GANDER OCEANIC CLEARS ABC456 CROSS 50 NORTH 040 WEST AT 1337 OR LATER. AFTER 40 WEST RESUME MACH 082.	**Meaning** ABC456, which is currently assigned Mach 082, is to adjust its speed to ensure that the flight will not reach 50N040W earlier than 1337 UTC. After reaching 50N040W, the flight is to resume maintaining Mach 082.
Example 9e – same clearance delivered via CPDLC CROSS 50N040W AT OR AFTER 1337 AFTER PASSING 50N040W MAINTAIN MACH 082	**Meaning** ABC456 is to adjust its speed to ensure that the flight will not reach 50N040W earlier than 1337 UTC. After reaching 50N040W, the flight is to maintain Mach 082.

ATTACHMENT 7

WEATHER CONDITIONS & CONSIDERATIONS

1. GENERAL

1.1 The following text is concerned primarily with the North Atlantic region north of 27°N. The general flow of air masses and weather systems through the Atlantic are described. Followed by more detailed information on the anticipated local conditions in Greenland, Iceland and the United Kingdom.

2. NORTH ATLANTIC WEATHER SYSTEMS

2.1 The weather situations affecting the safety of aviation weather services in the northern part is mainly dominated by depressions and frontal systems, but in the southern part by hurricanes and tropical storms, particularly in the Caribbean sector and the area between Cape Verde and the Leeward and Windward Islands.

2.2 Semi-permanent Pressure Systems

2.2.1 The Azores or Bermuda High is a region of subsiding warm air, usually oriented in an east-west line near 30°N in the winter and about 40°N during the summer. This high reaches its peak intensity in the summer months.

2.2.2 The Icelandic Low is a feature of the mean pressure charts of the North Atlantic. It is the result of frequent low pressure systems which, after deepening off the east coast of North America, move into the Iceland region.

2.2.3 The statistical average will show low pressure, but on a daily chart it may not even exist. On occasions the subtropical high is greatly displaced. This alters the main storm track resulting in abnormal weather conditions over large sections of the Atlantic.

2.3 Migratory Pressure Systems

2.3.1 Most in-flight weather is produced by frontal depressions. The North Atlantic is a region where new storms intensify or old storms redevelop. New storms may form off the Atlantic Seaboard and intensify as they move north-eastward across the ocean. These storms in particular are most intense in the winter months and have a wide variation in their tracks. Hurricane force winds may be expected near the surface. Sudden deepening of the depressions or changes in the estimated tracks can cause dramatic changes in upper air winds and consequently serious errors in wind forecasts. Winter storms over the North Atlantic should lead to extra careful planning of flights.

2.3.2 Sometimes storms develop west of the Azores and move northward or north-eastward toward Iceland and the United Kingdom. These storms are usually associated with warm highs over western Europe.

2.3.3 Secondary lows often develop west of Greenland when a low moves northeastward across the southern tip. These lows in the Davis Strait-Baffin Bay area result in poor weather conditions in the southeastern Arctic. With the tracks of the main low pressure systems lying to the south of Greenland and Iceland from east to west towards Scotland, cold and often stationary lows form frequently over the Greenland Sea between Iceland and South Greenland. Although these lows are without typical frontal zones, active CB-clouds with snow showers often tend to join into the "semi-front" with continuous snowfall. The same happens in the so- called polar-lows which during winter may develop in arctic air masses around Iceland and between Iceland and Norway.

2.3.4 Tropical storms and hurricanes originate in the Caribbean or eastern Atlantic during the late summer and early fall. They often curve northward around the Bermuda High onto the northern portions of the Atlantic producing severe in-flight and terminal weather.

2.3.5 High pressure areas found over the Atlantic have a variety of paths. Those that move eastward off the North American continent are usually cold domes. In winter these weaken or disappear entirely after they reach the warmer waters of the Gulf Stream. During the summer they generally merge with the Bermuda-Azores High. Occasionally, a high moving eastward off the Labrador coast will continue to build up for two or three days and spread more or less straight eastward to Europe.

2.3.6 Another important facet of the North Atlantic is the effect of the Siberian High. In winter this high may extend southwestward so that its western point reaches across northern Europe and out over the northeastern Atlantic. On rare occasions this high may dominate the entire region of the North Atlantic from Greenland to Europe.

2.3.7 The Azores low is a development that is most widely divergent from the normal conditions. During periods of meridional flow, cold air from northern Canada will advance well southward into the region between Bermuda and the Azores, breaking away from the main body and causing a cold low to develop in that region. These lows usually move very slowly and can become extensive. At the same time high pressure may build up to the Iceland area producing easterly winds over the entire region north of 30N.

2.3.8 On occasions an extensive high pressure area builds up over Europe. This blocks the eastward motion of lows and forces them to curve northward, resulting in the trough over the eastern Atlantic. A ridge then develops in the mid-Atlantic. This ridge in turn blocks lows moving off North America and causes a trough to form near the east coast. These troughs and ridges may persist for days with little motion. In the trough, lows develop, deepen, move northward, and occlude. Development of these low pressure systems is often very rapid, causing sudden, unpredictable weather to occur. One of the most treacherous situations for eastern Canadian terminals occurs when lows deepen or form rapidly south of the Maritimes with a trough northward over the Gulf of St. Lawrence and Labrador.

2.4 Upper Air Circulation

2.4.1 The main flow is generally from west to east but many variations do exist. The winds are stronger in winter when greater horizontal gradients exist. Inevitably, the strongest winds will be located in the western Atlantic. As the air masses traverse the oceanic area. considerable modification occurs resulting in weaker thermal gradients, producing lighter winds over the eastern Atlantic.

2.5 Air Masses

2.5.1 The air masses usually found over the Atlantic are those that have moved across the eastern United States, or southeastward across Canada or the Davis Strait. As these air masses move out over the Atlantic they rapidly assume maritime characteristics. The greatest change in these air masses occurs while crossing the Gulf Stream or the North Atlantic Drift either northward or southward. This modification may be sharp and very noticeable especially during winter months, when the air becomes very unstable with snow or hail showers or even thunderstorms.

2.6 Oceanic Currents and Temperatures

2.6.1 The dominant feature of the North Atlantic is the warm Gulf Stream and its eastward extension, the North Atlantic Drift. As the drift reaches the European sector it branches out. One portion moves northward along the Norwegian coast, known as the Norwegian Current. Another branch flows into the English Channel area. This produces relatively warm sea temperatures along the European shores during the winter months.

2.6.2 A southward flowing branch of the North Atlantic Drift, combined with up-welling, results in a cool current along the west coast of Africa, called the Canaries Current. Cold Arctic water from the Davis Strait reaches the North American coast as far south as New England. This current is referred to as the Labrador Current.

2.6.3 The effect of these currents on the terminal weather around the coastal area of the Atlantic varies with the time of year, the type of air mass involved, and the direction of flow.

3. GREENLAND LOCAL CONDITIONS

3.1 Seasonal Variation

3.1.1 Within the Søndrestrøm FIR, Arctic weather conditions such as intense storms, severe icing, severe turbulence, heavy precipitation, snow and water in various forms may be encountered throughout the year. Weather conditions change rapidly. Due to the mixture of warm air over the oceans and cold air over the icecap, heavy fog may build up over the coasts, closing down all of Greenland's airports simultaneously. Changes will often take place within a few minutes and will not always be included in the forecast received in your briefing prior to departure.

3.2 Sea Conditions

3.2.1 The waters around Greenland are not influenced by warmer waters such as the Gulf Stream. They are arctic waters with winter temperatures close to 0° Celsius. During the summer period the water temperatures may rise to 3-6° Celsius at the warmest. This is why you may encounter huge amounts of floating ice in the form of icebergs and ice floes at any time of year.

3.3 Terrain

3.3.1 The elevation of the highest point in Greenland is 13,120 ft, (4,006m), and the general elevation of the icecap is about 10,000 ft, (3,053m). The combination of low temperatures and high winds may under certain conditions create a lowest usable flight level of FL235 in the area near the highest terrain, and FL190 over the icecap. On the route between Søndrestrøm and Kulusuk the lowest usable flight level in general is about FL130. An equally high flight level can be encountered to and from Narsarsuaq from Canada or Iceland, as crossing the icecap will require a minimum altitude of FL130. On the route from Nuuk/Godthaab towards Iceland either direct or via Kulusuk NDB, the lowest usable flight level will often be FL150. On the direct route via the Prince Christian Sound NDB (OZN) to and from Canada or Iceland, the lowest usable flight level to be expected and planned is FL 110.

3.4 Wintertime Darkness/Summertime Daylight

3.4.1 VFR flight at night is not allowed in Greenland. This means you are prevented from flying into Narsarsuaq or Kulusuk VFR at night. VFR flight is only permitted from the beginning of the morning civil twilight until the end of civil twilight. Civil twilight ends in the evening when the center of the sun's disc is 6 degrees below the horizon, and begins in the morning when the center of the sun's disc is 6 degrees below the horizon. Additional information may be acquired from the airport of your destination or your flight planned alternate.

4. ICELAND LOCAL CONDITIONS

4.1 Seasonal Variation

4.1.1 The climate in Iceland is largely influenced by both warm subtropical air and cold polar air currents, as well as ocean currents. The mean January (the coldest month) temperature is about 2°C to 0°C (28°F to 32°F). The mean July (the warmest month) temperature is 9°C to F 11°C (48°F to 52°F).

4.1.2 Do not be misled, however, into expecting balmy temperatures and unlimited visibility. Extreme seasonal variations are to be anticipated. Like the majority of the North Atlantic, rapidly changing weather conditions involving severe icing, severe turbulence, and heavy precipitation are common, particularly during the wintertime. Again, these rapid changes make accurate forecasts extremely difficult.

4.2 Sea Conditions

4.2.1 Iceland is located near the border between warm and cold ocean currents. The North Atlantic Drift passes just to the south on its course northeastwards, and one of its branches, the Irminger Current encircles the south, west and partly the north coasts. On the other hand, a branch of the cold East Greenland Current, known as the East Iceland Current, flows in a southerly and south-easterly direction along the east coast. The sea surface temperatures are highest off the south and southwest coasts, 7°C to 8°C in winter, but 8°C to 12°C in summer.

4.3 Terrain

4.3.1 Iceland is a mountainous country with an average elevation of about 1,650 ft. The highest peak is 6,952 ft. (2119 m.) located near the southernmost edge of the island's largest glaciers. Due to the extreme variances in barometric pressure, coupled with high winds, the lowest usable flight level may be FL120.

4.4 Wintertime Darkness/Summertime Daylight

4.4.1 The shortest period of daylight falls in December. A typical day includes approximately 4 hours of daylight with long twilight periods. During summer nights, the sun remains 6° or more above the horizon, thus experiencing continuous daylight from 2 May to 25 July.

5. UNITED KINGDOM (SCOTLAND) LOCAL CONDITIONS

5.1 Seasonal Variation

5.1.1 The climate over Scotland and the northern part of the UK is influenced by warm maritime and cold polar air masses, modified by the Gulf Stream current. Seasonal variations are to be anticipated, particularly during the wintertime with severe icing, high winds, severe turbulence and heavy precipitation.

5.2 Sea Conditions

5.2.1 The average Mean Sea Surface Temperatures extrapolated for 60N 10W range from 8°C (47°F) in February to 12°C (54°F) in August.

5.3 Terrain

5.3.1 The whole of Scotland is designated as a "sparsely populated area". To the west of the mainland are many groups of islands with few airstrips or NAVAIDS. Scotland is mountainous with the highest peak 4,406 ft. The lowest usable flight level may be FL075.

6. WATER TEMPERATURES

6.1 In conjunction with changeable weather, the water in the North Atlantic is cold. The following temperatures were taken from the Bunkor Climate Atlas of the North Atlantic and represent average temperatures based on data assembled between 1941 and 1972. All values are in degrees Celsius.

	Frobisher	Goose Bay	Labrador Sea	South Greenland
Jan.	0°	0°	2°	2-4°
Feb.	0°	0°	2°	2-4°
Mar.	0°	0°	2°	2-4°
Apr.	0°	0°	2°	2-4°
May	2°	2°	2°	2-4°
Jun.	2°	4°	2°	2-4°
Jul.	4°	6°	2°	2-4°
Aug.	6°	6-8°	8-10°	6-8°
Sep.	6°	6°	2°	2-4°
Oct.	4°	4°	2°	2-4°
Nov.	2°	2°	2°	2-4°
Dec.	0°	0°	2-4°	2-4°

7. HYPOTHERMIA

7.1 Causes

7.1.1 Hypothermia can develop quickly and kill you. Sometimes referred to as exposure sickness, it is a condition of the body when its inner-core temperature falls to a level at which the vital organs no longer function effectively.

7.1.2 Hypothermia is caused by cold, wetness, and/or wind chilling the body so that it loses heat faster than it can produce it. Frequently the advent of hypothermia is hastened by a deficiency of energy producing food in the body. However, the greatest single contributing factor to hypothermia is improper clothing.

7.1.3 Hypothermia can occur anywhere that the environmental temperature is low enough to reduce the body temperature to a dangerous level. It occurs most frequently at sea or in rugged mountain terrain where a person on foot can pass from a calm and sunny valley to a wind and rain-lashed mountain ridge in a few hours. Most hypothermia accidents occur in outdoor temperatures between 1° and 10° C (30° to 50°F).

7.2 Symptoms

7.2.1 Fortunately the approach of hypothermia is easily noticeable and its advance marked by recognizable steps or stages. If the warning signs are heeded and counter-measures taken, tragedy can be avoided.

7.2.2 Noticeable symptoms normally occur in the following stages:

1. A person feels cold and has to exercise to warm up.

2. He starts to shiver and feel numb.

3. Shivering becomes more intense and uncontrollable.

4. Shivering becomes violent. There is a difficulty in speaking. Thinking becomes sluggish and the mind begins to wander.

5. Shivering decreases and muscles begin to stiffen. Coordination becomes difficult and movements are erratic and jerky. Exposed skin may become blue or puffy. Thinking becomes fuzzy. Appreciation of the seriousness of the situation is vague or nonexistent. However, the victim may still be able to maintain the appearance of knowing where he is and what is going on.

6. The victim becomes irrational, loses contact with the environment, and drifts into a stupor.

7. Victim does not respond to the spoken word. Falls into unconsciousness. Most reflexes cease to function and breathing becomes erratic.

8. Heart and lung centers of the brain stop functioning. The individual is now a fatality.

Note: Although the above symptoms are those typically noted, one of the editors of this manual has experienced hypothermia and he recalls that his symptoms were NOT easily noticeable. In fact, he was not aware at all that he was slipping into hypothermia. His symptoms were observed by a climbing partner who took appropriate action.

7.3 Treatment

7.3.1 A person who is alert and aware of the potential dangers can help himself in stages 1 through 3. But once the condition has advanced to stage 4 and the person's mind begins to wander, he may not realize what is happening and may well need assistance. Further deterioration will definitely require outside aid. Anyone showing any of the above-mentioned symptoms, including the inability to get up after a rest, is in trouble and needs your help. He may not realize and deny there is a problem. Believe the symptoms, not the victim. Even mild symptoms demand immediate and positive treatment.

1. Get the victim out of the cold, wind, and rain.

2. Strip off all wet clothes.

3. If the person is only mildly impaired;

   (a) give him warm, non-alcoholic, drinks.

   (b) get him into dry clothes and a warm sleeping bag;

4. If the victim is semi-conscious or worse;

   (a) try to keep him awake and give him warm drinks.

   (b) leave him stripped: put him in a sleeping bag with another person (also stripped); skin to skin contact is the most effective treatment.

5. If he has recovered sufficiently to eat, feed him. Make sure he is dressed in warm clothing and well rested before starting on again.

6. If the victim has to be carried out, make sure his body temperature has been brought up to normal and wrap him in a good sleeping bag before starting out.

7.4 Prevention

7.4.1 With the exception of cases involving bodily injury, most hypothermia accidents may be prevented. The first thing to remember is that hypothermia can occur anywhere and at any time that the air temperature drops low enough so that if a body is exposed, its inner-core temperature can be reduced to the danger level. Remember, wind chills the air.

7.4.2 Wet clothing in cold weather extracts heat from the body nearly 200 times faster than dry clothing. Wool clothing provides better protection than cotton in wet weather. In inclement weather, an uncovered head can account for up to 60% of body heat loss. A good wool cap is essential. The most common contributors of the development of problems during cold, wet, and windy weather are lack of proper clothing, inadequate shelter, and exhaustion. The best defense against the advent of hypothermia is to avoid exposure by being prepared.

1. Dress appropriately.

2. Carry rainwear, extra dry clothes, food, and matches.

3. Bring potential dangers to the attention of anyone inappropriately dressed. It could save their life.

4. Make the basic rules of conduct for trail safety clear, and that you expect them to be observed.

5. Travel at the speed of the slowest member of your party.

6. Break frequently for rest and gear check.

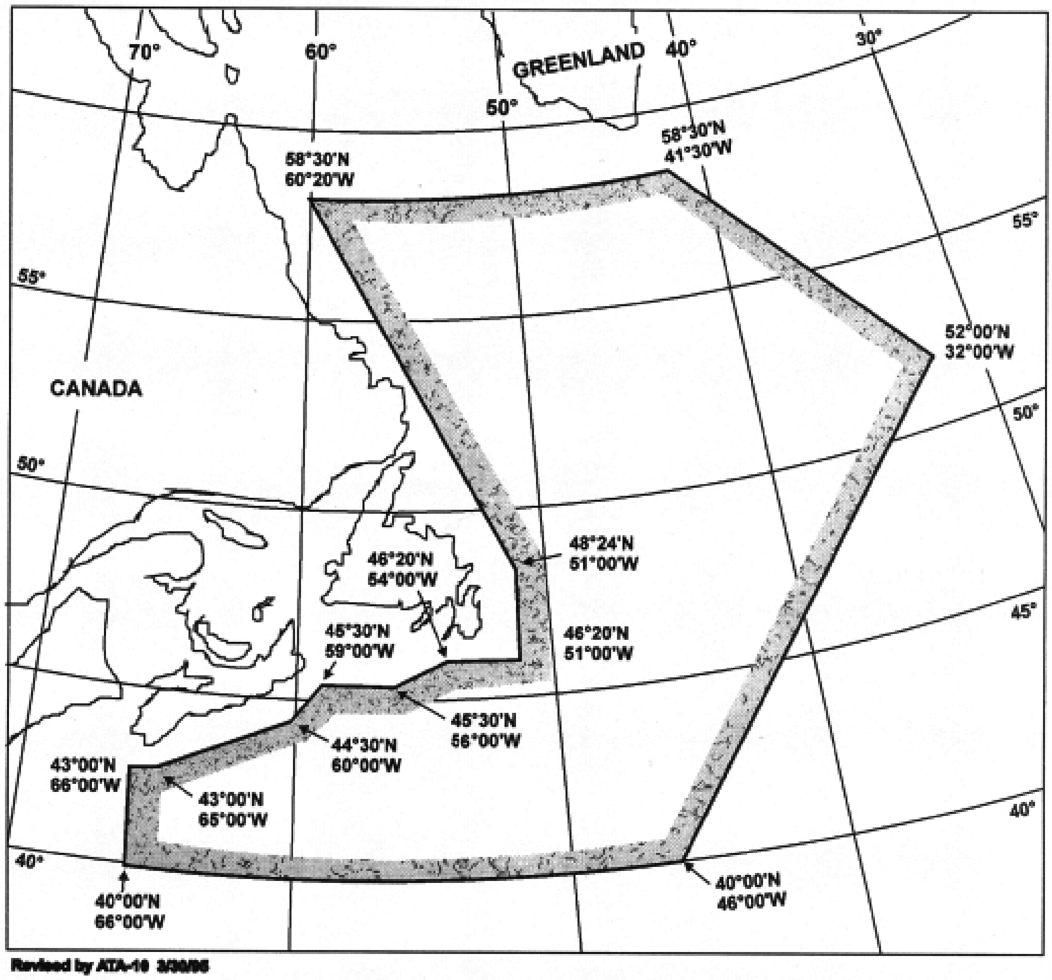
7. Distribute candies or other nibble food.

8. Keep watching all members of your party for signs of fatigue or discomfort.

Note: Items 5. and 6. above refer to the action of journeying on foot. In the case of having had to land or crash-land an aircraft in inhospitable and unpopulated territory, unless circumstances dictate otherwise, it is generally better to remain with the aircraft rather than attempting a trek to safety. The aircraft hull may be able to provide some degree of shelter and importantly, SAR services will have an easier job of locating a downed aircraft than a small group of individuals.

8. PERMANENT MILITARY OPERATIONS

8.1 AREA ELK FL 50 AND BELOW



8.2 Maritime surveillance aircraft conduct daily all-weather operational flights in Area ELK. These aircraft are required to operate on various headings and altitudes up to and including FL50 and to make rapid climbs and descents without prior warning. Because of operational considerations they operate without navigation or identification lights during the hours of darkness and often without SIF/IFF.

8.3 The Canadian Maritime Command (CANMARCOM) provides advisory information between maritime aircraft and other aircraft in Area ELK based on known air traffic.

8.4 Standard pressure setting 29.92 inches is used for transit and separation within the entire area.

8.5 In the interest of flight safety it is essential that CANMARCOM be informed in advance of all flights or proposed flight in or through Area ELK. Aircraft flight level(s), track and approximate times of ELK penetration and exit are required. Military aircraft are encouraged to communicate directly with CANMARCOM. On prior request, frequencies will be assigned on which to report position and obtain ELK clearance. ASW aircraft will be routed clear of all known military and civil traffic.

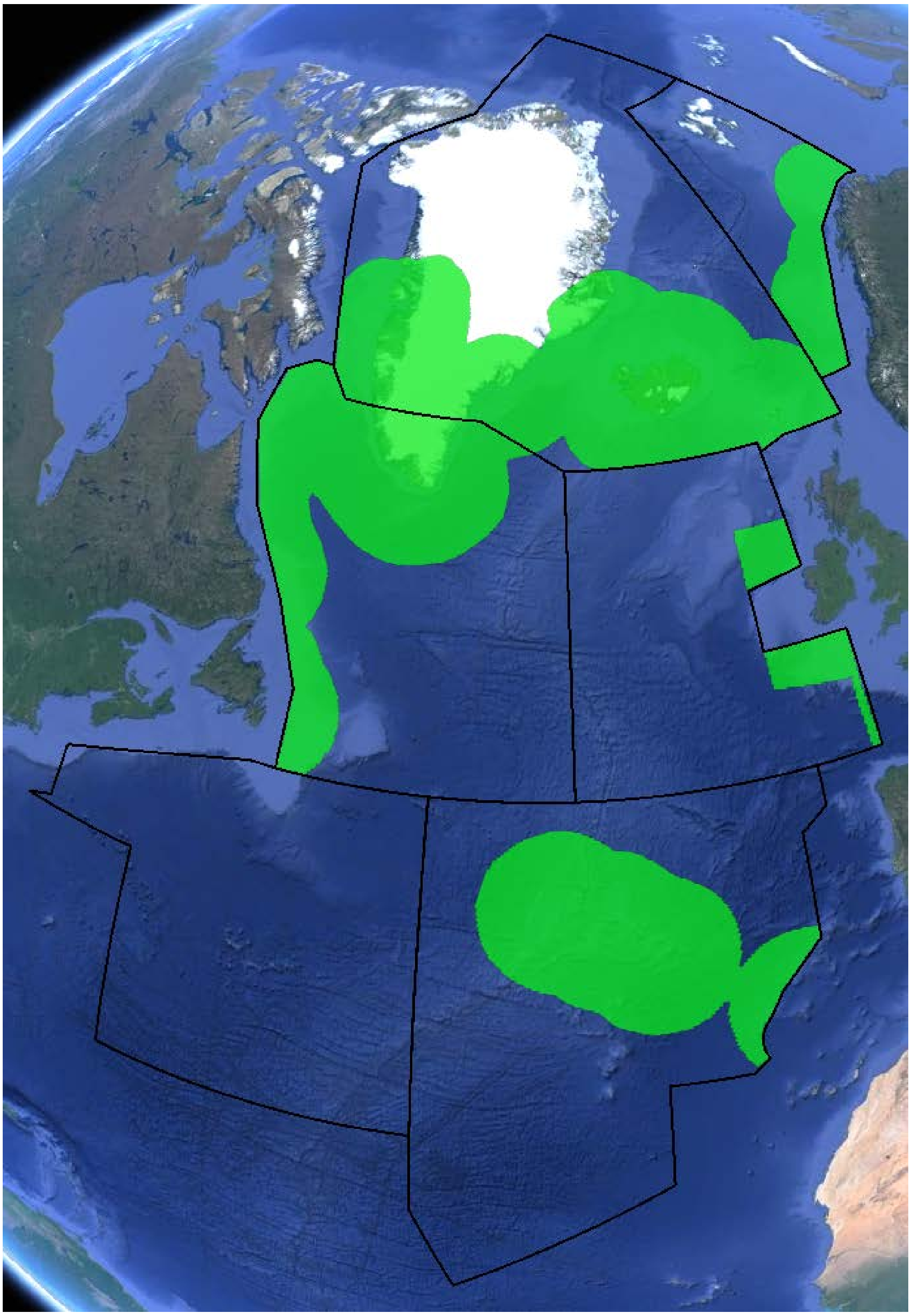
8.6 CANMARCOM may be contacted by the following means:

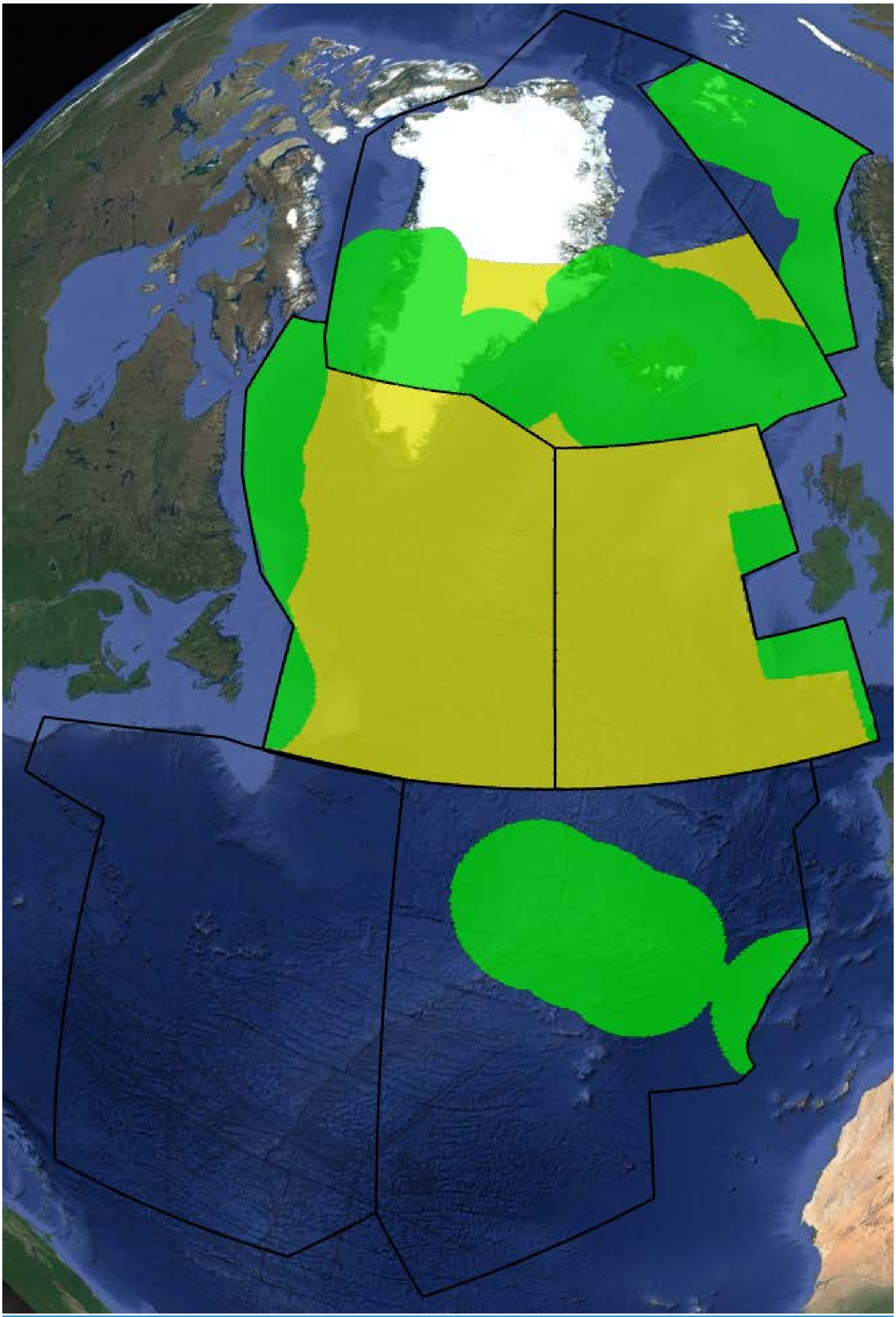
a) Letter to Commander maritime Command, Halifax, N.S., Canada.
b) Message to MOC HALIFAX.
c) Telephone Maritime Operations Centre 902-427-2501, 902 427 2502, Autovon 447-2502.
d) On request of the pilot when filing flight plans at departure points in North America, aircraft flight plans may be relayed through ATC channels to Moncton ACC for Maritime Command Operations.
e) In-flight position reports or advisories when not transmitted directly as in paragraph 4 above may

be relayed through Gander or Moncton ACC. These messages should specify "Pass to Maritime Operations Centre."

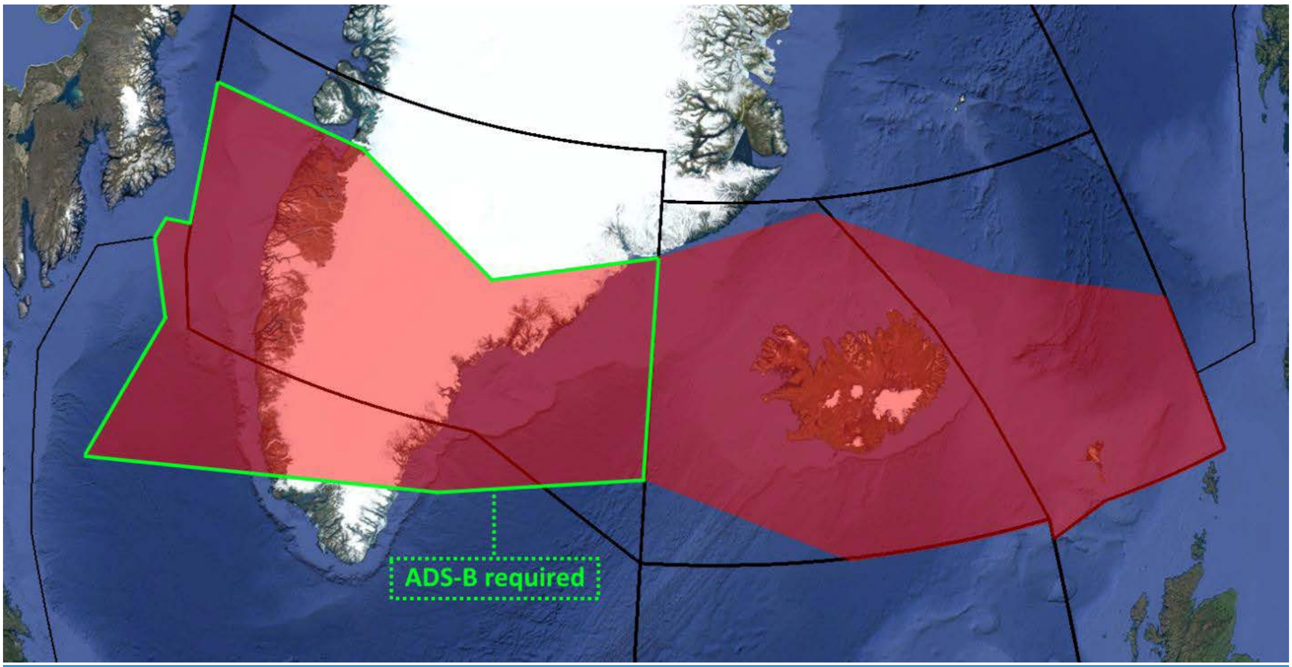
ATTACHMENT 8

NORTH ATLANTIC ATS SURVEILLANCE COVERAGE CHARTS ~~(to be updated at later stage)~~





Green: surveillance with VHF voice
Yellow: surveillance without VHF voice.



For planning purposes, this area is bounded by the following:

Northern boundary: 65N000W - 67N010W - 69N020W - 68N030W - 67N040W - 69N050W - 69N060W - BOPUT.

Southern boundary: GUNPA (61N000W) - 61N007W - 6040N010W - RATSU (61N010W) - 61N020W - 63N030W - 62N040W - 61N050W – SAVRY

Aircraft not equipped with FANS 1/A (or equivalent) systems will be allowed to operate within this area at DLM designated flight levels, provided the aircraft is suitably equipped (transponder/ADS-B extended squitter transmitter).

ATTACHMENT 9

CHECKLIST FOR PRIVATE PILOTS

This Attachment supplements the information in this manual by providing a general checklist for pre-flight preparation, inspection and in-flight contingencies.

Be prepared for systems failure. Know what to do in advance. Always plan a way out of a situation. If a borderline decision must be made, take the safest course of action. Don't exceed pilot or aircraft limitations. If anything, including weather, equipment, or your health, is not up to par, DON'T GO.

Position survival gear so that it is readily available, but clear of controls. The best survival techniques include thorough planning, knowledge of the route, and reliable weather information. There is no room for error in trans-oceanic flight, so plan accordingly, then re-check.

Allow sufficient time for a thorough briefing, planning, and administrative details. Have airplane ready the night before, avoiding the possibility of last minute mistakes.

Pre-Flight Preparation

The following checklist, cross-referenced to text appearing in this manual, will assist you during the preparation stages of your oceanic flight.

1. Current departure, en-route, arrival and topographical charts (Chapter 17)
2. An instrument rating (Chapter 17)
3. Long range NAVAIDS (Chapter 8)
4. Available daylight on your route (Chapter 17)
5. Aircraft inspected by a licensed mechanic for suitability for a long, over water crossing. The necessary aircraft documents (Chapter 17)
6. If transiting Canadian airspace, the required Sea/Polar Survival equipment necessary to adhere to Canadian Air Regulation 540 (Chapter 17)
7. Format to be used when filing an oceanic flight plan (Chapter 4)
8. The proper procedures to be used in obtaining an oceanic clearance (Chapter 5 & Attachment 7)
9. How to prevent hypothermia (Chapter 17)
10. VHF radio coverage in the NAT Region (Chapter 6 & Attachment 5)
11. A position report and a revised estimate (Chapter 6)
12. SELCAL Code (Chapter 6)
13. Flight planned for FL285 or above approval from the State of Registry (Foreword & Chapter 1)
14. Approval for flight in ADS-B airspace (Chapter 10).
15. Search and Rescue services. The importance of an ELT (Chapter 1 & Chapter 17)
16. The relevant meteorological information (Chapter 17)
17. Current NOTAMs with special regard to the status of radio-navigation aids and airport restrictions. (Chapter 17)

Pre-Flight Inspection

Pull the cowling and inspect for leaks and general overall condition.
Inspect:

1. Fuel system and management
2. Radio equipment and condition
3. Engine condition
4. Oil pressure, temperature, and consumption
5. Instruments

Check compass on nearest runway heading to your course.

1. Swing compass with radios and navigation lights ON
2. Check compass deviation with master switch off
3. Check compass deviation with VHF off
4. Check compass deviation with HF both ON and OFF
5. Check compass deviation with pilot heat ON
6. Check compass deviation with rotating beacon ON and OFF
7. Make notes on all deviations
8. Keep alternator load at 50% or less if possible
9. DO NOT assume compass card is accurate ADF may be affected by the alternator, VHF, HF, pilot heat, rotating beacon, autopilot, coastal refraction, or atmospheric conditions. Check and re-check all NAVAIDs receivers.

After a long flight, pilot's ability to handle marginal weather conditions may be in serious doubt. Therefore, weather minimums should be well above the published minimums. Alternate airports should be chosen with the same care.

In-flight contingencies.

Deviations:

Obtain clearance for deviations unless in an emergency, then the appropriate air traffic services unit must be notified of the action taken and that the action has been taken under emergency authority.

Reports:

Report any problems to Air Traffic Control agencies or on VHF 121.5 as soon as possible.
Use the VHF frequency 123.450 MHz as an air-to-air communications channel to ask for assistance if needed.

ATTACHMENT 10

CHECKLIST FOR DISPATCHERS

This Attachment supplements the guidance found in the Guidance for Flight Dispatchers Chapter of NAT Doc 007. It is intended as a checklist for those planning and monitoring/tracking flights in the NAT.

Index

1. Know your Airspace - Regulatory requirements and consequential routing limitations
2. Minimum Equipage (Navigation/Altimetry/Communications)
3. Special non-compliance routings
4. Flight planning
5. Flight Monitoring
6. En-route Equipage Failures
7. Document References
8. Separation Requirements

Checklist for Flight Dispatchers

1. Know your Airspace - Regulatory requirements and consequential routing limitations

Recall Item	Check	Timelines	Reference	
HLA Boundaries	Does my Routing enter the vertical & lateral boundaries of HLA Airspace	4 February 2016	Ensure: » HLA Ops Specs Approval	
PBCS Compliance- I	Understand PBCS requirements	29 March 2018	these standards will require your airline to be in compliance with the required communication performance (RCP) 240 and required surveillance performance (RSP) 180	ICAO Doc 9869, Performance-based Communication and Surveillance (PBCS) Manual Appendices B and C
PBCS Compliance - II	Is my aircraft and crew PBCS Compliant?	29 March 2018	ICAO FPL Filings: **PBC** : Insert the appropriate descriptor (**P1, P2 and/or P3**) in Item 10a **PBS**: Insert relevant required surveillance performance (RSP) specification(s) (e.g **RSP180**) in Item 18 of the flight plan following the SUR/ indicator. **CPDLC**: Insert the appropriate descriptor (**J2, J5 or J7**) in Item 10a of the FPL	

			(unchanged) **ADS-C**: Automatic Dependent Surveillance — Contract (ADS-C) services shall insert the **D1** descriptor in Item 10b of the FPL.	
PBCS Compliance - III	Do I meet RCP 240?	29 March 2018	Support a means within the airline for receiving in-flight reports of observed performance and the ability of taking corrective actions for aircraft identified as not complying with RCP specifications; and, carry authorizations in the AOC/Ops. Specs from the State of the Operator or the State of Registry, as appropriate, in order to qualify for the separation minima shown in the Separation Requirements Table in Item 8 below. As fitted, carry authorizations in the AOC/OpSpecs from the State of the Operator or the State of Registry to utilize CPDLC. This includes a statement of compliance with RTCA DO-258/EUROCAE ED-100 or equivalent and that it is capable of operating outside VHF data link coverage (availability of Satcom data)	
Mandatory ADS-B Carriage	Tango 9 Tango 290 Northern boundary: 645N000W -		Aircraft not equipped with FANS 1/A (or equivalent) systems will be allowed to operate	

	67~~8~~N010W - 69N020W - 68N030W - 67N040W - 69N050W - 69N060W - BOPUT. Southern boundary: GUNPA (61N000W) - 61N007W - 6040N010W - RATSU (61N010W) - 61N020W - 63N030W - 62N040W - 61N050W – SAVRY		within this area at DLM designated flight levels, provided the aircraft is suitably equipped (transponder/ADS-B extended squitter transmitter).	
Tango 9 and Tango 290 Requirements	a) VHF 8.33Khz equipped (Field 10a: ‘Y’) b) NAT HLA certified (Field 10a: ‘X’) c) RNP2 certified: -Field 10a: GNSS – ‘G’ -Field 10a: RNP – ‘R’ -Field 10a: Other Info – ‘Z’ -Field 18: “NAV/RNP2 d) Surveillance equipment - SSR Mode S - Field 10d: E Transponder - Mode S, including aircraft identification, pressure altitude and extended squitter (ADS-B) capability ADS-B B1 Ads-B with dedicated 1090 Mhz ADS-B ‘out’ capability			
Datalink Mandate Compliance	» Phase **2A**, commenced 5 February 2015: FL 350 to FL 390 (inclusive) all tracks within the NAT OTS. This phase applies to all aircraft operating on or at any point along the tracks; » Phase **2B**,			

	commenced 7 December 2017: FL 350 to FL 390 (inclusive) throughout the ICAO NAT region; » Phase **2C**, commencing 30 January 2020: FL 290 to FL 410 (inclusive) throughout the ICAO NAT Region.			
ICAO FPL Requirements	Multiple requirements for PBCS, HLA, Data Link Mandate, Equipage and 3rd Part Contracts	Ongoing	• Item 10a of the ICAO flight plan will be annotated with the letter **"X"** to indicate that the aircraft meets the requirements for HLA operations. • The letter **"R"** is required in Item 10a of the flight plan along with the performance-based navigation levels that can be met specified in Item 18 following the indicator **PBN/**. • The RNP4 designator, **"L1"** is required for 30NM lateral and 30NM longitudinal. • Either **"L1"** or the RNP10 designator, **"A1"** is required for 50NM longitudinal. • The equipment qualifier J-code must be found within Item 10a of the flight plan. The presence of at least one of the following J- codes is required: o **"J 5"** (INMARSAT), o **"J6"** (MTSAT), and o **"J7"** (Iridium) for	

			performance -based separation. • The equipment qualifier P-code **“P2”** must be found within Item 10a of the flight plan. • The **“P2”** equipment qualifier indicates the aircraft is certified **CPDLC** RCP-240 • The text string **“RSP180”** must appear in Item 18 of the flight plan, following the indicator for surveillance equipment and capabilities **(SUR/)**, which indicates the airframe is certified and compliant.	

- Lateral & Vertical
- Datalink Requirements
- State Approvals (NAT HLA /RVSM) See: Chapter 1.
- Approval for flight in NAT ADS-B airspace. See: Chapter 1.

2. Minimum Equipage (Navigation/Altimetry/Communications)

- ✓ NAT HLA/MNPS. See: Chapter 1
- ✓ RVSM. See: Chapter 1 and Chapter 16
- ✓ HF Communications. See: OpSpecs
- ✓ DLM. ADS-C (Automatic Dependent Surveillance Contract) and CPDLC (Controller Pilot Data Link Communications). See: OpSpecs
- ✓ ETOPS/EDTO. See Annex 6 Part 1
- ✓ MEL provisions. See: OpSpecs

3. Special non-compliance routings

- ✓ Long Range Navigation Systems. See : Chapter 1 and Chapter 12.
- ✓ Not approved for NAT HLA /RVSM . See Chapter 1.
- ✓ Routings without functioning HF Communications. See: Chapter 4.
- ✓ Maintenance Flights, temporarily non-RVSM. See: State AIPs.
- ✓ Delivery and Humanitarian Flights. See: State AIPs.

4. Flight planning

- ✓ Eastbound or westbound flights should be flight planned by significant points at whole degrees of latitude at each crossed ten degrees of longitude (10°W, 20°W, 30°W, 40°W etc.);

- ✓ Northbound or southbound flights should be flight planned by parallels of latitude spaced at five degree intervals (65°N, 60°N, 55°N etc.). See Chapter 4 and Chapter 16.
- ✓ Separate Organised Track System (OTS) structures. See: Chapter 2 and Chapter 3.
- ✓ North American Region., transitional airspaces and linking route structures in and through NAM Region. See: Chapter 3 and AIS of the relevant State authorities and/or via their websites.
- ✓ Flight Levels on OTS Track may plan at any of the levels as published for that track. Aircraft on a random route may plan any flight level(s) irrespective of direction. See: North Atlantic Flight Level Allocation Scheme (NAT FLAS Attachment 5). States AIPs and NOTAMs.
- ✓ Mach Number See: Chapter 7.
- ✓ FPL completion. A free text editor is available on the EUROCONTROL website.
- ✓ Approvals:
  - NAT HLA, the letter ‘X’, in addition to the letter ‘S’, within Item 10.
  - RVSM operations, the letter ‘W’ must also be included in Item10.
  - RNP approval; in Item 10 (Equipment) with the letter “R” and annotate Item 18, PBN/A1 (RNAV 10 (RNP 10) Approval) or PBN/L1 (RNP 4 Approval). See: Chapter 4.
  - ADS-B, B1 or B2 in Item 10b.

5. Flight Monitoring

- ✓ Oceanic clearances. See: Chapter 5
- ✓ Transponder Use. See: Chapter 16
- ✓ Re-Routes. See: Chapter 16
- ✓ En-route Contingencies. Chapter 16
- ✓ Loss of communications and HF failure. See Chapter 16 and Chapter 6.
- ✓ Normal Flight Tracking. See ICAO Annex 6 Part 1 Chapter 3.5.1
  - o 3.5.1 For appropriate aircraft, track every 15 minutes
  - o 3.5.4 Retention of tracking data
    - ▪ Note to 3.5.4 regarding 3rd party normal aircraft tracking…must comply with the policies and procedures of the operator
  - o ICAO Circular 347 Normal Flight Tracking – Guidance for Operators

6. En-route Equipage Failures

- ✓ Prior to entering NAT RVSM Airspace See: OPTION 1 to OPTION 3, Chapter 16
- ✓ After entering NAT RVSM Airspace. See: State AIPs.

7. Document References

Reference	Check
PBCS Manual	
PANS ATM Doc.4444	
ICAO Global Operational Data Link (GOLD) Manual (Doc 10037).	
EUR-NAT Supps. Doc 7030	
ICAO Annex 6 Part I	
ICAO Circular 323	
Canada AIC XXX	
ICAO Circular 347 Normal Flight Tracking	

8. Separation Requirements

Oceanic Area FIR	Separation Standard	ATC Application	COM	NAV	SUR	Flight Planning Guide
Gander Oceanic	**LATERAL SEPARATION**	23 NM	RCP240	RNP 4	RSP 180	Whole or Half Degrees of Latitude

FIR CZQX	(pairs of aircraft on Tracks or Random Route)				with ADS-C	
Shanwick Oceanic FIR EGGX	**LONGITUDINAL SEPARATION** (pairs of aircraft in trail)	30 minutes for non-turbo-jet aircraft				ATC sets Periodic ADS-C Contracts- usually to 14 minutes
Reykjavik Oceanic FIR BIRD		5 Mins.	RCP 240	RNP 10 or RNP 4	RSP 180	ATC sets Event Contracts - 5nm Lateral Deviations (LDE) - 300ft Level Range Deviation (LRDE) - Waypoint Change Event at CRP (WCE)
New York Oceanic East KZWY	**LATERAL SEPARATION** (pairs of aircraft on Tracks or Random Route)	30 NM	RCP 240	RNP 4	RSP 180 with ADS-C	Whole or Half Degrees of Latitude
Santa Maria Oceanic FIR	**LONGITUDINAL SEPARATION** (pairs of aircraft in trail)	30 minutes for non-turbo-jet aircraft				
LPPO		50 NM	RCP 240	RNP 10 or RNP 4	RSP 180 with ADS-C	ADS-C Contract set to 14 minutes
		30 NM	RCP 240	RNP 4	RSP 180 with ADS-C	ADS-C Contract set to 14 minutes

ATTACHMENT 11

BIBLIOGRAPHY AND OTHER REFERENCE MATERIAL

ICAO Annex 2* – Rules of the Air

www.icao.int

ICAO Annex 6* Operation of aircraft

www.icao.int

ICAO Annex 10* Aeronautical communications

www.icao.int

ICAO Doc 4444* Procedures for Air Navigation Services – Air Traffic Management (PANS–ATM)

www.icao.int

ICAO Doc 7030* (Regional Supplementary Procedures (SUPPS)

www.icao.int

ICAO Doc 8168* Procedures for Air Navigation Services – Aircraft Operations (PANS–OPS)

www.icao.int

ICAO Doc 8643* Aircraft Type designators

www.icao.int

ICAO Doc 9574* Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive

www.icao.int

ICAO Doc 9613* Performance-Based Navigation Manual (PBN)

www.icao.int

ICAO Doc 10037* Global Operational Data Link (GOLD) Manual

www.icao.int

ICAO NAT HF Guidance Material (NAT Doc 003)

www.icao.int/EURNAT/ > EUR & NAT Documents > NAT Documents > NAT Doc 003

Sample Oceanic Checklist

www.icao.int/EURNAT/ > EUR & NAT Documents > NAT Documents > NAT OES Bulletins

* ICAO saleable documents - Please contact ICAO Headquarters, Montreal sales@icao.int

Sample Oceanic Expanded Checklist

www.icao.int/EURNAT/ > EUR & NAT Documents > NAT Documents > NAT OES Bulletins

Oceanic Errors Safety Bulletin

www.icao.int/EURNAT/ > EUR & NAT Documents > NAT Documents > NAT OES Bulletins

NAT OPS Bulletins

www.icao.int/EURNAT/ > EUR & NAT Documents > NAT Documents > NAT OPS Bulletins

ICAO NAT Planning Documents Supporting Separation Reductions and Other Initiatives

www.icao.int/EURNAT/ > EUR & NAT Documents > NAT Documents > Planning documents supporting separation and other initiatives

Canada AIP

www.NAVCANADA.ca/

Canadian Flight Supplement - A saleable document which can be ordered via**:**

http://products.navcanada.ca

EASA CS-ACNS - Certification Specifications and Acceptable Means of Compliance for Airborne Communications, Navigation and Surveillance

http://www.eurocontrol.int/articles/library

EASA AMC 20-24

easa.europa.eu/system/files/dfu/Annex%20II%20-%20AMC%2020-24.pdf

ETSO- CS-ETSO

www.easa.europa.eu/ws_prod/g/doc/Agency_Mesures/Certification%20Spec/CS-ETSO.pdf

Field

Iceland AIP

http://eaip.samgongustofa.is/

Ireland AIP

http://iaip.iaa.ie/iaip/IAIP_Frame_CD.htm

RTCA DO 260/A/B

https://standards.globalspec.com/std/1994503/rtca-do-260

UK AIP

http://www.nats-uk.ead-it.com/public/index.php.html

UK "TrackWise" video

https://www.youtube.com/watch?v=EJTjwW5ZYas

USA FAA TSO-C129 or later standard (GPS Certification)

www.airweb.faa.gov

USA FAA AC 20-138D (Airworthiness Approval of GPS)

www.airweb.faa.gov

USA FAA AC 20-165B (Airworthiness Approval of ADS-B)

www.airweb.faa.gov

USA FAA AC91-85A (RVSM MASPSs)

www.faa.gov/air_traffic/separation_standards/rvsm/

USA FAA NAT Resource Guide for U.S. Operators

https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afx/afs/afs400/afs470/media/NAT.pdf

USA US Airport Facility Directory (NARs)

https://www.faa.gov/air_traffic/flight_info/aeronav/productcatalog/supplementalcharts/
https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dafd/

USA US AIP

https://www.faa.gov/air_traffic/publications/

USA US Coastguard GPS NOTAMs

www.navcen.uscg.gov

— END —

APPENDIX L — UPDATE TO NAT OPS BULLETIN - *DATA LINK PERFORMANCE IMPROVEMENT OPTIONS* (SERIAL NO: 2019_003)

(*paragraph 5.6.5 refers*)

Starts on next page

NAT OPS BULLETIN

Serial Number: **2019_003 Rev 3**
Subject: **Data Link Performance Improvement Options**
Originator: **NAT SPG**

Issued: XX 2021
Effective: XX 2021

The purpose of this North Atlantic Operations Bulletin (NAT OPS) is to provide guidance to North Atlantic (NAT) operators regarding options that are available to improve data link performance.

Any queries about the content of the attached document should be addressed to:

ICAO EUR/NAT Office: ***icaoeurnat@icao.int***

The NAT OPS Bulletin Checklist is available at ***www.icao.int/EURNAT/EUR & NAT Documents****,* ***NAT Documents****, then* ***NAT Ops Bulletins*****.**

NAT OPERATIONS BULLETIN – DATA LINK PERFORMANCE IMPROVEMENT OPTIONS

1. **Purpose of Bulletin.** The purpose of this bulletin is to provide guidance to North Atlantic (NAT) operators regarding options that are available to improve data link performance.

2. **Background.** Application of the reduced lateral and longitudinal separation minima in the NAT Region is dependent on a smooth functioning FANS 1/A data link system. Various known data link related deficiencies in aircraft systems and poor data link performance have a detrimental effect on the air traffic control system and impede aircraft operator's efforts to obtain performance-based communication and surveillance (PBCS) authorizations. Many of these known deficiencies have already been fixed by aircraft manufacturers and software upgrades are available. To ensure the best possible functioning of the NAT air traffic control system, it is of utmost importance that aircraft operators always operate the latest available FANS 1/A related software version in aircraft that fly in the NAT high level airspace (HLA) and that the aircraft systems are configured in an optimal manner. Meanwhile, implementation of improvements and corrections is also a priority undertaking for the ground and network segments of the overall FANS 1/A system.

3. The list of recommended data link performance improvement options provided in the **Attachment** to this OPS Bulletin describes the problems and solutions identified to improve data link performance. However, it should be noted that not all aircraft operators experience all these problems and therefore not all solutions apply to all aircraft operators. Additionally, while acknowledging there is confidence that the recommended improvement options would improve the data link performance, it should be noted that these updates might not be necessarily seen as sufficient to ensure a PBCS authorization. Aircraft operators are advised to consult with aircraft manufacturers for guidance regarding implementation of the improvement options.

4. The certification status versus EUROCAE ED-122 / RTCA DO-306 standards and PBCS authorization requirements should be clarified by aircraft operators in coordination with the manufacturers concerned, recognizing the aircraft operators need to consider the economic and operational aspects and priorities.

5. **Websites**

5.1 The ICAO EUR/NAT Office Website is at: **www.icao.int/eurnat**. Click on **EUR & NAT Documents** >> **NAT Documents** to obtain NAT Operations and NAT Region Update Bulletins and related project planning documents.

6. **Contacts**

6.1 Any queries about the content of this bulletin should be addressed to ICAO EUR/NAT Office:

icaoeurnat@icao.int.

ATTACHMENT - LIST OF DATA LINK PERFORMANCE IMPROVEMENT OPTIONS

PROBLEM / ISSUE	SOLUTIONS / ACTIONS
1. HF datalink – next-on-busy 1.1 Airbus ATSU and Rockwell Collins CMU-900 avionics may contain a feature called "next-on-busy" by which those avionics send a new downlink message via HF datalink when outside of VHF coverage and SATCOM is busy sending a previous downlink, instead of waiting for SATCOM to finish sending the previous downlink and then sending the new downlink via SATCOM. This feature reduces datalink performance because the avionics can actually deliver the new downlink more quickly if they wait for SATCOM to finish sending the previous downlink and then send the new downlink via SATCOM. On airframes equipped with Rockwell Collins CMU-900, this problem is compounded by subsequent downlink messages being queued while the avionics wait for acknowledgement of the HF datalink downlink message.	*Solution a): For CMU-900 installations with Iridium SATCOM where PBCS is showing poor performance, place the HF in "voice-only". This option removes HFDL as an available media so the "next-on-busy" function will not occur.* At the recent FAA PARC CWG40, an Iridium SATCOM equipped operator demonstrated the PBCS performance impact of HFDL "next-on-busy". Some other operators have also taken this action to place HF into "voice-only" mode. Iridium SATCOM operators, equipped with CMU-900, could take this action on interim basis prior to an available CMU software. See item 4 below on HFDL for similar recommendation.
	Solution b): Work with Airbus and Rockwell Collins to install software versions that disable the next-on-busy feature. (For the Rockwell Collins CMU-900 with recent software, this can be done with a database update).
2. VHF to SATCOM Transitions 2.1 Transitions from using VHF to using SATCOM, especially when they occur repeatedly in a short period of time, reduce datalink performance because the ACARS protocols are generally not designed to maximize performance but rather to minimize cost by persistently attempting to use less costly VHF.	*Solution a): Disable VHF datalink just prior to entering oceanic airspace* Implement flight crew procedures to disable VHF datalink (usually by placing the VHF radio used for VHF datalink into voice mode) just prior to entering oceanic airspace or prior to leaving contiguous VHF coverage in order to proactively force SATCOM use. Conversely, enable VHF datalink when exiting oceanic airspace or entering contiguous VHF coverage. *Caution: In the event of an oceanic diversion, when SATCOM and HF data link (if installed) are lost or otherwise unavailable, flight crews will need to re-enable VHF data link to provide ACARS AOC communication with company.*
	Solution b): Implement more precise VHF region definitions In avionics that offer the capability to prefer specified subnetworks in defined geographic regions (including 777 DCMF and 787 CMF), implement more precise VHF region definitions that exclude areas of the world with only intermittent VHF subnetwork coverage in order to force SATCOM use in those areas. Such areas, in which the DLMA has observed consistent performance problems, include the North Pacific near the Aleutian Islands and the Kamchatka Peninsula, the South Pacific near New

PROBLEM / ISSUE	SOLUTIONS / ACTIONS
	Caledonia and Vanuatu, and the North Atlantic near Bermuda and the Azores. *Caution: In the event of an oceanic diversion, when SATCOM and HF data link (if installed) are lost or otherwise unavailable flight crews will not have ACARS AOC communication with company.*
	Solution c): Implement the ARINC 618 RAT1 timer Upgrade ACARS router avionics (CMU or equivalent) software to include the new ARINC 618 RAT1 timer when it becomes available. This timer is intended to improve performance for FANS downlink messages during VHF-to-SATCOM transitions by additionally attempting to send a message via SATCOM when attempts to send it via VHF have not been successful for 60 seconds (such as when exiting land-based VHF coverage). This feature is available on some new aircraft types and will gradually become available for retrofit via software updates on existing aircraft.
3. “Ack-and-toss” 3.1 ACARS router (CMU or equivalent) avionics may for various reasons acknowledge receipt of a FANS uplink message but then fail to deliver the message to the avionics that host the FANS applications. This is commonly known as “ack-and toss” behaviour.	*Solution a) Rockwell Collins CMU-900 software problem* For the 737, 747-400, 757, 767, and MD-11, Rockwell Collins certified core software -014 that fixes this problem. For the 747-8, Boeing certified core software -202 that fixes this problem.
	Solution b) Boeing 777 AIMS-2 software problem Boeing developed AIMS-2 BPV17.1 software that fixed this problem.
	Solution c) Airbus A320/A330/A340 software problem This problem occurs only in the ATSU CSB/CLR7.1 to 7.4 software versions. CSB/CLR7.5 and CSB/CLR9 that fix this problem are now certified and available.
	Solution d) ARINC 618 false-positive duplicate uplink block identifier (UBI) determination ARINC 618-8, which was published in August 2016, contains a recommended avionics enhancement that reduces the likelihood of this problem occurring. For the 777, Boeing developed AIMS-2 BPV17B software that implements the avionics enhancement. For the 787, Boeing developed CMF BPV4 software that implements the avionics enhancement. For the Honeywell CMU Mark II, Honeywell developed -522 software that implements the avionics enhancement. Similar software upgrades are or will

PROBLEM / ISSUE	SOLUTIONS / ACTIONS
	be available for other affected ACARS router (CMU or equivalent) avionics, although it should be noted that the Rockwell Collins CMU-900 was never subject to this problem; the way it detects duplicate uplink blocks was standardized in ARINC 618-8 as the recommended avionics enhancement. A complete solution, however, requires the Communication Service Providers (CSPs) to ensure that two sequential non-general response uplinks do not contain the same UBI value.
4. HF data link - general 4.1 HF datalink performance has not been demonstrated to meet the RCP240 and RSP180 specifications, although for various reasons the avionics may send FANS downlink messages via HF datalink. This behaviour has a detrimental effect on data link performance.	*Solution Manually prevent HF datalink use* Prevent HF datalink use manually by implementing flight crew procedures to disable HF datalink (usually by placing the HF radio used for HF datalink into voice mode).
5. Internetworking 5.1 The DLMA has observed that some performance problems are caused by the challenges of effective CSP internetworking when an aircraft operator chooses to use one of the two global CSPs (ARINC or SITA) for VHF and the other global CSP for SATCOM. (The DLMA also realizes that some aircraft operators configure their avionics to first prefer regional DSPs, such as Avicom in Japan, which has not been shown to affect performance).	*Solution: For aircraft operators that do not configure their avionics to first prefer a regional CSP, use the same global CSP for both VHF and SATCOM* It is likely that the data link performance will be improved if the same global CSP is used for both VHF and SATCOM.
6. Large Pilot Operational Response Time (PORT) values 6.1 PORT is one component of the Actual Communications Performance (ACP), the other being the Actual Communications Technical Performance (ACTP). For an uplink-downlink CPDLC transaction, PORT captures the human portion of the transaction time and ACTP captures the technical (mainly network) portion of the transaction time. Accordingly, large PORT values reduce performance.	*Solution: Implement flight crew procedures to respond to CPDLC messages with STANDBY when appropriate.* In accordance with ICAO Doc 9869, Performance-Based Communication and Surveillance (PBCS) Manual, ATS providers should exclude CPDLC transactions with STANDBY responses from performance monitoring. ICAO Doc 10037, Global Operational Data Link (GOLD) Manual explains in paragraph 4.3.2.4 when STANDBY responses are appropriate under certain circumstances: *4.3.2.4 The flight crew should respond to CPDLC messages as soon as practical after they are received. For most messages, the flight crew will have adequate time to read and respond within one minute. However, the flight crew should not be pressured to respond without taking adequate time to fully understand the CPDLC message and to satisfy other higher priority operational demands. If*

PROBLEM / ISSUE	SOLUTIONS / ACTIONS
	additional time is needed, the flight crew should send a RSPD-3 STANDBY response.
7. Unknown causes 7.1 If a data link performance problem has an unknown cause, then the DLMA recommends submitting a problem report at http://www.fans-cra.com/ so that the DLMA and other involved stakeholders can attempt to determine the cause.	*Submit problem reports at http://www.fans-cra.com/*
8. Maximising access to the Classic Aero Ground Earth Station (GES) services: 8.1 In the Inmarsat SATCOM system, there are a multitude of transmission paths available via the different ground stations and satellites. If one path fails, the aircraft may be able to switch to an alternate path provided the Operator Requirement Table (ORT) in the SATCOM terminal is correctly configured. 8.2 Proper configuration of the ORT table is therefore vital for maximizing availability of SATCOM services in the NAT.	*Operators are requested to ensure that they review all Service Information Letters (SILs) and Software Bulletins (SBs) released from their Satcom avionics manufacturers, taking particular care to ensure that their advice on Operator Requirement Table (ORT) set-up for optimising accessibility to Inmarsat's GES resources is taken. In doing this, it will be ensured that all available satellite/GES combinations are included in the ORT, optimising access to the communications resource. This will maximise the aircraft capability to switch to an alternate communication path in case of a failure in the SATCOM communication chain.* *Below are some links to the SATCOM manufacturers' information portals:* *Cobham: https://sync.cobham.com/satcom/* *Honeywell: https://myaerospace.com/* *Thales: https://www.thalesgroup.com/en/customer-online* *Rockwell Collins: https://www.shopcollins.com]*
9. Software updates 9.1 Aircraft and avionics manufacturers work persistently on fixing problems that have been identified in data link operations. Periodically new software releases are issued that solve some of the problems that have been identified. Some of those fixes may improve data link performance and most of them fix issues that cause problems for pilots and air traffic controllers in the use of data link. 9.2 To ensure the best possible functioning of the NAT air traffic control system it is of utmost importance that aircraft operators take care to always operate the latest available FANS 1/A related software version in aircraft that fly in the NAT high level airspace and to ensure that the aircraft systems are configured in an optimal manner. A list of recommended aircraft avionics software versions is provided in the table below.	*Update FANS 1/A related software using the list of recommended aircraft avionics software versions provided in the table below.*

PROBLEM / ISSUE	SOLUTIONS / ACTIONS
9.3 It should be noted that new software versions that fix several known data link problems will become available for many aircraft types within the next year. Operators are advised to seek information from aircraft manufacturers about the status of those new software releases.	

~~~~~~~~~~~~
~~~~~~~~~~~~

RECOMMENDED AVIONICS DATA LINK SOFTWARE VERSIONS

<table>
<tr><th colspan="4">Recommended software versions for NAT data link operations</th></tr>
<tr><th>Aircraft type</th><th>FANS software</th><th>ACARS software</th><th>Notes</th></tr>
<tr><td>A318/A319/A320/A321</td><td>CSB7.5 or CSB9.4</td><td>CSB7.5 or CSB9.4</td><td>Aircraft with Thales FMS: S8 recommended</td></tr>
<tr><td>A330/A340</td><td>CLR7.5 or CLR9.4</td><td>CLR7.5 or CLR9.4</td><td>Aircraft with Thales FMS: T6 recommended</td></tr>
<tr><td>A350</td><td>CLV1.4</td><td>S4</td><td></td></tr>
<tr><td>A380</td><td>CLA4.2</td><td>S3</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>MD11</td><td>FMS Pegasus -923</td><td rowspan="7">Refer to applicable Service Bulletins and/or STCs</td><td></td></tr>
<tr><td>B736/B737/B738/B739
B37M/B38M/B39M/B3XM</td><td>A4 hardware: FMS U12*
C1 hardware: FMS U13* or U14</td><td>* There are planned ADs against the currently listed software. Updated software with AD related fixes are currently in the certification process or are already available for installation.</td></tr>
<tr><td rowspan="2">B744</td><td>With original FMS: Load 16
(not PBCS compliant)</td><td></td></tr>
<tr><td>With B748 FMS: BPV4.0</td><td></td></tr>
<tr><td>B748</td><td>FMS BPV4.0</td><td></td></tr>
<tr><td>B752/B753</td><td rowspan="2">Pegasus I FMC – Peg ‘09*
Pegasus II FMC – BP1A</td><td>* There are planned ADs against the currently listed software. Updated software with AD related fixes are currently in the certification process.</td></tr>
<tr><td>B762/B763/B764</td><td></td></tr>
<tr><td rowspan="2">B772/B773/B77L/B77W</td><td colspan="2">With AIMS-1: BPV16 (not PBCS compliant)</td><td></td></tr>
<tr><td colspan="2">With AIMS-2: BPV17B</td><td></td></tr>
<tr><td>B788/B789/B78X</td><td colspan="2">FMF BPV4 with CMF BPV6</td><td></td></tr>
<tr><td>B779</td><td colspan="2">FMF and CMF entry into service</td><td></td></tr>
</table>

Recommended software versions for NAT data link operations			
Aircraft type	**FANS software**	**ACARS software**	**Notes**
Beechcraft 4000	Universal Avionics UNS-1	Universal Avionics UniLink UL-80X SCN 30.4	3rd party STCs
Bombardier Learjet 35, 36, 35A, 36A, 40, 40XR, 45, 45XR, 60, 60XR	Universal Avionics FMS SCN 1002.1	Universal Avionics UniLink UL-80X SCN 31.3	
Bombardier Challenger 300, 350	Collins Proline 21 Advanced	Collins RIU-4000	
Bombardier Challenger 600, 601, 601-1A, 601-3A, 601-3R, 604	Universal Avionics FMS SCN 1002.1	Universal Avionics UniLink UL-80X SCN 31.3	
Bombardier Challenger 600, 601, 601-1A, 601-3A, 601-3R	Honeywell NZ6.1.1	Honeywell CMU MK II+	
Bombardier Challenger 605, 650	Collins Proline 21 Advanced	Collins CMU-4000	
Bombardier Global Express, Global Express XRS, Global 5000	Honeywell NZ6.1.1	Refer to applicable Service Bulletins/STCs	
Bombardier Global 5000 GVFD	Collins Proline Fusion	Collins DLCA-6000	
Bombardier Global 5500	Collins Proline Fusion	Collins DLCA-6000	
Bombardier Global 6000	Collins Proline Fusion	Collins DLCA-6000	
Bombardier Global 6500	Collins Proline Fusion	Collins DLCA-6000	
Bombardier Global 7500	Collins Proline Fusion	Collins DLCA-6500	
Dassault F50, F50EX	Universal Avionics UNS-1	Universal Avionics UniLink UL-80X SCN 30.4	3rd party STCs
Dassault F50, F50EX	Honeywell NZ6.1.1	Honeywell CMU MK II+	3rd party STCs
Dassault F2000	Universal Avionics UNS-1	Universal Avionics UniLink UL-80X SCN 30.4	3rd party STCs
Dassault F2000 DX/EX/LX/S	Honeywell EPIC NZ7.1.2	Honeywell EPIC CMF 2.51	EASy II 4th Cert
Dassault F900, F900B, F900C, F900EX	Honeywell NZ6.1.1	Honeywell CMU MK II+	
Dassault F900 DX/EX/LX	Honeywell EPIC NZ7.1.2	Honeywell EPIC CMF 2.51	EASy II 4th Cert
Dassault F900B	Universal Avionics UNS-1	Universal Avionics UniLink UL-80X SCN 30.4	3rd party STCs
Dassault F7X	Honeywell EPIC NZ7.1.2	Honeywell EPIC CMF 2.51	EASy II 4th Cert
	Honeywell NGFMS	Honeywell EPIC CMF 3.4	New EASy IV late 2021

Recommended software versions for NAT data link operations			
Aircraft type	**FANS software**	**ACARS software**	**Notes**
Dassault F8X	Honeywell NGFMS	Honeywell EPIC CMF 3.0	EASy III 2nd Cert
	Honeywell NGFMS	Honeywell EPIC CMF 3.4	New EASy IV late 2021
Embraer E135/145 "Legacy 600/650" business jet version	Honeywell NZ6.1.1	Honeywell CMU MK III Bld 1.29	
Embraer E170/190 "Lineage 1000" business jet version	Honeywell NGFMS	Honeywell EPIC CMF 3.0	
Embraer E170/175/190/195	Honeywell NGFMS	Honeywell EPIC CMF 3.0	
	Honeywell NGFMS	Honeywell EPIC CMF 3.4	New Load 27.4 mid 2021
Embraer E2-190/195	Honeywell NGFMS	Honeywell EPIC CMF 3.3	
	Honeywell NGFMS	Honeywell EPIC CMF 3.4	New Load 9 mid 2022
Gulfstream G100	Universal Avionics UNS-1	Universal Avionics UniLink UL-80X SCN 30.4	3rd party STCs
Gulfstream G150	Universal Avionics UNS-1	Universal Avionics UniLink UL-80X SCN 30.4	Gulfstream STC
Gulfstream G200	Collins Proline 4 (FMC SW 4.0)	Collins CMU-1000	Gulfstream STC
Gulfstream G200	Universal Avionics UNS-1	Universal Avionics UniLink UL-80X SCN 30.4	Gulfstream STC
Gulfstream G200	Universal Avionics UNS-1	Universal Avionics UniLink UL-80X SCN 30.4	3rd party STCs
Gulfstream G280	Collins Proline Fusion	DLCA-6000	Production Standard
Gulfstream GII, GIIB, GIII	Honeywell NZ6.1.1	Honeywell CMU MK III Bld 1.29	3rd party STCs
Gulfstream GII, GIIB, GIII	Universal Avionics UNS-1	Universal Avionics UniLink UL-80X SCN 30.4	3rd party STCs
Gulfstream G450	Honeywell EPIC NZ7.1.2	Honeywell EPIC CMF 2.6	(ASC 912C)
Gulfstream G550	Honeywell EPIC NZ7.1.2	Honeywell EPIC CMF 2.6	(ASC 912C)
Gulfstream GIV, GIV-SP	Honeywell NZ6.1.1	Honeywell CMU MK III Bld 1.29	
Gulfstream GV, GV-SP	Honeywell NZ6.1.1	Honeywell CMU MK III Bld 1.29	
Gulfstream G500	Honeywell NGFMS	Honeywell EPIC CMF 3.1	(Type Cert)
Gulfstream G600	Honeywell NGFMS	Honeywell EPIC CMF 3.1	(Type Cert)

Recommended software versions for NAT data link operations			
Aircraft type	**FANS software**	**ACARS software**	**Notes**
Gulfstream G650	Honeywell NGFMS	Honeywell EPIC CMF 3.0	(ASC 902B)
	Honeywell NGFMS	Honeywell EPIC CMF 3.1	New Block 3 late 2021
Gulfstream G700	Honeywell NGFMS	Honeywell EPIC CMF 3.5	New Type Cert 2022

- END -

LIST OF ACRONYMS

ADS	Automatic Dependent Surveillance
ADS-B	Automatic Dependent Surveillance – Broadcast
ANSP	Air Navigation Service Provider
COVID-19	Coronavirus disease 2019
CRE	Collision Risk Estimate
CSV format	comma-separated values
DENICE	Danish and Icelandic Joint Financing
Doc 10004	Global Aviation Safety Plan (GASP)
Doc 7030	*Regional Supplementary Procedures* (SUPPs)
Doc 9869	*ICAO Performance-based Communication and Surveillance Manual*
EUR	(ICAO) European (Region)
EASPG	European Aviation System Planning Group
EASPG PCG	EASPG Programme Coordination Group
EUR/NAT	European and North Atlantic
FPL	Flight Plan
GASP	ICAO Global Aviation Safety Plan (Doc 10004)
HMS	Height Monitoring System
IATA	International Air Transport Association
IBAC	International Business Aviation Council
ICAO OPDLWG	ICAO Operational Data Link Specific Working Group
METP MOG	ICAO Meteorology Panel MET Operations Group
MNPS	Minimum Navigation Performance Specifications
NAT	North Atlantic Region
NAT CMA	NAT Central Monitoring Agency
NAT DMO	NAT Document Management Office
NAT Doc	
NAT Doc 001	*North Atlantic Systems Planning Group Handbook*
NAT Doc 006, Part II (EUR Doc 019)	*Volcanic Ash Contingency Plan* (VACP), *Europe and North Atlantic Regions*
NAT Doc 007	*North Atlantic Operations and Airspace Manual*
NAT HLA	NAT High Level Airspace
NAT IMG	North Atlantic Implementation Management Group
NAT MWG	North Atlantic Mathematicians Working Group
NAT POG	North Atlantic Procedures and Operations Group
NAT Project Team	
NAT EFFG NHMSA PT	NAT EFFG New Height Monitoring System Arrangement Project Team
NAT HMS/FA PT	NAT EFFG Height Monitoring System Financial Assessment Project Team
NAT MHP PT	NAT MNPS/HLA and PBN Approval Project Team
NAT WMPT	NAT SOG Working Methods Project Team
PBCS NPRH PT	NAT SOG PBCS Non-Performance Report Harmonization Project Team
NAT SG	North Atlantic Scrutiny Group
NAT SOG	North Atlantic Safety Oversight Group
NAT SPG	North Atlantic Systems Planning Group
NAT TIG	North Atlantic Technology and Interoperability Group
NAT ASR	Annual Safety Report
NAT OESB	NAT Oceanic Error Safety Bulletin
OCA	Oceanic Control Area

OEM	Original Equipment Manufacturer
PANS	Procedures for Air Navigation Services
PBCS	Performance-Based Communication and Surveillance
PBN	Performance-Based Navigation
PIRG	Planning and Implementation Regional Group
RASG	Regional Aviation Safety Group
RMA	Regional Monitoring Agency
RVSM	Reduced Vertical Separation Minimum
SARPS	Standards and Recommended Practices
SAT	South Atlantic
SB ADS-B	Space-Based ADS-B
SKPI	Safety Key Performance Indicator
SLOP	Strategic Lateral Offset Procedures
SUPPs	*Regional Supplementary Procedures* (Doc 7030)
TLS	Target Level of Safety
ToR	Terms of Reference
VAA	Volcanic Ash Advisory
VAAC	Volcanic Ash Advisory Centres

— END —