NAT SPG/58

INTERNATIONAL CIVIL AVIATION ORGANIZATION

FINAL

SUMMARY OF DISCUSSIONS AND CONCLUSIONS OF

THE FIFTY-EIGHTH MEETING OF

THE NORTH ATLANTIC SYSTEMS PLANNING GROUP

Paris, France, 28 to 30 June 2022

PREPARED BY THE EUROPEAN AND NORTH ATLANTIC OFFICE OF ICAO JUNE 2022

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INTRODUCTION

0.1 The Fifty-Eighth Meeting of the North Atlantic Systems Planning Group (NAT SPG/58) was held in the European and North Atlantic (EUR/NAT) Office of ICAO from 28 to 30 June 2022.

0.2 The Meeting was chaired by Mrs. Hlin Holm (Iceland). Mr. Elkhan Nahmadov, ICAO Deputy Regional Director of the European and North Atlantic (EUR/NAT) Office acted as Secretary, 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**.

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; and

Agenda Item 6: Any Other Business.

1. REVIEW OF SIGNIFICANT INTERNATIONAL AVIATION DEVELOPMENTS

1.1 ICAO UPDATE

1.1.1 The NAT SPG was informed about recent significant international aviation developments and took note of the latest adopted amendments and proposals for amendment to a number of ICAO Annexes and documents, publication of new ICAO Documents and forthcoming ICAO global and NAT Region-related meetings.

1.2 STATUS OF FOLLOW UP ACTIONS ON NAT SPG CONCLUSIONS

1.2.1 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**.

1.2.2 Concerning NAT SPG Conclusion 57/10 [*PfA to NAT SUPPs (Doc 7030/5)*], the Meeting emphasised again the importance of timely processing and approval of Proposals for Amendment (PfA) to the NAT *Regional Supplementary Procedures* (NAT SUPPs, Doc 7030/5).

1.2.3 In addition, the Meeting noted that the following NAT SPG/58 Conclusions had been approved by correspondence prior to the present meeting and the actions had been completed:

NAT SPG Conclusion 58/1 (CORR) – Integration of NAT 2030 Vision into the NAT eANP Volume III

> That the ICAO Regional Director, Europe and North Atlantic take appropriate action to publish the amended version of the *NAT Air Navigation Plan (eANP) Volume III* (ICAO Doc 9634) as provided in **Appendix D**.

NAT SPG Conclusion 58/2 (CORR) – Removal of NAT Doc 005, Future ATM Concept of Operations

That the ICAO Regional Director, Europe and North Atlantic take appropriate action to discontinue and remove the document *Future ATM Concept of Operations* (NAT Doc 005) from publication.

NAT SPG Conclusion 58/3 (CORR) – PfA to NAT Doc 006, Part I

That:

a) the *North Atlantic Air Traffic Management Operational Contingency Plan* (NAT Doc 006, Part I) be amended as follows:

   i) replace the terms "Shannon Radio", "Shannon Aeradio" and "Shanwick Aeradio" with the station identifier: "Shanwick Radio" throughout the document;

   ii) delete the General Office telephone number "+353 61 471199" in the published SATVOICE numbers for Shanwick Radio throughout the document; and

b) ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish the amended version of the NAT Doc 006, Part I.

NAT SPG Conclusion 58/4 (CORR) – OWAFS-related and other amendments to NAT Doc 007

That the ICAO Regional Director, Europe and North Atlantic, take appropriate action to include and publish the amendments provided in **Appendix E** in the *North Atlantic Operations and Airspace Manual* (NAT Doc 007) with a subsequent withdrawal of the NAT OPS Bulletin 2019_001 [*Operations Without an Assigned Fixed Speed in the NAT (OWAFS) Special Emphasis Items (SEI)*] .

1.3 REVIEW BY THE AIR NAVIGATION COMMISSION OF THE NAT SPG/57 REPORT

1.3.1 The NAT SPG noted the outcome of the NAT SPG/57 review by the Air Navigation Commission (ANC) (AN-WP/9546 refers) presented to the 218th Session of the ANC as well as the *Consolidated Report On Planning And Implementation Regional Groups (PIRGs) And Regional Aviation Safety Groups (RASGs) for 2021* (C-WP/15370 refers) which was presented to the 226th Session of the ICAO Council.

1.4 ICAO PRIORITIES FOR THE 41ST SESSION OF THE ASSEMBLY AND THE NEXT TRIENNIUM

1.4.1 The NAT SPG was provided a presentation on the ICAO Priorities for the 41st Session of the Assembly (A41) and the next triennium, including on environment, the Collaborative Arrangement for the Prevention and Management of Public Health Events in Civil Aviation (CAPSCA), ICAO global plans on aviation safety, aviation security and air navigation, facilitation, the economic development of air transport, technical cooperation and the rule of law. In conclusion, States were invited to continue their engagement in preparation for A41 and in the follow-up on Long Term Aspirational Goal (LTAG) Global Aviation Dialogues (GLADS), provide sufficient financial and in-kind support to ICAO, ensure the necessary representation at State level in the relevant NAT contributory groups, and support information and experience sharing.

1.5 ICAO ENVIRONMENTAL ACTIVITIES

1.5.1 The NAT SPG was provided with the latest updates on the ICAO environmental activities in the EUR/NAT region related to the States' Action Plan Initiatives and Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) as well as potential new environmental capacity building activities to further support ICAO Member States. The Meeting also noted updates on the recent development on Environment such as the Feasibility of a LTAG for international aviation and the ICAO Assistance, Capacity-building and Training for Sustainable Aviation Fuels (SAF) (ACT-SAF) initiative.

1.5.2 The Meeting was informed that all NAT States announced their voluntary participation in CORSIA for the pilot phase and that all NAT States had submitted to ICAO their 2020 CO_2 emissions data.

1.6 COOPERATION WITH THE SOUTH ATLANTIC (SAT)

1.6.1 The NAT SPG was informed that the Special Atlantic Coordination Meeting (ACM-S) had been held on 23-24 June 2022 in Madrid, Spain, and reviewed the status of follow up actions stemming from the previous meeting and the 24th Meeting on the improvement of Air Traffic Services over the South Atlantic (SAT/24, June 2019). Also, a kick off meeting of the South Atlantic Safety Oversight Group (SAT SOG) and South Atlantic Implementation Management Group (SAT IMG) was conducted. The meeting resulted in the agreed actions to advance the work of the SAT SOG and IMG and further strengthen cooperation between the NAT and SAT.

1.7 NAT PROJECT TEAMS STATUS

1.7.1 The NAT SPG noted the status of the ongoing NAT project teams (**Appendix F** refers).

2. NAT PLANNING AND IMPLEMENTATION PROGRAMMES

2.1 INCORPORATION OF CYBERSECURITY INTO NAT PLANNING

2.1.1 The Meeting was provided with a report on the activities undertaken in follow-up to NAT SPG Conclusion 54/23 (Incorporation of Cybersecurity into NAT planning). It was noted that a NAT workshop had been held on 3-4 March 2020 based on NAT IMG Decision 55/1, supported by the NAT SOG. The outcomes of the workshop were discussed by the 59th meeting of the North Atlantic Implementation Management Group (NAT IMG/59, November 2021) and 25th meeting of the North Atlantic Safety Oversight Group (NAT SOG/25, December 2021) that supported the following:

a) Request briefings at the North Atlantic Technology and Interoperability Group (NAT TIG) from Communications Service Providers (CSP)/Surveillance Service Providers (SSP) (ARINC (Collins), SITA, Inmarsat, Iridium) on cybersecurity framework, procedures and capabilities put in place in order to meet cybersecurity challenges;

b) Acknowledge the ongoing work within the NAT provider States and organisations on cybersecurity and that the cybersecurity aspects of the current NAT operations are ensured;

c) Encourage integration of Cybersecurity as part of the individual Safety Management System (SMS) of NAT provider States and organisations and of the NAT Safety Case definition and template provided in the *NAT SPG Handbook* (NAT Doc 001), in coordination with recommendations stemming from the ICAO Cybersecurity Strategy.

d) Consider cooperation with entities that collect information on cybersecurity related occurrences, such as Aviation Information Sharing & Analysis Center (A-ISAC); and

e) Provide the Communication, Navigation and Surveillance (CNS) cyber threats matrices as developed by the NAT Workshop to the relevant NAT Contributory Groups for further review in terms of definition of the criticality, identification of hazards and mitigations.

2.1.2 Discussions at the NAT IMG and NAT SOG concluded that the nature of cybersecurity issues were typically treated with secrecy within each organization and that the extent and need for regional ICAO coordination mechanisms on cybersecurity was limited. In that sense, item c) above probably reflected the limit to which the NAT Region could intervene with the NAT provider States on this issue. It was also pointed out that ICAO could facilitate awareness of the importance of cybersecurity issues by conducting cybersecurity workshops at intervals as deemed required. Regarding any further involvement of NAT IMG and NAT SOG contributory bodies in cybersecurity issues, it was noted that the expertise required was not currently available within the NAT working groups and that the subject of Cybersecurity did not seem to fit well into any of the existing NAT working groups. Therefore, it was recommended that the NAT SPG convene periodic NAT workshops to enable sharing of information on the latest developments and best practices, as well as maintenance of the matrices to ensure the NAT SPG retained a current picture of the cyber threats and mitigations impacting the Region as it developed.

2.1.3 The Meeting agreed with the proposed recommendations and that the intent of NAT SPG Conclusion 54/23 would be covered by conducting regular NAT cybersecurity workshops to enable sharing of information on the latest developments and best practices, as well as maintenance of the matrices to ensure the NAT SPG retained a current picture of the cyber threats and mitigations impacting the region as they developed.

2.1.4 Therefore, the following was agreed:

NAT SPG Conclusion 58/5 – NAT cybersecurity workshop 2023

> That the ICAO Regional Director, Europe and North Atlantic, take appropriate measures to organise in coordination with NAT States, international organisations and industry a NAT workshop on cybersecurity in the first half of 2023.

2.1.5 Furthermore, the Meeting was informed that ICAO had published the 2nd edition of the Cybersecurity Action Plan in January 2022 which provided the foundation for ICAO, States and stakeholders to work together. ICAO had also produced or updated the following Guidance Material on cybersecurity:

a) Doc 8973 – *Aviation Security Manual*;

b) Doc 9985 – *ATM Security Manual*;

c) Aviation Cybersecurity Strategy;

d) Cybersecurity Action Plan;

e) Using Traffic Light Protocol;

f) Cybersecurity Culture in Civil Aviation; and

g) Cybersecurity Policy Guidance.

2.2 NAT 2030 VISION

2.2.1 The NAT SPG was provided with a report on the activities undertaken in follow-up to NAT SPG Conclusion 57/3 (NAT 2030 Vision high-level principles, goals and objectives and potential improvement areas). It was recalled that based on the NAT IMG/59 and NAT SOG/25 inputs, the NAT SPG agreed by correspondence on Conclusion 58/1 (Integration of NAT 2030 Vision into the NAT eANP Volume III) and Conclusion 58/2 (Removal of NAT Doc 005, *Future ATM Concept of Operations*).

2.2.2 Furthermore, the NAT IMG and NAT SOG undertook a review of the work programmes and assigned responsibilities for implementation of the related NAT 2030 vision improvements to their contributory bodies.

2.2.3 With regard to improvement 2-7 (Ensure systems cybersecurity and resilience), the NAT SPG agreed that this item would be addressed through regular NAT cybersecurity workshops as discussed in NAT SPG Conclusion 58/5 and paragraph 2.1.3.

2.2.4 The Meeting noted that further discussion and clarification were required concerning Improvement 6-2 (Horizontal Flight Efficiency), 6-3 (Vertical Flight Efficiency), 6-4 (Cost per 100KM ($)) and 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).

2.2.5 In this regard, the NAT SPG noted that there was a continuous need to maintain the NAT Vision document to ensure its alignment with ongoing developments within the NAT and adjacent Regions. A proposal to establish a specific body under the NAT SPG umbrella to steer this work or provide advice to the NAT SPG was noted. It was acknowledged that the responsibility for implementation of the Vision was with the NAT IMG, in coordination with the NAT SOG and North Atlantic Economic, Financial and Forecast Group (NAT EFFG). The NAT SPG had its role as a responsible body for policy and strategy decisions. In this vein, it was agreed that periodic reviews of the NAT 2030 Vision would be standing agenda items for future NAT SPG and NAT IMG meetings. Also, considering that the previous NAT workshop that started the development of the current NAT Vision took place in 2019, it was agreed that there was a need for another NAT Workshop in the first quarter of 2023. The objective of the workshop would be to discuss the necessary amendments to the NAT Vision, including its time horizon and other timelines and priorities, and also discuss the improvements that required further clarification as listed in para 2.2.4.

2.2.6 Therefore, the following was agreed:

NAT SPG Conclusion 58/6 – NAT Vision workshop 2023

That the ICAO Regional Director, Europe and North Atlantic, take appropriate measures to organise in coordination with NAT States, international organisations and industry a NAT Vision workshop in the first quarter of 2023.

2.2.7 In view of the above, the NAT SPG did not support a proposal for a standalone NAT SPG body to maintain the NAT Vision at this time. Furthermore, the Meeting took note of the updates to NAT Vision 2030 matrix of goals, objectives and prioritised potential improvements as provided by NAT IMG (**Appendix G** refers).

2.3 NAT ADS-B MANDATE

2.3.1 The NAT SPG was provided with a proposal to consider the feasibility of an Automatic Dependent Surveillance – Broadcast (ADS-B) mandate for the NAT Region that could potentially take effect on 1 January 2026 when the European mandate has taken full effect. It was noted that with an ADS-B mandate already implemented in the United States and being implemented in Europe, and taking into account implementation of space-based ADS-B in the NAT, there was a desire to maximize ADS-B usability, increase operational efficiency and to create conformity with the adjacent Regions. With wide ranging implementation of both ground and space-based ADS-B in the NAT Region, the ADS-B technology had become the mainstay of surveillance. As such, ADS-B equipment had become more important for Air Traffic Services (ATS) surveillance in the NAT Region than the (SSR) transponders mandated in the SUPPs (Doc 7030).

2.3.2 In this regard, the Meeting noted that the ADS-B equipage rate for traffic in the Reykjavik control area was 94% in May 2022 counting all IFR (Instrument Flight Rules) flights at all levels.

2.3.3 Therefore, it was agreed to task the appropriate NAT groups with investigating the feasibility of a NAT ADS-B mandate with the aim of returning conclusions to the NAT SPG/59 meeting (June 2023).

NAT SPG Conclusion 58/7 – NAT ADS-B Mandate

That, the:

a) North Atlantic Implementation Management Group (NAT IMG):
   i) explore the operational feasibility of a NAT Automatic Dependent Surveillance – Broadcast (ADS-B) mandate; and
   ii) draft any required NAT document amendment proposals;
b) North Atlantic Safety Oversight Group (NAT SOG) explore the regulatory feasibility of a NAT ADS-B mandate; and

c) North Atlantic Economic, Financial and Forecast Group (NAT EFFG) explore the economic feasibility of a NAT ADS-B mandate.

2.3.4 In agreeing to this Conclusion, the NAT SPG was aware of potential ambiguity of the word "feasibility". It was agreed that each contributory body would discuss and propose the most optimal method of determining feasibility per the foregoing Conclusion. The Secretariat, in coordination with Iceland, would provide appropriate input material for the upcoming meetings.

2.4 15NM TtT OPERATIONAL TRIAL IN REYKJAVIK FIR

2.4.1 The NAT SPG was provided with a draft implementation plan for an operational trial of a new 15 Nautical Mile (NM) Target to Target (TtT) separation minimum in the Reykjavik Control Area (CTA) and a request to approve the operational trial subject to the approval of the NAT IMG and NAT SOG. In this regard, NAT SPG Conclusion 50/07 was recalled supporting the expanded use of ATS surveillance capability using space-based reception of ADS-B signals.

2.4.2 The Meeting was informed that the main reasons for the trial implementation of the 15 NM TtT separation minimum were the expanded space-based ADS-B coverage throughout the Reykjavik CTA high level airspace; and simplicity in application of this single separation minimum that gives approximately the same benefits to aircraft operators as multiple procedural separation minima (often referred to as Advanced Surveillance Enhanced Procedural Separation (ASEPS)).

2.4.3 The Meeting noted that the initial plan was to implement the 15 NM TtT separation in the autumn of 2023. However, the delay of the Oceanic Clearance Removal (OCR) implementation prompted Iceland to reschedule its software and implementation development schedule and the new plan was to expedite the implementation of 15 NM TtT to the period January-April 2023.

2.4.4 Based on the foregoing, the following was agreed:

NAT SPG Conclusion 58/8 – Operational trial of 15 NM Target to Target separation minimum

That, subject to the endorsement of the NAT IMG and the NAT SOG, an operational trial of a 15 NM Target to Target separation minimum in the Reykjavik CTA is approved.

2.5 NAT NEW ENTRANT READINESS (NER) PROJECT TEAM

2.5.1 The NAT SPG was provided with the report of the NAT New Entrant Readiness Project Team (NAT NER PT) and the first draft of the NAT New Entrant Guidance Material. It was noted that the initial objective of the project team was to gather associated information to ensure as far as possible global harmonisation, considering the already published State legislation and guidance by several States. Due to the very tight timeline, the NER PT concentrated on space launch and re-entry operations. The Meeting took note of the current status of the NER PT high level tasks.

2.5.2 During the discussion on the draft guidance material, it was highlighted that some editorial improvements were needed, as well as coordination within the NAT SPG structure and internally within each State. Therefore, the NAT SPG agreed to extend the timeframe of the NER PT so that a further review could be done within the PT leading to a review by the 14th meeting of the North Atlantic Procedures and Operations Group (NAT POG/14) at the end of September with subsequent discussions/review at the NAT IMG/61 (November 2022) and NAT SOG/27 (December 2022).

2.5.3 Pending the outcome of the foregoing meetings, the NAT SPG would be invited by correspondence to endorse the NAT Guidance for New Entrants and task the NAT SPG contributory bodies to review and maintain the relevant sections in accordance with the NAT 2030 Vision high-level principles, goals and objectives.

2.5.4 The NAT SPG also supported the proposal that the NAT NER PT should continue its work to review the NAT SUPPs (Doc 7030) provisions related to airspace reservations before the end of 2022.

2.5.5 With regard to the economical and financial aspects of New Entrant operations, the NAT SPG did not support the establishment of a multi-disciplinary Project Team. It was felt that this discussion should be addressed at the global level through the presentation of the NAT SPG/58 Report to the ICAO Air Navigation Commission (ANC). It was observed that the current ICAO guidance, i.e. *ICAO's Policies on Charges for Airports and Air Navigation Services* (Doc 9082), might need updates to address the commercial space operations issue.

2.5.6 Furthermore, the NAT SPG deferred the decision on whether the NER PT work should include other new entrants (Supersonic; Hypersonic; Unmanned Aircraft Systems (UAS)/Drones; Balloons; High Altitude Long Endurance (HALE) and High-Altitude Platform Systems (HAPS)) to the next NAT IMG and NAT SOG meetings.

2.6 Wake Energy Retrieval Operations in the NAT

2.6.1 The NAT SPG was requested to provide advice on defining the relevant strategy to enable Wake Energy Retrieval Operations provisions in the NAT Airspace from 2025 onwards.

2.6.2 The Meeting was briefed on the successful operational flight trials that had taken place in 2021 which demonstrated the technical and operational feasibility and the 5% fuel and CO_2 savings (at least 2 tons of fuel saved during each flight). Airbus considered that the first step of deployment would be in the NAT high seas airspace. It was also noted that Airbus was preparing a paper for the 41st ICAO Assembly seeking further implementation support for Wake Energy Retrieval operations.

2.6.3 The NAT SPG noted that to enable the planned implementation, a review and update of the relevant ICAO provisions might be required which was the responsibility of the global ICAO panels and groups. The Meeting agreed that the potential need for revision would be highlighted through the NAT SPG/58 Report to the ICAO ANC to request their guidance. In the meantime, Airbus was also invited to submit inputs for discussions in the relevant ICAO panels.

2.7 Adequate resources for the NAT TIG data link analysts' work

2.7.1 The NAT SPG was provided with information on the relevant NAT IMG Decisions that were not subject to discussion at this meeting. In particular, the challenges faced by the NAT Air Navigation Service Providers (ANSPs) and the NAT TIG analysts' sub-group with time and resources to accomplish the monthly non-compliance analysis were noted.

2.7.2 Based on the above, the NAT SPG agreed to elevate the NAT IMG Decision 60/3 as follows:

NAT SPG Conclusion 58/9 – Adequate resources for the NAT TIG data link analysts' work

> That the NAT provider States be urged to ensure that adequate resources are made available to support the work of the data link analysts in the NAT Technology and Interoperability Group (NAT TIG).

2.8 Volcanic Ash Exercises (VOLCEX updates)

2.8.1 The NAT SPG was provided with an update on the Volcanic Ash Exercises (VOLCEX) for the EUR and NAT Regions, recalling that VOLCEX21 on 16 November 2021 had simulated a volcano eruption of Eyjafjallajökull, based on the eruption that occurred in April 2010. The Meeting noted significant achievements observed in VOLCEX21 and in particular, that no participating States had closed their airspace. This proved that States had adopted the acceptance of the Safety Risk Assessment (SRA) approach provided by operators which was in accordance to the *Volcanic Ash Contingency Plan* (EUR/NAT VACP), *Europe and North Atlantic Regions* (EUR Doc 019, NAT Doc 006, Part II).

2.8.2 Another significant achievement observed in VOLCEX21 was the demonstration of the successful use of the Dynamic Airborne Reroute Procedure (DARP) between Delta Air Lines and Area Control Centre (ACC) Shanwick.

2.8.3 The Meeting was informed that VOLCEX22 would take place on 17 November 2022 from 0800 to 1600 UTC (Coordinated Universal Time) and simulate an eruption of Pico del Teide (Canarias, Spain) which would produce a simulated ash plume that was expected to impact a large area including the Mediterranean, mainland Europe, the Balkans and the North Sea. Airline Operators and ANSPs were encouraged to participate in the use of DARP in VOLCEX22.

3. NAT SAFETY PERFORMANCE AND OVERSIGHT ISSUES

3.1 NAT ADS-B HMS UPDATE

3.1.1 With reference to the work carried out by the NAT SOG so far in the development of a plan for the implementation of the new Height Monitoring System (HMS) in line with NAT SPG Conclusion 57-1/1(CORR), it was noted that Iceland and the United Kingdom had provided several ADS-B samples which were used to carry out early testing and refinement of the ADS-B HMS tool. The United States used the data provided to refine the ADS-B processing algorithm and the supporting pre-processing software and provided an early demonstration of the current capability to the NAT Central Monitoring Agency (NAT CMA) and the United Kingdom’s NATS showing the progress so far. The NAT CMA presented a high-level implementation plan, composed of 3 phases: 1- Platform; 2- Validation; and 3- Database. This plan involved the participation of the United States’ Federal Aviation Administration (FAA), NAT CMA and UK NATS. The plan should enable the NAT CMA to provide detailed data format and file transfer requirements to all participating ANSPs.

3.1.2 In this regard and in order to allow development work to further progress on the introduction of the ADS-B HMS, the NAT SPG agreed to elevate the status of NAT SOG Decision 26/01 as follows:

NAT SPG Conclusion 58/10 – Support to NAT CMA for ADS-B HMS implementation

That the ICAO Regional Director, Europe and North Atlantic, take appropriate measures to invite:

a) the North American Approvals Registry and Monitoring Organization (NAARMO) team to ensure the necessary resources are available to provide the ADS-B Height Monitoring System (HMS) software, supporting documentation and any associated training to the NAT Central Monitoring Agency (NAT CMA) at the earliest opportunity; and

b) NAT ANSPs to provide all necessary support to the NAT CMA to ensure an effective implementation of the ADS-B HMS.

3.2 NAT SG/26 REPORT

3.2.1 The NAT SPG noted that a total of 110 events occurring in the NAT High Level Airspace (HLA) during the six-month review period of July to December 2021 had been reviewed by the North Atlantic Scrutiny Group (NAT SG/26, March 2022), including 37 Large Height Deviations (LHD), 37 actual lateral events (including 17 Gross Navigational Errors (GNEs), 13 actual coordination events, 34 prevented events and 3 longitudinal loss of separation events.

3.2.2 It was noted that the onset of the recovery from the COVID-19 pandemic crisis caused the world’s air traffic, in particular in the North Atlantic, to increase significantly in the latter part of 2021. The number of deviations reported therefore also increased when compared to SG/24 (65 events) and SG/25 (56 events) periods, when traffic levels were lower. With regard to the NAT SG/26 review period of July to December 2021, it was noted that:

a) the overall time of LHDs at unprotected flight levels was 37 minutes. One LHD generated 20 minutes of the 37-minute total of that time at unprotected flight levels, because the flight did not cross the oceanic entry point at the correct level. In comparison, the overall time at unprotected flight level was 6 minutes for SG/25 and 24 minutes for SG/24;

b) the overall time aircraft were on an unprotected profile was 36 minutes. These 36 minutes were from a single event involving a medical evacuation flight, exempted from the Data Link Mandate and without proper equipage. For SG/25 review period, this time was 6 minutes; and

c) the overall time coordination events were on an unprotected profile was zero (0) minute. For SG/25, this time was 21 minutes.

3.2.3 The Meeting expressed appreciation for the level of detailed analysis provided in the NAT SG report and recognized how the reports provide an increasingly detailed picture of safety in the NAT Region. It was also noted that the reduced number and duration of events may be directly attributable to programs successfully implemented by the NAT SPG, such as the NAT data link mandate (DLM), which had been instituted to improve safety.

3.2.4 In view of sharing this expertise and work methodology with the SAT, the NAT SPG agreed to extend an invitation to SAT SOG Chair team to participate as observers at the next NAT SG meeting. However, due care should be taken of sensitivity aspects of some information shared during the SG meetings. The Secretariat and NAT SPG Chair team would further discuss this subject to identify the best approach prior to the next meeting of the NAT SG.

3.3 NAT MWG/58 REPORT

3.3.1 The NAT SPG was provided with the North Atlantic Mathematicians Working Group (NAT MWG) 2021 collision risk estimates (CRE) and noted that the vertical operational collision risk estimate for 2021 was estimated to be 6.1×10^{-9} fatal accidents per flight hour (fapfh) for the NAT High Level Airspace (HLA), slightly higher than the vertical Target Level of Safety (TLS) for operational and technical errors of 5×10^{-9} fapfh. This value incorporated the benefits of the Observed Strategic Lateral Offset Procedure (SLOP). Regarding the vertical risk with optimal SLOP, it was further noted that if SLOP had been applied in an optimal manner for vertical risk reduction, the resulting risk estimate would have been $3.8 \text{ x } 10^{-9}$ fapfh, 24% lower than the TLS value.

3.3.2 The NAT SPG noted information on a Collision Risk Model (CRM) improvement made which was intended to better recognize and account for navigational accuracy in the NAT region, but which consequently increased the values of the computed CREs in the vertical dimension from what had been calculated previously.

3.3.3 It was also noted that, to continue refinement of the CRM to align with technological improvements in the NAT region as based on this provided data, the NAT MWG reviewed occupancy methods and concluded that they needed to be updated with the objective of improving annual collision risk estimates. Recognizing that the determination of access and frequency of traffic data (ADS-B / Automatic Dependent Surveillance-Contract (ADS-C)) as well as the sharing of methodology for all of the NAT Region would be key for a successful update of the occupancy methods, the NAT SOG agreed to establish a Project Team for this task.

3.3.4 In order to support this work, the NAT SPG agreed to elevate the status of NAT SOG Decision 26/03 as follows:

NAT SPG Conclusion 58/11 – NAT MWG Access to ADS-B data

That the ICAO Regional Director, Europe and North Atlantic, invite NAT provider States and their ANSPs to ensure access to ADS-B position data or sampled ADS-B positions for NAT MWG members.

3.4 NAT CMA REPORT

3.4.1 The NAT SPG was informed of the NAT CMA current activities and concerns. It was noted that, with regard NAT CMA's ToR (terms of reference) 2 (Circulation of regular reports of all operational deviations), the NAT CMA would continue to use its website for the publication of regular operational deviation summaries, graphics and tables for State, Regulator and operator information. With effect from January 2022, the NAT CMA published monthly reports with revised content and format, which obtained positive feedback from the receiving parties.

3.4.2 With regard to its ToR 4 (Technical Height Keeping Performance Data), there were no major outages of the Strumble Height Monitoring Unit (HMU) since last reported, although anomalies in the height monitoring data output that were related to the software had been identified. A fix which was implemented on 27 March 2022 was not successful and the NAT CMA reported that they continued to observe large amounts of anomalous height monitoring data output.

3.4.3 With regard to its ToR 8 (Data Exchange with other Regional Monitoring Agencies), the NAT SPG noted that due to communication restrictions, the NAT CMA had been unable to send or receive emails to the EURASIA Regional Monitoring Agency (RMA) directly. The restrictions on international flying have meant that this has had minimal impact on the NAT CMA tasks to date. ICAO offered to act as a conduit if any essential communication was required.

3.5 NAT SAFETY CASE ON THE DISCONTINUATION OF OCEANIC CLEARANCE

3.5.1 The NAT SPG noted that a NAT SOG Project Team had been established to review the draft NAT Safety Case for the removal of oceanic clearances. The high level tasks instructed this NAT Oceanic Clearance Removal Regional Safety Case Review Project Team (NAT OCR RSCR PT) to:

a) confirm the validity of given safety arguments within the Oceanic Clearance Removal (OCR) NAT Regional Safety Case (NRSC);

b) review the completed assessment checklist to confirm the validity of the claims made and the efficacy of any proposed mitigations;

c) determine whether additional data may be required to support post-implementation monitoring;

d) confirm that all of the required elements of the OCR NRSC are completed; and

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

3.5.2 It was noted that the draft NRSC followed the "definition and components of safety cases in support of changes to the NAT air navigation systems requiring SPG Approval" as described in *NAT SPG Handbook* (NAT Doc 001). The NRSC was intended to provide assurance to the NAT SPG that the risks associated with the changes introduced by OCR had been identified and would be managed through appropriate mitigations that would be implemented, and that State regulatory approvals would be issued before the change was introduced into operations.

3.5.3 The NAT SPG noted that the NRSC for OCR had concluded that following the identification of the hazards and appropriate mitigations, the proposed change was not anticipated to increase the overall risk level to the NAT Region system including systems interfacing with the NAT Region, that the proposed change fitted the NAT airspace system, and that all common aspects had been addressed at this time.

3.5.4 It was clarified that the regional identified hazards within this NRSC for OCR had been subject to risk assessment through the use of the checklist of the NAT safety case template. Additionally, it was reiterated that identified hazards would be subject to risk assessment in accordance with each implementing ANSP's Safety Management System processes as appropriate to each concerned State, and in accordance with Annex 19 (Safety Management) principles. Safety risk tolerability would be confirmed via State issued approvals/confirmations which would be attached to the NRSC for OCR in due time.

3.5.5 In terms of monitoring, the NAT SPG noted that each implementing ANSP intended to scrutinize events to:

a) determine if changes introduced by OCR contributed to the event;

b) provide details to NAT Contributory Groups for regional scrutiny to support post implementation monitoring; and

c) input a summary of information into a consolidated OCR Post Monitoring Information Paper to NAT SOG for two meetings after implementation.

3.5.6 The NAT SPG was advised that NAV CANADA and NATS UK would not make the initially planned implementation date of OCR of Q1 2023 and a new target date announcement was expected mid-summer 2022.

3.5.7 The NAT SPG noted the concurrence on the list of regional hazards, the consequences of these hazards and the mitigations identified. It was expected that these identified regional hazards would be included in each national hazard list within the States' safety cases.

3.5.8 The NAT SPG noted the NAT SOG follow-up action 26-03 requesting the State Oversight Authorities of the implementing States (Canada, Iceland, Norway, Portugal, United Kingdom) to provide written State assurance (confirmation) of completion of the national safety cases for OCR. These written confirmations would imply that:

a) the hazards assessed in the national safety cases include at a minimum the hazards identified at the NAT region level in the OCR NRSC; and

b) the proposed changes increase neither the overall risk associated with the NAT, nor increase the risks associated with any component part of the NAT system beyond acceptable levels and/or established NAT safety performance targets.

3.5.9 Furthermore, the NAT SPG noted that the conclusion of the NAT OCR RSCR PT work was expected by December 2022, before issuing any endorsement of the NRSC for OCR.

3.5.10 In connection with this discussion, the Meeting recalled NAT IMG Decision 59/4 endorsing the Concept of Operations (CONOPS) and implementation task list for the removal of oceanic clearance in the NAT Region. It was noted that the CONOPS was required by the ANSPs to progress the work on ground systems and procedures recognizing that any further changes could delay the project.

3.6 NAT ASR 2021

3.6.1 The NAT SPG was presented the NAT Annual Safety Report (NAT ASR) with the 2021 values of the Safety Key Performance Indicators (SKPIs) and Collision Risk Estimates (CREs) and containing information regarding:

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

b) the North Atlantic Scenario;

c) results of the scrutiny of events of year 2021, including the identified contributing issues, and the mitigations that were used for preventions; and

d) NAT Regional Priorities in line with the NAT 2030 Vision.

3.6.2 It was noted that the NAT ASR 2021 included the new SKPIs for the NAT as devised by the NAT SKPI Review Project Team in 2021 and accepted at NAT SPG/57.

3.6.3 Based on the foregoing, the following was agreed:

NAT SPG Conclusion 58/12 – *NAT Annual Safety (ASR) Report* 2021

That, the:

a) *NAT Annual Safety Report* (NAT ASR 2021) be endorsed; and

b) ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish the NAT SPG-endorsed NAT ASR 2021 (**Appendix H** refers).

4. NAT ECONOMIC, FINANCIAL AND FORECAST ISSUES

4.1 NAT TRAFFIC FORECAST 2022-2026

4.1.1 The NAT SPG was provided with a forecast of total NAT traffic for the period 2022-2026 which had been updated with information as received by 19 April 2022. It was noted that IATA had provided the NAT EFFG with the historical and forecasted passenger flow for the NAT Region. IATA informed that they were developing a methodology to also capture operational data and would report to NAT SPG, when this information was available.

4.1.2 In view of the above the following was agreed:

NAT SPG Conclusion 58/13 – Approval of the NAT Traffic Forecast (2022-2026)

That the ICAO Regional Director, Europe and North Atlantic, take appropriate measures to publish the NAT traffic forecast for the period 2022-2026 as provided in **Appendix I**.

4.2 NEW FINANCIAL ARRANGEMENT FOR THE NAT ADS-B HEIGHT MONITORING SYSTEM

4.2.1 The NAT SPG was provided with a report on the follow up activities on NAT SPG Conclusion 57/2 (Financial mechanism for funding the new NAT HMS) presenting several options.

4.2.2 It was noted that the NAT EFFG considered Option 3 was the most transparent and fairest. However, the majority felt that it would be the most complicated to put in place, requiring means to identify the flights concerned as well as changes to the billing and collection mechanisms, which could increase the overall administrative costs.

4.2.3 The NAT SPG agreed that for ease of application and cost effectiveness, Option 4 was the most cost efficient and easiest to implement.

4.2.4 IATA expressed concern that applying Option 4 could lead to fluctuations in user charges as it directly matched ANSPs' costs with flights in their respective airspace by recovering those costs through their own Oceanic charges. IATA also felt that the planned operational change to the height monitoring system would be an excellent opportunity to improve the financial arrangement, ending the correlation that existed with the DEN/ICE (Danish and Icelandic Joint Financing) Agreements and making it more transparent and more related to the services provided to the airspace users. With regard to currency exchange risks for payment by operators, it was noted the current billing practice did not include currency conversion to pay via local or an agreed-upon currency which currently limited operator flexibility.

4.2.5 The NAT SPG noted discussion on whether reduced vertical separation minima (RVSM) monitoring could be considered as part of normal air navigation services for which air navigation charges could be levied. It was agreed that further clarifications on this issue could be sought through ICAO as this was a global issue.

4.2.6 Based on the foregoing, the NAT SPG expressed appreciation for the complex work completed by the NAT EFFG and its PT, thanked their members for the good results that had been achieved and endorsed the following:

NAT SPG Conclusion 58/14 – Arrangement on the Joint Financing of a North Atlantic Height Monitoring System Using ADS-B Data

That, the:

a) following principles be applied for the Arrangement on the Joint Financing of a North Atlantic Height Monitoring System Using ADS-B Data:

   i) all ANSP costs, both set-up costs and operating costs, be recovered through each ANSP Oceanic Route Charges; and

   ii) all NAT CMA costs be recovered through the RVSM charge, based on the current charging system, i.e., collected for each crossing over the Atlantic, in conjunction with the DEN/ICE charges;

b) Joint Financing Section of ICAO be invited to finalize the financial arrangement as shown in **Appendix J** for the NAT height monitoring system using ADS-B data; and

c) NAT SPG/59 to be provided with a progress report on the above.

5. NAT DOCUMENTATION UPDATES

5.1 NAT DOC 001 – NAT SPG HANDBOOK

5.1.1 The NAT SPG was presented with a summary of all amendments to the *North Atlantic Systems Planning Group* (NAT SPG) *Handbook* (NAT Doc 001).

5.1.2 It was recalled that the NAT SPG had tasked the ICAO Secretariat to conduct an initial review of the NAT SOG and NAT IMG Terms of Reference (ToR) by comparing 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, and provide proposals to the next NAT IMG and NAT SOG meetings, for further presentation to the NAT SPG for review (NAT SPG Conclusion 57/17 refers). The initial review carried out by the Secretariat concluded that, although the NAT SPG, NAT SOG and NAT IMG ToRs mostly align with the RASG and PIRG generic ToRs, there were some minor improvements that could be considered. Although the task was to review the NAT IMG and NAT SOG ToRs, it transpired through the initial review that the ToRs of the NAT SPG, as de-facto the PIRG and RASG for the NAT Region, should be the main area for alignment and that the NAT SOG and NAT IMG ToRs could remain unchanged.

5.1.3 The related paragraph numbers and the main findings of the review of the NAT SPG Terms of Reference were as follows:

a) 2. Members: The Participation chapter states that each State/Territory member should be represented by a senior-level delegate nominated by the State/Territory, preferably from the civil aviation authority (CAA). Consideration could be made whether the NAT SPG ToRs should specify CAA;

b) 4 Reporting: The Reporting chapter states that the RASG and PIRG will report to Council on an annual basis. An article may be added in the NAT SPG ToR to that extent;

c) 5. Role of the States and 6. Role of international organizations and industry: The roles of the States and international organizations is given under two separate headings in the generic ToR. The *NAT SPG Handbook* could be amended to add such descriptions;

d) 7. Interregional coordination: The generic ToRs state the necessity of providing interregional coordination. It may be considered to include an article on ensuring interregional coordination in the NAT SPG and Contributory Bodies' ToRs;

e) 8. Global Plans: The importance of working in harmony with GASP and ICAO *Global Air Navigation Plan* (GANP, Doc 9750 is mentioned in many articles in the generic ToR. It may be considered to include the relevant sections from the generic ToR into the NAT SPG ToR;

f) 12. Meeting invitation, venue and documentation:

   i) 12.1: The Structure chapter states that invitations to PIRG and RASG meetings must be issued at least three months in *advance* of the meeting to assist States to plan participation; and

   ii) 12.2: The Venue chapter indicates that approval to host RASG meetings outside of the Regional Office must be obtained from the President of the Council. A clause could be added that the Council's approval is required for meetings to be held outside of the Regional Office.

5.1.4 The NAT SPG noted the following list of updates to the *NAT SPG Handbook* (NAT Doc 001):

a) Updates to Section 1 — *NAT SPG Terms of Reference* as described in 5.1.3;

b) Updates to Section 1: #18 – NAT SPG representatives - updates;

c) Updates resulting from the NAT SOG Safety Key Performance Indicator (SKPI) Review Project Team:

   i) Update to Sections 5:A [02] Amendments to the list of safety key performance indicators for the ICAO NAT Region, Table 1 - Safety Key Performance Indicators and related targets and deletion of Table 2 - Target Level Of Safety;

d) Updates to Section 6:A — *Documents promulgated by the NAT SPG* to the status of the following documents that have been approved or will be approved by the present meeting:

   i) NAT Doc 001 – *NAT SPG Handbook* – July 2022 (C 58/15 refers);

   ii) NAT Doc 005 – *Future ATM Concept of Operations for the North Atlantic Region* – Discontinued (C 58/2 [CORR] refers);

   iii) NAT Doc 006, Part I – *Air Traffic Management Operational Contingency Plan – North Atlantic Region* – Version 2.0 (NAT Doc 006, Part I) – July 2022 (C 58/16 *refers*);

   iv) Amendment to NAT Doc 011 – *PBCS Monitoring and Reporting Guidance* – Version 2022 – July 2022 and inclusion of NAT IMG to the list of groups responsible for updates of the NAT Doc 011 (C 58/18 *refers*);

   v) NAT eANP Vol III (ICAO Doc 9634) – *Volume III of the electronic Air Navigation Plan – North Atlantic Region* – January 2022 (C 58/1 [CORR] refers);

vi) *Minimum Monitoring Requirements: North Atlantic RVSM* – Discontinued; and

vii) NAT OPS Bulletin 2017_002_rev4 NAT OESB - *NAT Oceanic Errors Safety Bulletin* and NAT OPS Bulletin 2017_005_Rev1 *NAT OESB Supplements* - *NAT Sample Oceanic Checklists* (NAT SOG Decisions 24/02 and 24/03 refer).

5.1.5 Therefore the following was agreed:

NAT SPG Conclusion 58/15– PfA to the *NAT SPG Handbook*, NAT Doc 001

That, the:

a) NAT SPG Terms of Reference (ToRs) be amended in order to be aligned with the Generic Terms of Reference for Planning and Implementation Groups and Regional Aviation Safety Groups (PIRGs/RASGs), approved by the ICAO Council on 21 August 2020;

b) proposed set of SKPIs for the NAT as reflected in Section 5:A SAFETY RELATED POLICIES at **Appendix K** be adopted;

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

d) ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish and promulgate the updated *North Atlantic Systems Planning Group* (NAT SPG) *Handbook* (NAT Doc 001).

5.2 NAT DOC 006, PART I – NORTH ATLANTIC AIR TRAFFIC MANAGEMENT OPERATIONAL CONTINGENCY PLAN

5.2.1 The NAT SPG was presented with the results from the NAT Doc 006 Project team, which had been tasked to align the *Air Traffic Management Operational Contingency Plan – North Atlantic Region* (NAT Doc 006, Part I) with the published Aeronautical Information Publication (AIP) provisions and simplify the NAT Doc 006. The Project Team performed a comprehensive change to the structure of the *Air Traffic Management Operational Contingency Plan – North Atlantic Region* (NAT Doc 006, Part I) which included the following elements:

a) a considerable amount of procedures that were in the ANSP’s specific parts that were very close in content were moved to the common part;

b) all the references to Oceanic Clearance were removed, with a proposed procedure in case of limited/no service;

c) the common NOTAM (Notice to Airmen) template was moved to a Notification section, along with the relevant messages that each ANSP considered relevant;

d) the Contingency Route Structure for each ANSP was moved to a new Section;

e) all contact information was moved to a specific section, as it was scattered in the document and in some cases repeated; and

f) all crew procedures were removed, as they would be moved to the *North Atlantic Operations and Airspace Manual* (NAT Doc 007).

5.2.2 The Meeting agreed to the proposal to publish a new edition of the NAT Doc 006 and the following was endorsed:

NAT SPG Conclusion 58/16 – New Edition of NAT Doc 006, Part I

That the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish the new edition of *Air Traffic Management Operational Contingency Plan – North Atlantic Region* (NAT Doc 006, Part I) as provided at **Appendix L**.

5.3 AMENDMENTS TO NAT SUPPS (DOC7030) AND NAT DOC 007 - NAT OPERATIONS AND AIRSPACE MANUAL

5.3.1 The NAT SPG was presented with a proposal to amend the NAT *Regional Supplementary Procedures* (NAT SUPPs, Doc 7030/5) and the *North Atlantic Operations and Airspace Manual* (NAT Doc 007) in order to align the NAT communication failure procedures with the procedures and environment that would exist after the discontinuation of oceanic clearances.

5.3.2 Therefore the following was endorsed:

NAT SPG Conclusion 58/17 – PfA to NAT SUPPs and NAT Doc 007 related to NAT communication failure procedures

That, the:

a) proposed amendment to the *NAT Regional Supplementary Procedures* (NAT SUPPs, Doc 7030/5) related to communication failure procedures as detailed in **Appendix M** be endorsed;

b) proposed amendment to the *North Atlantic Operations and Airspace Manual* (NAT Doc 007) related to communication failure procedures as detailed in **Appendix N** be endorsed; and

c) ICAO Regional Director, Europe and North Atlantic, take appropriate action to process the proposed amendment to the *NAT Regional Supplementary Procedures* and publish and promulgate the updated NAT Doc 007.

5.3.3 While agreeing to the foregoing Conclusion, the NAT SPG decided that the NAT Doc 007 amendment related to communication failure procedures would not be published until the Doc 7030 amendment had been finalised, or the OCR implementation date, whichever came first.

5.4 NAT DOC 011 - PBCS MONITORING AND REPORTING GUIDANCE

5.4.1 The NAT SPG noted the NAT SOG and NAT IMG discussions regarding amendments to the *PBCS Monitoring and Reporting Guidance* (NAT Doc 011). It was noted that the NAT SOG/25 had agreed to proposed amendments on the removal of the guidance concerning inclusion of aircraft with insufficient data (less than 100 data points) from the monthly non-compliance reports.

5.4.2 The Meeting noted IATA's concerns on the *PBCS Monitoring and Reporting Guidance* (related to operator's ability to access timely non-compliance reporting data; and the extensive resources required to monitor and analyze PBCS airframe performance data which routinely meets performance requirements) and that the NAT Doc 011 should be maintained up-to-date at the NAT level.

5.4.3 The Meeting noted additional proposed amendments by IATA to the NAT Doc 011 and agreed that they should be presented by IATA to the next NAT TIG for further discussion. Furthermore, the Meeting agreed that, although the *NAT SPG Handbook* (NAT Doc 001) assigned responsibility for NAT Doc 011 maintenance to the NAT SOG, engagement of the NAT IMG would be needed to review the proposed amendments. In this regard, it was agreed to amend NAT Doc 001 to include the NAT IMG in the list of groups responsible for updates of the NAT Doc 011.

5.4.4 Based on the foregoing, the following was agreed:

NAT SPG Conclusion 58/18 – PfA to *PBCS Monitoring and Reporting Guidance* (NAT Doc 011)

That, the:

a) *PBCS Monitoring and Reporting Guidance* (NAT Doc 011) be amended to remove the guidance concerning inclusion of aircraft with insufficient data from the monthly non-compliance reports, as at **Appendix O**;

b) NAT IMG be included in the list of groups responsible for updates of the NAT Doc 011 in Section 6:A [Documents promulgated by the NAT SPG] of the *NAT SPG Handbook* (NAT Doc 001); and

c) ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish the amended version of NAT Doc 011, as soon as practical.

6. ANY OTHER BUSINESS

6.1 FAREWELLS

6.1.1 The NAT SPG was informed that Mr. Carlos Rodriguez (IFALPA) was planning to resign and would unlikely participate at the next meeting. The Meeting thanked Carlos for his hard work and friendship during his term as IFALPA representative at the NAT SPG and wished him all the best in his future endeavors.

6.2 NEXT MEETING

6.2.1 It was agreed that the NAT SPG/59 would be conducted from 27 to 29 June 2023 in Paris, France. It was agreed that from now onwards, the meetings of the NAT Contributory Groups would be conducted as face-to-face meetings.

APPENDIX A — LIST OF PARTICIPANTS

(Paragraphs 0.2 and 0.3 refer)

CHAIRPERSON
Hlin HOLM*

CANADA
Jean-Pierre COTÉ
Noel DWYER
Vanessa ROBERTSON

DENMARK
Patrick Alexander LIEBGOTT* (*remote*)
Line Lykke RASMUSSEN (*remote*)
Flemming SCHMIDT

FRANCE
Christophe GUILPAIN*

ICELAND
Thordis SIGURDARDOTTIR
Bjarni STEFANSSON
Arni GUDBRANDSSON

IRELAND
Paul KENNEDY

NORWAY
Baard LARSEN* (*remote*)

PORTUGAL
Antonio RITA* (*remote*)
Carlos ALVES
Luis TOJAIS
Alda MIRANDA (*remote*)

SPAIN
Lorena MIRANDA ABAD (*remote*)

RUSSIAN FEDERATION
Yury FENYUK (*remote*)
Petr SHIPIL (*remote*)
Sergey USIKOV (*remote*)

UNITED KINGDOM
Stuart LINDSEY*
Iain BROWN
Colin SCOTT (*remote*)

UNITED STATES
Jeffrey SZCZYGIELSKI*
Jennifer KILEO
Travis FIEBELKORN
Jim WEBB
Meghan CURRIER

Airbus
Philippe MASSON

EUROCONTROL
Rob PETERS

International Air Transport Association (IATA)
Jeffrey MILLER
Rich STARK

International Federation of Air Line Pilots Association (IFALPA)
Carlos RODRIGUEZ

NAT Central Monitoring Agency (NAT CMA)
David LUNAN (*remote*)

OBSERVERS FROM SOUTH ATLANTIC STATES

GHANA
Theophilus Joe QUAYE
Dan NARTEY

ICAO EUR/NAT
Elkhan NAHMADOV (Acting Secretary)
Abbas NIKNEJAD
Christopher KEOHAN
Sarantis POULIMENAKOS
Sven HALLE
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#	***Ag item***	***Title***	***Presented by***
WP01	0	Draft Agenda	Secretariat
WP02	1	Status of NAT SPG Conclusions	Secretariat
WP03	6	Incorporation of Cybersecurity into NAT Planning	Secretariat
WP04	6	NAT 2030 Vision Work Programme	Secretariat
WP05	5	Updates to NAT SPG Handbook (NAT Doc 001)	Secretariat
WP06	5	PfA to NAT Doc 006, Part I	Secretariat
WP07	5	PfAs to NAT SUPPs and NAT Doc 007	Secretariat
WP08	4	NAT EFFG/42 review of the New HMS Arrangement Project Team Report	Secretariat
WP09	4	NAT Traffic Forecast and NAT EFFG/41 & 42 outcomes	Secretariat
WP10	5	PfA to NAT Doc 011, PBCS Guidance	Secretariat
WP11	2	NAT ADS-B Mandate	Iceland
WP12	2	15 NM TtT operational trial in BIRD	Iceland
WP13	2	Wake Energy Retrieval Operations in the NAT	Airbus & Secretariat
WP14	3	NAT SOG/25 & 26 outcomes	Secretariat
WP15	2	NAT New Entrant Readiness (NER) PT	PT Lead
WP16	6	NAT Vision Steering Group/Advisory Group	United States, IATA & IFALPA
IP01	0	Meeting schedule	Secretariat
IP02	0	Meeting documentation	Secretariat
IP03	1	ICAO Update	Secretariat
IP04	1	Status of NAT Project Teams	Secretariat
IP05	3	VOLCEX Events	Secretariat
IP06	1	Review of NAT SPG/57 Report by the ANC Working Group of the Whole for Strategic Review and Planning (WG/SRP)	Secretariat
IP07	6	NAT IMG/59 outcomes	Secretariat
IP08	6	NAT IMG/59 outcomes	Secretariat
IP09	1	ICAO Environmental Activities	Secretariat
PP01	1	ICAO Priorities for the 41st Session of the Assembly and the Next Triennium	Secretariat
PP02	1	ICAO Environmental Activities	Secretariat
FL01	1	In support of IP09: ICAO Environmental Activities	Secretariat
FL02	5	In support of WP10 & WP14: IATA Concerns regarding NAT Doc 011	IATA

APPENDIX C — UPDATED NAT SPG CONCLUSIONS

(paragraph 1.2.1 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.		Closed
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 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

STATUS OF NAT SPG/57 CONCLUSIONS

Reference/Title	Description	Comments	Status
C 57/1 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.		On-going
C 57/2 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.	NAT SPG/58 – WP/08 refers.	Closed
C 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.	Incorporated into NAT eANP Volume III as proposed by NAT DMO	Closed

Reference/Title	Description	Comments	Status
C 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.	SL EUR/NAT 21-0258.TEC of 27 Sep 2021 refers.	Closed
C 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).	Email: 210628 - NAT SPG57 flwup - 2020 North Atlantic Annual Safety Report (NAT ASR 2020) (NAE/SUL) refers	Closed
C 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.		On-going
C 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).	- email: 210715 Publication of NAT Doc 011 - PBCS Monitoring and Reporting Guidance (cup) refers - coordination with ICAO HQ and OPDLWG on-going.	Closed

Reference/Title	Description	Comments	Status
C 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.	SL EUR/NAT 21-0194.TEC of 23 July 2021 refers.	Closed
C 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 maintenance 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.	Email: 210712 Publication of NAT Doc 001 - NAT SPG Handbook (cup) refers	Closed
C 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.	PfA submitted to HQ for clearance to circulate on 26 November 2021.	On-going
C 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.	Email: 210818 NAT SPG57 follow-up NAT MHP PT call for nominations (NAE/SUL) refers	Closed
C 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.	Email: 210712 Publication of NAT Doc 001 - NAT SPG Handbook (cup) refers	Closed

Reference/Title	Description	Comments	Status
C 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.	Email: 210708 Publication of the EUR/NAT Volcanic Ash Contingency Plan, Version 2.0.1 (kec/hoi/cup)	Closed
C 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.	Email: 210707 Publication of NAT Doc 007 - NAT Operations and Airspace Manual (cup) refers	Closed
C 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.	Email: 210630-NAT SPG57 follow-up - deletion of several NAT OPS bulletins (NAE/SUL) refers	Closed
C 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.	Email 210630-NAT SPG57 follow-up - NAT OPS Bulletin 2019_003Rev03 published (NAE/SUL) refers.	Closed
C 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.	NAT SPG/58 – WP/05 refers	Closed

APPENDIX D — PROPOSED AMENDMENTS TO NAT ANP VOLUME III

(*paragraph 1.2.3 refers*)

Starts on next page

APPENDIX D — PROPOSED AMENDMENTS TO NAT ANP VOLUME III

(*paragraph 1.2.3 refers*)

NORTH ATLANTIC (NAT) AIR NAVIGATION PLAN

VOLUME III

19 January 2022

ENDORSED BY NAT SPG/58*

Secretariat Note: An update of Parts 0 and I is being coordinated with ICAO Headquarters and Regional Offices.

* Endorsed by correspondence (NAT SPG Conclusion 58/1 refers)

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NAT ANP, VOLUME III
PART 0 – INTRODUCTION

1. INTRODUCTION

1.1 The background to the publication of ANPs in three volumes is explained in the Introduction in Volume I. The procedure for amendment of Volume III is also described in Volume I. Volume III contains dynamic/flexible plan elements related to the implementation of the air navigation system and its modernization in line with the ICAO Aviation System Block Upgrades (ASBUs) and associated technology roadmaps described in the Global Air Navigation Plan (GANP).

1.2 The information contained in Volume III is related mainly to:

- Planning: objectives set, priorities and targets planned at regional or sub-regional levels;
- Implementation monitoring and reporting: monitoring of the progress of implementation towards targets planned. This information should be used as the basis for reporting purposes (i.e.: global and regional air navigation reports and performance dashboards); and/or
- Guidance: providing regional guidance material for the implementation of specific system/procedures in a harmonized manner.

1.3 The management of Volume III is the responsibility of the North Atlantic Systems Planning Group (NAT SPG).

1.4 Volume III should be used as a tool for monitoring and reporting the status of implementation of the elements planned here above, through the use of tables/databases and/or references to online monitoring tools, as endorsed by NAT SPG. The status of implementation is updated on a regular basis as endorsed by the NAT SPG.

2. AVIATION SYSTEM BLOCK UPGRADES (ASBUs), MODULES AND ROADMAPS

2.1. The ASBU Modules and Roadmaps form a key component to the GANP, noting that they will continue to evolve as more work is done on refining and updating their content and in subsequent development of related provisions, support material and training.

2.2. Although the GANP has a worldwide perspective, it is not intended that all Block Upgrade Modules are required to be applied in every State, sub-region and/or region. Many of the Block Upgrade Modules contained in the GANP are specialized packages that should be applied only where the specific operational requirement exists or corresponding benefits can be realistically projected. Accordingly, the Block Upgrade methodology establishes an important flexibility in the implementation of its various Modules depending on a region, sub-region and/or State's specific operational requirements. Guided by the GANP, ICAO NAT regional, sub-regional and State planning should identify Modules which best provide the needed operational improvements.

NAT ANP, VOLUME III

PART I - GENERAL PLANNING ASPECTS (GEN)

1. PLANNING METHODOLOGY

1.1 Guided by the GANP, the regional planning process starts by identifying the homogeneous ATM areas, major traffic flows and international aerodromes. An analysis of this data leads to the identification of opportunities for performance improvement. Modules from the Aviation System Block Upgrades (ASBUs) are evaluated to identify which of those modules best provide the needed operational improvements. Depending on the complexity of the module, additional planning steps may need to be undertaken including financing and training needs. Finally, regional plans would be developed for the deployment of modules by drawing on supporting technology requirements. This is an iterative planning process which may require repeating several steps until a final plan with specific regional targets is in place. This planning methodology requires full involvement of States, service providers, airspace users and other stakeholders, thus ensuring commitment by all for implementation.

1.2 Block 0 features Modules characterized by technologies and capabilities which have already been developed and implemented in many parts of the world today. It therefore features a near-term availability milestone, or Initial Operating Capability (IOC), of 2013 for high density based on regional, sub-regional and State operational need. Blocks 1 through 3 are characterized by both existing and projected performance area solutions, with availability milestones beginning in 2018, 2023 and 2028 respectively.

2. REVIEW AND EVALUATION OF AIR NAVIGATION PLANNING

2.1. The progress and effectiveness against the priorities set out in the regional air navigation plans should be annually reported, using a consistent reporting format, to ICAO.

2.2. Performance monitoring requires a measurement strategy. Data collection, processing, storage and reporting activities supporting the identified global/regional performance metrics are fundamental to the success of performance-based approaches.

2.3. The air navigation planning and implementation performance framework prescribes reporting, monitoring, analysis and review activities being conducted on a cyclical, annual basis. An Air Navigation Reporting Form (ANRF) reflecting selected key performance areas as defined in the Manual on Global Performance of the Air Navigation System (ICAO Doc 9883) has been developed for each ASBU Module. The ANRF is a customized tool which is recommended for the application of setting planning targets, monitoring implementation, and identifying challenges, measuring implementation/performance and reporting. If necessary, other reporting formats that provide more details may be used but should contain as a minimum the elements described in the ANRF template. A sample of the ANRF is provided in **Appendix A**. A sample Template of a planning table which may be used to show the elements planned in an ICAO region is provided in **Appendix B**.

3. REPORTING AND MONITORING RESULTS

3.1 Reporting and monitoring results will be analyzed by the PIRGs, States and ICAO Secretariat to steer the air navigation improvements, take corrective actions and review the allocated objectives, priorities and targets if needed. The results will also be used by ICAO and aviation partner stakeholders to develop the annual Global Air Navigation Report. The report results will provide an opportunity for the international civil aviation community to compare progress across different ICAO regions in the establishment of air navigation infrastructure and performance-based procedures.

3.2 The reports will also provide the ICAO Council with detailed annual results on the basis of which tactical adjustments will be made to the performance framework work programme, as well as triennial policy adjustments to the GANP and the Block Upgrade Modules.

3.3 **Table GEN III-1** contains a minimum set of Implementation Indicator(s) for each of the eighteen ASBU Block 0 Modules necessary for the monitoring of these Modules (if identified as a priority for implementation at regional or sub-regional level). These indicators are intended to enable comparison between ICAO Regions with respect to ASBU Block 0 Modules and will apply only to commonly selected ASBU Modules. All regions/PIRGs reserve the right to select the ASBU Modules relevant to their needs and to endorse additional indicators, as deemed necessary. No reporting is required for ASBU Block 0 Modules that have not been selected.

Note: The priority for implementation as well as the applicability area of each selected ASBU Block 0 Module is to be defined by the NAT SPG. This should be reflected in Part II – Air Navigation System Implementation.

TABLE GEN III-1 – IMPLEMENTATION INDICATOR(S) FOR EACH ASBU BLOCK 0 MODULE

Explanation of the Table

1 Block 0 Module Code
2 Block 0 Module Title
3 High level Implementation Indicator
4 Remarks *Additional information as deemed necessary.*

Module Code	Module Title	Implementation Indicator	Remarks
1	**2**	**3**	**4**
B0-APTA	Optimization of Approach Procedures including vertical guidance	% of international aerodromes having at least one runway end provided with APV Baro-VNAV or LPV procedures	
B0-WAKE	Increased Runway Throughput through Optimized Wake Turbulence Separation	% of applicable international aerodromes having implemented increased runway throughput through optimized wake turbulence separation	1. Not to be considered for the first reporting cycles due to lack of maturity. 2. List of ADs to be established through regional air navigation agreement.
B0-RSEQ	Improve Traffic flow through Runway Sequencing (AMAN/DMAN)	% of applicable international aerodromes having implemented AMAN / DMAN	1. Not to be considered for the first reporting cycles due to lack of maturity. 2. List of ADs to be established through regional air navigation agreement.
B0-SURF	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	% of applicable international aerodromes having implemented A-SMGCS Level 2	List of ADs to be established through regional air navigation agreement.
B0-ACDM	Improved Airport Operations through Airport-CDM	% of applicable international aerodromes having implemented improved airport operations through airport-CDM	List of ADs to be established through regional air navigation agreement.
B0-FICE	Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration	% of FIRs within which all applicable ACCs have implemented at least one interface to use AIDC / OLDI with neighbouring ACCs	
B0-DATM	Service Improvement through Digital Aeronautical Information Management	- % of States having implemented an AIXM based AIS database - % of States having implemented QMS	

Module Code	Module Title	Implementation Indicator	Remarks
1	2	3	4
B0-AMET	Meteorological information supporting enhanced operational efficiency and safety	- % of States having implemented SADIS / WIFS - % of States having implemented QMS	
B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	% of FIRs in which FUA is implemented	
B0-NOPS	Improved Flow Performance through Planning based on a Network-Wide view	% of FIRs within which all ACCs utilize ATFM systems	
B0-ASUR	Initial capability for ground surveillance	% of FIRs where ADS-B OUT and/or MLAT are implemented for the provision of surveillance services in identified areas.	1. Not to be considered for the first reporting cycles due to lack of maturity.
B0-ASEP	Air Traffic Situational Awareness (ATSA)	% of States having implemented air traffic situational awareness	1. Not to be considered for the first reporting cycles due to lack of maturity.
B0-OPFL	Improved access to optimum flight levels through climb/descent procedures using ADS-B	% of FIRs having implemented in-trail procedures	1. Not to be considered for the first reporting cycles due to lack of maturity.
B0-ACAS	ACAS Improvements	% of States requiring carriage of ACAS (with TCAS 7.1 evolution)	
B0-SNET	Increased Effectiveness of Ground-Based Safety Nets	% of States having implemented ground-based safety-nets (STCA, APW, MSAW, etc.)	
B0-CDO	Improved Flexibility and Efficiency in Descent Profiles (CDO)	- % of international aerodromes / TMAs with PBN STAR implemented - % of international aerodromes/TMA where CDO is implemented	
B0-TBO	Improved Safety and Efficiency through the initial application of Data Link En-Route	% of FIRs utilising data link en-route in applicable airspace	
B0-CCO	Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO)	- % of international aerodromes / TMAs with PBN SID implemented - % of international aerodromes/TMA where CCO is implemented	

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Appendix A

SAMPLE TEMPLATE

1. AIR NAVIGATION REPORT FORM (ANRF)

(This template demonstrates how ANRF to be used.
The data inserted here refers to ASBU B0-05/CDO as an example only)

Regional and National planning for ASBU Modules

2. REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – B0-05/CDO: Improved Flexibility and Efficiency in Descent Profiles

Performance Improvement Area 4: Efficient Flight Path – Through Trajectory-based Operations

3. ASBU B0-05/CDO: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	N	N	Y	Y	Y

4. ASBU B0-05/CDO: Planning Targets and Implementation Progress

5. Elements	6. Targets and implementation progress (Ground and Air)
1. CDO	
2. PBN STARs	

7. ASBU B0-05/CDO: Implementation Challenges

Elements	Implementation Area			
	Ground system Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. CDO				
2. PBN STARs				

8. Performance Monitoring and Measurement
8A. ASBU B0-05/CDO: Implementation Monitoring

Elements	Performance Indicators/Supporting Metrics
1. CDO	Indicator: Percentage of international aerodromes/TMAs with CDO implemented Supporting metric: Number of international aerodromes/TMAs with CDO implemented
2. PBN STARs	Indicator: Percentage of international aerodromes/TMAs with PBN STARs implemented Supporting metric: Number of international aerodromes/TMAs with PBN STARs implemented

8. Performance Monitoring and Measurement
8 B. ASBU B0-05/CDO: Performance Monitoring

Key Performance Areas (Out of eleven KPAs, for the present until experienced gained, only five have been selected for reporting through ANRF)	**Where applicable, indicate qualitative Benefits,**
Access & Equity	Not applicable
Capacity	Not applicable
Efficiency	Cost savings through reduced fuel burn. Reduction in the number of required radio transmissions.
Environment	Reduced emissions as a result of reduced fuel burn
Safety	More consistent flight paths and stabilized approach paths. Reduction in the incidence of controlled flight into terrain (CFIT).

9. Identification of performance metrics: It is not necessary that every module contributes to all of the five KPAs. Consequently, a limited number of metrics per type of KPA, serving as an example to measure the module(s)' implementation benefits, without trying to apportion these benefits between module, have been identified on page 5. For the family of ASBU modules selected for air navigation implementation, States/Region to choose the applicable performance (benefit) metrics from the list available on page 5. This approach would facilitate States in collecting data for the chosen performance metrics. States/Region, however, could add new metrics for different KPAs based on maturity of the system and ability to collect relevant data.

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AIR NAVIGATION REPORT FORM
HOW TO USE - EXPLANATORY NOTES

1. **Air Navigation Report Form (ANRF):** This form is nothing but the revised version of Performance Framework Form that was being used by Planning and Implementation Regional Groups (PIRGs)/States until now. The ANRF is a customized tool for Aviation System Block Upgrades (ASBU) Modules which is recommended for application for setting planning targets, monitoring implementation, identifying challenges, measuring implementation/performance and reporting. Also, the PIRGs and States could use this report format for any other air navigation improvement programmes such as Search and Rescue. If necessary, other reporting formats that provide more details may be used but should contain as a minimum the elements described in this ANRF template. The results will be analysed by ICAO and aviation partners and utilized in the Regional Performance Dashboards and the Annual Air Navigation Report. The conclusions from the Air Navigation Report will serve as the basis for future policy adjustments, aiding safety practicality, affordability and global harmonization, amongst other concerns.

2. **Regional/National Performance objective:** In the ASBU methodology, the performance objective will be the title of the ASBU module itself. Furthermore, indicate alongside the corresponding Performance Improvement area (PIA).

3. **Impact on Main Key Performance Areas:** Key to the achievement of a globally interoperable ATM system is a clear statement of the expectations/benefits to the ATM community. The expectations/benefits are referred to eleven Key Performance Areas (KPAs) and are interrelated and cannot be considered in isolation since all are necessary for the achievement of the objectives established for the system as a whole. It should be noted that while safety is the highest priority, the eleven KPAs shown below are in alphabetical order as they would appear in English. They are access/equity; capacity; cost effectiveness; efficiency; environment; flexibility; global interoperability; participation of ATM community; predictability; safety; and security. However, out of these eleven KPAs, for the present, only five have been selected for reporting through ANRF, which are Access & Equity, Capacity, Efficiency, Environment and Safety. The KPAs applicable to respective ASBU module are to be identified by marking Y (Yes) or N (No). The impact assessment could be extended to more than five KPAs mentioned above if maturity of the national system allows and the process is available within the State to collect the data.

4. **Planning Targets and Implementation Progress:** This section indicates planning targets and status of progress in the implementation of different elements of the ASBU Module for both air and ground segments.

5. **Elements related to ASBU module:** Under this section list elements that are needed to implement the respective ASBU Module. Furthermore, should there be elements that are not reflected in the ASBU Module (example: In ASBU B0-80/ACDM, Aerodrome certification and data link applications D-VOLMET, D-ATIS, D-FIS are not included; Similarly in ASBU B0-30/DAIM, note that WGS-84 and eTOD are not included) but at the same time if they are closely linked to the module, ANRF should specify those elements. As a part of guidance to PIRGs/States, every Regional ANP will have the complete list of all 18 Modules of ASBU Block 0 along with corresponding elements, equipage required on the ground and in the air as well as metrics specific to both implementation and performance (benefits).

6. **Targets and implementation progress (Ground and Air):** Planned implementation date (month/year) and the current status/responsibility for each element are to be reported in this section. Please provide as much details as possible and should cover both avionics and ground systems. This ANRF being high level document, develop necessary detailed action plan separately for each element/equipage.

7. **Implementation challenges**: Any challenges/problems that are foreseen for the implementation of elements of the Module are to be reported in this section. The purpose of the section is to identify in advance any issues that will delay the implementation and if so, corrective action is to be initiated by the concerned person/entity. The four areas, under which implementation issues, if any, for the ASBU Module to be identified, are as follows:

- Ground System Implementation:
- Avionics Implementation:
- Procedures Availability:
- Operational Approvals:

Should be there no challenges to be resolved for the implementation of ASBU Module, indicate as "NIL".

8. **Performance Monitoring and Measurement:** Performance monitoring and measurement is done through the collection of data for the supporting metrics. In other words, metrics are quantitative measure of system performance – how well the system is functioning. The metrics fulfil three functions. They form a basis for assessing and monitoring the provision of ATM services, they define what ATM services user value and they can provide common criteria for cost benefit analysis for air navigation systems development. The Metrics are of two types:

   A. **Implementation Monitoring**: Under this section, the indicator supported by the data collected for the metric reflects the status of implementation of elements of the Module. For example- Percentage of international aerodromes with CDO implemented. This indicator requires data for the metric "number of international aerodromes with CDO".

   B. **Performance Monitoring**: The metric in this section allows to asses benefits accrued as a result of implementation of the module. The benefits or expectations, also known as Key Performance Areas (KPAs), are interrelated and cannot be considered in isolation since all are necessary for the achievement of the objectives established for the system as a whole. It should be noted that while safety is the highest priority, the eleven KPAs shown below are in alphabetical order as they would appear in English. They are access/equity; capacity; cost effectiveness; efficiency; environment; flexibility; global interoperability; participation of ATM community; predictability; safety; and security. However, out of these eleven KPAs, for the present until experienced gained, only five have been selected for reporting through ANRF, which are Access & Equity, Capacity, Efficiency, Environment and Safety. Where applicable, mention qualitative benefits under this section.

9. **Identification of performance metrics:** It is not necessary that every module contributes to all of the five KPAs. Consequently, a limited number of metrics per type of KPA, serving as an example to measure the module(s)' implementation benefits, without trying to apportion these benefits between module, have been identified on page 6. For the family of ASBU modules selected for air navigation implementation, States/Region to choose the applicable performance (benefit) metrics from the list available on page 6. This approach would facilitate States in collecting data for the chosen performance metrics. States/Region, however, could add new metrics for different KPAs based on maturity of the system and ability to collect relevant data.

Appendix B - Main Planning Table Template

	Objectives					Priorities and targets			Reference
Block	**ASBU modules and elements Enablers**	**Performance Improvement Area**	**Applicable or not in [Region] (Yes/No)**	**Regional planning elements**	**Enablers**	**Priority allocated in [Region]**	**Target(s) in [Region]**	**Indicator(s) / Metric(s)**	**Supporting Planning Document (ANRF, other)**

NAT ANP, VOLUME III

PART II – NAT 2030 VISION

1. NAT 2030 VISION STATEMENT

1.1 Through collaboration, the North Atlantic Region leads the way in the provision of safe Oceanic Air Traffic Management Services by leveraging emerging technologies in the North Atlantic in order to realize maximum efficiencies and ensure optimized seamless airspace provision.

2 NAT 2030 VISION HIGH LEVEL PRINCIPLES

2.1 Following are the agreed NAT 2030 Vision High Level Principles:

a) Respond to changing traffic profiles in a safe, efficient and sustainable manner based on agreed performance based measurable criteria. Meet, and where possible, exceed the NAT Safety Targets.

b) Enhance and develop the NAT airspace to safely and effectively integrate all anticipated airspace users, while aligning with the Global Air Navigation Plan (GANP) and Global Aviation Safety Plan (GASP), as required.

c) Utilise operational and technological developments to improve safety, service delivery and efficiency of operations.

d) Implementations should be based on business analysis encompassing safety, service and environmental benefits, cost and practicality.

e) Include all stakeholders, and, when relevant, military authorities, in a collaborative decision making process to effect change."

2.2 Following are the agreed NAT 2030 Vision Goals and Objectives:

	Goal	**Objective**
1	Ensure as far as possible that all NAT developments are implemented in the context of "seamless boundaries."	Take full account of the other regional environments such that we have seamless operational boundaries.
2	Enhanced resilience and predictability of the NAT wide operations.	1. Weather and other operational impacting events are managed through appropriate and agreed plans with minimum of operational impact. 2. That operations consistently adopt across the NAT, new advanced tools to enhance 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.

3	Continued cooperation with all adjacent regions and industry wide stakeholders to achieve seamless boundaries.	All stakeholders will be engaged in the development and implementation of the Development Roadmap to ensure all operational and technical capabilities are appropriately exploited.
4	The NAT operations takes account of both the prevailing and forecast operational and stakeholders' capabilities and implements proportionate performance based outcomes.	1. New technology will be supported by an agreed Concept of Operations and a safe and cost-effective solution. 2. The NAT will optimise utilisation of current capabilities whilst ensuring all new developments do not inadvertently impact prevailing capabilities. 3. The development roadmap will be continually validated to ensure it remains relevant.
5	The NAT technology roadmap is aligned to the practical capabilities that will exist to 2030.	Maximised benefits from available technologies.
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.	Performance based metrics and meeting the NAT safety targets, including TLS, as well as any other future performance targets.

3 GOALS, OBJECTIVES AND POTENTIAL IMPROVEMENT AREAS

3.1 Following is the agreed list of NAT 2030 Vision goals, objectives and potential improvement areas:

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)

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-2	Enhanced resilience and predictability of the NAT wide operations.				
Objective	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.				
	Potential Improvement	**Prioritisation**	**Feasibility Timeline**	**NAT Sub-Group**	**Linked to Goal**
2-1	Communication systems resilience – SATVOICE Migration from HF Voice to SATVOICE as backup to FANS	2	2023-2026	POG/TIG/IMG	(Goal 4)
2-2	Communication systems resilience – Digital HF developments	3	2026-2031	POG/TIG/IMG	(Goal 4)
2-3	Communication systems resilience – Space Based VHF	3	2021-2023	POG/TIG/IMG	(Goal 4)
2-4	Improvements to end-to-end performance to meet at least RCP 240 and including their associated SRs	1	2021-2023	POG	(Goal 4)
2-5	Improvements to end-to-end performance to meet at least RSP 180, including their associated SRs	1	2021-2023	TIG	(Goal 4)
2-6	NAT Contingency procedures shall be continually reviewed (every Spring).	1	2021-2031	POG	(Goal 4)
2-7	Ensure systems cybersecurity and resilience.	1	2021-2031	POG/TIG/IMG/SOG	(Goal 4)
2-8	Consider space weather factors as part of contingency procedures.	2	2021-2023	POG	(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-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)

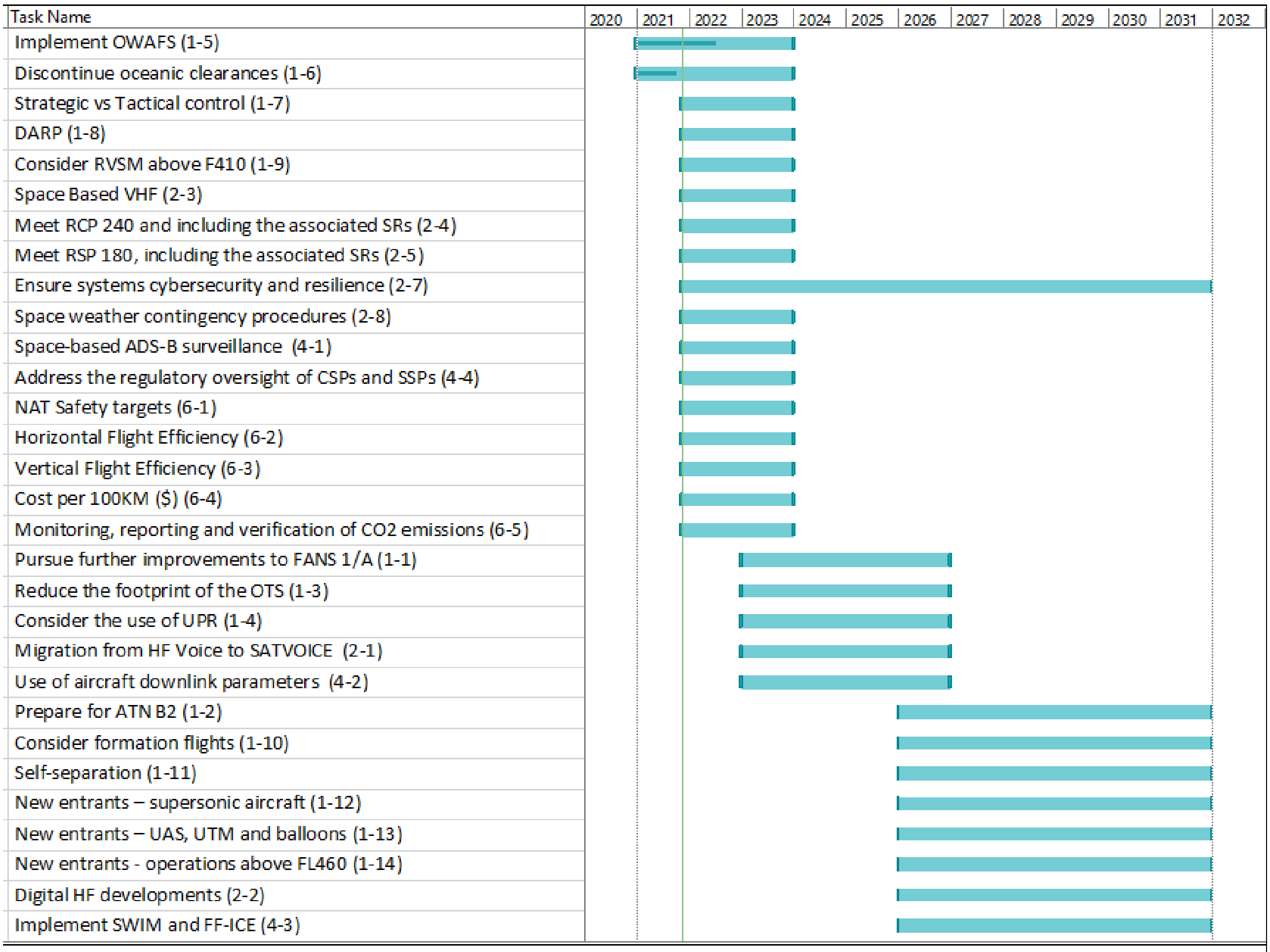
NAT 2030 Vision Matrix

- 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	

4 NAT Service Development Roadmap

4.1 The following is the NAT Service Development Roadmap in accordance with section 3 above.



NAT ANP, VOLUME III

PART III – AIR NAVIGATION SYSTEM/ASBU IMPLEMENTATION

Published as part of the NAT GANP/ASBU annual implementation status report
(https://www.icao.int/EURNAT/Pages/EUR-and-NAT-Document.aspx)

NAT ANP, VOLUME III

PART IV - AIR NAVIGATION SYSTEM/REGIONAL AVIATION SYSTEM IMPROVEMENT (RASI) IMPLEMENTATION

Published as part of the NAT GANP/ASBU annual implementation status report (https://www.icao.int/EURNAT/Pages/EUR-and-NAT-Document.aspx)

- END -

APPENDIX E — OWAFS-RELATED AND OTHER AMENDMENTS TO NAT DOC 007

(*paragraph 1.2.3 refers*)

Starts on next page

European and North Atlantic Office

NAT Doc 007

NORTH ATLANTIC OPERATIONS AND AIRSPACE MANUAL

~~V.2021-2 (Applicable from July 2021)~~V.2022-1 (Applicable from January 2022)

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

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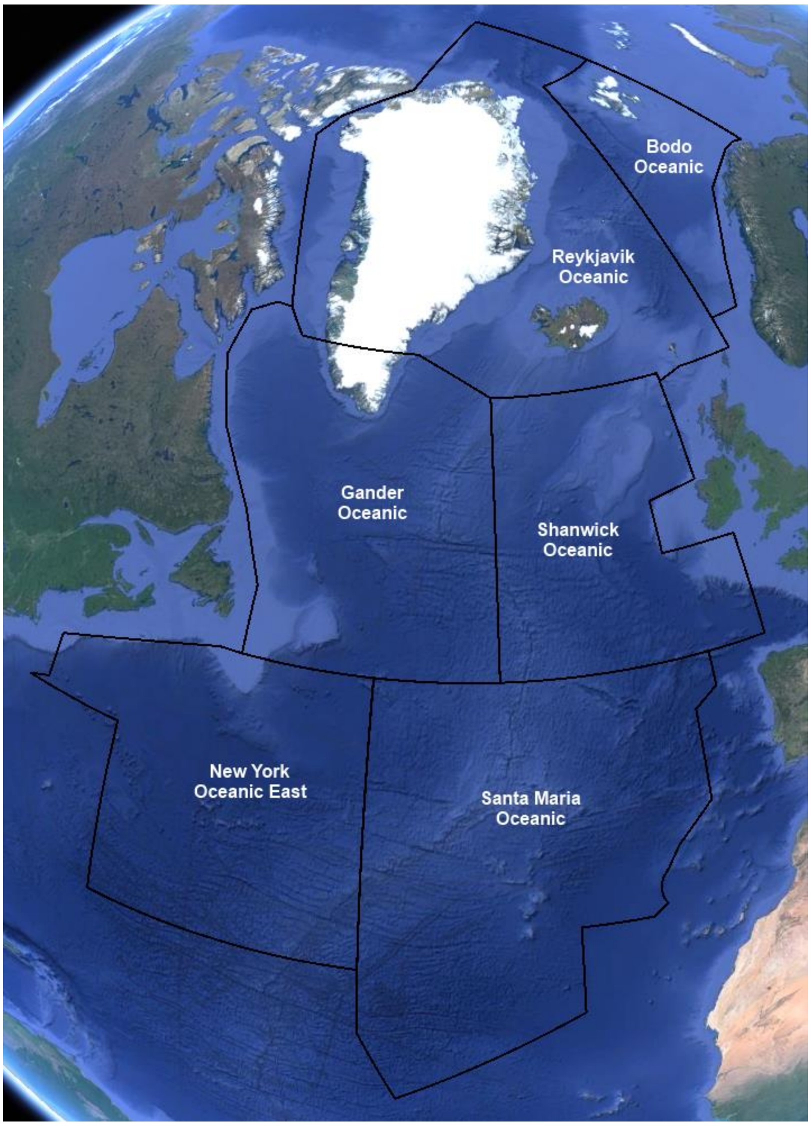
Figure 1 – The North Atlantic High Level Airspace (NAT HLA)



~~*(Prior to February 2016 designated as "NAT MNPS Airspace")*~~

Commented [LT1]: Historical reference not needed

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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 Figure **1** 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.

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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 data link requirements – updated with information from discontinued NAT OPS Bulletin 2017_001*[NAT common DLM AIC – Revision 4]*;
- section 1.10.1 to 1.10.2 PBCS operations – updated;
- section 1.10.5 PBCS operations – new text regarding the uplink message latency monitor function;
- section 8.2.15 service applied in Gander and Shanwick airspace for provision of climbs – updated with information from discontinued NAT OPS Bulletin 2013_005 *[New Service Notification for Gander Oceanic Control Area]*;
- section 8.5.20 to 8.5.22 Uplink Message Latency Monitor Function – updated with information from discontinued NAT OPS Bulletin 2018_002 *[CPDLC Uplink Message Latency Monitor Function – Revision 1]*;
- section 13.4 Weather Deviation Procedures – new *Figure 13-2 Visual aid for understanding and applying the weather contingency procedures guidance*;
- Attachment 8 Charts for ATS surveillance coverage in NAT – updated with information from discontinued NAT OPS Bulletin *2017_001 NAT common DLM AIC – Revision 4*;
- Attachment 10 Checklist for dispatchers, under Mandatory ADS-B Carriage, Northern Boundary coordinates corrected; and
- ICAO EUR/NAT email address and public website url updated whenever mentioned in document.

Edition 2022-v1 - Content Modifications/Additions Incorporated

This modification includes changes to:

To be established before publication

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
OWAFS	Operations Without an Assigned Fixed Speed
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.
OWAFS	The requirement to issue an assigned fixed Mach number to flights in the NAT has been removed. All aircraft are eligible for the application of cost index (ECON) with an ATC clearance of RESUME NORMAL SPEED in both ATS surveillance and non-surveillance airspace. Oceanic clearance procedures will remain unchanged and a fixed Mach number will continue to be part of the oceanic clearance.
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)
RESUME NORMAL SPEED	An ATC clearance that allows the flight crew to select cost index (ECON) speed instead of the assigned fixed Mach number with the condition that ATC must be advised if the speed changes by plus or minus Mach .02 or more from the last assigned Mach number.

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.~~

Commented [LT2]: we do not need information regarding the transition anymore?

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.

~~1.3.1~~1.3.2 Operations without an assigned fixed speed (OWAFS) were implemented in July 2019. This implementation allows ATC to issue the clearance RESUME NORMAL SPEED after oceanic entry that allows the flight crew to select a cost index (ECON) speed instead of a fixed Mach number with the condition that ATC must be advised if the speed changes by plus or minus Mach .02 or more from the last assigned Mach number.

Lateral Navigation

Equipment

~~1.3.2~~1.3.3 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~~1.3.4 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.

Commented [LT3]: There is still clarification pending on the MNPS certification but MNPS airspace no longer exists. It´s just HLA

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 ***do not*** *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~~1.3.5 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~~1.3.6 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~~shall 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~~1.3.7 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.

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:

a) Airspace north of 80° North;

b) New York Oceanic East flight information region (FIR);

c) 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).

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.

a) Altitude reservation (ALTRV) requests will be considered on a case by case basis, irrespective of the equipage status of the participating aircraft.

b) 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.

c) 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.

d) 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.

1.8.5 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 Performance Based separation minima as small as 19 NM lateral and 14 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 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.

Commented [LT4]: Do we still need a reference to RLatSM?

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 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 300 SEC to different aircraft types. It has therefore been decided among the NAT 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

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~~1.11.2 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.

Commented [LT5]: For consideration. Is this still true or can we soften the sentence?

Commented [BT6R5]: Suggested edit below:
Use of the OTS is not mandatory. Aircraft may flight plan random routes which remain clear of the OTS or routes that join, leave or cross the OTS. While ATC will make every effort to accommodate requested profiles, changes may be necessary during the busiest OTS traffic periods. A comprehensive understanding of the OTS, FLAS and NAT traffic patterns can assist flight planners in determining the feasibility of requested profiles.

Commented [KR7R5]: Agree, not even sure if we need to say this at all. With the reduced ADSB separation standards and most joins (<45 degree) requiring the same standard as same track, a lot of times we are first come first serve for individual aircraft. I think the only time we would give preference to track aircraft would be when the cutter or joiner is affecting more than one single track aircraft. Easier to move one than multiple aircraft. I know form my point of view, whenever I get a call from an airline, I suggest to flight plan what you want and we will accommodate as much as traffic will allow us to.

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 2-0-1** 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 Example 1/**Figure 2-0-1** and Example 2/ **Figure 2-0-2** 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~~ ZCZC OLG068 2020190~~TZA179~~

~~082009~~
FF EGZZOWXX EGZZOXXX~~BIRDZQZZ BIKFYZYZ~~
082009 202019 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~~NIL
NAR NIL -
B GOMUP 59/20 61/30 62/40 52/50 PIDSO
EAST LVLS NIL WEST LVLS 310 320 330 350 360 380
EUR RTS WEST NIL~~GINGA~~
NAR NIL –
C SUNOT 58/20 60/30 61/40 61/50 SAVRY
EAST LVLS NIL
WEST LBLS 310 320 330 340 360 380
EUR RTS WEST NIL
NAR NIL -
END OF PART ONE OF THREE PART(S)

~~ZCZC OLG070 202020TZA181 082010~~
FF ~~BIRDZQZZ BIKFYXYX~~EGZZOWXX EGZZOXXX
082009 202020 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 NEEKO
EAST LVLS NIL
WEST LVLS 310 320 330 340 350 360 370 380 390
EUR RTS WEST NIL
NAR NIL -
E RESNO 56/20 56/30 55/40 53/50 RIKAL
EAST LVLS NIL
EST LVLS 310 320 330 340 350 360 370 380 390
EUR RTS WEST NIL

Commented [C8]: Madison:
@pages 32&35- NAT Track Message – REMARKS #2 is incorrect for applicable data link FLs. *Doc 007 should have an updated Track Message example.*

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~~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.ICAO.INT/EURNAT/.~~ NAR NIL –
F VENER 5530/20 5530/30 5430/40 5230/50 SAXAN
EAST LVLS NIL
WEST LVELS 350 360 370 380 390
EUR RTS WEST NIL
NAR NIL –
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 NIL –
END OF PART TWO OF THREE PART(S)

ZCZC OLG072 202021~~TZA182 082010~~
FF EGZZOWXX EGZZOXXX~~BIRDZQZZ BIKFYZYZ~~
082010 202021 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 NIL –
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~~290-~~390~~ 410 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.
~~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.~~

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Commented [BT9]: Need a new track message

Commented [KR10R9]: Agree, needs to be updates for DLM expansion 290-410, is this even needed as a track message?

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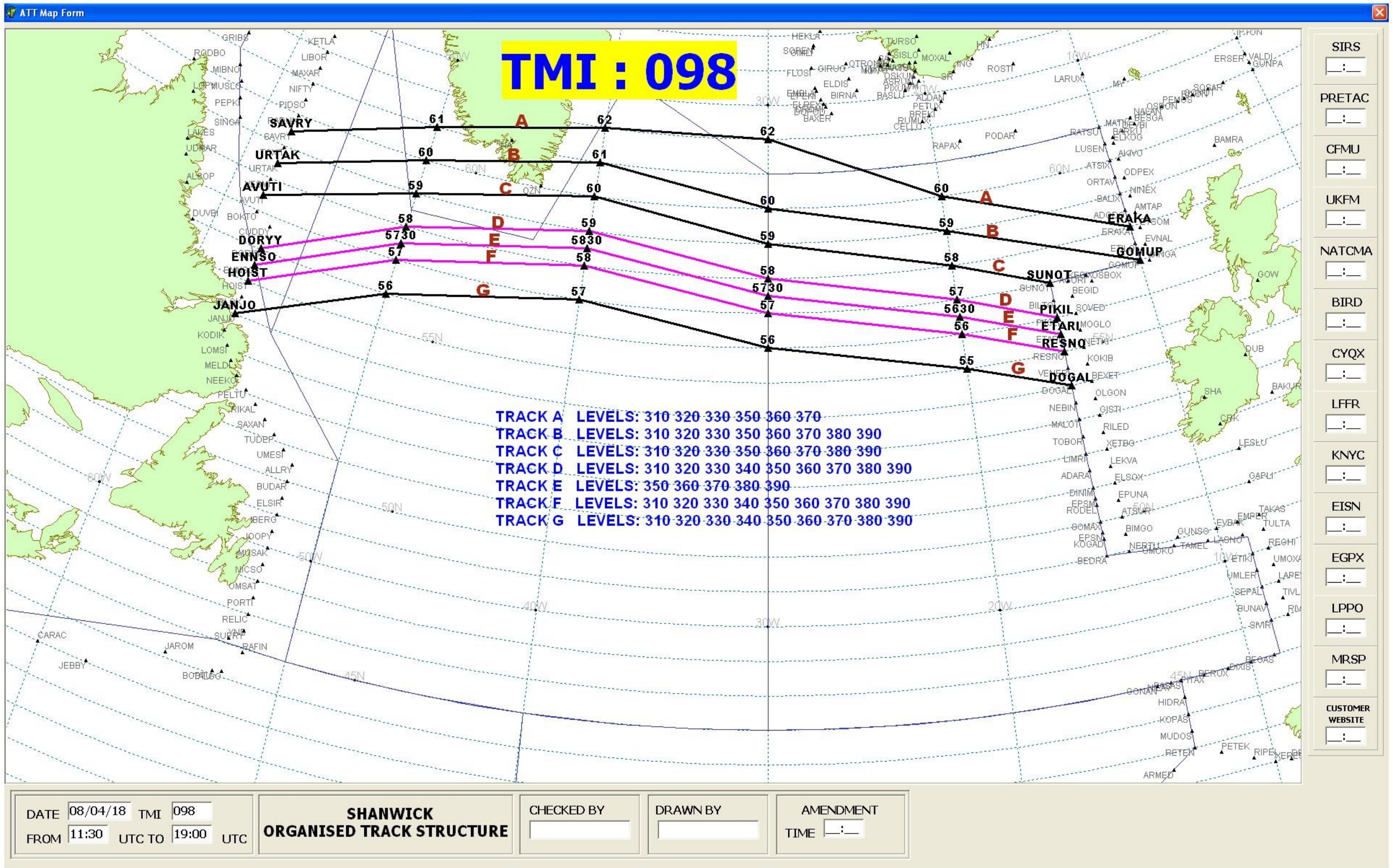
~~6.OPERATORS ARE REMINDED THAT CLEARANCES MAY DIFFER FROM THE FLIGHT PLAN, FLY THE CLEARANCE.~~
~~7.UK AIP. ENR 2.2.4.2 PARA 5.2 STATES THAT NAT OPERATORS SHALL FILE PRM'S.~~
~~8.FLIGHTS REQUESTING WESTBOUND OCEANIC CLEARANCE VIA ORCA DATALINK SHALL INCLUDE IN RMK/ FIELD THE HIGHEST ACCEPTABLE FLIGHT 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)~~

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

DD CYZZENAT
021302 CZQXZQZX
(NAT - 1 / 3 TRACKS FLS 320 / 400 INCLUSIVE
NOV 03/0100Z TO NOV 03/0800Z
PART ONE OF THREE PARTS -
U JANJO 56/50 58/40 59/30 58/20 SUNOT KESIX
EAST LVLS 320 330 340 350 360 370 380 390 400
WEST LVLS NIL
EUR RTS EAST NIL
NAR N685A N683A-
V LOMSI 55/50 57/40 58/30 57/20 PIKIL SOVED
EAST LVLS 320 330 340 350 360 370 380 390 400
WEST LVLS NIL
EUR RTS EAST NIL
NAR N625A N621A-
END OF PART ONE OF THREE PARTS)
~~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)~~

DD BIRDZQZZ
021302 CZQXZQZX
(NAT - 2 / 3 TRACKS FLS 320 / 400 INCLUSIVE
NOV 03/0100Z TO NOV 03/0800Z
PART TWO OF THREE PARTS -
W MELDI 5430/50 5630/40 5730/30 5630/20 ETARI MOGLO
EAST LVLS 350 360 370 380 390
WEST LVLS NIL
EUR RTS EAST NIL
NAR N597A N587A-
X NEEKO 54/50 56/40 57/30 56/20 RESNO NETKI
EAST LVLS 320 330 340 350 360 370 380 390 400
WEST LVLS NIL
EUR RTS EAST NIL
NAR N561A N555A-
Y RIKAL 53/50 55/40 56/30 55/20 DOGAL BEXET
EAST LVLS 320 330 340 350 360 370 380 390 400
WEST LVLS NIL
EUR RTS EAST NIL
NAR N511A N495C-
END OF PART TWO 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~~

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~~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)~~

DD BIRDZQZZ
021303 CZQXZQZX
(NAT - 3 / 3 TRACKS FLS 320 / 400 INCLUSIVE
NOV 03/0100Z TO NOV 03/0800Z
PART THREE OF THREE PARTS -
Z TUDEP 52/50 54/40 55/30 54/20 MALOT GISTI
EAST LVLS 320 330 340 350 360 370 380 390 400
WEST LVLS NIL
EUR RTS EAST NIL
NAR N453A N435A-
REMARKS:
1.TMI IS 307 OPERATORS ARE TO INCLUDE TMI NUMBER
IN OCEANIC CLEARANCE READ BACK.
2.ADS-C AND CPDLC ARE MANDATED FOR LEVELS 290-410 IN NAT
AIRSPACE
3.PBCS OTS LEVELS 350-390. PBCS TRACKS AS FOLLOWS
TRACKS V W X
4.80% OF NAVIGATIONAL ERRORS RESULT FROM POOR COCKPIT
PROCEDURES
ALWAYS CARRY OUT PROPER WAYPOINT PROCEDURES.
5.SEE NAT OPS BULLETIN 2015_004 FOR DATALINK CREW PROCEDURES.
ICAO WEBSITE WWW.ICAO.INT
6.EASTBOUND AIRCRAFT OPERATING IN THE OTS MUST COMPLY WITH NAR FLIGHT
PLANNING RULES IN CANADA FLIGHT SUPPLEMENT OR DAILY BOSTON ADVISORY
7.AIRCRAFT EXITING THE NAT INTO TO A DOMESTIC AGENCY SHOULD CONTINUE
TO OPERATE TRANSPONDERS ON CODE 2000 UNTIL OTHERWISE ADVISED BY ATC
SEE ICAO NAT DOC 007 6.8 FOR MORE INFO.
8.SEND RCL 90 MINUTES PRIOR TO OCEAN ENTRY POINT.
END OF PART THREE 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 IN~~
~~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~~

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Commented [KR12R11]: Same as above

~~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.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)~~

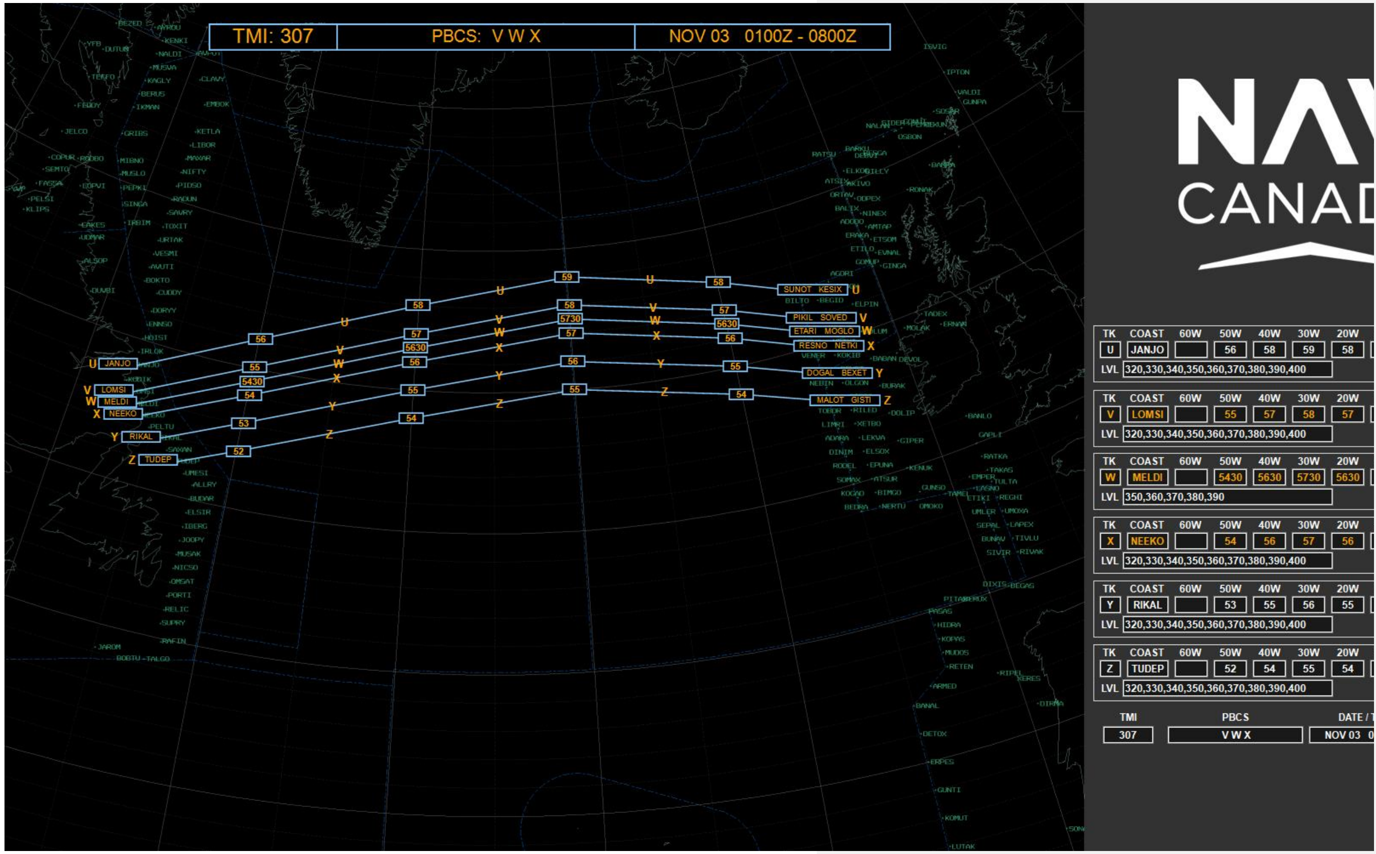
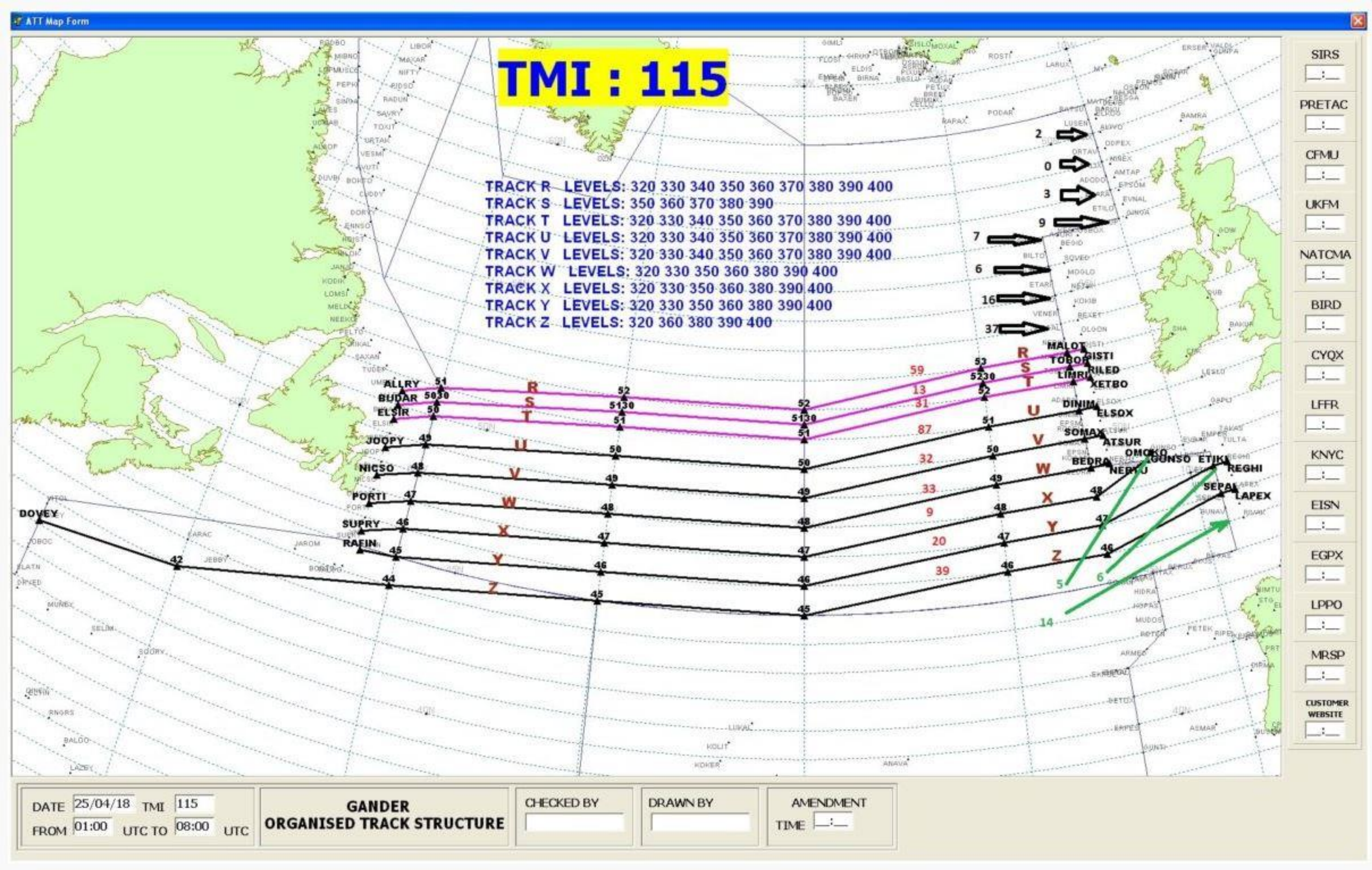


Figure 2-0-2 — Example of Night-Time Eastbound NAT Organised Track System

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 or random) and between the Azores and the Madeira Archipelago;

Commented [LT13]: To clarify that this does not apply only to traffic on T25

Commented [BT14R13]: To my knowledge all of the routes in section a) require state approval. I am sure all of the routes in our airspace do- those in RKs area may be different

Commented [KR15R13]: Agree

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

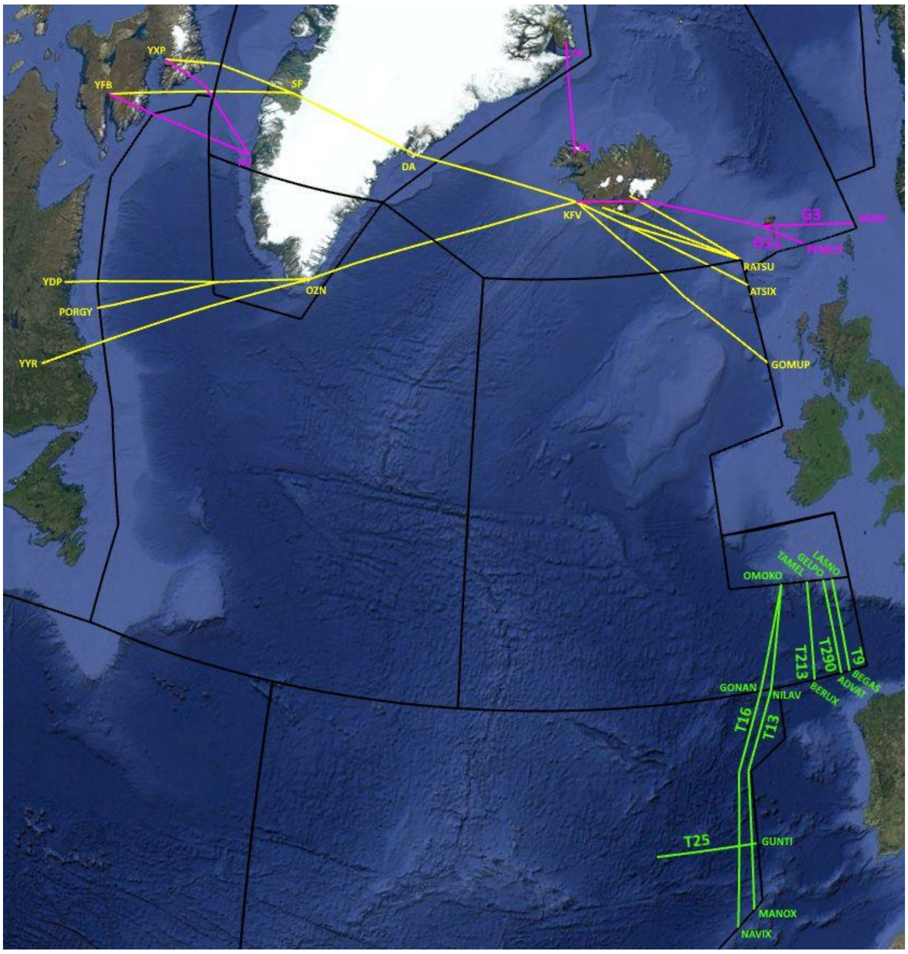


Figure 3-1

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):

a) in accordance with the OTS; or

b) along a route to join or leave an outer track of the OTS; or

c) on a random route to remain clear of the OTS, either laterally or vertically.

Commented [LT16]: Is this still true?

Commented [BT17R16]: It's still true. Whether it's needed or not is a different discussion

Commented [KR18R16]: Similar thought as 2.1.4

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.

Commented [BT19]: See suggested "softening" from 2.1.4

Commented [KR20R19]: At a minimum the would likely needs to be replaced. But same comments as 2.1.4

4.1.7 Outside of the OTS periods, operators flying against the pending OTS may flight plan any random routing, except:

a) Eastbound flights that cross 30°W less than one hour prior to the pending Westbound OTS (i.e. after 1029 UTC);

b) 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.

Commented [LT21]: Is this true? Isn´t the point to have operators plan the optimal level? It´s true that the FLAS exists and that it can affect the final approved level but a lot of times flights do have the requested level even if not according to FLAS.

Commented [BT22R21]: If we remove this section we may as well remove FLAS from publication That may not be a bad thing but operators are always talking about levels of certainty and adhering to the FLAS can help with that

Commented [KR23R21]: Agree, I would rather see aircraft FP using the FLAS but when they send in their RCL, request their optimal level. We will always try to get optimal level if possible, but better to plan for a level that falls within the 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:

a) 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.

b) 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.

c) 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.:

   i) at intervals of 10 degrees of longitude (between 5°W and 65°W) for flights operating at or south of 70°N; and

   ii) 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.

d) 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:

a) 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.

b) 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

Commented [LT24]: ACARS Ops Bulletin (deleted text at IMG)
4.1 Flights so equipped should request the clearance by sending the RCL. Aircraft must not enter NAT HLA airspace without a clearance.
Note: (Gander) Flights not equipped to send an RCL must complete the ACARS logon and expect a clearance automatically in Gander's airspace.

Final text:
4.1 Enough time should be allowed to request, receive, and understand the oceanic clearance (or amended clearance) well before reaching the OEP.

Note: (Shanwick) Flights must not enter without an oceanic clearance.

For discussion with the group, inconsistent with text here

Commented [BT25R24]: I don't think this s a contradiction- Shanwick just goes a step further. Final text from above does not say all flights require a clearance just that it should be requested in plenty of time- definitely not the same thing

Commented [KR26R24]: Agree

made without prior ATC clearance, except in an urgency situation. (e.g. encountering unanticipated severe turbulence).

~~5.1.11~~5.1.12 With the implementation of OWAFS, flight crews can expect ATC to issue the clearance RESUME NORMAL SPEED when traffic permits after oceanic entry. This clearance allows the flight crew to select a cost index (ECON) speed instead of a fixed Mach number with the condition that ATC must be advised if the speed changes by plus or minus Mach .02 or more from the last assigned Mach number.

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.

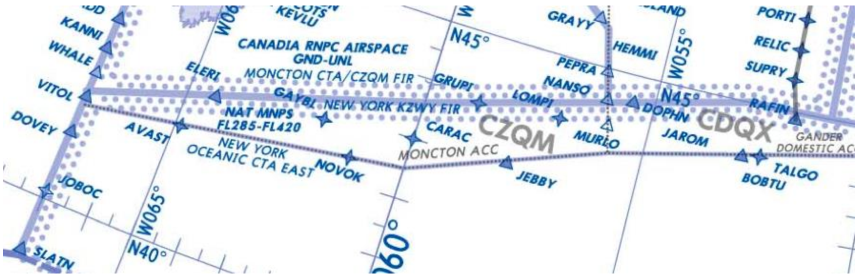
Example: *Flight enters airspace delegated to Moncton ACC and exits back into New York Oceanic via (AVAST, NOVOK, or JEBBY) never entering Gander Domestic ACC airspace;*

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/or 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.

Commented [LT27]: Clarification that it´s one or the other. But it needs to be clear that this has nothing to do with the DLM…

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 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.

[*] *See 6.1.11 c) and 6.1.24*

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 ~~listing~~ continuous air-ground communication 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~~ shall maintain a ~~listening~~ continuous air-ground communication 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~~ shall 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/ .

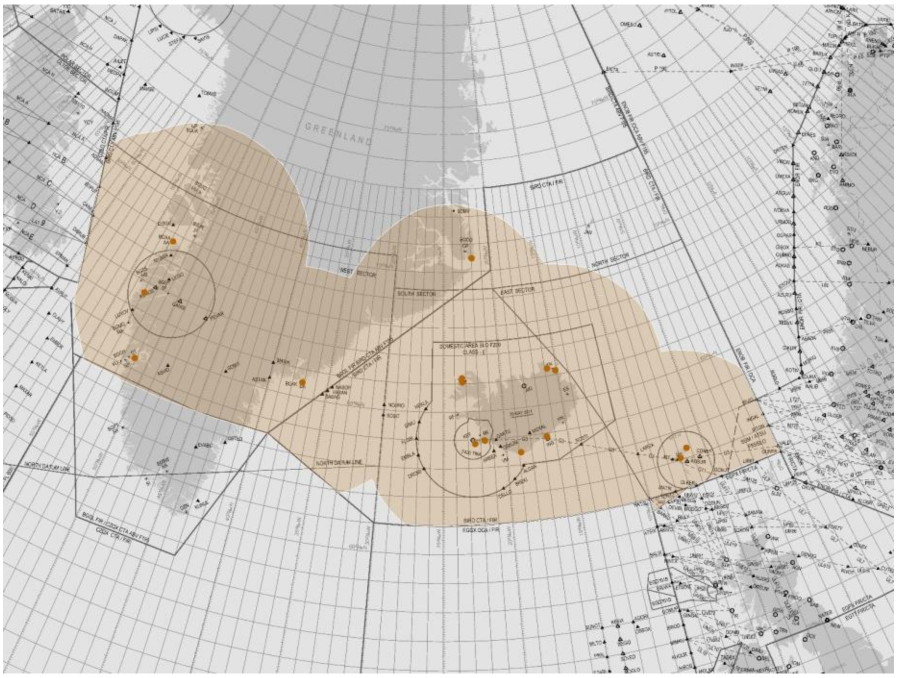
VHF Voice Communications

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 (Reykjavik Control Direct Controller Pilot VHF Coverage at FL 300)



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 continuous air-ground communication~~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 continuous air-ground communication~~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 continuous air-ground communication~~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~~ shall be made at the significant points listed in the flight plan.

Commented [LT28]: Align with 7030

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.

VOLMET Services

6.5.3 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 6.1.2.
    - 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 6.1.2.

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

Commented [LT29]: See POG08 WP12 for discussion

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~~ shall operate transponders continuously in Mode A/C Code 2000, except that the last assigned code ~~will~~ shall be retained for a period of 30 minutes after entry into NAT airspace or after leaving a ~~radar~~ surveillance 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.

Commented [LT30]: Align with 7030

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.

~~7.1.1~~7.1.2 The ATC clearance RESUME NORMAL SPEED allows the flight crew to fly a cost index (ECON) speed instead of a fixed Mach number with the condition that ATC must be advised if the speed changes by plus or minus Mach .02 or more from the last assigned Mach number.

7.2 OBJECTIVE

7.2.1 MNT is used by ATC to ~~improve the utilisation of airspace on long route segments where ATC has only position reports to ensure~~ control the longitudinal spacing between pairs of aircraft that are close to minimum 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 until ATC issues the clearance RESUME NORMAL SPEED. Aircraft capable of maintaining an assigned Mach must flight plan their requested Mach number. ATC uses assigned Mach number or other speed information, along with position ~~reports~~ information 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 and will issue the clearance RESUME NORMAL SPEED when traffic permits.

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~~ An assigned Mach number must be maintained.** If an immediate temporary change in ~~the~~ an assigned Mach number is essential (due to turbulence for example), ATC must be so informed.

7.3.5 If a Mach number has been assigned, ~~F~~flight crews should maintain the~~ir~~ ~~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.

8.2.15 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

8.2.16 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).

System Alignment

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.

Satellite Availability

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.

Satellite Navigation Prediction

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 With the implementation of OWAFS, flight crews should expect an ATC clearance of RESUME NORMAL SPEED after oceanic entry via a CPDLC uplink or voice. It is not automated in all OCAs. If not offered, request NORMAL SPEED.

8.4.15 Once cleared RESUME NORMAL SPEED, insert the appropriate current flight plan cost index (ECON) into the FMS. This should typically be within plus or minus Mach .01 of the previously assigned Mach number.

8.4.16 Flight crews must inform ATC if, as a result of the RESUME NORMAL SPEED clearance and subsequent insertion of cost index (ECON), the speed varies plus or minus Mach .02 or more from the last assigned Mach number.

8.4.17 ATC will assign a fixed Mach number when required due to traffic.

8.4.18 Advise ATC immediately of any data link issues that might affect FANS (CPDLC/ADS-C) data link operations or any situation, like weather conditions, that require a more significant speed change.

~~8.4.14~~8.4.19 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~~8.4.20 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~~8.4.21 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~~8.4.22 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~~8.4.23 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~~8.4.24 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~~8.4.25 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~~8.4.26 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.

8.6 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~~ shall 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~~ shall be operated continuously in Mode A/C code 2000.

Commented [LT31]: See POG08 WP12 for discussion

Commented [LT32]: Align with 7030

Note 1: Because of the limited time spent in NAT HLA when flying on Route Tango 9, change to code 2000 ~~should~~ shall 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 shall be made10 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.

<u>*Satellite Fault Detection Outage*</u>

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.

~~When a diversion to an enroute airport not listed on the flight plan as an alternate is necessary, the pilot and the flight dispatcher, or the pilot and the person designated by the operator for the control and supervision of flight, shall collaborate, when time permits, in the choice of the diversion airport, depending upon the reason for the diversion; with the pilot receiving information and instructions necessary for the continued safety of the flight.. Due consideration shall be made for enroute, operational and terminal environmental issues in the selection of the diversion airport, which will affect the continued route of the flight and coordination with the ATSU(s). *(Further guidance shall be found in Chapter 16 – Guidance for Dispatchers.)*~~

Commented [LT33]: IFALDA comment on the term "en-route". As much as I could understand, "en route" and "enroute" are both acceptable, being the later used in US English. Opted to not change the document.

Commented [LT34]: IFALDA

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.

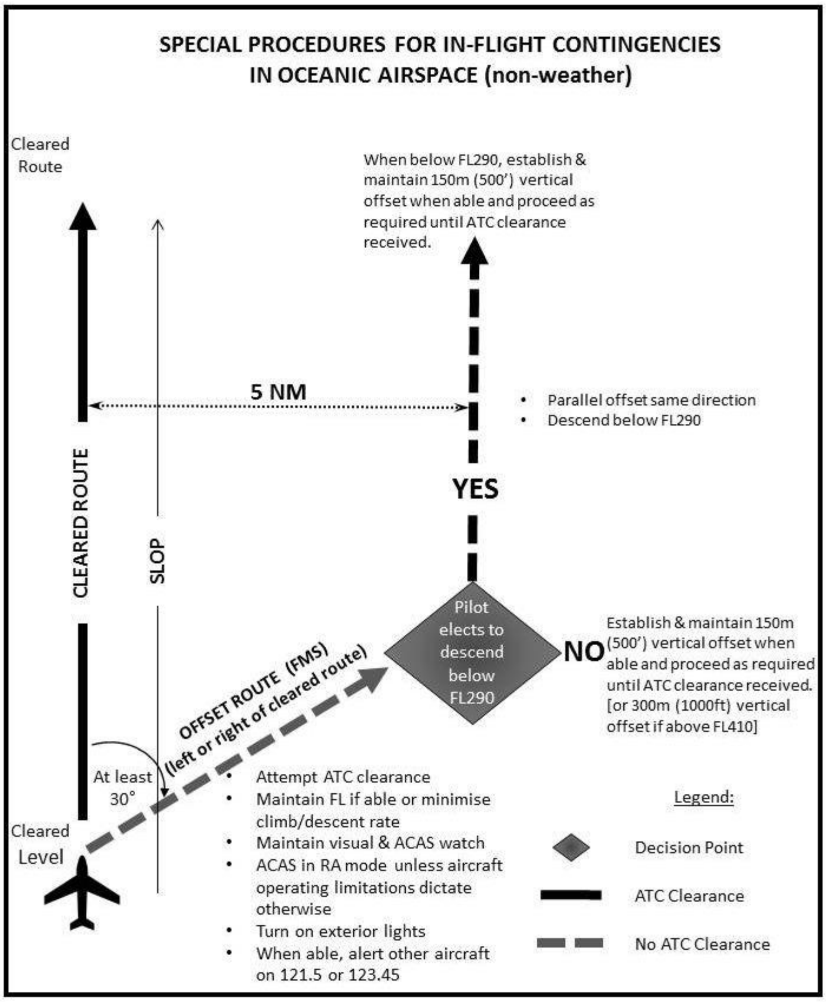


Figure 13-1 — Visual aid for understanding and applying the contingency procedures guidance.

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)

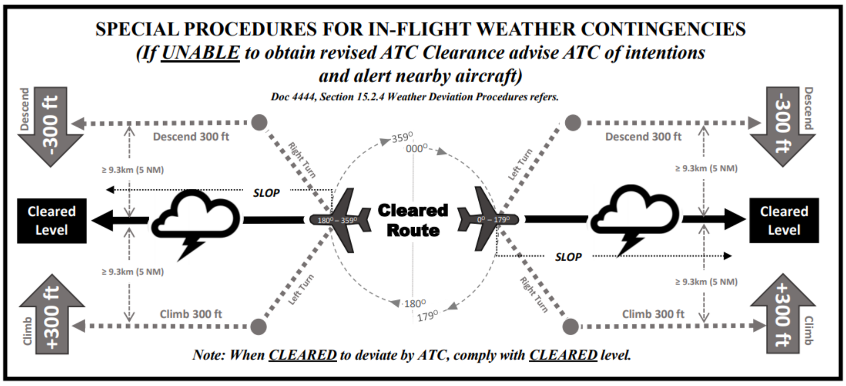


Figure 13-2. Visual aid for understanding and applying the weather contingency procedures guidance.

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. With the implementation of OWAFS, operators will have more efficiencies in the NAT. Chapter 7 ~~above~~ provides more detailed information about the application of Mach number techniques. Chapter 4 provides details about ATC flight planning (ICAO FPL) requirements. Operators can flight plan cost index (ECON) provided that the planned true Mach number for any portion of the flight within the NAT is specified in item 15 of the ICAO FPL. ~~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

Commented [C35]: Madison: Update Para. 16.6.6. First bullet refers to phased implementation of DLM. Suggested amended first bullet text: "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. For other details, see DATA LINK REQUIREMENTS in Chapter 1."

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 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. For other details, see DATA LINK REQUIREMENTS in Chapter 1."~~The NAT region is implementing DLM in phases. To fly within the DLM airspace aircraft must~~shall ~~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/pilot considerations for en-route diversions

Commented [LT36]: IFALDA. Just moved first line of 16.6.31 to a sub-title

16.6.31 ~~Chapter 13 notes that p~~Pilots and dispatchers ~~shall~~should collaborate, when able, regarding where the flight diverts based on the nature of the en-route contingency and the viability of the otherwise adequate airports available to assure the airport is actually suitable for the diversion.

Dispatcher guidance for NAT RVSM operations.

References

~~16.6.30~~16.6.32 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~~ 290 - FL 4~~1~~20 inclusive where 1,000 ft vertical separation is applied ~~(i.e. FLs 290 thru 410 inclusive)~~.

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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 continuous air-ground communication~~listening~~ watch on appropriate frequency must be maintained.

17.11.5 An HF SELCAL device will ease the strain of a continuous continuous air-ground communication~~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 continuous air-ground communication~~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 continuous air-ground communication~~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)

Part 4 – Only to be completed in the event of Partial or Full Navigation failure

Indicate the number of equipment units which failed	**INS**			**GNSS**			**IRS/FMS**			**OTHER**			
Circle estimated longitude at which equipment failed	60°W	55°W	50°W	45°W	40°W	35°W	30°W	25°W	20°W	15°W	10°W	5°W	0°E/W
Give an estimate of the duration of the equipment failure	Time of failure : Time of exit from NAT HLA: Duration of failure in NAT												
At what time did you advise ATC of the failure													

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="2">OPERATOR</td><td>FLIGHT NUMBER</td></tr>
<tr><td colspan="3">AIRCRAFT TYPE & SERIES</td><td>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="3">CLEARED TRACK CO-ORDINATES</td></tr>
<tr><td colspan="2">FLIGHT LEVEL</td><td>SPEED/MACH
NBR.</td><td colspan="2">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="2">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="2">ACTUAL WEATHER

WIND VISIBILITY
CLOUD
TEMPERATURE</td><td colspan="3">DEGREE OF TURBULENCE

*LIGHT/MODERATE/SEVERE</td></tr>
<tr><td colspan="6">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

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ATTACHMENT 4

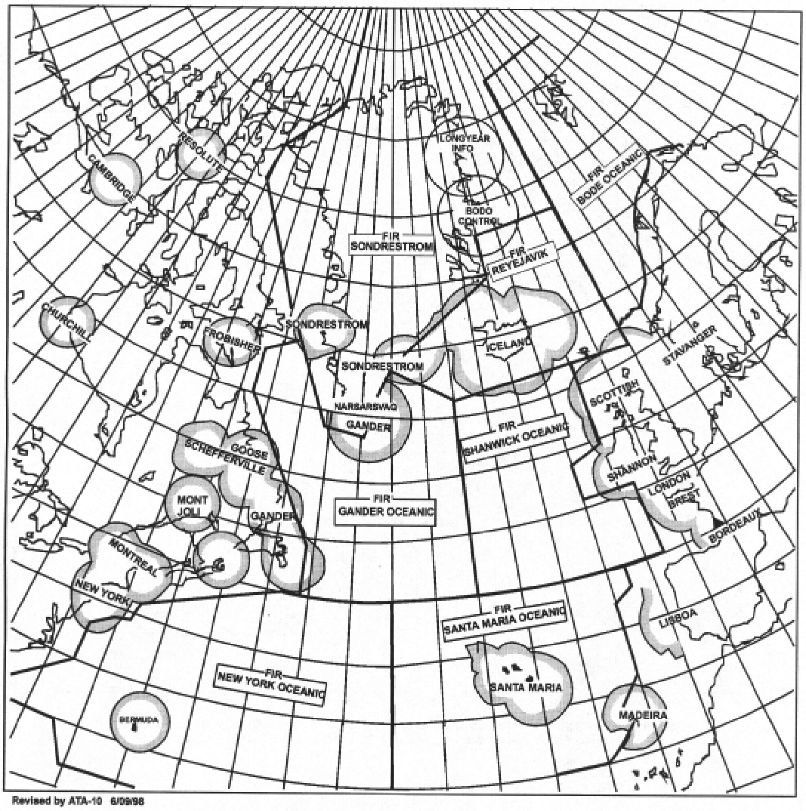
VHF AIR/GROUND COMMUNICATIONS COVERAGE EXISTING IN THE NAT REGION

Chart #1

VHF RADIO COVERAGE IN THE NAT REGION AT FL100 (Map is not applicable anymore, UPDATED VERSION NEEDED)

Commented [BT38]: Coverage hasn't changed for us- not sure why we need this map. I would suggest deleting it as flights should look to AIPs for details

Commented [KR39R38]: Sounds good



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*.*

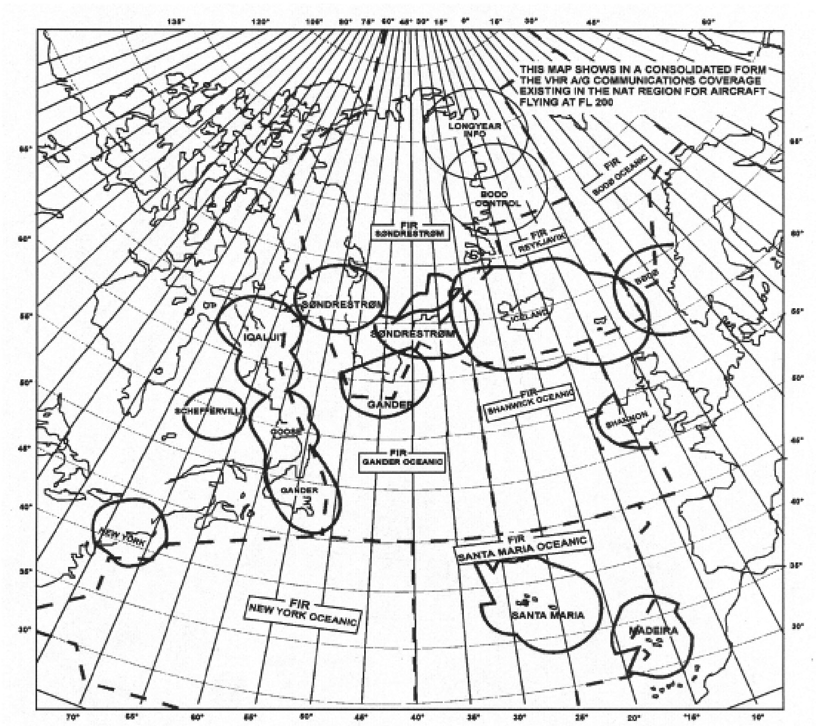
[2] The VHF cover provided by the Oaqatoqaq and Kulusuk stations in Greenland (Søndrestrøm) serves Søndrestrøm FIC only (below FL195)

[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)***

Commented [BT40]: Same comments as above



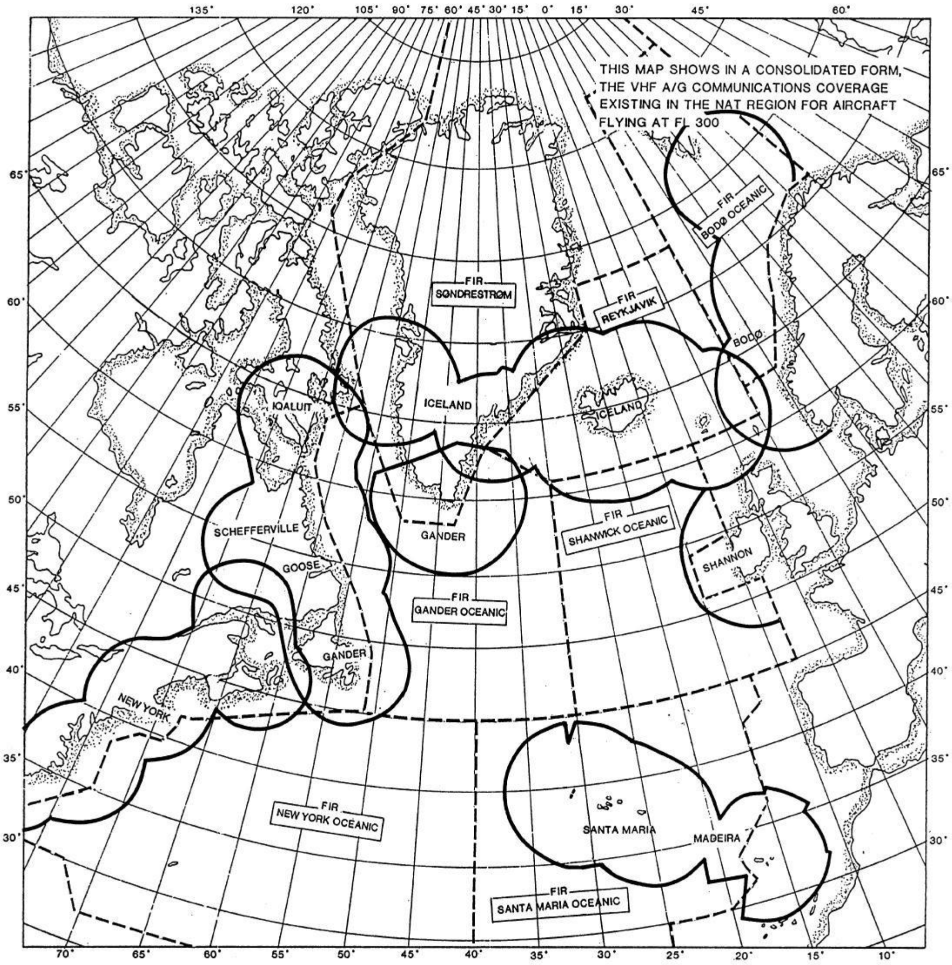
The VHF coverage provided by the QAQATOQAQ and KULUSUK stations in Greenland (Søndre Strømfjord), serves Søndre Strømfjord FIC only (below FL 195).

***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)***

Commented [BT41]: Same comment as above



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.

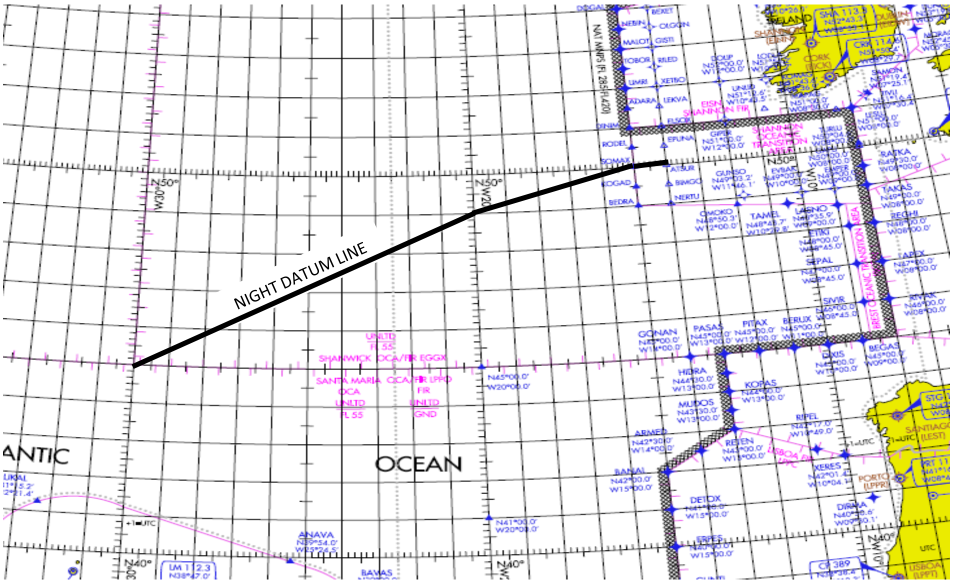
Night Datum Line, is established with the following coordinates:

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.

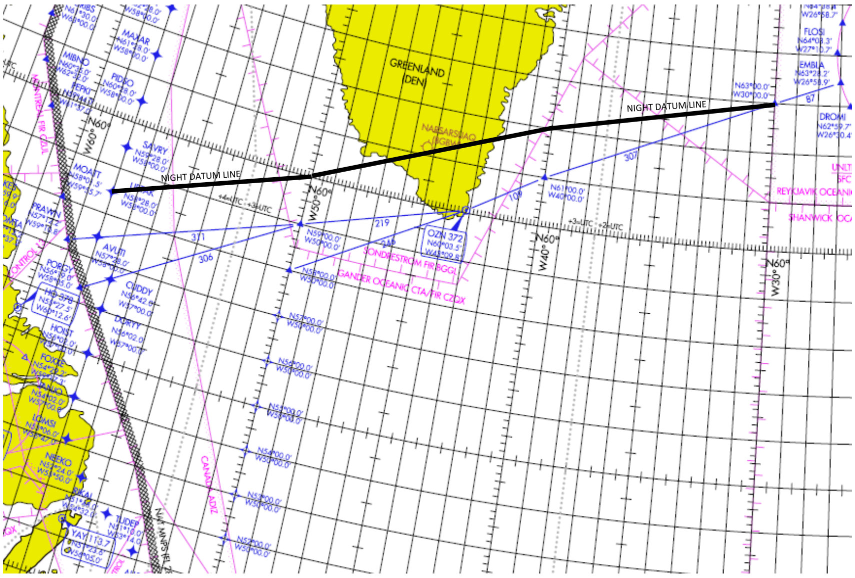


North Datum Line, is established between 0300Z and 0700Z with the following coordinates:

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.

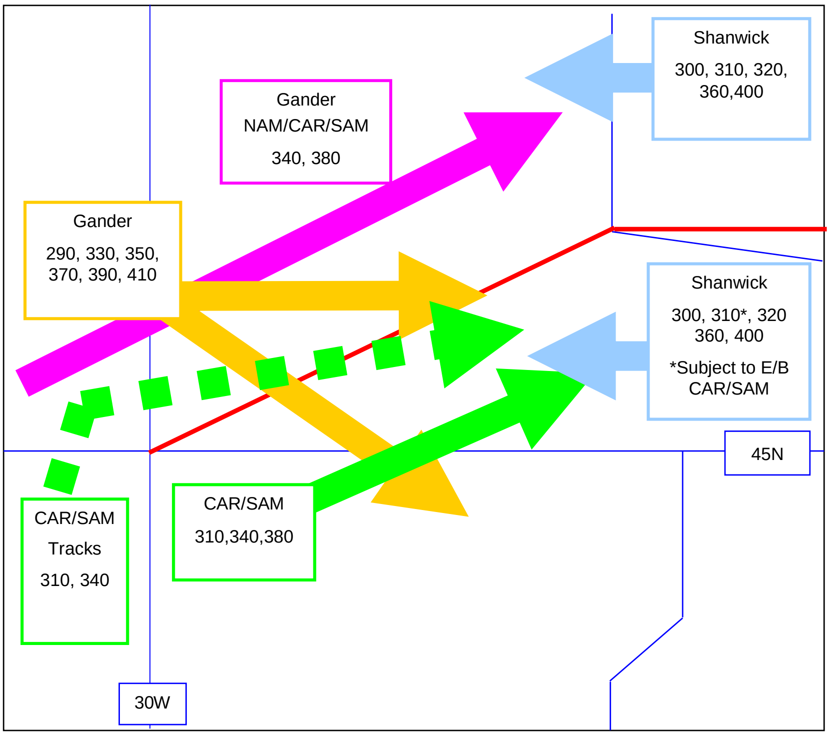


Diagram 1

Diagram 2 illustrates the situation when there are Gander eastbound NAT tracks in the vicinity.

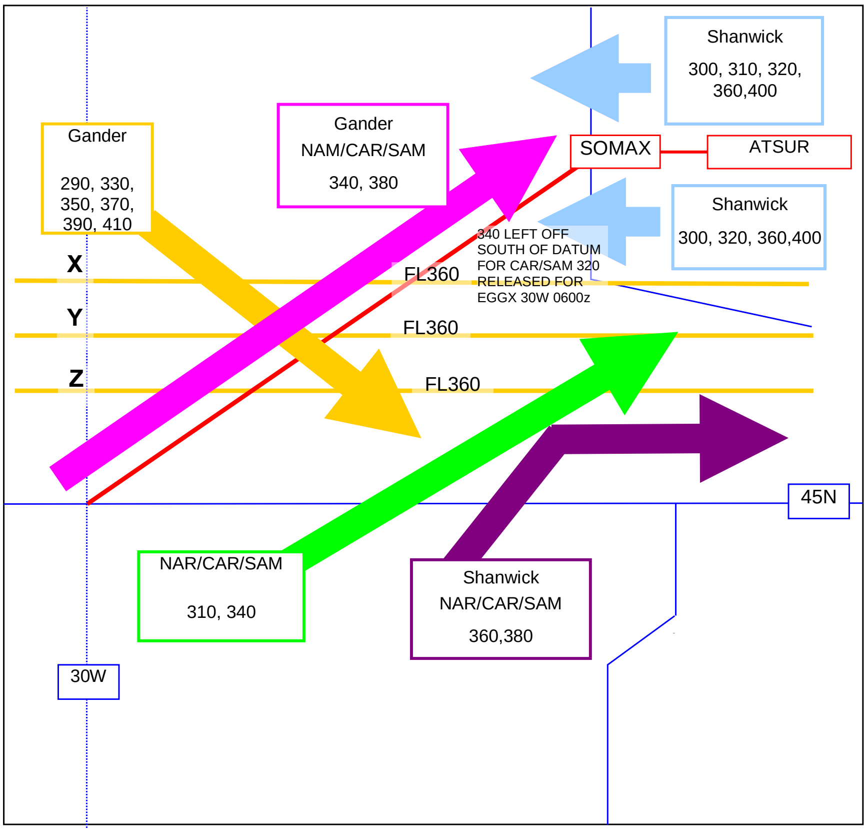


Diagram 2

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	Westbound.
	2230 – 0059	Westbound (avoiding OTS). Eastbound OTS (subject to westbounds).
	0100 – 0800	Westbound (avoiding OTS). Eastbound (OTS).
FL390	1901 – 1029	Eastbound.
	1030 – 1129	Eastbound (avoiding OTS). Westbound OTS (subject to eastbounds).
	1130 – 1900	Eastbound (avoiding OTS). Westbound (OTS).
FL380	0300 – 0700	Westbound (ODL, on and to the North of the North datum line).
	0801 – 2229	Westbound.
	2230 – 0059	Eastbound (subject to westbounds).
	0100 – 0800	Eastbound (OTS and ODL).
FL370	1901 – 1029	Eastbound.
	1030 – 1129	Eastbound (avoiding OTS). Westbound OTS (subject to eastbounds).
	1130 – 1900	Eastbound (avoiding OTS). Westbound (OTS).
FL360	0801 – 2229	Westbound.
	2230 – 0059	Westbound (avoiding OTS.) Eastbound OTS (subject to westbounds).
	0100 – 0800	Westbound (avoiding OTS). Eastbound (OTS).
FL350	1901 – 0959	Eastbound.
	1000 – 1129	Eastbound (avoiding OTS). Westbound OTS (subject to eastbounds).
	1130 –2000	Eastbound (avoiding OTS). Westbound (OTS).
FL340	0801 – 2229	Westbound.
	2230 – 0059	Eastbound (subject to westbounds). Eastbound OTS (subject to westbounds).
	0100 – 0800	Eastbound (OTS and ODL).
FL330	1901 – 0959	Eastbound.
	1000 – 1129	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.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	**Meaning**
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	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.	**Meaning**
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.	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.

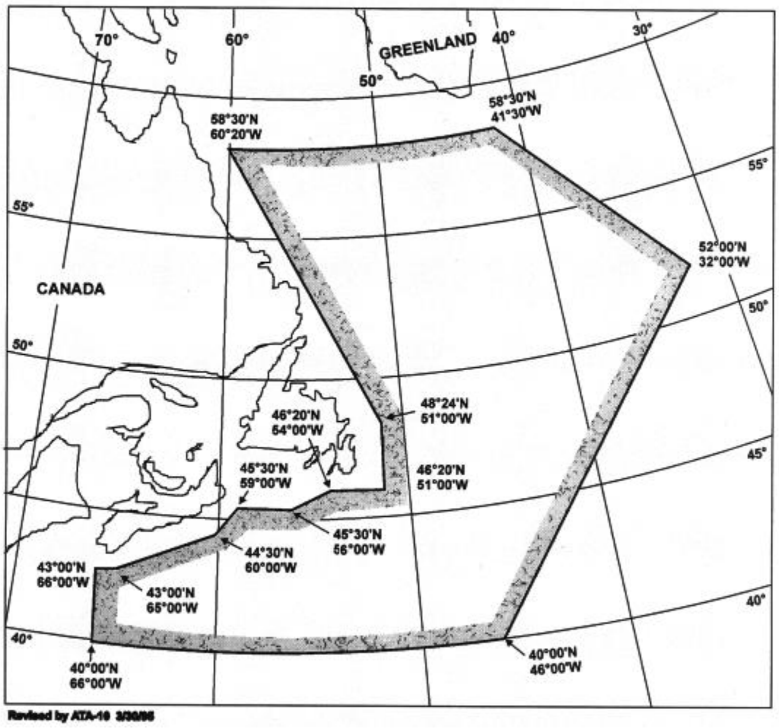
7.4.2 Wet clothing in cold weather extracts heat from the body nearly 200 times faster than dry clothing. Wool clothing provides better protection than cotton in wet weather. In inclement weather, an uncovered head can account for up to 60% of body heat loss. A good wool cap is essential. The most common 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.

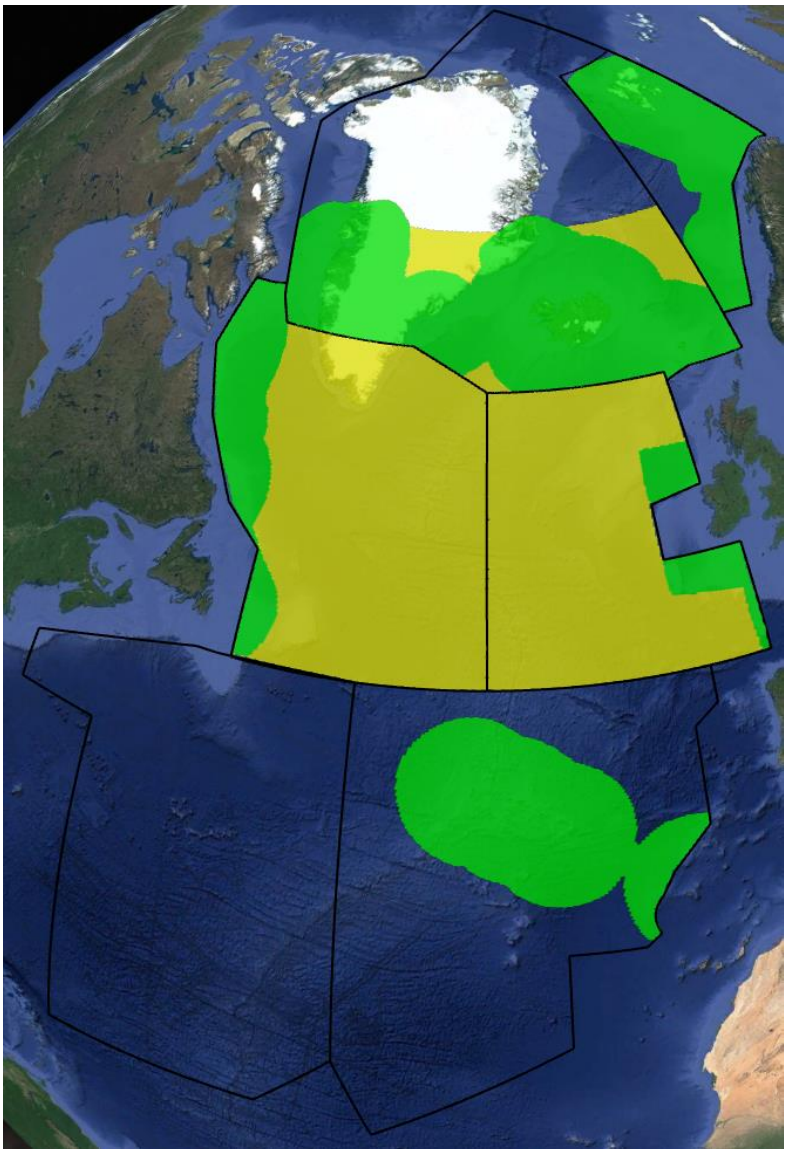
8.6 CANMARCOM may be contacted by the following means:

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



Green: surveillance with VHF voice
Yellow: surveillance without VHF voice.

Commented [C42]: - The depiction on pg. 168 “ATTACHMENT 8, NORTH ATLANTIC ATS SURVEILLANCE COVERAGE CHARTS” has confusing language at bottom of picture,
i.e. “Green: surveillance with VHF voice,”
“Yellow: surveillance without VHF voice.”
To eliminate confusion, the GREEN area on the depiction needs to be enlarged to include the area with routes between:

KFV – EPENI – 63°N 30°W – 61°N 40°W – OZN
(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)
(Doc 007 pg. 38, Paragraph 3.2 ROUTES WITHIN THE NAT HLA. refers

Commented [BT43R42]: Blue Spruce routes were not designed to accommodate aircraft operating without HF- they were designed for flights with either a single long range nav system or with one that had failed. The fact that VHF coverage exists is a happy coincidence so routes and coverage should not be confused.

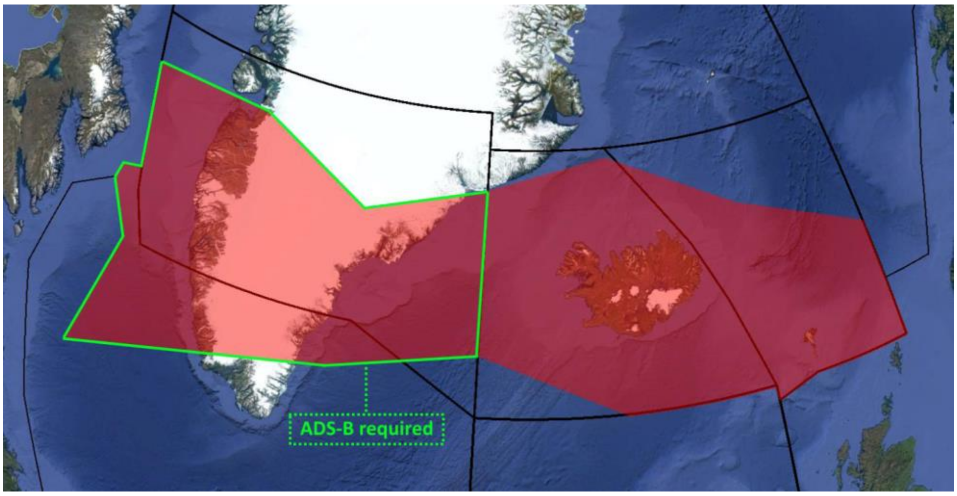
The minimum altitude for continuous VHF coverage across the NAT is considered to be FL300
Operations in the vicinity on the blue spruce routes without HF are restricted to FL250 and above and are simply defined as YYR-OZN (NA)- KFV as per the AIP.

If the Blue Spruce routes are to be included there has to be a reference to minimum FLs for operation.

Perhaps it should also be noted that we do not provide surveillance below FL 290.

Given all the caveats and the fact that the map is for illustrative purposes only I would leave it as is and simply put an asterix and a note: * see state AIPs for detailed surveillance and communication coerage

Commented [KR44R42]: I am happy with this suggested addition. I do like the levels, especially 250 and above comment being mentioned somewhere. We seem to get many questions relating to this.



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).

Commented [C45]: Additionally, the depiction on pg. 169 also needs to be amended to include the area of the aforementioned routes because the air traffic service unit provides VHF Voice direct-controller-pilot-communications (DCPC) in the *surveilled* airspace.
When the depiction is amended, the latitude and longitudes of the Southern boundary should also be adjusted.

Commented [BT46R45]: This is one you'll have to make a judgement call on- I was prepared to argue it some time ago to release us from maintaining the Greenland ground-based frequencies and all the associated costs however:
The intent behind VHF coverage as a requirement for DLM exempted airspace is so a controller can immediately intervene should an aircraft be observed going off course. That's why we need surveillance (ADS-B is a must) and direct communication.
The only VHF coverage regularly used (monitored) in that area is the PAL at OZN and as you know that's not operated by controllers. I wouldn't think the safety case that was originally used to determine DLM exempt airspace would support the change Luis is proposing.

Commented [KR47R45]: Isn't there other VHF frequencies that our IFSS can monitor in that airspace? But Lyn is correct, these frequencies are not monitored directly by controllers, so not sure how this effects the safety case

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: 65N000W - 67N010W - 69N020W - 68N030W - 67N040W - 69N050W - 69N060W - BOPUT. Southern boundary:		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).	

	GUNPA (61N000W) - 61N007W - 6040N010W - RATSU (61N010W) - 61N020W - 63N030W - 62N040W - 61N050W – SAVRY			
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: ○ **“J 5”** (INMARSAT), ○ **“J6”** (MTSAT), and ○ **“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

Commented [C48]: - If reference to MNPS is retained, add the following to pg. 176 2. Minimum Equipage (Navigation/Altimetry/Communications) NAT HLA/MNPSA.

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.

Commented [LT49]: Question for IFALDA: Not in LPPO for FANS aircraft. Relevant here?

- 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
  - 3.5.1 For appropriate aircraft, track every 15 minutes
  - 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
  - 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 FIR CZQX	**LATERAL SEPARATION** (pairs of aircraft on Tracks or Random Route)	23 NM	RCP240	RNP 4	RSP 180 with ADS-C	Whole or Half Degrees of Latitude
Shanwick Oceanic FIR EGGX		30 minutes for non-turbo-jet aircraft				ATC sets Periodic ADS-C Contracts- usually to 14 minutes
Reykjavik Oceanic FIR BIRD	**LONGITUDINAL SEPARATION** (pairs of aircraft in trail)	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)
	LATERAL				RSP 180	Whole or Half Degrees of

Commented [LT50]: Question for IFALDA:

-Does it help to have a non-comprehensive list of separation minima?
-In LPPO, we apply 30NM /5 minutes and not 50NM
-30 minutes for non-turbojet aircraft but now there is a chance to apply Mach Number technique

New York Oceanic East KZWY **Santa Maria Oceanic FIR** **LPPO**	**SEPARATION** (pairs of aircraft on Tracks or Random Route)	30 NM	RCP 240	RNP 4	with ADS-C	Latitude
	LONGITUDINAL SEPARATION (pairs of aircraft in trail)	30 minutes for non-turbo-jet aircraft				
		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

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 F — STATUS OF ONGOING NAT PROJECT TEAMS

(*paragraph 1.7.1 refers*)

Created at	Project Team	Parent Group	Supervisor	Project Title	Start date	End date	Lead	Report	Progress Status
NAT SOG Dec 26/02	NMOM PT	NAT SOG	NAT MWG	NAT MWG Occupancy Methods PT	01/09/2022	31/12/2022	Nabil Afodjo (Canada)	NAT SOG/27	On-going
NAT SOG Dec 25/03	OCR RSCR PT	NAT SOG	NAT SOG	Review of Oceanic Clearance Removal NAT Regional Safety Case	18/02/2022	15/12/2022	Danielle Crudden (US FAA)	NAT SOG/27	On-going
NAT SPG/57	NER PT	NAT SPG	NAT SPG	New Entrant Readiness Project Team	01/12/2021	30/06/2022	Colin Scott (UK CAA)	NAT SPG/58	On-going
NAT SPG Con 57/11	MHP PT	NAT SOG	NAT SPG	NAT MNPS/HLA&PBN Approval Project Team	01/06/2021	15/12/2022	Madison Walton (US FAA)	NAT SOG/27	On-going
NAT POG/06	OCR PT	NAT POG	NAT POG	NAT Oceanic Clearance Removal (OCR) PT	01/09/2018	31/03/2022	Shelley BAILEY, replaced Lyn TERRIS, Canada	NAT IMG/61	On-going
NAT IMG Dec 52/9	NODAR PT	NAT TIG	NAT TIG	NAT Network Outage Detection and Reporting (NODAR)	01/04/2018	15/12/2022	Theresa Brewer, United States	NAT TIG/14	On-going
NAT EFFG/40	NHMSA PT	NAT EFFG	NAT EFFG	NAT New Height Monitoring System (HMS) Arrangement Project Team	15/05/2021	30/03/2022	Alda Miranda (Portugal), Gudny Jokulsdottir (Iceland) and Anna Haldorsdottir (Iceland)	NAT EFFG/42	Completed
NAT IMG/59	Doc 006 Rev PT	NAT IMG	NAT POG	NAT DOC 006 Part I Review Project Team	01/10/2021	30/04/2022	Luis Tojais (Portugal)	NAT POG/13	Completed
NAT SOG Dec 24/04	NAT SKIPR-PT	NAT SOG	NAT SOG	NAT SOG Safety Key Performance Indicator Review Project Team	10/06/2021	06/12/2021	Jona EINARSDOTTIR (SG Rapporteur), Danielle CRUDDEN(US FAA)	NAT SOG/25	Completed
NAT IMG Dec 57/1	NAT PBCS PIM PT	NAT TIG	NAT IMG	NAT PBCS Post-Implementation Monitoring Project Team	20/10/2020	01/10/2021	Jose Cabral(Portugal)	NAT TIG/12	Completed

APPENDIX G — UPDATES TO NAT VISION 2030 MATRIX OF GOALS, OBJECTIVES AND PRIORITISED POTENTIAL IMPROVEMENTS

(*paragraph 2.2.7 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)
• NAT TIG/13; reviewed and updated the FANS Problem Solution Tracker					
1-2	Prepare for ATN B2	4	2026-2031	TIG	(Goal 4)
• No update					
1-3	Reduce the footprint of the OTS (lateral, vertical and time period)	2	2023-2026	POG/TIG IMG/SOG	(Goal 4)
• NATS has published procedures (which started 01 March 2022) that remove Flight Levels below FL340 from OTS Tracks					
1-4	Consider the use of User Preferred Routings (UPR)	2	2023-2026	POG/TIG IMG/SOG	(Goal 4)
• NATS has published procedures (which started 01 March 2022) that remove Flight Levels below FL340 from OTS Tracks					
1-5	Only apply speed restrictions when needed for separation (OWAFS) (work already in progress);	1	2021-2023	POG/SOG/IMG	(Goal 4)
• Implemented; NAT OPS Bulletin 2019-001 published. OWAFS was implemented with New York in November 2021 and additional system improvements were put in place to ensure the AIDC coordination when automated OWAFS is enabled.					

<table>
<tr><td colspan="6">NAT 2030 Vision Matrix</td></tr>
<tr><td></td><td colspan="5">• 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-1</td><td colspan="5">Ensure as far as possible that all NAT developments are implemented in the context of “seamless boundaries.”</td></tr>
<tr><td>Objective</td><td colspan="5">Take full account of the other regional environments such that we have seamless operational boundaries.</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>1-6</td><td>Discontinue oceanic clearances;</td><td>1</td><td>2021-2023</td><td>POG/SOG/IMG</td><td>(Goal 4)</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td colspan="6">• Anticipate approval by NATSPG/58 June 2022 of the relevant documentation to allow for implementation by Q1 2023.
• NAT OCR RSCR PT, Review of Oceanic Clearance Removal NAT Regional Safety Case, report due NAT SOG/27 (15/12/2022)
• State AIPs and ICAO State Letter to be published confirming date OCR implementation (minimum 2 AIRAC)</td></tr>
<tr><td>1-7</td><td>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.);</td><td>2</td><td>2021-2023</td><td>POG/IMG</td><td>(Goal 4)</td></tr>
<tr><td colspan="6">Following the implementation of ADS-B separation minima that were published in the PANS ATM in November 2020 by Gander, Shanwick and Santa Maria, the ICAO Separation and Airspace Safety Panel (SASP) has developed a 15 NM Target to Target (TtT) separation minimum for the same environment.
This new separation minimum is currently going through the ICAO process and is expected to become applicable in the PANS-ATM in November 2024.
During NAT POG/13 Isavia ANS announced their decision to implement the 15 NM TtT separation minimum in the Reykjavik CTA.
Isavia ANS subject to approval in June 2023, expects that approximately 95% of the traffic in the Reykjavik CTA will be able to make use of the following separation minima:
• 3/5/10 NM TtT using DCPC VHF voice communications and ATS surveillance
• 15 NM TtT using CPDLC communications and ATS surveillance
• Other traffic not applicable for ATS surveillance service will be separated using traditional procedural separation standards
Portugal stated that Santa Maria, as their operating environment is similar to that in Iceland, were also considering the simplification/reduction of the currently applied
• separation minima and expressed its interest to join the Icelandic initiative.</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-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**
1-8	Dynamic Airborne Rerouting Procedure DARP;	1	2021-2023	POG/TIG/IMG	(Goal 4)
VOLCEX/21; informal use of Dynamic Airborne Reroute Procedures (DARP) on 16 November 2021. The functionality of DARP was exercised, but there was no actual movement of the aircraft from the originally cleared route. All data link route uplinks to the flight crews and route downlinks to ATC were "real" messages and flight crews were instructed to respond with UNABLE to any ATC CPDLC route clearance uplinks as directed by Shanwick ATC (any change in flight profile was then simulated). With the coordination of Delta Air Lines and Shanwick ATSU, IATA was able to demonstrate the safety, viability, functionality and necessity of DARP for 2 flights during a volcanic ash event. The two scenarios that need to be considered in an event such as this are either a flight coordinating with the flight dispatcher for a revised routing that they would subsequently request with ATC, or ATC being in a position where there may be multiple flights, not coordinating with dispatch, that need to be rerouted. In both cases, ATC needs to have the capability and resources to issue CPDLC loadable route clearance uplinks. It was proposed that the next VOLCEX events (e.g. VOLCEX22 on 17 November 2022) should include both scenarios and coordination requirements for the Network Manager (NM) to consider routing of flights eastbound with an exit at a different waypoint. The procedures from the ICAO GOLD document have been used in the exercises.					
1-9	Consider RVSM above FL410;	3	2021-2023	OPDLWG ATMOPS POG/TIG IMG/SOG/SASP	(Goal 4
NAT POG/13 Santa Maria has collected information from 2018-2022, each ANSP will collect data and report back to POG/14					
1-10	Consider formation flights;	5	2026-2031	POG/TIG IMG/SOG	(Goal 4)
fello'fly (Airbus Wake Energy Retrieval) program development, operational trials were performed on 9th and 10th November 2021 from Toulouse to Montreal with a longitudinal separation of 1.5NM and confirmed 5% fuel savings. Airbus also presented a proposal for the establishment of a NAT Project Team with the aim to further develop/define ATC operations and procedures applicable to Wake Energy Retrieval Flights in NAT Airspace. NAT POG did not support the creation of a PT. Airbus will perform an analysis on which ICAO provisions (especially in Annex 2, Annex 6, Annex 11 and the relevant PANS) would currently prevent the "normal" wake energy retrieval cruise flight operations. This could then be presented as a working paper to the NAT SPG/58 meeting in June 2022 for further discussions.					

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)
• No update					
1-12	Accommodation of new entrants – supersonic aircraft	3	2026-2031	POG/IMG/SOG	(Goal 4)
• ICAO NAT NER PT (NATSPG/58)					
1-13	Accommodation of new entrants – UAS, UTM and balloons,	3	2026-2031	POG/IMG/SOG	(Goal 4)
• ICAO NAT NER PT (NATSPG/58)					
1-14	Accommodation of new entrants - operations above FL460).	3	2026-2031	POG/IMG/SOG	(Goal 4)
• ICAO NAT NER PT (NATSPG/58)					

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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 colspan="6">SATVOICE DOC10038 under review at OPDLWG
SARP Development in progress under ICAO Data Communication Infrastructure Working Group (DCIWG) under the Communications Panel</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 colspan="6">The continuing development of a wideband-capable aircraft HF radio which will also bring size, weight, and power benefits to HF users. The development of a standalone, wideband HF ground network awaits the outcome of the WRC-23 agenda item is known and a clearer definition of industry requirements. Regarding the regulatory effort to gain approval for the changes in spectrum usage that HF NEXT will bring, ICAO DCIWG/4 was formally informed that that technical development is now in abeyance. However, if regulatory approval is successful, technical development may resume along with SARPS development, in accordance with revised industry needs and requirements. Although technical development of HF NEXT is now suspended pending outcome of WRC-23, the global HF network is undergoing a technical refresh one benefit of which will be more capable ground stations capable of accepting software updates such as those for HF NEXT. </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 colspan="6">Added to NAT TIG work programme (NAT TIG/13 refers)
Canada and Portugal will collect information on this item and provide feedback to NAT TIG/14</td></tr>
</table>

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<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>2-4</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 colspan="6">• NAT POG/13 presented with (Draft Manual on the Implementation of ATS Surveillance Separation Using RCP 240 or Better and Draft SASP safety assessment of the 15 NM target to target separation minimum)
• See below</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 colspan="6">NAT TIG/13: discussed ways to address items (2-4) and 2-5). The group noted that these potential improvements had been set for the timeline 2021-2023. The NAT TIG discussed the lack of a quantifiable metric within the target (e.g. 99.9%). Furthermore, the Group agreed that the potential improvements, by nature, were an ongoing objective of the NAT TIG work programme and are consistently being pursued by the NAT TIG.

Additionally, the Group concluded that given current technologies and trends, achieving 99.9% performance for RCP240 and RSP180 within the specified timeline (2021-2023) was not realistic. It was estimated that this could take 10-20 years to complete when considering all the technology and equipage requirements.

The Group agreed to recommend to the NAT IMG (2-4 and 2-5) already being part of the NAT TIG work program, those items should be removed from the NAT 2030 Vision document. Nevertheless, the NAT TIG will continue to provide updates on the achieved datalink performance to the NAT IMG twice a year.</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 colspan="6">• NAT DOC006 Reviewed (NAT POG/13)</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>
</table>

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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 colspan="6">NAT IMG/59 paragraphs 3.3 to 3.6</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>
<tr><td colspan="6">Space Weather contingencies, for possible inclusion in NAT Doc 006, are still under review (NAT POG/13 para 4.6)</td></tr>
</table>

NAT 2030 Vision Matrix					
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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)
• Ongoing task					

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)
• Isavia ANS implemented space-based ADS-B north of 70N on 24 March so that now the entire Reykjavik CTA high level airspace is covered by space-based ADS-B					
4-2	Use of aircraft downlink parameters (i.e. pilot selected level);	2	2023-2026	POG / TIG/IMG	(Goal 1)
• No Update					
4-3	Implement SWIM and FF-ICE;	3	2026-2031	ALL	(Goal 1)
• No Update					
4-4	Address the regulatory oversight of CSPs and SSPs;	1	2021-2023	TIG OPDLWG IMG/SOG	(Goal 1)
NAT SOG Action 25-1, the Meeting agreed to investigate internally in each State how this issue is addressed and report to the next meeting.					

NAT 2030 Vision Matrix					
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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)
• Ongoing task					

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• Sub-Group: (IMG, SOG, POG, TIG etc.).</td></tr>
<tr><td>Goal-6</td><td colspan="5">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.</td></tr>
<tr><td>Objective</td><td colspan="5">Performance based metrics and meeting the NAT safety targets, including TLS, as well as any other future performance targets.</td></tr>
<tr><th></th><th>Potential Improvement</th><th>Prioritisation</th><th>Feasibility Timeline</th><th>NAT Sub-Group</th><th>Linked to Goal</th></tr>
<tr><td>6-1</td><td>NAT Safety Targets;</td><td>1</td><td>2021-2023</td><td>All Groups</td><td></td></tr>
<tr><td colspan="6">• NAT SOG/25 this item is already on the NAT SOG work programme.
• NAT SKIPR-PT; NAT SOG/25 Annual safety reports are developed on the regional status vis-à-vis the agreed safety targets, including the agreed risk mitigations
• Continuous review of the targets and indicators has been added to the task list for the NAT SG to ensure their continuous applicability and relevance.
• The NAT Regional Safety Case template allows for the development of additional new metrics and targets with regard to post implementation monitoring for changes to the NAT.</td></tr>
<tr><td>6-2</td><td>Horizontal Flight Efficiency;</td><td>1</td><td>2021-2023</td><td>All Groups
New Group Required</td><td></td></tr>
<tr><td colspan="6">• No Update</td></tr>
<tr><td>6-3</td><td>Vertical Flight Efficiency;</td><td>1</td><td>2021-2023</td><td>All Groups
New Group
Required</td><td></td></tr>
<tr><td colspan="6">• No Update</td></tr>
<tr><td>6-4</td><td>Cost per 100KM ($);</td><td>1</td><td>2021-2023</td><td>All Groups
New Group</td><td></td></tr>
<tr><td colspan="6">• NAT EFFG Spring 2022</td></tr>
<tr><td>6-5</td><td>Monitoring, reporting and verification of CO^2 emissions in accordance with Annex 16, Volume IV, and the Environmental Technical Manual (Doc 9501), Volume IV.</td><td>1</td><td>2021-2023</td><td>All Groups
New Group</td><td></td></tr>
<tr><td colspan="6">• No Update</td></tr>
</table>

APPENDIX H — NAT ANNUAL SAFETY (ASR) REPORT 2021

(*paragraph 3.6.3 refers*)

Starts on next page

SAFETY

NORTH ATLANTIC SYSTEMS PLANNING GROUP (NAT SPG)

2021 Annual Safety Report

2022 Edition

International Civil Aviation Organization (ICAO) North Atlantic Region

2021 Annual Safety Report

<u>Safety Policy</u>

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:

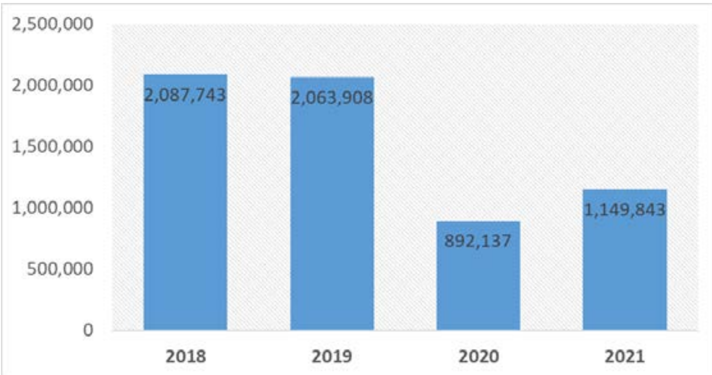
- **Clearly** define all accountabilities and responsibilities for the delivery of safety performance with respect to the provision of air navigation services and participation in the NAT SPG and its contributory bodies;
- **Support** the safety management activities that will result in an organizational 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 2021 which, as a result of the global health crisis, has posed the aviation industry with an unprecedented challenge. In 2021 the traditional methods for data analysis and validation have not been fully 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 2021 was 1,149,843. This is a significant increase on that reported in 2020 (892,137 flight hours), but still not at the level of pre-COVID-19 years.



Safety Performance in the NAT HLA continues to be monitored by the measures and targets associated with Safety Key Performance Indicators (SKPIs) with targets based on three years of rolling data. This report premieres the new SKPIs for the NAT as devised by the NAT SKPI Review Project team in 2021 and accepted at NAT SPG/57.

While reduction in air travel caused by the COVID-19 pandemic is considered to be, the most significant contributor to the improved safety performance in 2021, the SKPIs are, for the most part, weighted to take into account overall traffic volumes and will adapt as the traffic flexes.

In the context of 29% traffic growth from 2020 to 2021, there has been an increase in overall vertical collision risk of 43% and lateral collision risk of 11%. This increase in collision risk estimate in the vertical dimension is attributed to an adjustment to the mathematical collision risk model to acknowledge the increased navigational accuracy of aircraft in the NAT HLA due to widespread GPS equipage.

The number of events scrutinized in 2021 was similar to that reviewed in 2020 with the profile of root causes similar and so, while the reduction in traffic needs to be taken into account, the benefits of near, real-time surveillance capability in the NAT has delivered significant benefits in the early detection and resolution of deviations in the vertical and lateral planes

<u>**The North Atlantic Scenario**</u>

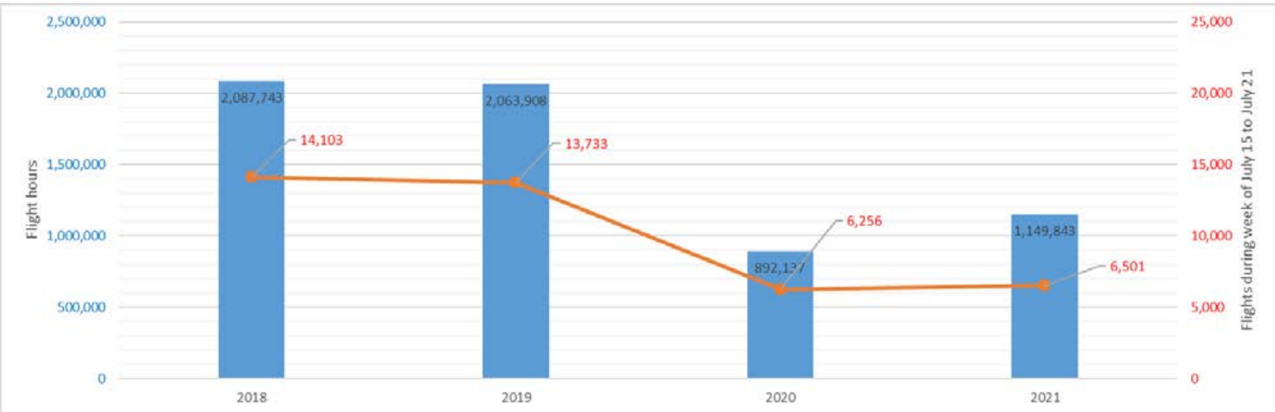
The airspace of the North Atlantic, which links Europe and North America, is the busiest oceanic airspace in the world. The NAT Region is a pioneer in the implementation of advanced procedures and technology supporting the progress of the global air navigation and aviation safety plans.

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 2021 was 1,149,843 which is an increase from the 892,137 hours in 2020. It is however still significantly below the flight hours before the COVID-19 pandemic. The NAT Economic, Financial and Forecast Group (NAT EFFG) estimates that in 2021, during the peak week of July 15 to July 21, approximately 6,501 flights crossed the North Atlantic. This figure was 6,256 for that same week in 2020.



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 July 2019 and June 2021, 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.

Collision Risk Estimates

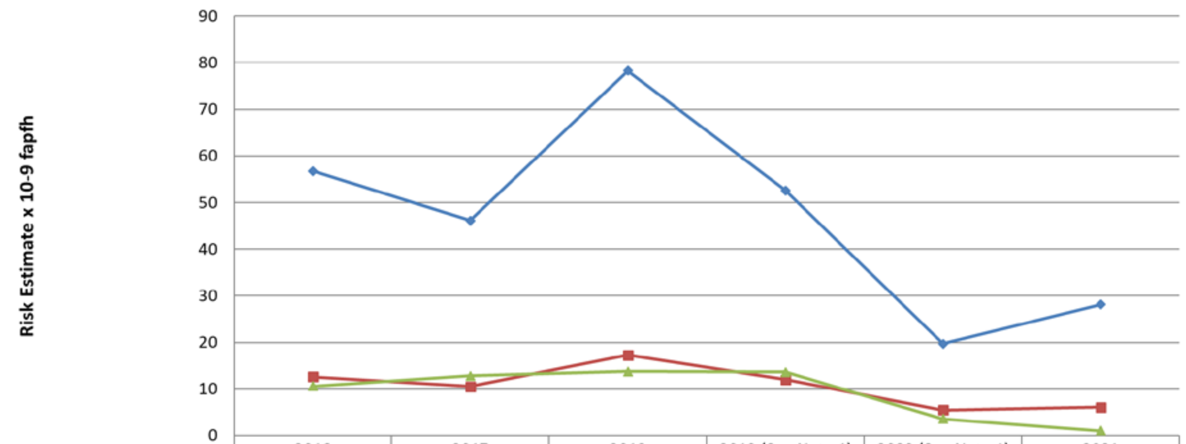
The estimated risk of a mid-air collision, referred to as Collision Risk Estimate (CRE), is reported in terms of fatal accidents per flight-hour (fapfh) and is calculated in the lateral and vertical planes. The model used for computation essentially assumes each aircraft is a box having a fixed x, y, 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 2021 in the NAT HLA are based on risk bearing events reported to the NAT Central Monitoring Agency (CMA) for the period January to December 2021. 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 2021 was estimated to be 28.1 x 10^{-9} fapfh for all NAT HLA. Figure 1 shows that this reduces by 78% to 6.1 x 10^{-9} fapfh with SLOP. The Vertical Collision Risk Estimates in 2021 both with the SLOP effect incorporated and without SLOP are higher in comparison to 2020 estimates. This increase in collision risk estimate in the vertical dimension is attributed to an adjustment to the mathematical collision risk model to acknowledge the increased navigational accuracy of aircraft in the NAT HLA due to widespread GPS equipage.

Figure 1 also presents the 2021 lateral risk estimate of 1.0 ×10^{-9} fatal accidents per flight hour. This represents a significant decrease of 72% compared to 2020.

The vertical CREs with and without SLOP are greater than the vertical Target Level of Safety (TLS) for operational and technical errors of 5 × 10^{-9} fatal accidents per flight hour (fapfh). However, the value of lateral CRE meets the TLS of 5 × 10^{-9} fapfh.



	2016	2017	2018	2019 (See Note 1)	2020 (See Note 1)	2021
Vertical CRE	56.8	46.1	78.3	52.6	19.7	28.1
Vertical CRE (with SLOP)	12.6	10.5	17.3	12	5.5	6.1
Lateral CRE	10.6	12.8	13.8	13.6	3.6	1.0

Figure 1 - Collision Risk Estimates in the NAT HLA (2016-2021)

Safety Key Performance Indicators (KPIs)

The NAT SPG has established Safety KPIs and associated targets for the NAT HLA. The NAT HLA performance in 2021 is shown the table below. The 2021 figures are shown in green where the performance meets the targets and red otherwise.

Safety KPI		Target	Previous rolling three-year period of performance (2018-2019-2020)	2018 Performance	2019 Performance	2020 Performance	2021 Performance
NAT.SKI.01	Number of accidents	0	n/a	0	0	0	**0**
NAT.SPKI.02a	Number of LHD events divided by number of flight hours flown in the NAT HLA	Reduction over previous rolling three-year period of performance	3.72×10^{-5}	2.87×10^{-5}	3.59×10^{-5}	4.71×10^{-5}	**4.61×10^{-5}**
NAT.SKPI.02b	Overall time of LHDs at unprotected flight level divided by total duration of flights in minutes	Reduction over previous rolling three-year period of performance	7.21×10^{-7}	6.95×10^{-7}	9.45×10^{-7}	5.23×10^{-7}	**6.23×10^{-7}**
NAT.SKPI.03a	Number of Lateral deviations divided by number of flight hours flown in the NAT HLA	Reduction over previous rolling three-year period of performance	5.57×10^{-5}	4.6×10^{-5}	5.71×10^{-5}	6.39×10^{-5}	**4.87×10^{-5}**
NAT.SKPI.03b	Overall time of lateral deviations on an unprotected profile divided by total duration of flights in minutes	Reduction over previous rolling three-year period of performance	1.27×10^{-6}	1.29×10^{-6}	1.70×10^{-6}	0.82×10^{-6}	**0.61×10^{-6}**
NAT.SKPI.04	Number of losses of separation events divided by number of flight hours flown in the NAT HLA	Reduction over previous rolling three-year period of performance	1.36×10^{-5}	1.87×10^{-5}	1.65×10^{-5}	0.56×10^{-5}	**0.522×10^{-5}**
NAT.SKPI.05a	Number of coordination errors divided by number of flight hours flown in the NAT HLA	Reduction over previous rolling three-year period of performance	1.87×10^{-5} (average for 2019-2020, as 2018 data not available)	No data	0.824×10^{-5}	2.91×10^{-5}	**1.83×10^{-5}**
NAT.SKPI.05b	Overall time of coordination errors spent at unprotected profile divided by total duration of flights in minutes	Reduction over previous rolling three-year period of performance	1.48×10^{-6} (average for 2019-2020, as 2018 data not available)	No data	0.162×10^{-6}	2.8×10^{-6}	**0.304×10^{-6}**
NAT.SKPI.06a	Collision Risk Estimate (CRE) in the vertical dimension	5×10^{-9} fapfh	n/a	17.3×10^{-9}	12×10^{-9}	5.5×10^{-9}	**6.1×10^{-9} (with SLOP)**
NAT.SKPI.06b	Collision Risk Estimate (CRE) in the lateral dimension	5×10^{-9} fapfh	n/a	13.8×10^{-9}	13.6×10^{-9}	3.6×10^{-9}	**1.0×10^{-9}**
NAT.SKPI.07	Regional Effective Implementation (EI) score in ANS for NAT provider States	-Maintain 85% or above until 2026 -Reach 95% by 2030	n/a	n/a	n/a	n/a	**89.21%**

Table 1 – Safety Key Performance Indicators (SKPIs) and associated targets (2018-2021)

Scrutiny of events (numbers in brackets are 2020 figures)

The NAT SG carried out the scrutiny of 166 (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 2021. These events were categorized as follows:

- 53 (47) Large Height Deviations (LHDs)
- 56 (57) actual lateral deviations, including:
    - 23 (15) GNEs and
    - 5 (13) ATC Interventions where when the Air Traffic Controller (ATCO) caught and corrected a lateral deviation before it developed into a GNE
- 21 (26) coordination events, where coordination between two Units has not been correctly carried out, leading to a vertical, lateral or time event.
- 4 (1) longitudinal loss of separation events.
- 53 (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 166 events of 2021 showed that the top 10 contributing issues allocated to all events were (Arrows indicate relative position from 2020 report):

1. *Flight Plan vs. Clearance* where flying, or intending to fly the planned route instead of the cleared route contributed in 42 (25%) of the events of 2021. In most cases (32 out of the 42), deviations did not actually occur as they were prevented by an ATCO.
2. *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 28 (17%) of the 2021 events.
3. *ATC coordination* where an error occurring during the coordination between two ATC sectors or ANSPs contributed in 26 (16%) of the events of 2021.
4. *Weather* where weather conditions experienced during the flight contributed in 19 (11%) of the events of 2021.
5. *ATC Clearance,* where a clearance issue contributed in 15 (9%) of the 2021 events. This can for example be caused by ATC not issuing a clearance to an aircraft to match the coordinated profile or by the lack of an appropriate clearance.

6. *Dispatch*, where a flight plan issue contributed in 15 (9%) of the 2021 events. This can for example be an arrival route into an FIR or airport not filed as per the national AIP or flight plans filed incorrectly, causing the existence of multiple flight plans with different routes for one flight.
7. *ATC Pertinent message not actioned* where ATC response, on receipt of a pertinent message, was not actioned or a message was erroneously discarded contributed in 13 (8%) of the events of 2021.
8. *Crew-Other*, where a crew action contributed to 12 (7%) of the 2021 events but there is insufficient information or evidence to allocate any of the currently scrutinized causal factors.
9. *Incorrect Weather Contingency action* where crew deviated from their assigned clearance to avoid adverse meteorological conditions, but did not follow the correct procedures for in-flight contingencies in Oceanic Airspace contributed to 9 (5%) of the 2021 events.
10. *Readback/Hearback*, where incorrect read back or hear back of a clearance contributed to 8 (5%) of the 2021 events, as well as:

    Incorrect application of SLOP where a misapplication of SLOP by the crew contributed to an event contributed to 8 (5%) of the 2021 events.

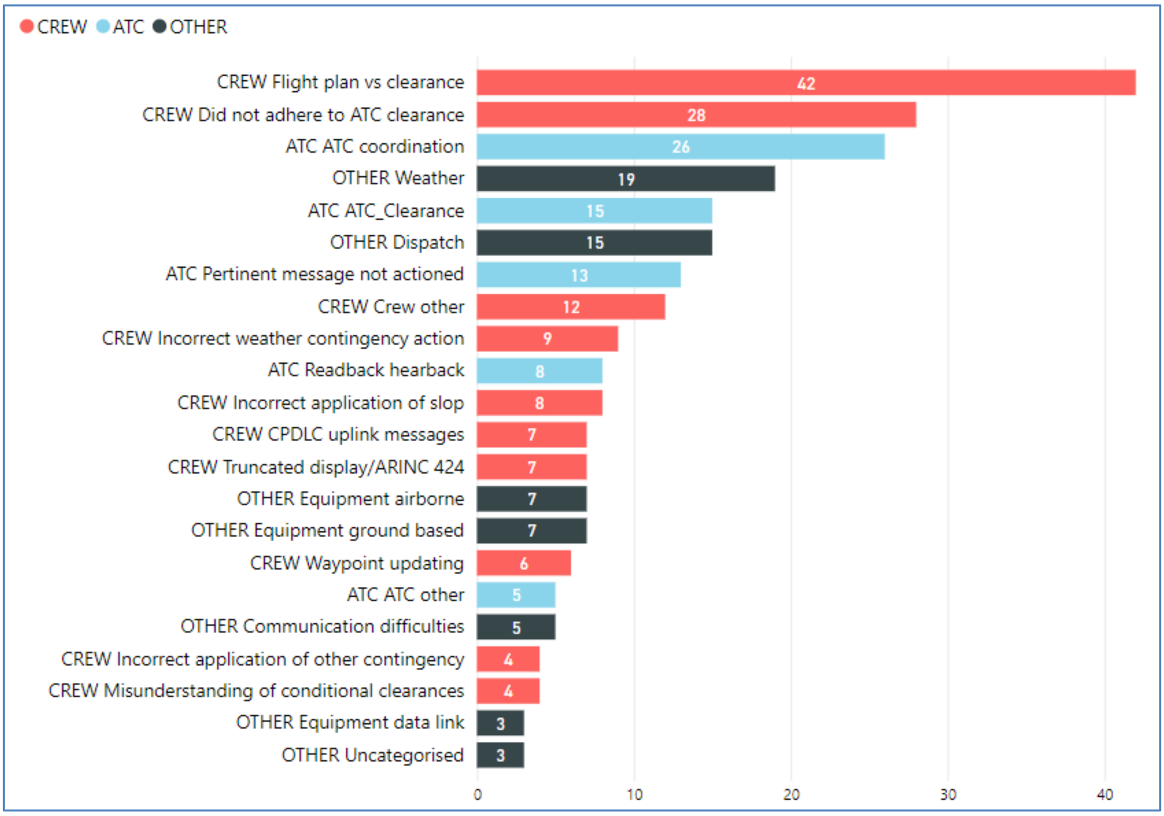


Figure 2: Contributing issues to events in the NAT HLA in 2021

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 3, 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.

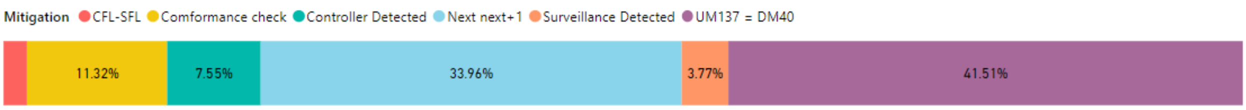


Figure 3: Mitigations used for prevented deviation events in 2021

NAT regional priorities

The reduced volume of air traffic in 2021 continues to shape the priorities for the region as it grows back to pre-COVID levels. The immediate benefits of the implementation of Space-Based ADS-B into the NAT in 2019, have been somewhat restricted by the global health crisis which continued to stifle global aviation through 2021. As the industry commenced its rebuild in late 2021 and into 2022, the experience gained with ADS-B allowed the NAT SPG to agree and endorse the goals, objectives and priorities in support of the NAT 2030 Vision.

The NAT 2030 Vision states that "Through collaboration, we lead the way in the provision of safe Oceanic Air Traffic Management Services by leveraging emerging technologies in the North Atlantic in order to realize maximum efficiencies and ensure optimized seamless airspace provision."

The NAT 2030 Vision is evidence of the willingness of all organisations within or bordering the region to work collaboratively to improve the operating environment. The Vision is sympathetic to the changing environment and allows the deliverables to be flexed and reprioritised to deliver the widest benefit for the region over the next decade.

In 2021, Airbus tested its Wake Energy Retrieval plans across the NAT under the "fello'fly" project proving savings in fuel and CO_2 of 5% and paving the way for further implementations and benefits in Continental airspace in the middle of the decade.

In 2021, the "footprint" for NAT tracks was safely reduced, by firstly trialling "Nil Track" days and secondly, by removing the need for NAT tracks below flight level 330. This initiative enabled by expanded utilization of Space-Based ADS -B, sought to provide operators with the ability to flight plan and fly random routes while taking advantage of newly implemented operational capabilities in the NAT.

In addition, the Project Team established for the removal of Oceanic Clearances works towards the removal of Oceanic Clearances by 2023 to align the Concept of Operations in the NAT with global methods of operation. In doing so, the Project Team are working across States to test the template for regional safety cases and developing the regional safety arguments in parallel to the States' own individual processes for approval of a change.

In VOLCEX21 in November of 2021, Delta Air Lines, along with the Shanwick ANSPs tested the use of Dynamic Airborne Reroute Procedure (DARP) to make use of existing CPDLC message sets to deliver greater flexibility and enhanced levels of safety when ATC are required to reroute flights.

In monitoring the performance of flights crossing the NAT, guidance has been developed for operators, ANSPs and States to manage potential non-compliant airframes when data link performance dips below the established targets with the aim of removing inconsistencies in the reporting and management of non-compliance reports and identifying improvements that can be made to "the system", both in the air and on the ground.

Testing to understand ADS-B capability to monitor height-keeping performance of flight crossing the NAT also concluded that a great opportunity existed to increase the sample size and gain greater confidence in the height keeping capability of aircraft flying within the NAT and around the globe. The tests have led to the commencement of the implementation of a new height monitoring system in the NAT.

The NAT Vision 2030 targets "New Entrant" Operators into the region in the latter half of the decade, but in order to demonstrate the flexibility of the region to respond to changes in our industry convened the New Entrant Readiness Project Team at the June 2021 meeting of the NAT SPG to assist in the management of requests for novel flights within the region's airspace.

The NAT2030 vision provides the framework for the region to continue to adapt its services and develop new ways of working to leverage emerging and innovative technologies. The NAT SPG structure ensures that the region implements improvements to its airspace provision while building and enhancing the levels of safety the region has become accustomed to.

____

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 —

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APPENDIX I — NAT TRAFFIC FORECAST FOR THE PERIOD 2022-2026 (AS OF MAY 2022)

(*paragraph 4.1.2 refers*)

May 2022 NAT EFFG Traffic Forecast							
Annual Growth Rates							
	2019-2020	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024**	**2024-2025**	**2025-2026**
Total NAT	-54.4%	3.9%	58.1%	21.7%	1.7%	2.7%	2.4%
Reykjavik CTA	-58.4%	30.1%	42.6%	8.0%	9.3%	3.0%	2.9%

APPENDIX J — ARRANGEMENT ON THE JOINT FINANCING OF A NORTH ATLANTIC HEIGHT MONITORING SYSTEM USING ADS-B DATA

(*paragraph 4.2.6 refers*)

ARRANGEMENT

ON THE JOINT FINANCING OF

A NORTH ATLANTIC HEIGHT MONITORING SYSTEM USING ADS-B DATA

The Civil Aviation Authorities and the Air Navigation Service Providers of Canada, Iceland, Ireland, Norway, Portugal, the United Kingdom of Great Britain and Northern Ireland and the United States of America, and the International Civil Aviation Organization, hereinafter the Parties;

Desiring to ensure the safety of aircraft flying over the North Atlantic under the Height Monitoring System Program;

Have agreed as follows:

Article I - DEFINITIONS

For the purpose of this Arrangement:

a) “Administrator” means the International Civil Aviation Organization;

b) “ADS-B” means Automatic Dependent Surveillance–Broadcast;

c) "ADS-B HMS" means ADS-B Height Monitoring System;

d) “ASE” means Altimetry System Error;

e) “Civil Aviation Authority” or “CAA” means the entity having responsibility for the administration of air navigation services within the concerned States;

f) “CMA" means Central Monitoring Agency;

g) “DEN/ICE” means Danish and Icelandic Joint Financing Agreements;

h) “NAT” means North Atlantic;

i) “NAT ANSPs” means the Air Navigation Service Providers responsible for providing ADS-B data for the purpose of height monitoring in the NAT (NAV Canada, Isavia ANS, Irish Aviation Authority, Avinor Flysikring, NAV Portugal and NATS);

j) “NAT EFFG” means the North Atlantic Economic, Financial and Forecast Group;

k) “NAT SPG” means the North Atlantic Systems Planning Group;

l) “RVSM” means Reduced Vertical Separation Minimum;

m) “Services” means the services specified in Section I of the Annex and any additional services which may from time to time be provided pursuant to this Arrangement;

n) “under- or over-recoveries” means the differences between actual recoverable costs and amounts billed, when the former are higher than the latter, or the opposite;

o) “United States ANSP” means the Federal Aviation Administration.

Article II – SCOPE

1. The parties to this Arrangement have agreed to provide, operate and maintain the Services as set forth in the Annex to this Arrangement, and provide, operate and maintain any additional services that may be mutually agreed upon by them.

2. Taking into consideration that the United States already process their own ADS-B available data and makes the ASE results available in the North American Approvals Registry and Monitoring Organization (NAARMO) database, the communication of this data by the United States ANSP to the NAT CMA is not justified, since its processing would be a redundant task. However, the United States ANSP has offered to provide the NAT CMA with the software and meteorological pressure altitude data that is necessary to perform the functions provided for in this Agreement.

3. No contracting party to this Arrangement shall be liable for any acts or omissions of any other contracting party that may take place during the course of the service provision.

Article III - DEFINITION OF COSTS

1. There are two types of costs related to the provision of services using ADS-B data:

a) Initial Set-up Costs:

i. A new processing system capable of receiving data from the NAT ANSPs and being used for the services provided for in the Annex to this Arrangement is required.

ii. The NAT ANSPs that are parties to this Arrangement shall develop systems/processes by which the appropriate ADS-B data is extracted from their operational systems and made available to the processing system referred in i) above.

b) Operating costs:

i. The NAT ANSPs that are parties to this Arrangement shall make the ADS-B data, properly formatted, available to the NAT CMA, in accordance with the frequency defined in Section I of the Annex, allowing the provision of the services provided for therein.

ii. The NAT CMA shall process the ADS-B data received from the NAT ANSPs for the purpose of height monitoring, as per the NAT CMA Terms of Reference set out in the *NAT SPG Handbook* (NAT Doc 001).

2. Administrative charges incurred by the Administrator can also be added to the NAT RVSM cost base and recovered through the NAT RVSM user charge.

Article IV - REPORTING

1. The United Kingdom ANSP shall furnish to the Administrator each year by 15 September:

a) a statement of actual costs incurred in the previous calendar year; and

b) an estimate of the costs expected to be incurred in the following calendar year.

2. These costs should be expressed in their own currency, and broken down between set-up and operating costs as appropriate.

3. The Administrator shall report, at the NAT EFFG autumn meeting, the actual cost of the service in the previous year, the reconciliation of the RVSM charge, the estimated cost of the service for the upcoming year, as well as the unit rate of the NAT RVSM user charge for the upcoming year. The NAT EFFG shall review and assess the report provided by the Administrator.

Article V – BILLING AND COLLECTION

1. A system of NAT RVSM user charge shall be operated. A single user charge shall be imposed on all civil aircraft making crossings as defined in Article IV of the Danish and Icelandic Joint Financing Agreements. The NAT RVSM user charge shall be calculated in accordance with the Annex to this Arrangement.

2. The data relating to all civil aircraft crossings is the same data that is defined in Article IV of the Danish and Icelandic Joint Financing Agreements.

3. The billing agent shall arrange for the billing and collection of the NAT RVSM user charge and shall provide monthly statements to the Administrator of the amounts collected.

Article VI – AMENDMENTS AND TERMINATION

1. This Arrangement may be amended by mutual written agreement of the Parties. However, modification of certain provisions that do not affect the rights and obligations of all Parties, may be effected by mutual agreement of the parties concerned, following notification of their intention to all Parties.

2. If one Party states its intention to withdraw from the Arrangement, a meeting will be held to assess the feasibility of continuing the Arrangement.

3. This Arrangement may be terminated by mutual agreement of the Parties by notice in writing given to the Administrator to disseminate to all Parties. In such a circumstance, a meeting with all Parties will be held, maximum three (3) months after the Administrator's notice in writing, to agree on the termination timescale and any remaining cost recovery conditions.

Article VII - DISPUTES

Any dispute relating to the interpretation or application of this Arrangement or its Annex thereto which is not settled by negotiation shall, upon the request of any Party to this Arrangement, be referred to the Council of the International Civil Aviation Organization for its recommendation.

Article VIII – ENTRY INTO FORCE

This Arrangement, and its Annex, which forms an integral part thereof, shall enter into force upon signature by all of the Parties.

ANNEX TO THE

ARRANGEMENT

on the Joint Financing of

a North Atlantic Height Monitoring System using ADS-B data

Section I - THE SERVICES

Services shall be provided in the form of a NAT ADS-B Height Monitoring System (NAT ADS-B HMS), as well as a North Atlantic Central Monitoring Agency (NAT CMA). To this respect,

a) The United Kingdom shall provide for the operation of the NAT CMA;

The NAT CMA performs monitoring and analysis of operational and technical performance to support NAT Safety targets, and ongoing performance tracking to support State Authorities and NAT Operators in meeting ICAO Annex 6 requirements as per the NAT CMA Terms of Reference set out in the NAT SPG Handbook (NAT Doc 001).

b) The NAT CMA shall use, for this task, the processing software made available to the NAT CMA by the United States ANSP. The processing software must be capable of measuring the geometric height of an aircraft for comparison with the geometric height of the flight level at which it is being flown.

c) The NAT ANSPs that are party to this Arrangement shall provide NAT ADS-B data as required by the NAT CMA to successfully monitor NAT airspace at a frequency which meets the minimum height monitoring requirements agreed by the NAT SPG.

d) As a reference for the frequency of data transmission and associated costs, the minimum height monitoring requirements as agreed by the NAT SPG are reflected in the *NAT SPG Handbook* (NAT Doc 001, Safety Policies, paragraph #05 refers).

Section II – COST RECOVERY

1. The costs incurred and recoverable by the NAT ANSPs only include the operating and resourcing costs of NAT CMA.

2. The costs incurred are defined as follows:

a) Set-up Costs: only exist in the start-up phase and cover:

i) The changes needed by ANSPs to make position data available. These costs shall be funded by each ANSP and may be included in the cost base of each ANSP’s oceanic route charges.

ii) The development of an automatic system for processing this information by the NAT CMA. The United States ANSP will provide the processing system software to the NAT CMA free of charge.

b) Operating Costs: operational expenses related to data management, maintenance and NAT CMA resourcing, necessary for the provision of services referred to in Section I. The costs incurred by the NAT ANSPs will be included in the cost base of each ANSP´s oceanic route charges, except the costs related to NAT CMA resourcing which will be reimbursed via the NAT RVSM user charge.

The United States ANSP will provide the meteorological pressure altitude data to the NAT CMA free of charge.

Section III - NAT RVSM USER CHARGE

1. Pursuant to Article V of the Arrangement, and subject to review and recommendation for approval from the NAT EFFG on the level of costs according to Article IV, the Administrator shall determine, by 20 November of year N-1, a single NAT RVSM user charge, that will be applied to all civil aircraft crossings, as defined in Article IV of the Danish and Icelandic Joint Financing Agreements in the following year (N). The user charge shall be calculated by dividing the total estimated costs incurred by the NAT CMA and by the Administrator, for calendar year N, expressed in British pounds, by the total number of forecast crossings in the NAT region for this same period. The forecast number of crossings used shall be found by using the baseline forecast percentage change in aircraft movement for the NAT prepared, by the NAT EFFG for the NAT SPG.

2. Any differences between the actual costs for year N, reported by the United Kingdom ANSP in year N+1, and the estimated costs referred to in paragraph 1 above, shall be reflected as under- or over-recovery on the cost base of year N+2, thereby increasing or decreasing the NAT RVSM user charge for this calendar year.

3. The billing agent shall arrange for the billing and collection of the NAT RVSM user charge on behalf of the United Kingdom ANSP. A monthly statement on the amounts collected from the operators by the United Kingdom shall be provided to the Administrator.

4. The billing agent can add to the NAT RVSM user charge a fee, not to exceed 5 percent of the user charge, in respect of its services in collecting and accounting for the user charges.

Section IV – TRANSITION PHASE

Pursuant to Article III of the Arrangement on the Joint Financing of a North Atlantic Height Monitoring System, signed in 1995, any costs associated with the decommissioning of the HMU Project shall be presented and recovered separately from this new Arrangement. The same procedure shall be adopted for the under- or over-recoveries of years N-2 and N-1. The impact of these costs will be assessed by the NAT EFFG.

APPENDIX K — PFA TO THE *NAT SPG HANDBOOK*, NAT DOC 001

(*paragraph 5.1.5 refers*)

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European and North Atlantic Office

NAT Doc 001

NAT SPG HANDBOOK

Second Edition

~~Version 2.6.0 – 2021~~Version 2.7.0 – 2022

~~Approved by NAT SPG/57~~Approved by NAT SPG/58

Prepared by the ICAO European and North Atlantic Office

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

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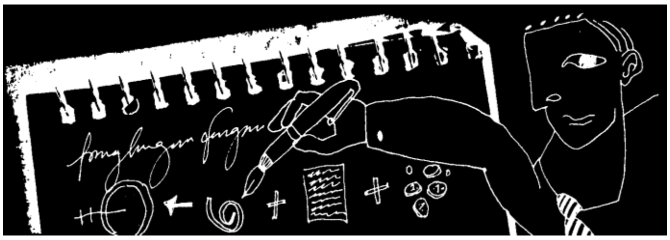

And so while the great ones depart for their dinner
The secretary stays, growing thinner and thinner
Racking his brain to record and report
What he thinks that they think that they ought to have thought.

(Anstey)

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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 — 18: 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* – Version 2021 – February 2021 ~~– 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).

Amendment 7, V2.7.0, August 2022, introduced the following changes [C 58/15]

- Section 1: #18 – NAT SPG representatives - updated;
- Section 1: NAT SPG Terms of Reference – updates to reflect C-WP/14983 Rev.2, C-DEC 219/7 (*Generic Terms of Reference for Planning and Implementation Groups and Regional Aviation Safety Groups (PIRGs/RASGs*), approved by the President of the Council on 21 August 2020) (*C 58/15* refers);
- Section 5:A, [02] *Amendments to the list of safety key performance indicators for the ICAO NAT Region, Table 1 - Safety Key Performance Indicators and related targets* and *Table 2 - Target Level Of Safety* - updates from the NAT SOG Safety Key Performance Indicator (SKPI) Review Project Team;
- Section 6:A — *Documents promulgated by the NAT SPG:*
  - updates to the status of the following documents:
    - NAT Doc 001 – *NAT SPG Handbook* – Version 2.7.0 – August 2022 (*C 58/15* refers);
    - NAT Doc 005 – *Future ATM Concept of Operations for the North Atlantic Region* – **Discontinued** (*C 58/2 [CORR]* refers);
    - NAT Doc 006, Part I – *Air Traffic Management Operational Contingency Plan – North Atlantic Region* – Version 2.0 – August 2022 (*C 58/16* refers);
    - Amendment to NAT Doc 011 – *PBCS Monitoring and Reporting Guidance* – Version 2022 – August 2022 and inclusion of NAT IMG to the list of groups responsible for updates of the NAT Doc 011 (*C 58/18* refers);
    - NAT eANP Vol III (ICAO Doc 9634) – Volume III of the electronic Air Navigation Plan – North Atlantic Region – 2022 January 2022 (*C 58/1 [CORR]* refers);
    - Minimum Monitoring Requirements: North Atlantic RVSM – **Discontinued**; and
    - NAT OPS Bulletin 2017_002_rev4 *NAT OESB - NAT Oceanic Errors Safety Bulletin* and NAT OPS Bulletin 2017_005_Rev1 *NAT OESB Supplements - NAT Sample Oceanic Checklists* (*NAT SOG Decisions 24/02 and 24/03* refer).

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.

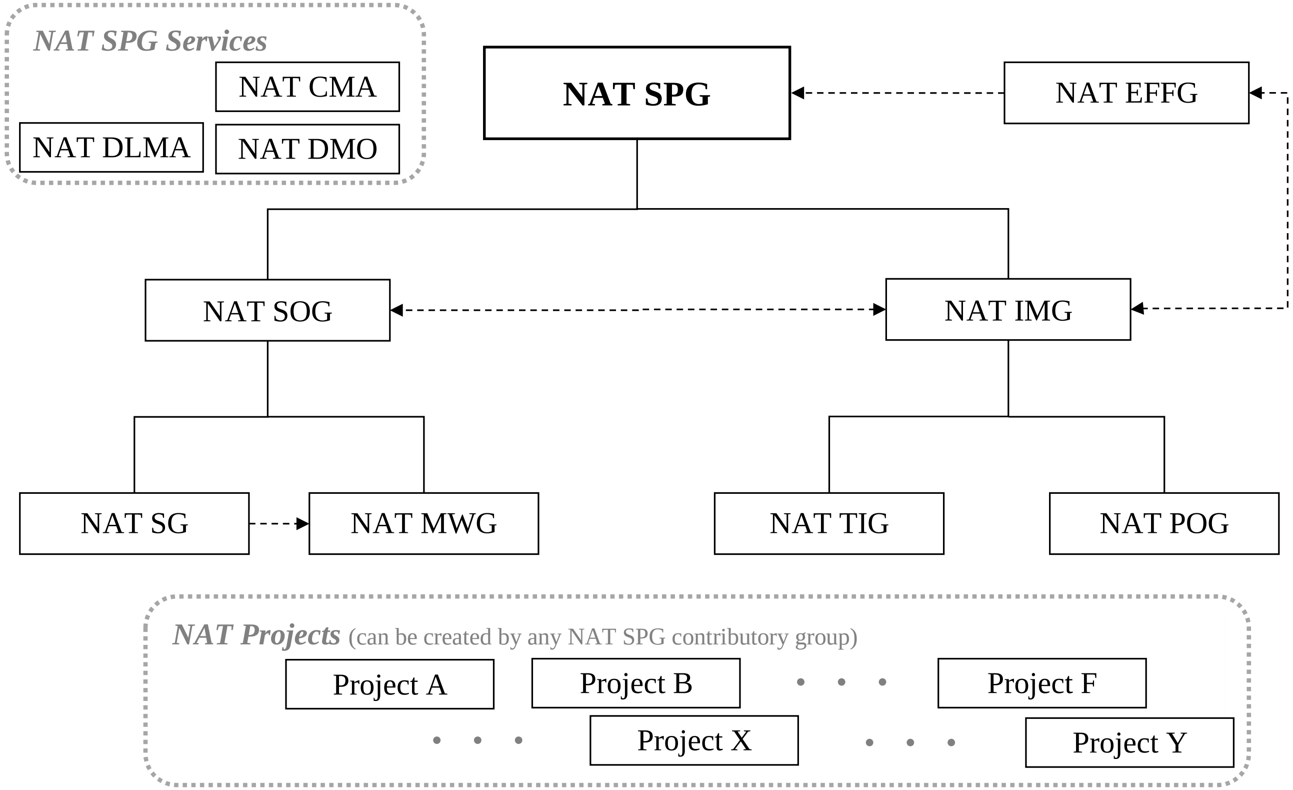
At NAT SPG/45, Paris, 23-26 June 2009, it was agreed to make adjustments to the NAT SPG working structure and to the terms of reference of its contributory bodies to accommodate the change in emphasis to performance based requirements, as driven by the Global ANP, and to take account of the Global Aviation 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.

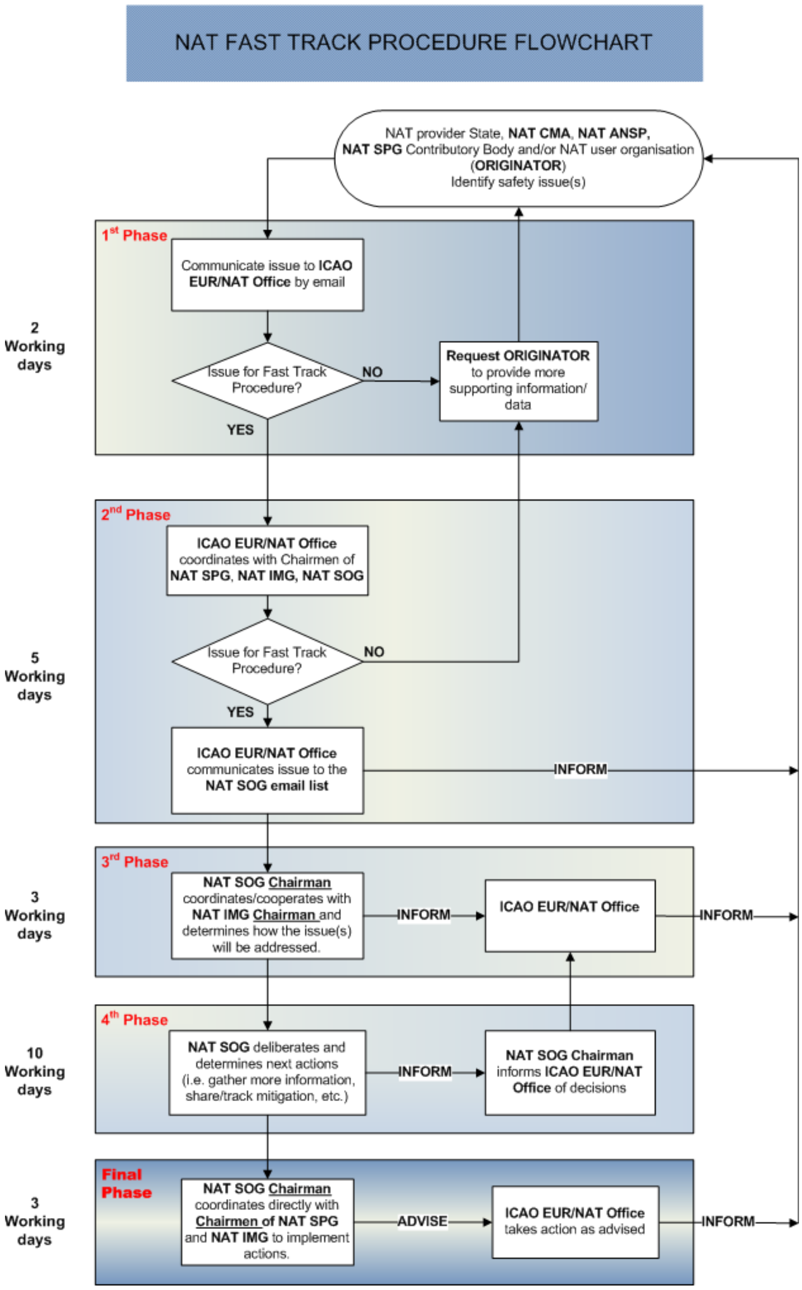
Guiding Principles

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)
(Revised to reflect C-WP/14983 Rev.2, C-DEC 219/7 and President of Council approval on 21 August 2020)

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.

Each State/Territory member should be represented by a senior-level delegate nominated by the State/Territory, preferably from the civil aviation authority (CAA) in order to support related policy-making within the State. A delegate may be supported by an alternate delegate and/or advisers with the requisite technical knowledge in the subject matters under consideration.

Commented [SU1]: Copied from PIRG 2.2 AND 2.3

The CAAs should be supported by service providers (such as air navigation services providers, airport, operators, meteorological service providers, etc.) as advisers.

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. Reporting

The NAT SPG will report to Council on an annual basis.

5. The Role of the States

State CAAs, supported by service providers as necessary, should participate in the work of the NAT SPG and its contributory bodies to:

a) ensure the continuous and coherent development and implementation of regional air navigation plans and report back on the key performance indicators (KPIs);

b) support the regional work programme with participation from the decision-making authority with the technical expertise necessary for the planning and implementation mechanism, thus supporting policy decisions at the State level;

c) enable coordination, at the national level, between the CAA, service providers and all other concerned stakeholders, and harmonization of the national plans with the regional and global plans;

d) facilitate the implementation of GANP and GASP goals and targets;

e) report on the status of implementation, within the State, on a regular basis;

f) plan for basic services to be provided for international civil aviation in accordance with ICAO Standards, within State national plans;

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

g) facilitate the development and establishment of Letters of Agreement and bilateral or multilateral agreements;

h) mitigate deficiencies identified under the uniform methodology for the identification, assessment and reporting of air navigation deficiencies in a timely manner;

i) embrace a performance-based approach for implementation as highlighted in the Global Plans; and

j) ensure the inclusion of the regional priorities in the States' national implementation plans to the extent possible.

Commented [SU2]: PIRG 3.3

6. The International Organizations and Industry

Industry, in particular airspace users, professional associations and organizations should participate in the work of the NAT SPG and its contributory bodies, in order to support air navigation implementation and collaborative decision-making processes, taking into consideration the safety aspects of air navigation services.

Commented [SU3]: PIRG 3.4

7. Interregional Coordination

The NAT SPG shall:

a) ensure interregional coordination through formal and informal mechanisms, including the participation in meetings established for the purpose of coordinating NAT SPG, the GANP/GASP, regional air navigation and aviation safety plans and regional supplementary procedures; and

b) ensure coordination with informal groups, such as the South Atlantic Group, Informal South Pacific ATS Coordination Group and Informal Pacific ATS Coordination Group, Cross-Polar Working Group to assure harmonized planning and smooth transition through regional interface areas.

8. Global Plans

In regard to Global Plans, the NAT SPG and its contributory bodies shall:

a) support implementation by States of the *Global Air Navigation Plan* (GANP, Doc 9750) and *Global Aviation Safety Plan* (GASP, Doc 10004) by ensuring effective coordination and cooperation between all States and stakeholders;

b) monitor and report the progress on the implementation by States of the GANP and GASP, and the regional objectives and priorities;

c) ensure continuous and coherent development of the regional air navigation plan, *Regional Supplementary Procedures* (Doc 7030) and other relevant regional documentation, and propose amendments to reflect the changes in operational requirements in a manner that is harmonized with adjacent regions, consistent with ICAO Standards and Recommended Practises (SARPs), Procedures for Air Navigation Services (PANS) and the GANP/GASP;

d) provide feedback on the GANP and GASP implementation and propose amendments to the Global Plans as necessary to keep pace with the latest developments and ensure harmonization with regional and national plans;

e) in line with the GANP, GASP and regional priorities, identify specific deficiencies in the air navigation field, and propose mitigating actions and timelines to resolve deficiencies; and

~~a)~~f) verify the provision of air navigation facilities and services in accordance with global and regional requirements.

Commented [SU4]: PIRG 4

~~4.~~9. Chairperson

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

~~5.~~10. 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.~~11. Secretary

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

~~7.~~12. Meeting Invitation , Venue and Documentation

Invitations to NAT SPG and its contributory bodies' meetings must be issued at least three months in advance of the meeting to assist States to plan participation.

Commented [SU5]: PIRG 3.1.7

Meetings will be convened in the EUR/NAT Regional Office, to the extent possible, to facilitate proper access by States. Approval to host meetings outside of the Regional Office must be obtained from the President of the Council.

Commented [SU6]: PIRG 3.2.1

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.~~13. Conduct of the meetings of the NAT SPG groups and sub-groups[1]

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 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,

[1] *NAT SPG Conclusion 45/3 refers*

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.~~14. 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.~~15. Procedure for processing of Proposals for Amendment to the NAT SUPPs

~~10.1.~~15.1. 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.~~15.2. The ICAO Secretariat will process the PfA in accordance with the formal procedures immediately after its endorsement by the NAT SPG.

~~10.3.~~15.3. 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.~~16. Formulation of recommendations to the NAT SPG[1]

~~11.1.~~16.1. 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 order

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

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.~~16.2. 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.~~16.3. 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.~~16.4. 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.~~17. Projects and Project Teams for the NAT SPG Working Structure

~~12.1.~~17.1. 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.~~17.2. 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.~~18. NAT SPG REPRESENTATIVES

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

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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].

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[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].

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[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.

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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].

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[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].

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[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 the following 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 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
12. Address other safety-related issues as necessary.
13. Use the fast track to advance safety concerns between formal meetings.
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. To ensure that NAT stakeholders' views are represented, representatives from Spain as well as Observers from IATA, IBAC, IFALPA and IFATCA are invited to participate in the work of the NAT SOG.

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.

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. 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.

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.

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.

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[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]

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[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).

2. Support the ICAO EUR/NAT Office with the implementation of approved proposals and their publication.

Composition

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

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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, C58/15)

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~~ NAT.SKPI.01	Number of accidents	0
~~ii~~	~~Number of fatal accidents~~	~~0~~
~~iii~~	~~Number of fatalities related to aviation fatal accidents~~	~~0~~
~~iv~~ NAT.SKPI.02a	~~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~~ Number of LHD events divided by number of flight hours flown in the NAT HLA	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~~ NAT.SKPI.02b	~~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)~~ Overall time of LHDs at unprotected 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~~

[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*~~

Key Performance Indicator		Target
~~ix~~ NAT.SKPI.03a	~~Rate of GNE events[1] (No. of GNE events divided by No. of flight hours flown in the NAT region) , involving operations with Data Link in use~~ Number of Lateral deviations divided by number of flight hours flown in the NAT HLA	Reduction over previous rolling three-year period of performance
~~x~~ NAT.SKPI.03b	~~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~~ Overall time of lateral deviations on an unprotected profile divided by total duration of flights in minutes	Reduction over previous rolling three-year period of performance
~~xi~~ NAT.SKPI.04	~~Rate of losses of separation (vertical) (No. of losses of separation events divided by No. of flight hours flown in the NAT region)~~ Number of losses of separation events divided by number of flight hours flown in the NAT HLA	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~~
NAT.SKPI.05a	Number of coordination errors divided by number of flight hours flown in the NAT HLA	Reduction over previous rolling three-year period of performance
NAT.SKPI.05b	Overall time of coordination errors spent at unprotected profile divided by total duration of flights in minutes	Reduction over previous rolling three-year period of performance
NAT.SKPI.06a	Collision Risk Estimate (CRE) in the vertical dimension	5 x 10 $^{-9}$ fapfh[2]
NAT.SKPI.06b	Collision Risk Estimate (CRE) in the lateral dimension	5 x 10 $^{-9}$ fapfh
NAT.SKPI.07	Regional Effective Implementation (EI) score in ANS for NAT provider States	-Maintain 85% or above until 2026 -Reach 95% by 2030

~~*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 x 10 $^{-9}$ fapfh[3]~~
~~xiv~~	~~Performance in the lateral dimension~~	~~5 x 10 $^{-9}$ fapfh~~

~~[1] *GNE is a deviation of 10 NM or greater*~~
[2] *Fatal accidents per flight hour*
~~[3] *Fatal accidents per flight hour*~~

[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.

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 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 provide assurance to the NAT SPG that all the established components of a regional safety case were accomplished. For a NAT SOG endorsement, the following should be taken into account:

a) 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) 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 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

[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 5.0×10^{-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 $2.5 \text{ X } 10^{-9}$, as this is the value which has been used to derive the Minimum Aircraft System Performance Specification.

A TLS of 5.0×10^{-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 5×10^{-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.

[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.

[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 2.7~~6~~.0 – ~~July 2021~~August 2022	ICAO Secretariat	NAT SPG*	Except for the following: ∗ *1 — 18 – 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~~5 – Nov. 2019~~1~~	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~~ *Discontinued*	~~2nd Edition, – Nov. 2012~~	~~NAT IMG~~	~~NAT SPG~~	*C58/1 [CORR] Integration of NAT 2030 Vision into the NAT eANP Volume III; and C58/2 [CORR] Removal of NAT Doc 005, Future ATM Concept of Operations refer.*
NAT Doc 006 - Part I	Air Traffic Management Operational Contingency Plan – North Atlantic Region	Version ~~1.15~~2.0 – ~~February 2021~~August 2022	NAT IMG	NAT SPG	
NAT Doc 006 - Part II EUR/NAT VACP	Volcanic Ash Contingency Plan – Europe and North Atlantic Regions	Version 2.0.1 – June 2021	NAT IMG and ~~EANPG COG~~EASPG PCG in accordance with the process described in the body of the document –	Coordinated approval of main document body by both NAT SPG and ~~EANPG~~EASPG PCG	

Number	Title	Current edition/version	Kept under review by	Approval/Amendments/removals approved by	Remarks
NAT Doc 007	North Atlantic Operations and Airspace Manual	Version V-2021-2 - 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	
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~~Version 2021 February 2021	NAT SOG and NAT IMG	NAT SPG	
NAT Doc 011	PBCS Monitoring and Reporting Guidance	Version 2022 - ~~July 2021~~August 2022	NAT SOG and NAT IMG	NAT SPG	

Number	Title	Current edition/version	Kept under review by	Approval/Amendments/removals approved by	Remarks
NAT eANP Vol III (ICAO Doc 9634, Vol III)	Volume III of the electronic Air Navigation Plan – North Atlantic Region	2022~~17 – June 2018~~January 2022	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~~ *Discontinued*	~~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_rev4 ~~3~~	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_Rev1	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 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 L — PFA TO NAT DOC 006, PART I

(*paragraph 5.2.2 refers*)

Starts on next page

European and North
Atlantic Office

NAT Doc 006 – Part I

AIR TRAFFIC MANAGEMENT OPERATIONAL CONTINGENCY PLAN

NORTH ATLANTIC REGION

Second Edition

August 2022

Prepared by the ICAO European and North Atlantic Office

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

EXCLUSION OF LIABILITY

First published: 22 October 2009
Second edition: 5 August 2022

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FOREWORD

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 North Atlantic region is the busiest oceanic airspace in the world, extending from the North Pole to 27N and spanning the high seas between Europe and North America. In 2019 in excess of 600,000 flights transited the airspace. The Organised Track Structure accommodates a high concentration of traffic which regularly sees traffic flows in excess of 100 flights per hour. Control of traffic in this vast and complex airspace is delegated to a number of States, with their Oceanic Control facilities geographically dispersed.

The North Atlantic Air Traffic Management Operational Contingency Plan is primarily for the information of operators and pilots planning and conducting operations in North Atlantic region. The intent is to provide a description of the arrangements in place to deal with a range of contingency situations.

The Manual has been produced with the approval and on behalf of the North Atlantic Systems Planning Group (NAT SPG); a 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.

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This Document will be made available to users from a number of web sites including the ICAO EUR/NAT website http://www.icao.int/EURNAT/, following "EUR & NAT Documents", then "NAT Documents", in folder "NAT Doc 006 - NAT Contingency Plan".

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.

RECORD OF AMENDMENTS

Amdt. Number	Effective Date	Details
2nd Ed.	August 2022	*Approved by NAT SPG Conclusion 58/16* This new edition comprises a comprehensive change to the structure of the document as follows: - new Chapter 1 on Common Procedures: the procedures that were in the ANSPs' specific parts which were similar in content were moved here; - new Chapter 10 on Notification Messages: the common NOTAM template was moved here, along with the relevant messages that each ANSP considered relevant; - new Chapter 11 on Contingency Route Structures: the Contingency Route Structure for each ANSP was moved here; - new Chapter 12 on Contact Details: all contact information for each ANSP was moved here; - all the references to Oceanic Clearance were removed, with a proposed procedure in case of limited/no service; and - all crew procedures were removed, as they will be published in a new update to the *North Atlantic Operations and Airspace Manual* (NAT Doc 007).

ATM CONTINGENCY PLAN

FOR FLIGHTS OPERATING

WITHIN THE NORTH ATLANTIC OCEANIC CONTROL AREAS

Objective

The Air Traffic Management (ATM) Contingency Plan contains details of the arrangements in place to ensure, as far as possible, the continued safety of air navigation in the event of partial or total disruption of Air Traffic Services within the NAT region. This document is produced in accordance with the requirement of ICAO Annex 11 – Air Traffic Services, Chapter 2, paragraph 2.32.

This plan details both common procedures throughout the NAT region and the procedures specific to the individual ANSPs within the NAT region. The plan is presented in two parts:

Part I – Contingency Situations Affecting ATC Facilities

ATC services within the NAT region are provided from a number of geographical locations and this plan details the contingency arrangements at each of these facilities. It is considered unlikely that any physical contingency at one particular facility will affect another directly, hence in Part 1 of this document the procedures for each OAC/ACC are considered independently.

Part II – Contingency Situations Affecting Multiple FIRs

This part of the plan considers events which are likely to affect more than one facility within the NAT region.

In particular, these include the contingency arrangements in place to deal with the airspace suffering contamination by volcanic ash.

States and FIRs affected

This document contains contingency procedures for those Air Navigation Service Providers (ANSPs) who provide an ATC service within the NAT region, and those ANSPs whose airspace has a common boundary with the NAT region for which supporting procedures are published.

The States, FIRs and ACCs affected by this contingency plan and for which procedures are promulgated are as follows:

United Kingdom

- Shanwick Oceanic FIR (OAC)
- Scottish FIR (ACC)

Canada

- Gander Oceanic FIR (OAC)

Iceland

- Reykjavik CTA

Portugal

- Santa Maria Oceanic FIR (OAC)

United States

- New York Oceanic FIR (OAC)

Norway

- Bodø FIR (OAC)

Ireland

- Shannon FIR (ACC)

France

- Brest FIR (ACC)

PART I

CONTINGENCY SITUATIONS

AFFECTING ATC FACILITIES

SCOPE OF THE PLAN

This part of the Contingency Plan considers:

- Common procedures adopted by ATC facilities in the event of contingency situations.

- Detailed procedures adopted by individual ATC facilities in the event of contingency situations. The plan considers contingency situations which may result in a degradation of the ATC service provided (limited service) as well as situations where there is a total loss of the ability to provide ATC services (no service).

  Where available, information is also provided outlining the steps taken by ANSPs to deal with a long term unavailability of an ATC facility. In particular, the procedures detailed by each ATC facility will, insofar as possible, comprise the following:

  - FIRs for which the Contingency Plan applies
  - FIRs with supporting procedures
  - Notification procedures
  - Implementation of the plan
  - Limited service
    - disruption of ground/air communication capability
    - disruption of ability to provide control services
  - No service
    - loss of ground/air communication capability
    - loss of ability to provide control services
  - Contingency Route Structure:
    - for activation within that OCA
    - for activation within adjacent OCA/FIR
  - Long term contingency arrangements
  - Contact details

CHAPTER 1: COMMON PROCEDURES

1.1 IMPLEMENTATION OF THE PLAN

In the event of adoption of contingency procedures ANSPs will notify all affected agencies and operators appropriately.

In a **limited service** situation, notification of any service limitations and traffic management measures will be promulgated to operators and adjacent ANSPs by NOTAM normally not later than 12 hours prior to activation or as soon as practicable in case of an unexpected service interruption.

Examples of limited services would be the removal of datalink or services for the purpose of maintenance or forecast radio propagation issues resulting in partial fade-out due to Solar Flares or Geomagnetic Storms.

In **No Service** situations it is likely that the ATC facility involved will be subject to evacuation. In this instance the ANSP will issue NOTAMs and broadcast on appropriate frequencies that contingency procedures have been initiated. Operators in receipt of the contingency message are asked to forward this information to affected flights wherever possible.

Operator attention is directed to Chart 1, which provides a "quick reference" guide for pilots in the immediate aftermath of a sudden withdrawal of ATC services in NAT airspace. It is intended to be used as an aid for operators developing pilot training material.

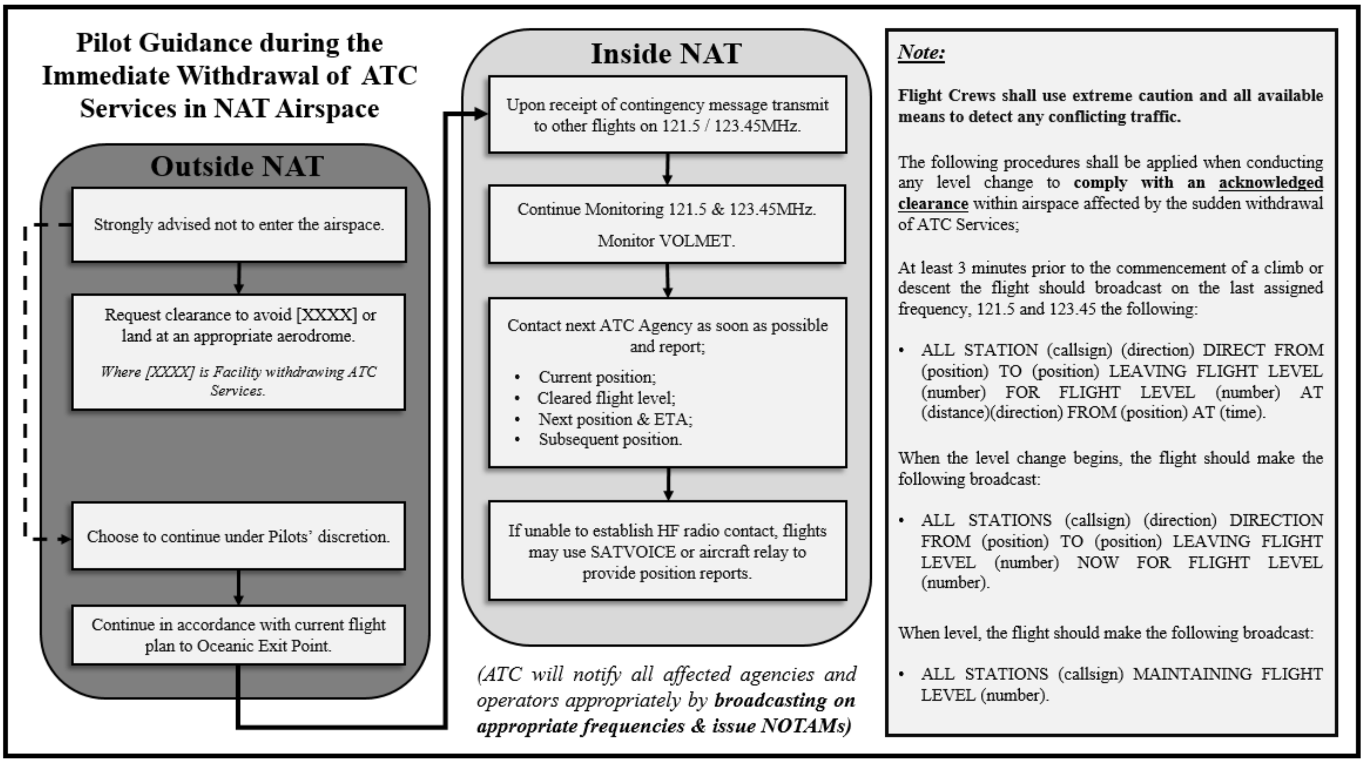


Chart 1

1.2 LIMITED/NO SERVICE - PROCEDURES

A disruption to services will most likely be the result of a disruption to air/ground communications capabilities and in some cases a limitation on the ability to provide control services.

Communications

Where the disruption is in relation to air/ground communications, inter-facility arrangements will guarantee to the maximum extent possible the continuation of services, and the transmission of information to maintain flight crew awareness of the situation.

In the event that communications are degraded substantially, ATFM measures may be imposed as necessary. If the event is limited to ADS/OCL/CPDLC, flights will revert to HF/VHF/SATVOICE which may result in frequency congestion.

Control Services

In the event where an Air Navigation Service Provider (ANSP) is unable to continue to provide control services, that ANSPs shall determine, co-ordinate and promulgate any necessary restrictions to meet the service limitation. The coordinated restrictions will vary and be dependant on the nature of the service limitation which may impact, the flow of traffic through adjacent ANSPs airspace. Such measures may include, but are not limited to, temporary capacity restrictions and tactical rerouting measures.

Traffic about to enter the NAT region may be subject to tactical traffic management to meet the requirements of the service limitation, for example being tactically issued en-route re-clearances to avoid the OCA that is impacted.

Traffic already within the NAT or close to entry (within 60 minutes) shall have priority over any other traffic. En-route re-clearance of such traffic should be avoided except in emergency.

As soon as possible after the limited or no service situation, notification will be sent to the relevant agencies that in turn are expected to advise the affected traffic.

Operator attention is directed to Chart 1, which provides a "quick reference" guide for pilots in the immediate aftermath of a sudden withdrawal of ATC services in NAT airspace. It is intended to be used as an aid for operators developing pilot training material.

Contingency routes

Dependant on the nature of the service limitation, ANSPs may promulgate and activate contingency routes. See Chapter 11:.

Air Traffic Flow Management

ANSPs shall co-ordinate any necessary traffic management measures where necessary. Such measures may include, but are not limited to, temporary capacity restrictions and tactical rerouting measures.

ANSPs shall co-ordinate these restrictions where necessary with adjacent ANSPs where they may affect the flow of traffic through these units' airspace.

Notification

As soon as possible after the limited or no service situation, notification will be sent to the relevant agencies that in turn are expected to advise the affected traffic.

1.2.1 Effects on Flights in NAT airspace

Flights inside the NAT airspace, upon notification of the contingency, must be operated in accordance with the last received and acknowledged clearance.

Flights should establish communication with the next agency at the earliest opportunity stating current position, cleared flight level, next position and estimate and subsequent position. This also applies to flights using automatic position reports (ADS) as these reports may not have been received by the next agency.

When ADS equipped flights are notified of a control centre evacuation they must revert to voice position reporting until clear of that OCA, or notified otherwise. Pilots should note that they may be asked to log-on to the next centre when within that OCA, they should not initiate this action until instructed to do so.

Any flights involved in level changes should complete the manoeuvre as soon as possible in accordance with the clearance.

As there may be unknown aircraft in the airspace from adjacent centers under contingency procedures, flights should avoid any profile changes.

If unable to establish radio contact, flights may use SATVOICE to provide position reports.

Flights may request their flight dispatch offices to forward position reports, if sending position reports to multiple ATS Units or if they are otherwise unable to make position reports.

1.2.2 Effects on flights approaching the NAT

In the event that an OAC must be evacuated, traffic within 20 minutes of that FIR should proceed according to the last received and acknowledged ATC clearance. In the event that Gander OAC must be evacuated, only aircraft 60 minutes or less from their respective OEPs at the time of service disruption shall be permitted to transit Gander OCA.

All other flights should plan to re-route around the affected OCA or to land at an appropriate airfield, but can proceed at the pilot's discretion. Frequency congestion is likely.

Adjacent OACs will issue advice on procedures to be followed.

No conflict free profiles for the affected portion of the route are guaranteed by ATC.

CHAPTER 2: DETAILED PROCEDURES – SHANWICK OAC

2.1 AREA FOR WHICH THE CONTINGENCY PLAN APPLIES

Shanwick Oceanic FIR

2.2 FIRs WITH SUPPORTING PROCEDURES

Gander Oceanic FIR
Shannon FIR
Scottish FIR
Brest FIR

2.3 DISRUPTION OF AIR GROUND COMMUNICATIONS

Scottish and Oceanic Area Control Centre includes both Scottish Radar and Shanwick Oceanic Control. Should Shanwick OAC be evacuated the potential would exist for a major disruption to Air Traffic Control (ATC) within the Shanwick OCA and Scottish Radar units.

The HF radio communications for the Shanwick Oceanic Centre are remotely located, so will not be affected.

2.4 LOSS OF ABILITY TO PROVIDE CONTROL SERVICES

Shanwick OAC will send a signal to all NAT track collective addresses advising of the Shanwick evacuation, as per Chapter 10:.

OAC Contingency routes for Scottish FIR are in Chapter 11:.

2.5 LONG TERM CONTINGENCY ARRANGEMENTS

In the event that Shanwick loses the ability to provide an ATC service from the OAC at Prestwick for an extended period, contingency plans are in place to provide the service from an alternate location.

The facility will be established at another NATS location but will take some time to put in place as equipment and communication links have to be brought into operation and staff relocated. The nature of the loss of the Prestwick facility may influence the time required to bring the contingency facility into service, but it is expected that under most circumstances an ATC service will be available in the Shanwick OCA within 48 hours. In the interim period no ATC service will be available and all flights will be required to route clear of the Shanwick OCA.

When established, the contingency facility will comprise a slightly reduced complement of control and support workstations, but with the existing range of communication facilities including VHF clearance delivery, OCL, ADS, CPDLC and AFTN.

Operators can expect that ATFM regulations will be in place throughout the period of the transition, with a gradual buildup to near normal operating levels. The facility is designed to meet 95% of demand and is sustainable in the long term.

CHAPTER 3: DETAILED PROCEDURES – GANDER OAC

3.1 AREA FOR WHICH THE CONTINGENCY PLAN APPLIES

Gander Oceanic FIR

3.2 FIRs WITH SUPPORTING PROCEDURES

Shanwick Oceanic FIR
Reykjavik Oceanic FIR

3.3 OAC LIMITED SERVICE - PROCEDURES

3.3.1 Disruption of ground/air communication capability

Communication services will be maintained using available equipment supplemented with the assistance of adjacent facilities. HF services on the North Atlantic ordinarily provided by Gander International Flight Service Station will be delegated to the other International radio stations; New York Radio, Iceland Radio, Santa Maria Radio and Shanwick Radio. Appropriate frequency will be published in the daily ATFM messages (NOTAM, Advisory).

3.4 NO SERVICE - PROCEDURES

3.4.1 Loss of ability to provide control services and ground/air communication capability

Gander ACC includes Gander Domestic Control and Gander Oceanic Control Units, and Gander International Flight Service Station (Gander Radio). Should Gander ACC be evacuated, the potential exists for a major disruption to Air Traffic Control (ATC) services extending from the western boundary of the Gander Flight Information Region (FIR) to 30 degrees west longitude.

As soon as possible after evacuation a contingency message will be forwarded to all concerned agencies, either directly or through the NAV Canada National Operations Centre.

Exception: Facilities responsible for loading a valid OTS commencing in their area of responsibility that transits the Gander OCA may elect to continue transitioning traffic in accordance with that track structure provided it is ensured that traffic information is passed to the next en-route facility after Gander.

3.5 LONG TERM CONTINGENCY ARRANGEMENTS

Should Gander lose the ability to provide ATC services from the ACC for an extended period, contingency plans are in place to provide the service from an alternate NAV CANADA location.

While the nature of the evacuation may impact time frames as equipment and communication links must be established and staff relocated to another NAV CANADA facility, it is expected that under most circumstances an ATC service would be available within 48-72 hours.

In the interim, limited or no ATC services may be available, and flights may be required to continue to route outside of Gander OCA.

Once established, the contingency facility will provide ATC services that may include VHF Clearance Delivery, OCL, OTS design and promulgation, ADS-C, CPDLC, HF communications, AFTN flight planning and PRM filing, Altitude Reservations and ADS-B surveillance.

Operators can expect emphasis to be placed on the immediate, or near immediate resumption of services to emergency, humanitarian and critical military flights. All other operations will be resumed in a phased approach with flow control expected.

NAV CANADA's National Operations Center will coordinate details of resumption plans with operators and adjacent units as the situation unfolds.

CHAPTER 4: DETAILED PROCEDURES – REYKJAVIK CTA

4.1 AREA FOR WHICH THE CONTINGENCY PLAN APPLIES

Reykjavik CTA

4.2 FIRs WITH SUPPORTING PROCEDURES

None

4.3 LIMITED SERVICE - PROCEDURES

4.3.1 Disruption of ground/air communication capability

Iceland Radio and Shanwick Radio jointly provide voice communications in the Reykjavik and Shanwick Oceanic Control Areas.

Radio Operators work flights in either area on an as-needed basis, serving both Reykjavik and Shanwick Control Centres.

Joint Operations between Iceland Radio and Shanwick Radio enhance redundancy in the provision of the general purpose voice communications service.

Iceland Radio provides communication services using HF and general purpose VHF. Reykjavik OAC provides DCPC VHF communications in the South sector, East sector, West sector and the southernmost part of North sector. Reykjavik OAC and Iceland Radio are located in separate buildings several kilometres apart. Disruption at one facility is therefore unlikely to affect the other and each will therefore serve as a backup for the other in cases of limited disruption of ground/air communication capability.

In case of failure of Iceland Radio HF services, the HF service will be delegated to Shanwick Radio, Gander Radio and Bodø Radio.

4.3.2 Disruption of ability to provide control services

Reykjavik will determine, co-ordinate and promulgate any necessary restrictions to meet the service limitation. Traffic may be subject to tactical traffic management measurements to meet the requirements of the service limitation.

Aircraft shall not communicate directly with Reykjavik Oceanic Control on DCPC VHF except when instructed to do so or if in emergency. Position reporting within Reykjavik CTA will be with Iceland Radio or via ADS-C in accordance with normal procedures. Aircraft unable to contact Iceland Radio on HF Frequency shall call Shanwick Radio, Bodø Radio or Gander Radio.

Aircraft shall maintain continuous listening watch on the assigned frequencies.

ATS surveillance service

An ATS surveillance service will be provided at ATS discretion. Aircraft are required to maintain their assigned discrete SSR Code while within Reykjavik CTA. West of 030W the ATS surveillance service is provided with ADS-B only.

4.4 NO SERVICE - PROCEDURES

4.4.1 Loss of ground/air communication capability

Iceland Radio and Shanwick Radio jointly provide voice communications in Reykjavik and Shanwick Oceanic Control Areas.

Radio Operators work flights in either area, updating both Reykjavik and Shanwick Control Centres.

Joint Operations between Iceland Radio and Shanwick Radio increases the ability to provide a 'normal' service with assistance from adjacent aeronautical stations.

Iceland Radio provides communication services using HF and general purpose VHF. Reykjavik OAC provides DCPC VHF communications in the South sector, East sector, West sector and the southern most part of North sector. Reykjavik OAC and Iceland Radio are in separate buildings located several kilometres apart. Disruption at one facility is therefore unlikely to affect the other facility and each will therefore serve as a backup for the other in cases of limited disruption of ground/air communication capability.

In case of failure of Iceland Radio HF services, the HF service will be delegated to Shanwick Radio, Gander Radio and Bodø Radio.

4.4.2 Loss of ability to provide control services

Should Reykjavik OAC be evacuated the potential exists for a major disruption to Air Traffic Control service within the Reykjavik OCA.

The HF and general purpose VHF radio communications facilities for the Reykjavik Oceanic Centre are remotely located at the Iceland Radio facilities in another part of Reykjavik city, and will therefore unlikely be affected.

In the event that Reykjavik OAC is evacuated, the operations will be moved to Iceland Radio and the provision of Air Traffic Services (ATS) within the Reykjavik CTA will be continued at that location as far as practicable.

As soon as possible after evacuation a contingency message will be sent by NOTAM and Iceland Radio will advise aircraft within Reykjavik FIR/CTA. Adjacent centers will be advised by phone.

Aircraft unable to contact Iceland Radio on general purpose VHF or HF Frequency shall call Shanwick Radio, Gander Radio or Bodø Radio. Aircraft shall maintain continuous listening watch on the assigned frequencies.

ATS surveillance service

An ATS surveillance service will not be provided. Aircraft are nevertheless required to maintain their assigned discrete SSR Code while within Reykjavik CTA.

Flights may request their flight dispatch offices to forward position reports, if sending position reports to multiple ATS Units or if otherwise unable to forward position reports.

CHAPTER 5: DETAILED PROCEDURES – SANTA MARIA OAC

5.1 AREA FOR WHICH THE CONTINGENCY PLAN APPLIES

Santa Maria Oceanic FIR

5.2 FIRs WITH SUPPORTING PROCEDURES

Nil

5.3 LIMITED SERVICE

Communications

Communications services will be maintained using available equipment and with the assistance of adjacent facilities.

SATVOICE equipped flights using INMARSAT or IRIDIUM ATS Safety network may contact Santa Maria Radio through published short codes 426302 and 426305.

SATVOICE equipped flights using non ATS Safety satellite network (for example, a portable satellite phone) may exceptionally contact Santa Maria Radio dialing directly +351 296 886 655.

Flights reporting via ADS and using CPDLC communications may maintain data link services until otherwise instructed by a ground facility.

Roles and responsibilities of adjacent facilities

The action required of adjacent service providers will vary depending of the nature of the service limitation. After notification by Santa Maria OAC, the adjacent facilities shall be responsible to implement the necessary procedures to meet the Santa Maria Oceanic restrictions.

Adjacent Aero-radio facilities shall be responsible to implement the necessary procedures to meet the Santa Maria Radio requirements.

5.4 NO SERVICE

Communications

Lisboa ACC will monitor aircraft as far as possible by VHF coverage. Shanwick Radio Station will monitor aircraft until 030W on HF (family A). Gander Radio Station will monitor aircraft between 45N and 40N on HF (family A). New York will monitor aircraft below 40N until 30W on HF (family E).

Flights reporting via ADS and using CPDLC communications must revert to voice procedures unless so instructed by Shanwick Radio, Gander Radio or New York Radio.

Roles and Responsibilities of Adjacent OAC's and ACC's

Until Contingency tracks can be implemented adjacent units will take immediate actions for necessary traffic management procedures in accordance with this plan. The adjacent units will not issue re-clearances within Santa Maria FIR after notification of the no service situation, unless any loss of separation minima between aircraft is detected. Madrid ACC, Piarco ACC, Dakar OAC and Sal OAC shall not clear any aircraft into Santa Maria FIR after notification of the loss of service.

Lisboa ACC will ensure that Lisboa RCC, Madrid ACC and Canarias ACC are advised of the situation, and will assist any emergencies between 015W and 020W when possible by VHF coverage. Lisboa ACC will change the cleared traffic to Shanwick Radio Station.

Shanwick OAC will ensure that Gander OAC is advised of the situation. Shanwick Radio Station will change the cleared traffic to New York Radio or to Gander Radio Station after 30W as appropriate.

New York OAC will ensure that Piarco is advised of the situation. New York executive controllers shall verify if Eastbound traffic coordinated before the notification of the loss of the Santa Maria facility, are separated at least until 20W. New York OAC will assist any emergencies between 30W and 40W, and will change the cleared traffic to Shanwick Radio Station or Gander Radio Station as appropriate.

Ponta Delgada and Horta approach will monitor all traffic within surveillance coverage (230 NM) and will assist any emergencies between 020W and 030W.

Lajes Rapcon will monitor all aircraft within radar coverage (200 NM) and will assist any emergencies between 020W and 030W. Lajes airport will be available H24 for any distress situation for landing purposes without prior military authorization.

Sal OAC will ensure that Dakar OAC is advised of the situation.

CHAPTER 6: DETAILED PROCEDURES – NEW YORK OAC

6.1 AREA FOR WHICH THE CONTINGENCY PLAN APPLIES

New York OAC

NOTIFICATION PROCEDURES

In a limited service situation

Notification of any service limitations and traffic management measures will be issued to operators and adjacent facilities via AFTN messages, NOTAMs, FAA Command Center advisories or by telephone.

In a no service situation

NY Oceanic Area of Control (OAC) may have to be evacuated and/or relocated. Appropriate messages will be sent to all affected air traffic control facilities and aircraft operators.

Air Traffic Flow Management

New York Center shall coordinate any necessary traffic management initiatives with the FAA Air Traffic Control System Command Center (ATCSCC). Such measures may include, but are not limited to, temporary capacity limitations and associated restrictions, airway usage and altitude availability procedures, separation standard modifications and tactical rerouting measures.

Responsibilities of Adjacent ANSPs

The action of adjacent ANSPs will vary depending on the nature of the service limitation. Where such action is not contained within the Inter-Center Letters of Agreement (LOAs) the requirement will be promulgated at the time of the initial failure and will include any FAA Air Traffic System Command Center advisories/restrictions.

6.2 LIMITED SERVICE - PROCEDURES

6.2.1 Disruption of ground/air communication capability

If communication services cannot be adequately maintained by Aeronautical Radio Inc. HF communications services on the North Atlantic will be delegated to the other International radio stations; Gander International Flight Service Station (Gander Radio) and/or Santa Maria Radio. Appropriate frequencies will be published in a NOTAM.

6.2.2 Disruption of ability to provide control services

NY OAC shall determine, co-ordinate, and issue any necessary restrictions to meet the service limitation. Aircraft having valid oceanic clearances shall have priority over any other traffic. En route re-clearances of traffic shall be limited to aircraft in emergency situations. Traffic without an oceanic clearance may be subject to tactical traffic management procedures/restrictions to meet the requirements of the service limitation.

The route structure included in this contingency plan is intended to provide adjacent ANSPs and aircraft operator’s information as to what can be expected during limited service operation. However, real-time operations affected by meteorological conditions, restricted airspace, etc., may necessitate the use of alternative routes, designation of single direction routes, and/or altitudes.

6.3 NO SERVICE – PROCEDURES

6.3.1 Loss of ground/air communication capability

If communication services cannot be conducted by any radio station throughout the entire NY OAC, no traffic will be permitted to enter NY OAC airspace. Limited service may be provided in those identified airspace areas where reliable communications are still possible.

6.3.2 Loss of ability to provide control services

If the loss of ability to provide control services is due to communications failure at the NYARTCC, NY OAC area will endeavour to relocate.

After the relocation, appropriate contingency messages will be sent to all the affected ANSPs and operators and limited air traffic services will be provided thereafter as soon as possible.

6.4 GENERAL PROVISIONS

Military Operators

Military aircraft shall follow the same procedures as civilian aircraft. If an airspace reservation is in progress or a critical mission is scheduled the Central Altitude Reservation Facility (CARF) at the FAA ATCSCC will make a suitable decision regarding the continuation of the airspace reservation, according to the mission requirements and the type of contingency.

Separation Standards

New York OAC will be responsible for ensuring through the FAA ATCSCC the coordination and implementation of any additional separation requirements.

Appendix 1

Adjacent Agencies Communications

Westbound via	**Facility to contact**	**Frequencies**
DOVEY	N.Y. Center (ZNY)	125.925 / 284.75
JOBOC	N.Y. Center (ZNY)	125.925 / 284.75
SLATN	N.Y. Center (ZNY)	125.925 / 284.75

North or Northwest bound via	**Facility to contact**	**Frequencies**
KAYYT	N.Y. Center (ZNY)	125.925 / 284.75
MARIG	N.Y. Center (ZNY)	133.5 / 354.0
SAVIK	N.Y. Center (ZNY)	133.5 / 354.0
OKONU	N.Y. Center (ZNY)	133.5 / 354.0

Inbound to Bermuda airspace via	**Facility to contact**	**Frequencies**
BALOO	N.Y. Center (ZNY)	128.5 / 239.0
NUMBR	N.Y. Center (ZNY)	128.5 / 239.0
LAZEY	N.Y. Center (ZNY)	128.5 / 239.0
WINGZ	N.Y. Center (ZNY)	128.5 / 239.0
PIREX	N.Y. Center (ZNY)	128.5 / 239.0
GECAL	N.Y. Center (ZNY)	128.5 / 239.0
SHEIL	N.Y. Center (ZNY)	128.5 / 239.0
ALUDA	N.Y. Center (ZNY)	128.5 / 239.0
ANTIG	N.Y. Center (ZNY)	128.5 / 239.0
JIMAC	N.Y. Center (ZNY)	128.5 / 239.0
ENAPI	N.Y. Center (ZNY)	128.5 / 239.0
DASER	N.Y. Center (ZNY)	128.5 / 239.0
BOVIC	N.Y. Center (ZNY)	128.5 / 239.0
ANVER	N.Y. Center (ZNY)	128.5 / 239.0

North or Westbound via	**Facility to contact**	**Frequencies**
OXANA (FL240 & above)	N.Y. Center (ZNY)	126.025 / no UHF
OXANA (FL230 & below)	Giant Killer (VACAPES)	135.875 / 251.6
JAINS (FL380 and above)	Jacksonville Center (ZJX)	120.125 / 381.45
JAINS (FL370 and below)	Jacksonville Center (ZJX)	135.05 / 307.05
UKOKA (FL380 and above)	Jacksonville Center (ZJX)	120.125 / 381.45
UKOKA (FL370 and below)	Jacksonville Center (ZJX)	135.05 / 307.05

South or Southwest bound via	Facility to contact	Frequencies
SNAGY	Miami Center (ZMA)	123.67 / no UHF
SUMRS	Miami Center (ZMA)	123.67 / no UHF
MAPYL	Miami Center (ZMA)	134.8 / 298.9
CONNR	Miami Center (ZMA)	134.8 / 298.9
GRATX	Miami Center (ZMA)	134.8 / 298.9
MILLE	Miami Center (ZMA)	126.27 / 251.12
CANEE	Miami Center (ZMA)	126.27 / 251.12
LETON	Miami Center (ZMA)	135.2 / 327.0
LNHOM	Miami Center (ZMA)	135.2 / 327.0
LAMER	Miami Center (ZMA)	135.2 / 327.0
LUCTI	Miami Center (ZMA)	135.2 / 327.0
MLLER	Miami Center (ZMA)	135.2 / 327.0

Southbound via	Facility to contact	Frequencies
KINCH	San Juan CERAP (TJZS)	134.3/307.0
HANCY	San Juan CERAP (TJZS)	134.3/307.0
NECKS	San Juan CERAP (TJZS)	134.3/307.0
OPAUL	San Juan CERAP (TJZS)	125.0/285.5
DAWIN	San Juan CERAP (TJZS)	125.0/285.5
LAMKN	Piarco Center (TTZP)	123.7 / no UHF
North or Northeast bound via	**Facility to contact**	**Frequencies**
NOVOK	Moncton ACC (ZQM)	125.25 / no UHF
JEBBY	Moncton ACC (ZQM)	125.25 / no UHF
BOBTU	Gander ACC (ZQX)	134.7 / no UHF

NEW YORK RADIO HF Frequency Families			
NAT Region HF Frequencies		**WATRS Region HF Frequencies**	
2962 -QE	11309 -XE	2887 -QE	8846 -VF
3016 -QA	13306 -YA	3455 -CS	8918 -VQ
5598 -TA	13354 -YE	5520 -EN	11330 -LS
6628 -TE	17952 -ZE	5550 -TL	11396 -XO
8825 -VE	21964 -PN	6577 -UI	13297 -YG
8906 -VA		6586 -UJ	17907 -ZD
N.Y. U.S.A., Area VHF 129.9 -JW		San Juan, PR, Area VHF 130.7 -KA	

Gander Radio HF Frequencies									
Family	Frequency bands								
	3 MHz	3.5 MHz	4.7 MHz	5.6 MHz	6.6 MHz	9 MHz	11.3 MHz	13.3 MHz	18 MHz
A	3016			5598		8906		13306	
B	2899			5616		8864		13291	
C	2872			5649		8879	11336	13306	
D	2971		4675			8891	11279		
F		3476			6622	8831		13291	
VOLMET		3485			6604		10051	13270	

Appendix 2

VOLMET International Broadcast

The VOLMET broadcast is an international broadcast providing Terminal Aerodrome Forecasts, and METARs, plus the New York and Caribbean Oceanic SIGMETs to pilots traversing the Atlantic Ocean and Caribbean Sea enroute to the United States. The VOLMET broadcast operates on the hour and thirty minutes past each hour, announcing the weather for 25 different airports, including 3 Caribbean Island air terminals. The program (as represented below) is divided into four 5-minute segments, each dealing with 6 terminals in a predetermined schedule, including any pertinent severe weather advisories. Immediately following the New York broadcast, a similar 10 minute presentation is made for airports in Canada by Gander Radio, located at Gander, Newfoundland.

The operating frequencies of the broadcast are 3485, 6604, 10051 and 13270 MHz. All transmitters are located at Barnegat, New Jersey.

Information related to a significant system failure or pertinent to a U. S. National emergency, MAY be available on VOLMET.

NAT VOLMET 3.485 6.604 10.051 13.270 MHz					
WSY 70 **NEW YORK**				VFG **GANDER**	
H + 00	**H + 05**	**H + 10**	**H + 15**	**H + 20**	**H + 25**
DETROIT CLEVELAND CINCINNATI Detroit Cleveland Cincinnati Indianapolis Pittsburgh	BANGOR WINDSOR LOCKS CHARLOTTE Bangor Windsor Locks Norfolk Charlotte	**NEW YORK** NEWARK BOSTON **New York** Newark Boston Baltimore Washington	BERMUDA MIAMI ATLANTA Bermuda Miami Nassau Orlando Atlanta	MONTREAL TORONTO OTTAWA **Gander** Montreal Toronto Ottawa Goose	WINNIPEG EDMONTON CALGARY CHURCHILL Kuujjuaq Winnipeg Churchill
H + 30	**H + 35**	**H + 40**	**H + 45**	**H + 50**	**H + 55**
CHICAGO MILWAUKEE MINNEAPOLI S Chicago Milwaukee Minneapolis Detroit Boston	INDIANAPOLIS ST LOUIS PITTSBURGH Indianapolis St Louis Pittsburgh Atlantic City	BALTIMORE PHILADELPHIA WASHINGTON Baltimore Philadelphia Washington **New York** Newark	NASSAU ORLANDO Bermuda Miami Nassau Orlando Atlanta Tampa West Palm Beach	**GANDER** ST JOHN'S HALIFAX **Gander** St John's Halifax Stephenville Montreal / Mirabel	GOOSE IQALUIT SØNDRE STRØM Goose Iqaluit Søndre Strøm Kuujjuaq

CHAPTER 7: DETAILED PROCEDURES – BODØ OAC

7.1 AREA FOR WHICH THE CONTINGENCY PLAN APPLIES

Bodø Oceanic FIR

7.2 FIRs WITH SUPPORTING PROCEDURES

Reykjavik FIR
Polaris FIR, Stavanger ACC
Polaris FIR, Bodø ACC
Sweden FIR, Stockholm ACC
Finland FIR, Helsinki ACC,
St. Petersburg FIR

7.3 OAC LIMITED SERVICE- PROCEDURES

The Regional Rules and Regulation for Bodø Oceanic Area Control Centre (OAC) address the issues of limited service provision in the NAT Region. In the event that Bodø OAC/ATCC must be evacuated, the specifics of section "~~6.3~~7.4 NO SERVICE – PROCEDURES" will immediately be activated.

Once the Bodø Area Control Centre has been sterilized of oceanic traffic, the rebuilding of service provision will begin.

Until full service can be re-established Bodø OAC will delegate control of aircraft within Bodø Oceanic Control Area to Stavanger ATCC, Bodø ATCC Domestic sectors, Stockholm ACC and Reykjavik ACC.

7.3.1 Disruption of ground/air communication capability

A limited communication service will be maintained with the assistance of adjacent ACC's and Aeronautical Radio Stations. Appropriate frequencies will be advised by the assisting stations.

7.3.2 Disruption of ability to provide control services

Bodø OAC will determine, co-ordinate and promulgate any necessary restrictions to meet the service limitation.

Dispersal of Air Traffic

Aircraft already within the Bodø OCA, will be given priority for the limited services available. Aircraft intending to enter Bodø OCA will, if necessary, be restricted to meet the limited service capability. Random westbound routing may be restricted.

Communications

Communication services will be maintained to the possible extent using available equipment supplemented with the assistance of adjacent facilities. Aircraft unable to contact Bodø Radio on HF Frequency shall call one of the following stations:

Iceland Radio
Shanwick Radio

Notification

Bodø OAC will notify all adjacent units and co-ordinate necessary traffic restrictions.

Responsibilities of adjacent OACs and ATCCs

The action required of adjacent ANSPs will vary dependant on the nature of the service limitation. Where such action is not contained within the inter-centre Letters of Agreement (LOAs) the requirement will be promulgated within the initial failure and restrictions message.

For Westbound traffic, Bodø OAC will issue clearances to 0º Longitude only. Reykjavik CTA will assume responsibility west of 0º Longitude. Eastbound traffic will be accepted as normal.

Separation Minima

Bodø OAC will be responsible for ensuring the coordination and implementation of any additional separation standard.

Same direction longitudinal separation may be increased if (e.g. add 5 minutes). Lateral separation will not be increased. Flight profile changes in the Bodø OCA may be limited.

Contingency Tracks

Bodø OAC shall publish contingency tracks within the Bodø OCA and ensure that the available limited Air Traffic Services are not overloaded.

Air Traffic Flow Management (ATFM) Requirements

Bodø OAC will, in conjunction with the NMOC, initiate ATFM measures as required.

7.4 NO SERVICE - PROCEDURES

7.4.1 Loss of ground/air communication capability

A limited communication service will be maintained with the assistance of adjacent ACC's and Aeronautical Radio Stations. Appropriate frequencies will be advised by the assisting stations.

7.4.2 Loss of ability to provide control services

The Bodø ACC facility includes Bodø Domestic Control, Bodø Oceanic Control and Bodø Radio (HF). Should Bodø ACC be evacuated, the potential exists for a major disruption to Air Traffic Control service within Bodø ACC (Polaris FIR from 62N to Russian Border boundary) as well as Bodø OFIR/OCA.

As soon as possible after evacuation Contingency Message will be forward to all concerned agencies.

Dispersal of Air Traffic

Where possible, aircraft already within the Bodø OCA will be notified that no services are available. Oceanic traffic intending to operate through Norwegian domestic airspace will require further clearance to do so.

Aircraft that elect to continue flight through Bodø OCA will operate on published tracks and at published flight levels. Aircraft that already are on random track will require specific co-ordination and approval from all concerned ATS units until the contingency tracks become active. The lowest flight level available for transiting flights will be FL280.

Traffic to and from Svalbard/ Longyear will use flight levels appropriate to direction of flight until exiting Bodø OCA. The highest available flight level will be FL270.

Communications

Bodø Radio and adjacent facilities will extend HF monitoring and assist with flight information services to aircraft within or about to enter Bodø OCA.

If unable to establish radio contact with adjacent facilities, flights may use SATCOM voice and satellite telephone to provide position reports.

Notification

Bodø OAC will attempt to notify adjacent units of the loss of service. If adjacent units are unable to establish contact with Bodø OAC, the phone numbers listed in Chapter 12:~~the appendix~~ can be used. Adjacent facilities are also listed.

Responsibilities of adjacent OACs and ATCCs

Adjacent OACs/ATCCs should implement ATFM measures as required. In addition, they may co-ordinate and publish routes to minimize the impact of the loss of service. Norwegian domestic ATCC will ensure that the necessary oceanic separation minima are established for traffic entering Bodø OCA from their area.

Reykjavik CTA will be required to:

- Clear eastbound traffic in accordance with the contingency tracks and provide necessary separation; and

- Organize a method of passing and receiving estimates with the Norwegian domestic ACCs.

Separation Minima

Longitudinal separation for all traffic entering Bodø OCA from Norwegian domestic airspace may be increased.

Contingency Tracks

The contingency tracks, FL280 or above, will be laterally separated and will use flight levels appropriate to direction of flight. Before leaving Bodø OCA, aircraft operating on contingency tracks shall request a clearance from the appropriate adjacent unit. Change of flight level will not be permitted while on the contingency tracks.

Air Traffic Flow Management

Bodø OAC will, in conjunction with the NMOC, initiate ATFM measures as required.

CHAPTER 8: DETAILED PROCEDURES – SHANNON ACC

8.1 AREA FOR WHICH THE CONTINGENCY PLAN APPLIES

Shannon FIR

8.2 FIRs WITH SUPPORTING PROCEDURES

Shanwick Oceanic FIR

8.3 LIMITED SERVICE

Communications

Communication services will be maintained by using available equipment backed up by reserve Radio Equipment (RBS) and relays via Shanwick radio if required.

Notification

Shannon ACC will notify adjacent ATCC and NMOC of the situation.

8.4 NO SERVICE

Dispersal of traffic

Westbound Flights

Westbound flights not already in the Shannon FIR/UIR/SOTA or NOTA will be routed clear of the Shannon ACC by the ACC concerned.

Shannon shall advise westbound flights already within the Shannon FIR/UIR/SOTA or NOTA as follows:

- Aircraft at assigned OAC level to contact Shanwick on VHF or HF.

- Aircraft not at assigned OAC levels will be instructed to climb immediately to OAC levels and contact Shanwick. Where aircraft are restricted in climb due traffic, they will be cleared to the highest available track level and instructed to contact Shanwick.

Eastbound Flights

Shanwick will attempt to reroute eastbound flights clear of the Shannon FIR/UIR/SOTA or NOTA.

If Shanwick are unable to route aircraft clear of the Shannon FIR/UIR/SOTA/NOTA, they will advise the flights of the non availability of service in the Shannon area and adopt the Procedures detailed below:

- Eastbound NAT overflying traffic will continue to landfall and after that position, direct to a point on the Scottish, London or Brest FIR boundary associated with that landfall point (See chart in Chapter 11:~~below~~). Aircraft will maintain their assigned OAC level and Mach No. and contact the adjacent centre for further instruction as soon as possible. Shanwick will advise Scottish, London or Brest of the estimate for the FIR entry point based on the estimate/report for 20W/15W positions and no level changes shall be effected without co-ordination between Shanwick and the centre involved. See notes below.

Landfall points and associated FIR Boundary points

Landfall	Route	Boundary Point	Elapsed Time	Contact
AGORI		See Note 1		Scottish
KESIX	DCT	IBROD	17	Scottish
BEGID	DCT	MIMKU	17	Scottish
SOVED	DCT	MIMKU	17	Scottish
MOGLO	DCT	NIBOG	17	Scottish
NETKI	DCT	NIBOG	17	Scottish
KOKIB	DCT	LIFFY	40	LAC (Swanwick)
BEXET	DCT	LIFFY	38	LAC (Swanwick)
OLGON	DCT	LIPGO	40	LAC (Swanwick)
GISTI	DCT	SLANY	38	LAC (Swanwick)
RILED	DCT	SLANY	41	LAC (Swanwick)
XETBO	DCT	NORLA	33	LAC (Swanwick)
LEKVA	DCT	NORLA	33	LAC (Swanwick)
ELSOX	DCT	LESLU	28	LAC (Swanwick)
EPUNA	DCT	LESLU	29	LAC (Swanwick)
ATSUR	DCT	GAPLI	29	LAC (Swanwick)
BIMGO	DCT	GAPLI	29	LAC (Swanwick)
NASBA	DCT	RATKA	29	Brest
OMOKO	DCT	TAKAS See Note 2	20	Brest
TAMEL	DCT	See Note 3	12	Brest
LASNO	DCT	See Note 4		Brest

Note 1: Traffic planned to enter the Shannon AOR via AGORI will be re-routed by Shanwick to enter Scottish airspace north of the Shannon AOR.

Note 2: Traffic planned to enter the Shannon AOR via OMOKO will not continue to landfall but will be cleared direct from the common boundary to TAKAS to ensure track separation with the NASBA/RATKA track.

Note 3: Traffic planned to enter the Shannon AOR via TAMEL will not continue to landfall but will be cleared direct from the common boundary to TULTA. If there is conflicting traffic routeing OMOKO – TAKAS, another form of separation will be applied.

Note 4: Traffic planned to enter the Shannon AOR via LASNO will be re-routed by Shanwick to enter Brest airspace south of the Shannon AOR.

Communications

Communication services may be possible by using Shanwick radio. Inter centre telephone communication will be established and may be supplemented with the assistance of adjacent centres. Shannon will notify Shanwick of the relevant frequencies in use in Scottish, London and Brest.

Search and Rescue

Should Shanwick become aware of an aircraft in need of Search & Rescue in Shannon's area of responsibility, they shall forward this information immediately to the Station Manager, Air Traffic Control, Dublin.

Responsibility of the other adjacent centres

Details are contained in the relevant annexes of the Letters of Agreement between Shannon and adjacent ACCs.

CHAPTER 9: DETAILED PROCEDURES – BREST ACC

9.1 AREA FOR WHICH THE CONTINGENCY PLAN APPLIES

Brest FIR

9.2 FIRs WITH SUPPORTING PROCEDURES

Shanwick Oceanic FIR

9.3 LIMITED SERVICE

Communications

Communication services will be maintained either by using back up radio equipment or available equipment supplemented with the assistance of adjacent facilities.

9.4 NO SERVICE

9.4.1 Dispersal of traffic

The Brest supervisor will inform the NMOC (Network Manager Operational Centre) and the adjacent centres. The NMOC will issue a message instituting an alternative route traffic scheme.

WESTBOUND FLIGHTS

If the flights are not in Brest airspace they will be re-routed by the concerned ACC clear of the Brest ACC area.

Already in Brest area, proceeding to Shannon:

Westbound traffic continue the flight in accordance with the current flight plan and maintain the last acknowledged cruising level until the exit point. It is strongly recommended to the pilot to try to contact Shannon as soon as possible so as to continue the flight in normal condition.

Already in Brest area, proceeding to Shanwick:

EASTBOUND FLIGHTS

Already in Brest area:

The Eastbound traffic will continue in accordance with the current flight plan and maintain the last acknowledged cruising level. Each concerned aircraft will try to contact the next ACC, in accordance with the current flight plan as soon as possible so as to give a position report and flight details to that ACC.

Flights proceeding to Brest area:

Eastbound traffic will be rerouted by Shannon ACC clear of Brest area.

Eastbound traffic will whenever possible be rerouted by Shanwick OAC clear of Brest area.

These traffic that cannot be rerouted by Shanwick will follow the procedure hereafter:

Maintain their last oceanic flight level.

Squawk 2000.

Navigate as detailed below:

Traffic leaving Shanwick OAC airspace via:

ETIKI:

Traffic with destination LFPG/LFPO/LFPB shall route direct from REGHI to DVL (Deauville VOR) and be instructed to contact Paris ACC.

Other traffic shall route direct from REGHI to TSU (Toussus VOR) and be instructed to contact Reims ACC as soon as possible.

UMLER:

Traffic shall route direct from UMOXA to TSU (Toussus VOR) and be instructed to contact Reims ACC as soon as possible

SEPAL:

Traffic with destination LFPG/LFPO/LFPB shall route direct from LAPEX to ANG (Angers VOR) and be instructed to contact Paris ACC as soon as possible.

Other traffic shall route direct from LAPEX to CNA (Cognac VOR) and be instructed to contact Bordeaux ACC as soon as possible.

SIVIR:

Traffic shall route direct from RIVAK to SAU (Sauveterre VOR) and be instructed to contact Bordeaux ACC as soon as possible.

BUNAV:

Traffic shall route direct from TIVLU to CNA (Cognac VOR) and be instructed to contact Bordeaux ACC as soon as possible

Communications

In case of a total radio failure, at present time there is no plan to guarantee the possibility for any adjacent centre to cover a part of Brest airspace.

Notification

In the event of a total loss of service Brest will inform the NMOC and all the adjacent centres.

CHAPTER 10: NOTIFICATION MESSAGES

10.1 NOTIFICATION PROCEDURES

In a limited service situation notification of any service limitations and traffic management measures will be promulgated to operators and adjacent ANSPs via AFTN.

In a no service situation, the OAC is likely to have been evacuated. As soon as possible after evacuation a contingency message will be sent to agencies which receive the NAT track message. An evacuation message will be broadcast on appropriate frequencies. Operators in receipt of the contingency message are asked to forward this information to affected flights wherever possible.

An example of the NOTAM is as follows:

DUE TO EMERGENCY EVACUATION OF [OAC/CTA] DUE [REASON] AIR TRAFFIC CONTROL SERVICES ARE UNAVAILABLE IN THE [NAME] OCA.

FLIGHTS NOT YET OPERATING WITHIN THE [AIRSPACE NAME] ARE STRONGLY ADVISED NOT TO ENTER THE AIRSPACE. IF POSSIBLE REQUEST CLEARANCE TO AVOID [NAME] OR LAND AT AN APPROPRIATE AERODROME.

FLIGHTS THAT CONTINUE UNDER PILOTS DISCRETION ARE EXPECTED TO PROCEED IN ACCORDANCE WITH THE LAST ATC CLEARANCE ISSUED, AND MUST CONTACT NEXT ATC AGENCY AS SOON AS POSSIBLE AND REPORT CURRENT POSITION, CLEARED FLIGHT LEVEL, NEXT POSITION AND ESTIMATE, AND SUBSEQUENT POSITION(S). FLIGHTS MUST REVERT TO VOICE POSITION REPORTING PROCEDURES. DATALINK EQUIPPED AIRCRAFT ARE EXPECTED TO REMAIN CONNECTED TO CURRENT CENTRE UNTIL OTHERWISE INSTRUCTED.

FLIGHTS MUST MONITOR 121.5 / 123.45MHZ AND VOLMET AND USE ALL AVAILABLE MEANS TO DETECT ANY CONFLICTING TRAFFIC.

FURTHER DETAILS WILL BE PROVIDED VIA NOTAM IN DUE COURSE.

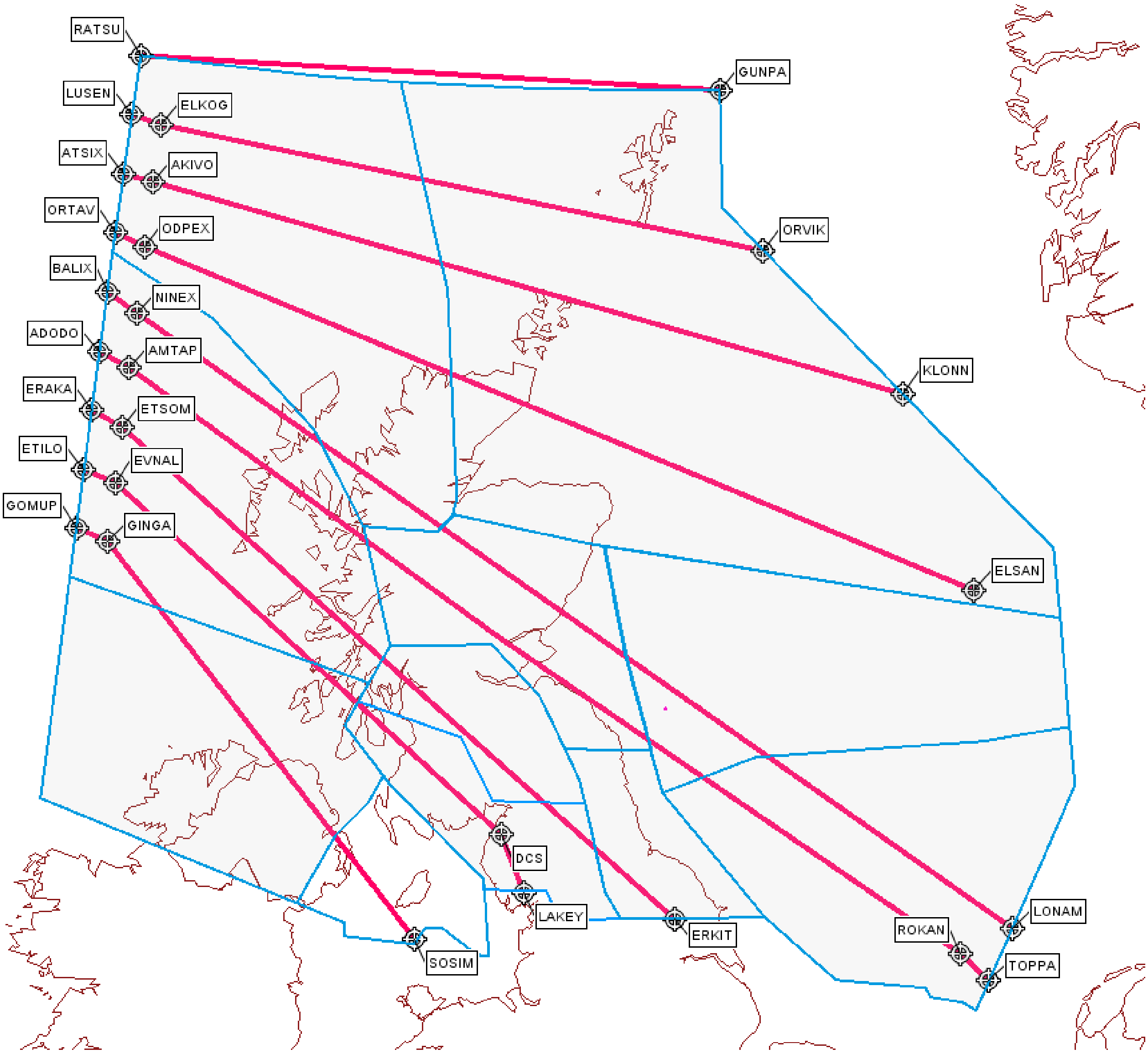
CHAPTER 11: CONTINGENCY ROUTE STRUCTURES

~~9.5~~11.1 SHANWICK OAC

~~9.5.1~~11.1.1 For activation within adjacent OCA/FIR

Scottish FIR

Unless instructed otherwise, flights entering the Scottish FIR should use the following contingency routes:



Communications with the next ATSU should be established at the earliest opportunity.

In the event of a total loss of service Shanwick will inform the NMOC and all the adjacent centres

Flights operating close to the Reykjavik or Shannon northern boundaries should, where possible, establish communications with those units in order to negotiate a reroute to avoid the Scottish FIR.

Reykjavik OCA/FIR

In limited- and no service contingency situations in Shanwick the following contingency tracks may be activated in Reykjavik CTA/FIR. Any NAT tracks that conflict with those contingency tracks would at the same time be cancelled. The contingency tracks must be flight planned as if they were random route tracks (detailing each waypoint in the flight plan).

OLKER – 63N010W – 64N020W – 64N030W – 64N040W – 64N050W – EMBOK

BESGA – MATIK – 62N010W – 63N020W – 63N030W – 63N040W – 63N050W – KETLA

BARKU – RATSU – 62N020W – 62N030W – 62N040W – 62N050W – MAXAR

~~9.6~~11.2 GANDER OAC

~~9.6.1~~11.2.1 For activation within Gander OCA

An Organized Track Structure (OTS) will remain valid for the time period published.

Westbound flights

Laterally spaced routes extending into the next agency will be utilized. Westbound flights shall proceed in accordance with the following table, until communication is established with, and a re-clearance issued by the next agency.

Flights operating FL290 and above.

FLIGHT IS ROUTED OVER	THE FLIGHT SHALL PROCEED:	Next control agency and frequency:
AVPUT	NALDI DUTUM	Montreal ACC 134.85
CLAVY	KAGLY TEFFO	Montreal ACC 134.85
EMBOK	IKMAN FEDDY	Montreal ACC 134.85
KETLA	GRIBS JELCO	Montreal ACC 134.800
LIBOR	6101N 06241W	Montreal ACC 133.200
MAXAR	MIBNO RODBO	Montreal ACC 133.200
NIFTY	MUSLO	Montreal ACC 133.200
PIDSO	PEPKI LOPVI	Montreal ACC 135.800
RADUN	SINGA	Montreal ACC 135.800
SAVRY	LAKES MCKEE	Montreal ACC 132.450
TOXIT	UDMAR	Montreal ACC 132.450
URTAK	TEALS VANSI	Montreal ACC 119.400
VESMI	ALSOP	Montreal ACC 119.400
AVUTI	YKL ROUND	Montreal ACC 119.400
BOKTO	VOKET DUVBI	Montreal ACC 119.400
CUDDY	YWK MT	Montreal ACC 132.90 @ 63W
DORYY	YBC ANCER	Moncton ACC 132.95
HOIST	YRI	Moncton ACC 118.875
IRLOK	5031N 06500W	Moncton ACC 118.875
JANJO	CEFOU	Moncton ACC 118.875
KODIK	4941N 06500W	Moncton ACC 132.52
LOMSI	QUBIS	Moncton ACC 132.52
MELDI	4853N 06500W	Moncton ACC 132.52
NEEKO	TAFFY	Moncton ACC 124.975
PELTU	4813N 06500W	Moncton ACC 135.77
RIKAL	MIILS	Moncton ACC 135.77
SAXAN	4718N 06500W	Moncton ACC 133.55
TUDEP	TOPPS	Moncton ACC 133.55
UMESI	4618N 06500W	Moncton ACC 133.55
ALLRY	EBONY	Moncton ACC 132.8
BUDAR	4536N 06500W	Moncton ACC 132.8
ELSIR	ALLEX	Moncton ACC 132.8
IBERG	4451N 06500W	Moncton ACC 132.75
JOOPY	TUSKY	Moncton ACC 132.75
MUSAK	4409N 06500W	Moncton ACC 132.75
NICSO	BRADD	Moncton ACC 132.75

FLIGHT IS ROUTED OVER	THE FLIGHT SHALL PROCEED:	Next control agency and frequency:
OMSAT	4336N 06500W	Moncton ACC 133.3
PORTI	KANNI	Moncton ACC 133.3
RELIC	4303N 06500W	Moncton ACC 133.7
SUPRY	WHALE	Moncton ACC 133.7
VODOR	NANSO VITOL	Moncton ACC 125.25
BOBTU	JAROM GAYBL	Moncton ACC 125.25

Flights operating FL280 and below. Routes HOIST and south are the same as for flights operating FL290 and above.

FLIGHT IS ROUTED OVER	THE FLIGHT SHALL PROCEED:	Next control agency and frequency
NALDI	DUTUM	Montreal ACC 134.55
KAGLY	TEFFO	Montreal ACC 134.55
IKMAN	FEDDY	Montreal ACC 134.55
GRIBS	JELCO	Montreal ACC 128.25
MIBNO	RODBO	Montreal ACC 128.25
PEPKI	LOPVI	Montreal ACC 135.1
5900N 06000W	LAKES MCKEE	Montreal ACC 135.1
MOATT	LOMTA TEALS VANSI	Montreal ACC 132.9
PRAWN	YDP YKL ROUND	Montreal ACC 132.25@65W
PORGY	YWK MT	Montreal ACC132.25@ 63W

Eastbound flights

Laterally spaced routes beginning on or near the western boundary between Gander FIR and Moncton and Montreal's FIRs and connecting to oceanic exit points shall be utilized. Eastbound flights shall proceed in accordance with the following table:

INLAND CONTINGENCY FIX	INTERMEDIATE FIX	OCEANIC ENTRY POINT
KENKI		AVPUT
MUSVA		CLAVY
BERUS		EMBOK
GRIBS		KETLA
6101N 06241W		LIBOR
MIBNO		MAXAR
MUSLO		NIFTY
PEPKI		PIDSO
SINGA		RADUN
LAKES	5900N 06000W	SAVRY
UDMAR		TOXIT
YKL	LOMTA	URTAK
ALSOP		VESMI
YWK	YDP	AVUTI
DUVBI	VOKET	BOKTO
MUNBO		CUDDY
BORUB		DORYY
TEXUN		ENNSO

INLAND CONTINGENCY FIX	**INTERMEDIATE FIX**	**OCEANIC ENTRY POINT**
TASTI	YYR	HOIST
5222N 06106W		IRLOK
SERBO		JANJO
KONCH		KODIK
VERTU		LOMSI
5111N 05929W		MELDI
PIKNA		NEEKO
5052N 05859W		PELTU
NAPLO	YAY	RIKAL
4950N 05828W		SAXAN
MIGLI		TUDEP
4904N 05754W		UMESI
LOPRO		ALLRY
4818N 05730W		BUDAR
VINSI	YQX	ELSIR
4734N 05712W		IBERG
TAGRA		JOOPY
4649N 05654W		MUSAK
SUTKO	YYT	NICSO
4610N 05639W		OMSAT
RUBDA		PORTI
4521N 05621W		RELIC
PEPRA		SUPRY
NANSO		RAFIN
LOMPI	JAROM	

~~9.7~~11.3 REYKJAVIK CTA

~~9.7.1~~11.3.1 For activation within Reykjavik CTA

In a **limited service** contingency situation Reykjavik CTA may promulgate contingency tracks in addition to the published OTS.

Flight level changes for en-route aircraft should not be expected within Reykjavik CTA.

Random flights at directional levels will be accepted at FL 290 and below as well as FL 410 and above, however, flow restrictions may be imposed.

An ATS Surveillance service will be provided at ATS discretion.

Ambulance and SAR flights will be dealt with on individual bases.

~~9.8~~11.4 SANTA MARIA OAC

~~9.8.1~~11.4.1 For activation within Santa Maria FIR

When no service situation occurs within Santa Maria FIR the contingency tracks listed below may be implemented. The tracks will be effective after coordination between adjacent units.

Period 2300 UTC - 0630 UTC

Eastbound tracks

EAST1101	29N040W 33N 030W 36N020W LUTAK ESP - FL 310,330,350,370,390
EAST1102	43N040W 42N030W 41N020W DETOX DIRMA - FL 290,320,350,390
EAST1103	45N030W 44N020W ARMED PRT - FL 290,320,350,390
EAST1104	34N040W 40N030W 45N020W 47N 008W - FL 330, 340, 360, 370, 380, 400
EAST1105	40N040W 45N030W 47N 020W - FL 330,340,360,370,380,400
EAST1108	28N040W ULTEM FL 340,380

Westbound tracks

WEST1106	GUNTI 39N020W 39N030W 38N040W - FL 280
WEST1107	45N020W 40N030W 34N040W - FL 310
WEST1109	ULTEM 28N040W FL 320,360

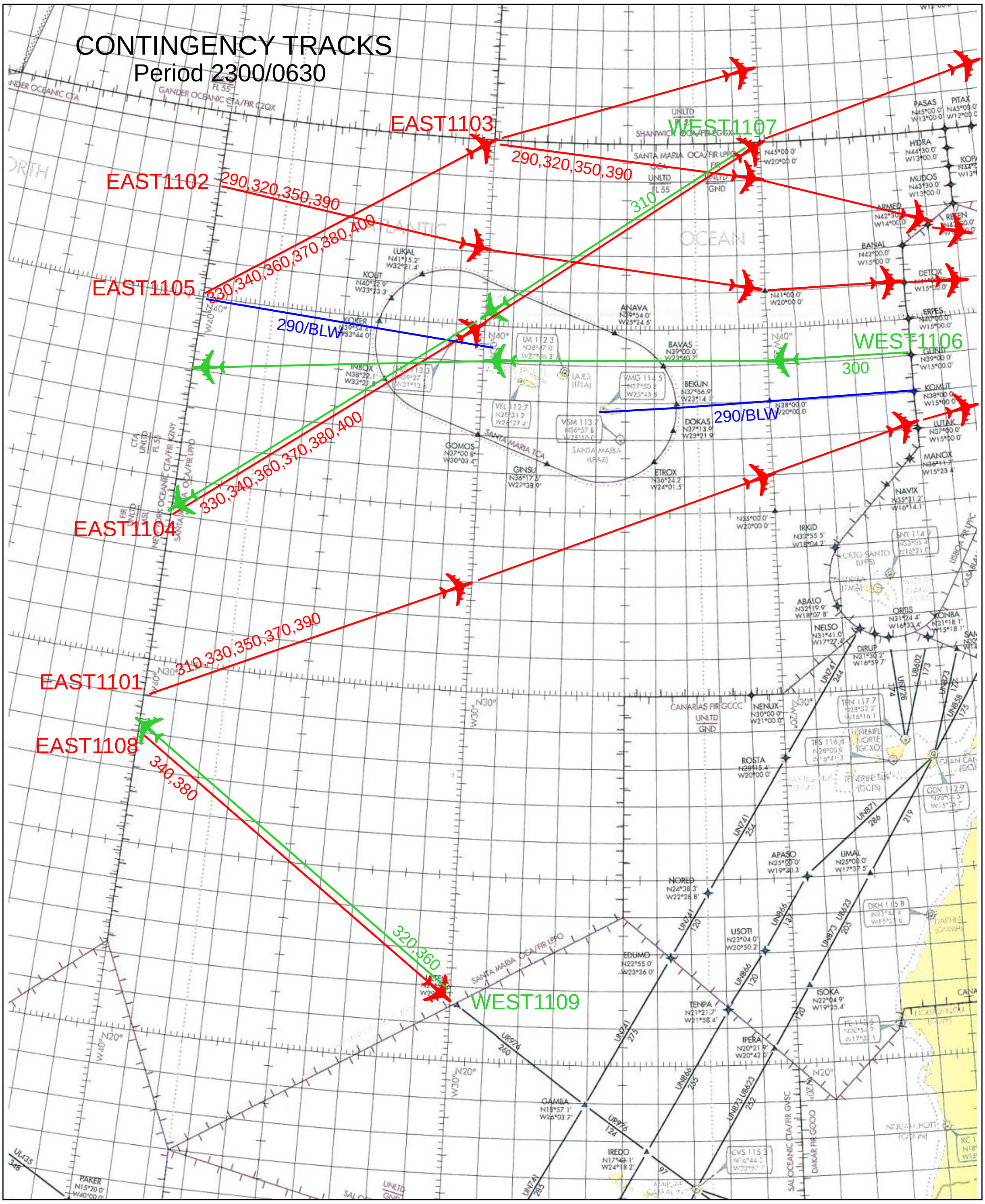


Figure: Contingency night tracks for Santa Maria CTA/FIR during the period 2300/0630 except AZOCON tracks which are effective 24 hours a day. See text above.

Period 1000 UTC - 1800 UTC

Westbound tracks

WEST2201	DETOX 41N020W 42N030W 43N040W - FL 310, 350,370,390
WEST2202	GUNTI 39N020W 39N030W 38N040W - FL 330, 350,370,390
WEST2203	LUTAK 36N020W 33N030W 29N040W - FL 310, 330, 350,370,390
WEST2204	45N015W 42N020W 37N030W 32N040W - FL 300, 320, 340,360, 380, 400
WEST2205	45N020W 40N030W 35N040W - FL 300,320,340,360,380,400
WEST2209	ULTEM 28N040W – FL320,360

Eastbound tracks

EAST2206	40N040W 45N030W 47N020W - FL 330
EAST2207	38N040W 39N030W 39N020W GUNTI - FL310
EAST2208	28N040W ULTEM – F340,380

Flights between Santa Maria Radar and Lisboa FIR

AZOCON01 KOMUT 38N020W BEKUN VMG - FL 290 and below (according to direction of flight).

Flights between Santa Maria Radar and New York FIR

AZOCON02 40N040W FRS LADOX - FL 290 and below (according to direction of flight)

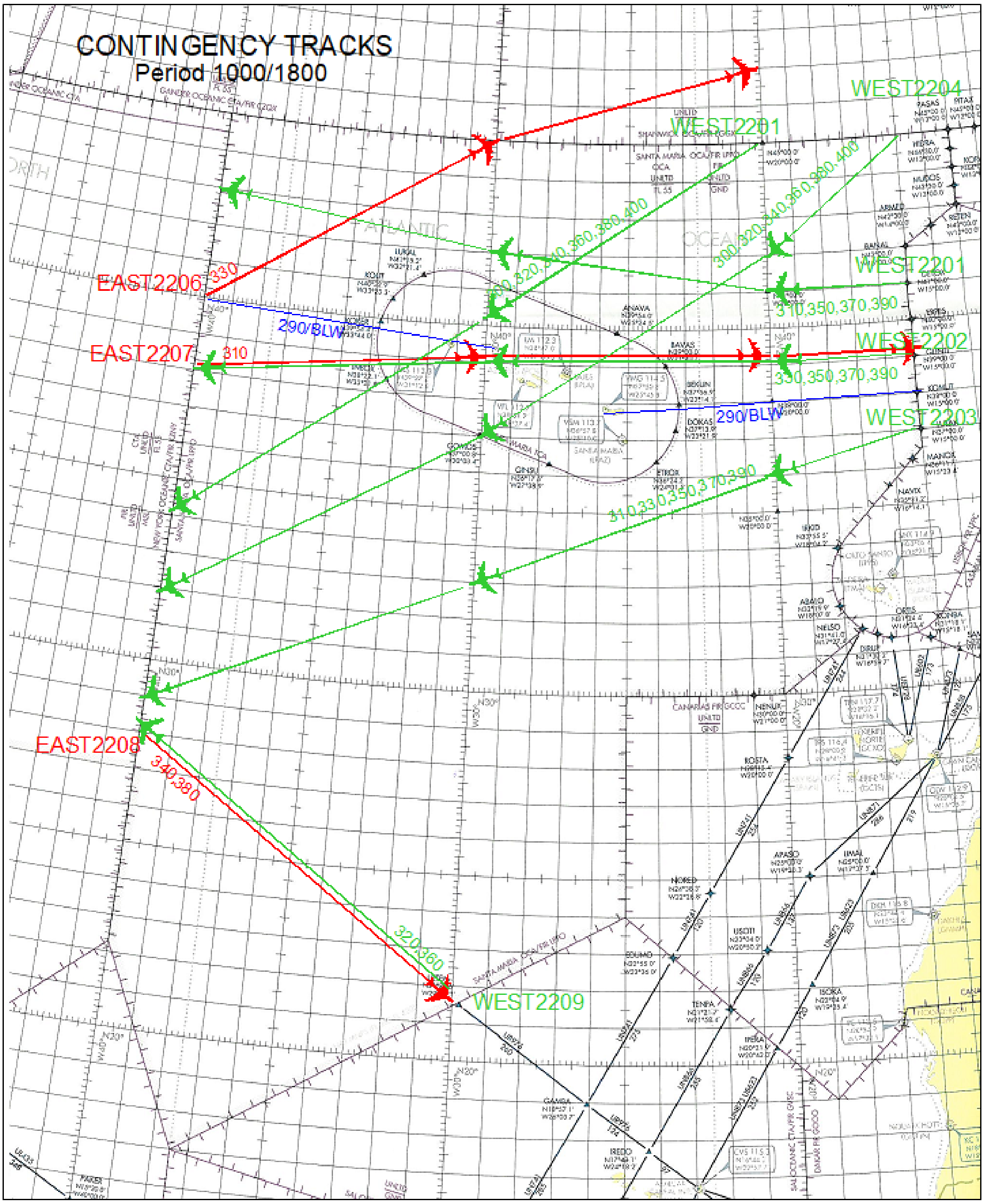


Figure: Contingency day tracks for Santa Maria CTA/FIR during the period 1000/1800, except AZOCON tracks which are effective 24 hours a day. See text above.

~~9.9~~11.5 NY OAC

~~9.9.1~~11.5.1 For activation within NY FIR

NYARTCC has developed and will activate fixed routes to be used in conjunction with, or in lieu of, the Organized Track System (OTS). The enclosed named and fixed routes in the NY OAC will be implemented. The implementation may include all or a portion of the route options depicted in this document based on the nature of the contingency. Further guidance will be published at the time of the contingency.

New York Center will be implementing a contingency plan whose main philosophy will be separating routes by altitude stratification based on direction and distance of flight.

Stratification Category	*Altitude Range*
Low Altitude	FL 290 and below
Mid Altitude	FL 300 – FL 350
High Altitude	FL 360 and above

Stratification categories and their associated altitude bands have been developed based upon the expected flight distance that will be flown. The shorter distances between the U.S. mainland, Canada to/from the Bermuda Area will receive the low altitude routing band, the mid distance between North America and the Caribbean and South America will receive the mid altitude routing band, and flight between the Americas and the Caribbean to/from Europe will receive the high altitude routing.

Route #								Altitudes
1	46/40	44/50	42/60	DOVEY				FL350 and below
2	44/40	42/50	40/60	SLATN				FL350 and below
3		41/50	39/60	SELIM	M203			FL350 and below east of 60w FL290 and below west of 60w
4	NOVOK	M201						FL360 and above
5	JEBBY	M202						FL360 and above
6	BOBTU	M203						FL360 and above
7	43/40	40/50	36/60	RNGRS	JIMAC	M327		FL 290 or below west of JIMAC
8	41/40	38/50	34/60	LAZEY	BALTN	M329		FL 290 or below west of ALUDA
9	39/40	36/50	32/60	WINGZ	GECAL	M331		FL 290 or below west of GECAL
10	37/40	34/50	AMENO	M594				FL 290 and below OR FL360 and above
11	35/40	30/50	FIVZE	M597				FL 290 and below OR FL360 and above
12	33/40	28/50	RKDIA	A516	OBIKE			FL 290 and below OR FL360 and above
13	31/40	25/50	18/60					NO restrictions
14	28/40	22/50	18/56					NO restrictions

~~9.10~~11.6 BODØ OAC

~~9.10.1~~11.6.1 For activation within Bodø FIR

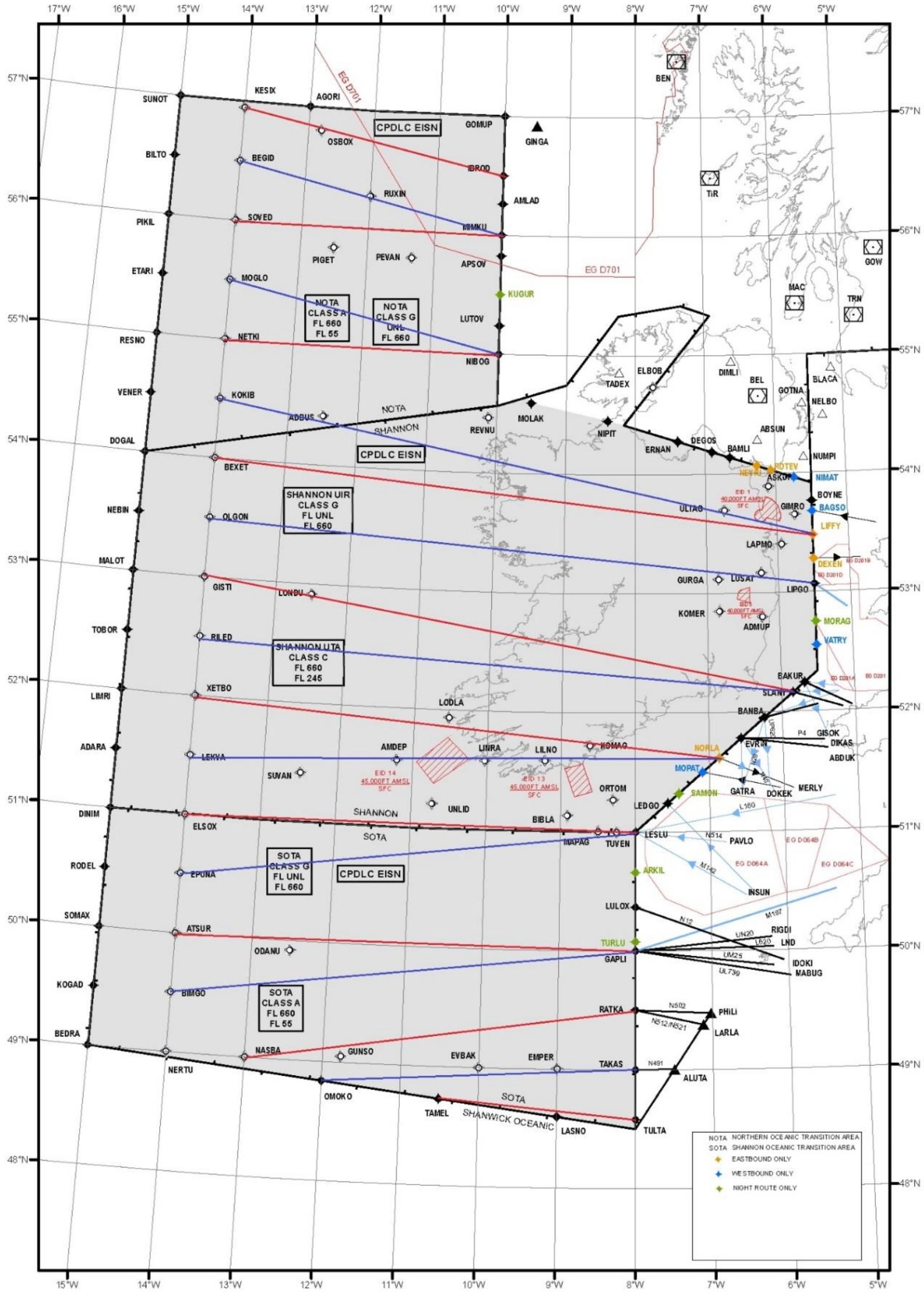
Bodø OCA Contingency Tracks, FL280 or above

Latitude at 0ºL	**Domestic border/Landfall**
80N	TRO
72N	AND
70N	BDO
69N	OGPAR
68N	BNN
67N	TRM
66N	ABADA
65N	VIG
64N	FLS

Westbound traffic shall use even levels, and eastbound traffic shall use odd levels.

~~9.11~~11.7 SHANNON ACC

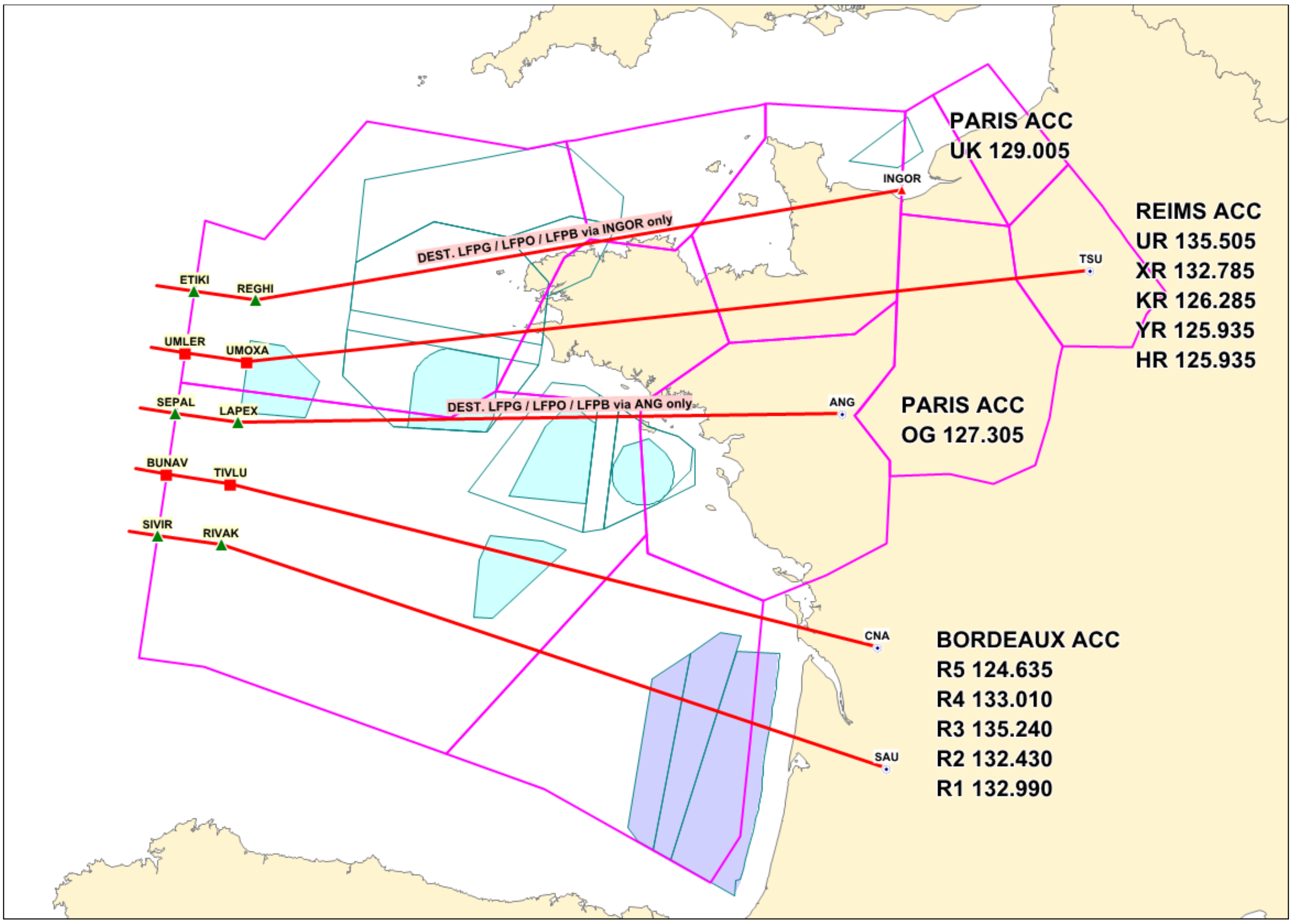
~~9.11.1~~11.7.1 For activation within Shannon FIR - NAT Eastbound Contingency Routes



~~9.12~~11.8 BREST ACC

~~9.12.1~~11.8.1 For activation within Brest FIR

Unless instructed otherwise, flights entering the Brest FIR should use the following contingency route:



CHAPTER 12: CONTACT DETAILS

Contact Details - Shanwick OAC

Shanwick Watch Supervisor	+44 1294 655141
Shanwick OAC Watch Manager	+44 1292 692469
Shanwick ATC Sectors	+44 1294 655100
Shanwick Fax	+44 1292 692042
Ballygirreen (Shanwick Radio)	+353 61 368241 Ground/Air Ops

Contact Details - Gander OAC

Gander Shift Manager	+1 709 651 5207 +1 709 651 5203
Gander Oceanic	+1 709 651 5324 SATVOICE 431603 or +1 709 651 5260
Gander Domestic	+1 709 651 5315 SATVOICE 431602 or +1 709 651 5297
Gander IFSS	+1 709 651 5222 SATVOICE 431613 or +1 709 651 5298
Gander Control Tower	+1 709 651 5329
Gander Airport Duty Manager	+1 709 424 1235
NAV CANADA Operations Centre	+1 613 563 5626
Moncton ACC	+1 506 867 7173
Montreal ACC	+1 514 633 3365

Contact Details - Reykjavik CTA

Reykjavik CTA		
Reykjavik Shift Manager (07:00-22:00)	+354 424 4241	acc@isavia.is
Reykjavik Shift Manager Iridium Satellite Phone (07:00-22:00)	+881 631 450 347	
Shift Manager (22:00-07:00)	+354 424 4240	
Reykjavik ACC Telefax	+354 424 4200	
North Sector primary commercial/ 1st backup	+354 424 4264	
West Sector primary commercial/ 1st backup	+354 424 4264	
East Sector primary commercial/ 1st backup	+354 424 4263	
South Sector primary commercial/ 1st backup	+354 424 4262	
South Sector domestic operations commercial/ 1st backup	+354 424 4261	
All Sectors 2nd backup	+354 568 3033	
All Sectors 3rd backup	+354 568 3035	
JRCC Iceland	+354 545 2100	
System Operators and Flight Data Specialists	+354 424 4265	
System Operators and Flight Data Specialists, Iridium Satellite Phone	+881 621 434 042	
ATM Systems Department H24	+354 424 5203	
ATM Systems Department, Mobile	+354 897 8483	
Supervisor Iceland Radio	+354 424 4100	supervisor.iceland.radio@isavia.is
Radio operator Iceland Radio	+354 568 4600	

Contact Details – Santa Maria OAC

Santa Maria OAC	Telephone Number	AFTN
Atlantic Operations Director	+351 296 820 501	
Operations Division Manager	+351 296 820 504	
Operations Division Manager	+351 296 820 508	
Radio Station Manager	+351 296 820 509	
Maintenance Manager	+351 296 820 512	
ACC Watch Manager	+351 296 820 400 +351 296 886 299 +351 296 820 422 (fax)	LPAZZOZX
Radio Station Watch Manager	+351 296 820 401	
Lajes RCC	+351 295 513 686 +351 295 540 792 (fax)	

Contact Details – NY OAC

New York Center (ZNY) OAC Telephone/Facsimile Numbers:		
ZNY Watch Desk	+1-631-468-5959	Fax: +1-631-468-4224
ZNY Traffic Management Unit	+1-631-468-1084	Fax: +1-631-468-4224
ZNY North Atlantic Operating Area Supvr	+1-631-468-1496	Fax: +1-631-468-4224
ZNY WATRS Operating Area Supvr	+1-631-468-1495	Fax: +1-631-468-4224
ZNY Airspace & Procedures Office	+1-631-468-1018	Fax: +1-631-468-4229
ZNY Technical Operations Area	+1-631-468-1293	Fax: +1-631-468-1289

Collins Aerospace INC. (Radio) Telephone/Facsimile Numbers:		
Radio Operation Team Leader	+1-631-589-7272	Fax: +1-631-563-2412
Radio Shift Manager	+1-631-244-2483	Fax: +1-631-563-2412

Boston Center (ZBW) Telephone/Facsimile Numbers:		
ZBW Watch Desk	+1-603-879-6655	Fax: +1-603-879-6717
ZBW Traffic Management Unit	+1-603-879-6666	Fax: +1-603-879-6717
ZBW Procedures Office	+1-603-879-6858	Fax: +1-603-879-6410
ZBW Traffic Management Officer	+1-603-879-6644	Fax: +1-603-879-6717
ZBW Technical Operations Area	+1-603-879-6729	Fax: +1-603-879-6934

Moncton ACC (YQM) Telephone/Facsimile Numbers:		
Nav Canada National Operations Center	+1-613-248-4087	Fax: +1-613-248-3983
YQM Moncton ACC (at NOVOK or JEBBY)	+1-506-867-7175	Fax: +1-506-867-7180
YQM Moncton ACC (at NOVOK or JEBBY)	+1-506-867-7173	Fax: +1-506-867-7180

Gander ACC (YQX) Telephone/Facsimile Numbers:		
Nav Canada National Operations Center	+1-613-248-4087	Fax: +1-613-248-3983
YQX Gander Shift Manager	+1-709-651-5207	Fax: +1-709-651-5324
YQX Gander Shift Manager	+1-709-651-5203	Fax: +1-709-651-5324
YQX Gander Oceanic Supervisor	+1-709-651-5324	Fax: +1-709-651-5324
Gander Radio Supervisor	+1-709-651-5212	Fax: +1-709-651-5344

Santa Maria (LPAZ) Telephone/Facsimile Numbers:		
LPAZ Santa Maria ACC	+351-296-820-438	
LPAZ Santa Maria ACC (satellite link)	+351-296-886-042	
LPAZ Atlantic Operations Director	+351-296-820-501	
LPAZ Operations Division Manager	+351-296-820-501	
LPAZ ATC Operations Manager	+351-296-820-508	
LPAZ Radio Station Manager	+351-296-820-509	
LPAZ ACC Watch Manager	+351-296-820-400	
LPAZ ACC Watch Manager	+351-296-886-299	Fax: +351-296-820-422
LPAZ Radio Station Watch Manager	+351-296-820-401	
Lajes RCC	+351-295-540-515	
Lajes RCC	+351-295-513-686	Fax: +351-295-540-792

Piarco ACC Telephone/Facsimile Numbers:		
Piarco Control Room	+868-669-6181	Fax: +868-669-1716
Piarco Control Room	+868-669-4852	

San Juan CENRAP (ZSU) Telephone/Facsimile Numbers:		
ZSU Watch Supervisor	+1-787-253-8664	Fax: +1-787-253-8685
ZSU Watch Supervisor	+1-787-253-8665	
ZSU Watch Supervisor	+1-787-253-8648	
ZSU Watch Supervisor (Satellite Phone)	..888-570-3278	

Miami Center (ZMA) Telephone/Facsimile Numbers:		
ZMA Watch Desk	+1-305-716-1588	Fax: +1-305-716-1511/1613
ZMA Traffic Management Unit	+1-305-716-1736	Fax: +1-305-716-1777
ZMA Traffic Management Officer	+1-305-716-1591	Fax: +1-035-716-1777
ZMA Airspace and Procedures	+1-305-716-1547	
ZMA Tech Ops	+1-305-716-1204	Fax: +1-305-716-1293

Jacksonville Center (ZJX) Telephone/Facsimile Numbers:		
ZJX Watch Desk	+1-904-549-1537	Fax: +1-904-549-1843
ZJX Area 2 – North Area	+1-904-549-1546	Fax: +1-904-549-1843
ZJX Traffic Management Unit	+1-904-549-1542	Fax: +1-904-549-1843
ZJX Airspace and Procedures Office	+1-904-549-1574	Fax: +1-904-549-1803
ZJX Traffic Management Officer	+1-904-549-1538	Fax: +1-904-549-1843
ZJX Tech Ops	+1-904-549-1604	Fax: +1-904-549-1695

Fleet Area Control and Surveillance Facility, Virginia Capes Telephone/Facsimile Numbers:		
Control Room Supervisor	+1-757-433-1230	Fax: +1-757-433-1266/1209
Control Room Supervisor	+1-757-433-1231	Fax: +1-757-433-1266/1209
Airspace Officer	+1-757-433-1248	
Airspace Chief Petty Officer	+1-757-433-1225	

FAA Air Traffic Control System Command Center (ATCSCC) Telephone/Facsimile Numbers:		
National Operations Manager (NOM)	+1-703-904-4525	Fax: +1-703-904-4459
International Operations	+1-703-925-3113	Fax: +1-703-904-4461
Strategic Operations	+1-703-904-4402	Fax: +1-703-904-4461

Contact Details – Bodo OAC

Bodø Supervisor (07:00-22:00)	+47 755 42900
Bodø Supervisor Mob.(07:00-22:00)	+47 478 06643
Bodø OAC/ACC Telefax	+47 755 20733
Oceanic Sector primary commercial	+47 755 42935
Domestic Sector primary commercial	+47 755 20391
All Sectors 2nd backup (mobile)	+47 478 06644
All Sectors 3rd backup (mobile)	+47 478 06647
System Operators and Flight Data Specialists	+47 755 42902
Systems Department	+47 670 33830
Manager Bodø OAC/ACC Mr. Raymond Ingebrigtsen	+47 670 33751 +47 992 32628 (mobile)
Operational Manager Bodø OAC/ACC Mr. Morten Tjønndal	+47 670 33753 +47 911 05587 (mobile)
Bodø Radio	+47 755 42940

— END —

APPENDIX M — PFA TO NAT SUPPS RELATED TO COMMUNICATION FAILURE PROCEDURES

(*paragraph 5.3.2 refers*)

~~**3.5.2.3 Procedures to follow when unable to obtain an oceanic clearance using HF communications**~~
~~(P-ATM – Chapter 15)~~

~~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.~~

~~*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*~~.

. . .

~~**6.1.2.2 Unable to obtain oceanic clearance using HF voice**~~
~~(P-ATM – Chapter 15)~~

~~6.1.2.2.1 Aircraft operating outside VHF coverage that are unable to contact ATC on 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.— 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.*~~

. . .

9.3 AIR-GROUND COMMUNICATION FAILURE
(A2 – Chapter 3; P-ATM – Chapter 15; P-OPS, Vol. I)

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.

General

9.3.1 The pilot shall attempt to contact either another aircraft in its vicinity (123.45/121.5), or any ATC facility and 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

9.3.2 If loss of communications is encountered prior to entering the NAT then the pilot should:

a) follow the radio communication failure procedures of the airspace in which the aircraft is operating.
b) if the pilot elects to continue the flight, then enter oceanic airspace at the Oceanic Entry Point at the level and speed resulting from the execution of the adjacent airspace RCF procedures; then
c) follow the procedures in 9.3.3 below.

Communications failure after entering NAT Region

9.3.3 If loss of communications is encountered or continued after entering the NAT then:

a) The pilot should maintain the current flight plan until reaching the Oceanic Exit Point.
b) No route, flight level or speed change shall be made before the Oceanic Exit Point unless a change is deemed necessary by the pilot in command to ensure the safety of the aircraft.

9.3.4 Aircraft with a destination within the NAT region should follow the procedures in 9.3.3 above until reaching the top of descent point and should thereafter follow globally applicable procedures in accordance with PANS-ATM 15.3.3 b) 4) – 7).

~~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.~~

~~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.~~
~~*Communications failure prior to exiting NAT Region –*~~
~~*Cleared on filed flight plan route*~~

~~9.3.4 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, 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*~~

~~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.~~

~~*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 Information Publication.*~~

APPENDIX N — PFA TO NORTH ATLANTIC OPERATIONS AND AIRSPACE MANUAL (NAT DOC 007) RELATED TO COMMUNICATION FAILURE PROCEDURES

(*paragraph 5.3.2 refers*)

Operational Procedures for Loss of Communications before Entering the NAT

6.6.15 If loss of communications is encountered before entering the NAT then the pilot should:

a) follow the radio communication failure procedures of the airspace in which the aircraft is operating.

b) if the pilot elects to continue the flight, then enter oceanic airspace at the oceanic entry point at the level and speed resulting from the execution of the adjacent airspace RCF procedures; then

c) follow the procedures in 6.6.16 below.

Operational Procedures for Loss of Communications after Entering the NAT

6.6.16 If loss of communications is encountered or continued after entering the NAT then:

a) The pilot should maintain the current flight plan until reaching the Oceanic Exit Point.

b) No route, flight level or speed change shall be made before the Oceanic Exit Point unless a change is deemed necessary by the pilot in command to ensure the safety of the aircraft.

c) When being vectored or having been directed by ATC to proceed offset using RNAV without a specified limit, proceed in the most direct manner possible to re-join the current flight plan route no later than the next significant point, taking into consideration the applicable minimum flight altitude.

Note: a) and b) are NAT specific rules while c) is a globally applicable rule in accordance with PANS-ATM 15.3.3 b)3).

6.6.17 Aircraft with a destination within the NAT region should follow the procedures in 6.6.16 above until reaching the top of descent point and should thereafter follow globally applicable procedures in accordance with PANS-ATM 15.3.3 b) 4) – 7). Those procedures are repeated below for convenience:

a) proceed according to the current flight plan route to the appropriate designated navigation aid or fix serving the destination aerodrome and, when required to ensure compliance with b), hold over this aid or fix until commencement of descent;

b) commence descent from the navigation aid or fix specified in a) at, or as close as possible to, the expected approach time last received and acknowledged; or, if no expected approach time has been received and acknowledged, at, or as close as possible to, the estimated time of arrival resulting from the current flight plan;

c) complete a normal instrument approach procedure as specified for the designated navigation aid or fix; and

d) land, if possible, within 30 minutes after the estimated time of arrival specified in b) or the last acknowledged expected approach time, whichever is later.

In all cases, after the NAT oceanic exit point, follow the radio communication failure procedures of the airspace in which the aircraft is operating.

APPENDIX O — PFA TO THE PBCS MONITORING AND REPORTING GUIDANCE (NAT DOC 011)

(*paragraph 5.4.4 refers*)

Note: Deleted text is shown using strikeout (~~text to be deleted~~), and added text with grey shading (text to be inserted).

. . .

1.3 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 focus~~s~~es 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:

. . .

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

~~a) **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.~~

. . .

2.4 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. The ATSP will also review the airframes with performance observed below the 99.9% benchmarks, but depending on resources available, the priority is to review the cases below the 95% benchmarks for the monthly non-compliance reporting.

. . .

2.9 For ASP, filter out all airframes with fewer than ~~25~~100 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.

. . .

2.13 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 2.2 above). ~~Aircraft with ≥25 data points, but <100 data points available for analysis are categorized as "insufficient data" and included in a simplified report (see 2.15 below).~~

. . .

~~2.15 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~~

. . .

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

~~a) **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.~~

. . .

4.7 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. While the monthly non-compliance reporting focuses on airframes that have filed P2/RSP180 and have been observed with at least 100 ADS-C messages to analyze, the biannual reports contain results for all aircraft observed to be using data link regardless of filing status and number of messages. This allows for every aircraft using data link to be monitored in every airspace where they are operating and can help to provide the State Oversight Authorities to have a more holistic view of each aircraft's performance.

LIST OF ACRONYMS

A41	41st Session of the ICAO Assembly
ACC	Area Control Centre
ACM	Atlantic Coordination Meeting
ACM-S	Special Atlantic Coordination Meeting
ACT-SAF	ICAO Assistance, Capacity-building and Training for Sustainable Aviation Fuels (SAF)
ADS	Automatic Dependent Surveillance
ADS-B	Automatic Dependent Surveillance – Broadcast
ADS-C	Automatic Dependent Surveillance-Contract
AIP	Aeronautical Information Publication
A-ISAC	Aviation Information Sharing & Analysis Center
ANC	Air Navigation Commission
ANSP	Air Navigation Service Provider
ASEPS	Advanced Surveillance Enhanced Procedural Separation
ATS	Air Traffic Services
CAA	Civil Aviation Authority
CAPSCA	Collaborative Arrangement for the Prevention and Management of Public Health Events in Civil Aviation
CNS	Communication, Navigation and Surveillance
CO_2	Carbon Dioxide
CONOPS	Concept of Operations
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
COVID-19	Coronavirus Disease 2019
CRE	Collision Risk Estimate
CRM	Collision Risk Model
CSP	Communications Service Providers
CTA	Control Area
CyAP	*Cybersecurity Action Plan*
DARP	Dynamic Airborne Reroute Procedures
DENICE	Danish and Icelandic Joint Financing
DLM	Data Link Mandate
EUR	(ICAO) European (Region)
EUR/NAT	European and North Atlantic
FAA	Federal Aviation Administration
fapfh	fatal accidents per flight hour
GANP	*ICAO Global Air Navigation Plan* (Doc 9750)
GASP	*ICAO Global Aviation Safety Plan* (Doc 10004)
GLADS	Global Aviation Dialogues
GNE	Gross Navigational Error
HALE	High Altitude Long Endurance
HAPS	High-Altitude Platform Systems
HMS	Height Monitoring System
HMU	Height Monitoring Unit
ICAO Doc	
Doc 10004	*Global Aviation Safety Plan* (GASP)

Doc 7030	*Regional Supplementary Procedures* (SUPPs)
Doc 8973	*Aviation Security Manual*
Doc 9082	*ICAO's Policies on Charges for Airports and Air Navigation Services*
Doc 9501	*Environmental Technical Manual*
Doc 9634	*Regional Air Navigation Plan – North Atlantic* (NAT eANP)
Doc 9750	*Global Air Navigation Plan* (GANP)
Doc 9985	*ATM Security Manual*
IFR	Instrument Flight Rules
LHD	Large Height Deviation
LTAG	Long Term Aspirational Goal
NAARMO	North American Approvals Registry and Monitoring Organization
NAT	North Atlantic Region
NAT CMA	North Atlantic Central Monitoring Agency
NAT Doc	
NAT Doc 001	*North Atlantic Systems Planning Group Handbook*
NAT Doc 005	*Future ATM Concept of Operarations for the North Atlantic Region*
NAT Doc 006, Part I	*Air Traffic Management Operational Contingency Plan – North Atlantic Region*
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 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 NER PT	North Atlantic New Entrant Readiness Project Team
NAT OCR RSCR PT	NAT Oceanic Clearance Removal Regional Safety Case Review Project Team
NAT POG	North Atlantic Procedures and Operations Group
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	NAT Annual Safety Report
NAT eANP	*Regional Air Navigation Plan – North Atlantic* (Doc 9634)
NM	Nautical Mile
NOTAM	Notice to Airmen
NRSC	NAT Regional Safety Case
OCR	Oceanic Clearance Removal
OWAFS	Operations Without an Assigned Fixed Speed
PfA	Proposal for Amendment
PIRG	Planning and Implementation Regional Group
RASG	Regional Aviation Safety Group
RMA	Regional Monitoring Agency
RVSM	Reduced Vertical Separation Minima
SAF	Sustainable Aviation Fuels
SAT	South Atlantic
ACM	Atlantic Coordination Meeting
SAT	Meeting on the improvement of Air Traffic Services over the South Atlantic
SAT IMG	South Atlantic Implementation Management Group
SAT SOG	South Atlantic Safety Oversight Group

SEI	Special Emphasis Items
SKPI	Safety Key Performance Indicator
SLOP	Strategic Lateral Offset Procedure
SMS	Safety Management System
SRA	Safety Risk Assessment
SSP	Surveillance Service Providers
SSR	Secondary Surveillance Radar
SUPPs	*Regional Supplementary Procedures* (Doc 7030)
TLS	Target Level of Safety
ToR	Terms of Reference
TtT	Target to Target
UAS	Unmanned Aircraft Systems
UTC	Coordinated Universal Time
VOLCEX	Volcanic Ash Exercises for the European (EUR) and North Atlantic (NAT) Regions

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