INTERNATIONAL CIVIL AVIATION ORGANIZATION

FINAL

SUMMARY OF DISCUSSIONS AND CONCLUSIONS OF

THE FIFTY-SIXTH MEETING OF

THE NORTH ATLANTIC SYSTEMS PLANNING GROUP

2ND SESSION

Virtual Meeting, 26 to 27 January 2021

PREPARED BY THE EUROPEAN AND NORTH ATLANTIC OFFICE OF ICAO FEBRUARY 2021

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INTRODUCTION

PLACE AND DURATION

0.1 The second part of the Fifty Sixth Meeting of the North Atlantic Systems Planning Group (NAT SPG/56-2) was held on 26 and 27 January 2021 via Webex. The first teleconference session (NAT SPG/56-1) took place on 24 and 25 June 2020. The two sessions were conducted as partial replacements for its Fifty Sixth Meeting (NAT SPG/56) which had originally been planned to take place on 22-26 June 2020. This meeting arrangement was necessary due to the continuation of the COVID-19 pandemic crisis which prevented the NAT SPG/56 from gathering at a face-to-face meeting.

OFFICERS AND SECRETARIAT

0.2 The Meeting was chaired by Mrs. Hlin Holm (Iceland). Mr. Sven Halle, ICAO Regional Officer, Europe and North Atlantic, acted as the Secretary of the Meeting, assisted by ICAO staff as listed in **Appendix A**.

ATTENDANCE

0.3 The Meeting was attended by a total of 50 participants from Canada, Denmark, Iceland, Ireland, Norway, Portugal, United Kingdom and United States, as well as observers from Argentina, Spain, Russian Federation, Trinidad and Tobago, EUROCONTROL, the International Air Transport Association (IATA), the International Business Aviation Council (IBAC), the International Federation of Air Line Pilots' Associations (IFALPA) and the NAT Central Monitoring Agency (CMA). Apologies were received from France. The list of all participants and contacts are listed at **Appendix A**.

AGENDA

0.4 The NAT SPG agreed to the following agenda:

Agenda Item 1: Review of significant international aviation developments;

Agenda Item 2: NAT planning and implementation programmes;

Agenda Item 3: NAT safety performance and oversight issues;

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

Agenda Item 5: NAT Documentation updates;

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

Agenda Item 7: Any Other Business.

0.5 The list of meeting documentation is provided at **Appendix B**.

0.6 Due to the exceptional COVID-19 crisis situation and meeting arrangements, the NAT SPG meeting was focussed again, similar to its first session in June 2020, on the progress of particular NAT matters that were required to advance the overall NAT work programme including items that required NAT SPG decisions and additional guidance. It was agreed that the discussions on the NAT 2030 Vision would be deferred to the next potential NAT SPG face to face meeting, as these discussions would require a non-virtual environment. Due to the current exceptional circumstances, the NAT SPG agreed, for the sake of efficiency and flexibility, to review and approve a number of draft NAT SPG Conclusions on routine matters, as well as the information from the Project Teams, in a PowerPoint presentation format instead of the usual Working Paper format. Following the discussions, the NAT SPG also agreed that the status of presentations should be reviewed for a potential inclusion as recognised NAT SPG Meeting Documentation into the *NAT SPG Handbook* (NAT Doc 001) .

1. REVIEW OF NAT SPG CONCLUSIONS

1.1 NAT SPG CONCLUSIONS APPROVED AT NAT SPG/56-1

1.1.1 The NAT SPG noted the progress of the NAT SPG/56 Conclusions which had been approved at its first session (NAT SPG/56-1).

1.2 VOLCANIC ASH EXERCISES

1.2.1 The NAT SPG was provided a summary of the Volcanic Ash Exercises in the European (EUR) and North Atlantic (NAT) Regions. It was noted that the ICAO EUR/NAT Regional Office issued State Letter EUR/NAT 20-0201.MET informing States and volcanic ash exercise stakeholders that due to the ongoing COVID-19 outbreak, the planned VOLCEX20 (Volcanic Ash Exercises for the EUR Region) Volcanic Ash Exercise had been postponed from 17 November 2020 to November 2021 (specific date to be determined).

1.2.2 Additionally, the ICAO EUR/NAT State Letter EUR/NAT 20-0250.MET informed VOLKAM (Volcanic Ash Exercises for the (far) Eastern part of the EUR Region) stakeholders that VOLKAM20 and the related steering group meeting had been postponed to 2021 (this was the second postponement) due to the ongoing COVID-19 pandemic crisis.

1.2.3 IATA raised the issue that the use of dynamic airborne reroute procedures (DARP) should be considered during the VOLCEX20 exercise. Iceland gave a short statement from the kick-off meeting of the VOLCEX20 exercise and IATA was invited to contact the Aircraft Operator member at the EACCC (European Aviation Crisis Coordination Cell) (Mr. Carlo Verelst from IATA) to include this aspect into the exercise objectives.

1.3 UPDATE ON CYBERSECURITY

1.3.1 The NAT SPG was informed that the ICAO Cybersecurity Action Plan that had been approved by the ICAO Council during its Second Meeting of the 219th Session on 4 March 2020 had been disseminated via the ICAO State Letter 20/114 on 5 November 2020. The Action Plan presents further guidance to support the implementation of the Cybersecurity Strategy by States, industry, and stakeholders in accordance with the ICAO Assembly Resolution A40-10 (Addressing cybersecurity in civil aviation).

2. NAT PLANNING AND IMPLEMENTATION PROGRAMMES

2.1 TEMPORARY ACCOMMODATION OF NAT DATA LINK MANDATE

2.1.1 The NAT SPG noted the results from the NAT Data Link Mandate Temporary Accommodation Project Team (NAT DLMTA PT), which had the objective to develop criteria for the extension or withdrawal of the NAT DLM temporary accommodation measures. The results of the PT were approved by the NAT SPG written consultation process in September 2020 and the NAT SPG recalled that the two trigger actions for re-instatement of the NAT Data Link Mandate would either be the AIRAC date of 25 February 2021 or when the threshold of 50% of the 2019 traffic levels were reached.

2.1.2 The PT conducted monthly coordination via correspondence (first week of each month), where the data was collected on the traffic figures compared to 2019 and the percentage of non-equipped flights at DLM levels. The data collected from July 2020 to December 2020 is presented in **Appendix C.**

2.1.3 In support of the discussions on the NAT DLM, IATA presented a proposal for a further extension of the exemption to higher traffic levels (e.g. 70 or 75% of the 2019 traffic levels) as the monthly reports indicated that air navigation service providers (ANSPs) would have no issues with the management of the exempted traffic. In the discussions the PT lead, as well as several NAT SPG members stated that the expert judgement in the PT came up with the conservative 50% value for the continuation of safe and efficient

operations within the NAT. The assumptions from IATA for the increase of the 50% value to a higher number were not supported by the majority of the NAT SPG members due to the lack of substantial background information which could have been used for justification for a different value. IATA expressed its disappointment on the outcome of the discussions.

2.1.4 As a result of the discussions, the following was endorsed:

NAT SPG Conclusion 56-2/1 – Re-instatement of the NAT DLM

That, in accordance with the previously defined criteria, the NAT Data Link Mandate be re-instated, as currently published, from the AIRAC date 25 FEB 2021 onwards.

2.2 NAT OPS BULLETIN 2018_003 - WAYPOINT INSERTION/VERIFICATION SPECIAL EMPHASIS ITEMS

2.2.1 The NAT SPG was presented with a detailed historical background on the discussions and decisions from the North Atlantic Implementation Management Group (NAT IMG) and North Atlantic Safety Oversight Group (NAT SOG) in relation to the update of the NAT OPS Bulletin 2018_003 "*Waypoint Insertion/Verification SEI*". The aim of the proposed amendment to the NAT OPS Bulletin 2018_003 was to raise the awareness of aircraft operators that in accordance with NAT agreed procedures, half-degree waypoints may be included in voice or OCL (Obstacle Clearance Limit) oceanic clearances and re-clearances.

2.2.2 Following the various presentations/discussions/conclusions in the NAT IMG and NAT SOG meetings during 2020, the NAT SPG was presented with the status quo situation that the publication of the updated guidance material in the NAT OPS Bulletin was supported by most NAT IMG and NAT SOG members and that the United States and IFALPA would not concur with the publication of the revised OPS Bulletin. The positions of the United States and IFALPA were reconfirmed at the meeting.

2.2.3 In acknowledging that one of the main purposes of NAT OPS Bulletins is the dissemination of additional guidance material to airspace users which are operating in the NAT, the NAT SPG followed the proposal from the NAT IMG/56 and NAT SOG/21 and endorsed the following conclusion:

NAT SPG Conclusion 56-2/2 – Update to NAT OPS Bulletin 2018_003 - *Waypoint Insertion/Verification SEI*

That,

a) the NAT OPS Bulletin 2018_003 - *Waypoint Insertion/Verification SEI* be updated as provided in **Appendix D**; and

b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish the updated NAT OPS Bulletin 2018_003 Rev 1.

3. NAT SAFETY PERFORMANCE AND OVERSIGHT ISSUES

3.1 NAT ANNUAL SAFETY REPORT (NAT ASR) FOR 2019

3.1.1 The Meeting was presented with a draft NAT Annual Safety Report for the year 2019 developed by the ICAO Secretariat, with support from the NAT SOG Chair and in coordination with the North Atlantic Scrutiny Group (NAT SG) and North Atlantic Mathematicians Working Group (NAT MWG) Rapporteurs as well as the NAT CMA. NAT SOG/23 reviewed and agreed in December 2020 with the draft ASR 2019, which contains information regarding:

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

b) The North Atlantic Scenario;

c) Vertical and lateral Collision Risk Estimates (CRE);

d) Safety Key Performance Indicators (SKPI);

e) Results of the scrutiny of events of year 2019, including the identified contributing issues as well as the mitigations that were used for preventions; and

f) NAT Regional Priorities, including Space-based Automatic Dependent Surveillance – Broadcast (SB ADS-B), the continued work in evaluating Performance Based Communications and Surveillance (PBCS) implementation and possible improvements over the coming decade as part of the NAT 2030 Vision.

3.1.2 The Meeting recognized that in 2020, 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 crisis. Because of this, the events that occurred in the NAT High Level Airspace (HLA) between July and December 2019, even though scrutinized in 2020 by a small group of experts, could not be reviewed by the usual full NAT Scrutiny Group (NAT SG) membership during a face-to-face meeting. The meeting agreed with the note that had been inserted in the NAT ASR 2019 stating that the values for safety performance presented in the NAT ASR for 2019 could be revisited when full face-to-face NAT SG meetings can be reconvened, and are therefore subject to change.

3.1.3 In view of the above the Meeting agreed to the following:

NAT SPG Conclusion 56-2/3 – 2019 NAT Annual Safety Report (NAT ASR)

That,

a) the 2019 NAT Annual Safety Report (NAT ASR) be endorsed; and

b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish the NAT ASR 2019 (**Appendix E** refers).

3.2 CPDLC ROUTE CLEARANCE UPLINKS TO REDUCE GROSS NAVIGATIONAL ERRORS (GNES)

3.2.1 The Meeting was informed of the NAT SOG/23 discussions whereby it was agreed that the increased use of Flight Management Computer (FMC) loadable Controller Pilot Data Link Communications (CPDLC) route clearance uplinks to reduce Gross Navigational Errors (GNEs) and improve the collision risk in the lateral dimension should be supported and that NAT ANSPs should be invited to ensure its enhanced and expanded use.

3.2.2 Iceland supported the notion that the NAT should strive to maximize as far as practicable the use of CPDLC when issuing route clearances to aircraft, however it was highlighted that Isavia ANS was not in a position to "*ensure the enhanced and expanded use of CPDLC route clearance uplinks after oceanic entry"*. After discussion on this issue, a revised wording of the following NAT SPG Conclusion was agreed:

NAT SPG Conclusion 56-2/4 – Use of CPDLC Route Clearance Uplinks to reduce Gross Navigational Errors (GNEs)

That, in order to help further reduce the number of GNEs and improve the collision risk in the NAT:

a) the NAT ANSPs examine their use of CPDLC route clearance uplinks after oceanic entry with the aim of maximizing their use as far as operationally practicable; and

b) report outcome of the review to NAT POG/12 (North Atlantic Procedures and Operations Group) and NAT IMG/59.

4. NAT ECONOMIC, FINANCIAL AND FORECAST ISSUES

4.1 NAT TRAFFIC FORECAST 2020-2025

4.1.1 The NAT SPG was informed that the NAT Economic, Financial and Forecast Group (NAT EFFG) subgroup of forecasting experts worked during Spring 2020 and updated, by August 2020, a preliminary "crystal ball" forecast of total NAT traffic for the period 2020-2025. The NAT EFFG were requested to approve, by correspondence by 4 September 2020, the updated NAT Traffic Forecast for the period 2020-2025. This exceptional process and deadline had been requested in order to support the work on the DENICE (Danish and Icelandic Joint Financing) Agreement for calculations of user charges for 2021 which needed to be completed by September 2020.

4.1.2 The ad-hoc forecast was a weighted average of each ANSP's forecast for traffic through their respective Flight Information Region (FIR) (data collected during June 2020 and updated in August 2020). It had been agreed that the forecast provided by the United Kingdom had been input for Shanwick and that it would also be used as a proxy for Gander, as NAV CANADA, as a publicly listed entity, had not made any public forward-looking disclosures with respect to the impacts of the pandemic on traffic and revenue levels.

4.1.3 Following the notice of approval by correspondence of the forecast, Ireland, supported by Canada and the United Kingdom, highlighted that the projected rates of growth for Shanwick in 2024 and 2025, based on figures extracted from the ad-hoc forecast of 18 August 2020 should be updated. It was considered that there should be more consistency between the Shanwick and Gander forecasts in view that they were adjacent airspaces. It was also clarified that Ireland did not produce specific NAT traffic forecasts and that the STATFOR (EUROCONTROL Statistics and Forecast Service) forecasts, adjusted where necessary to reflect specific local circumstances, were used.

4.1.4 The NAT EFFG agreed that due to the circumstances, the forecast was reflecting the available very limited traffic data up to August 2020. As the economic and traffic situation was extremely fluid and in view of the high level of uncertainties related to the ongoing pandemic, it was agreed that the forecast should be updated based on information which would be released by Canada and the United Kingdom as well as the STATFOR forecasts.

4.1.5 The NAT SPG noted that the updated forecast (enhanced by information up to December 2020) would be consolidated by the end of February 2021 for NAT EFFG and that the first updated figures in this still volatile environment could be expected for NAT SPG approval by correspondence in March 2021.

4.2 INTERIM REPORT OF THE NAT EFFG HMS/FA PT

4.2.1 The NAT SPG recalled that it had tasked the NAT ADS-B Height Monitoring System (HMS) Project Team (NAT ADS-B HMS PT) at the first session of NAT SPG/56 (NAT SPG/56-1, June 2020) to work with the NAT EFFG (NAT SPG Conclusion 56/9 refers) in order to conduct the necessary financial assessments of the following options identified by NAT SOG/22 and to report back to the NAT SPG:

i) an HMS in collaboration with NAT ANSPs utilising existing ADS-B data; and/or

ii) a SB ADS-B HMS in collaboration with Aireon LLC.

4.2.2 The NAT EFFG established the HMS Financial Assessment Project Team (NAT HMS/FA PT) in September 2020 to conduct the financial assessment of the above technical options and tasked it to conclude the work by 15 December 2020.

4.2.3 The outline for the final report to be delivered to the NAT SPG/NAT SOG was noted. With regard to Chapters B and C of the report, the NAT SPG was informed of the following issues:

a) For Option i (an HMS in collaboration with NAT ANSPs utilising existing ADS-B data):

i) a State letter was sent on 16 November 2020 with a deadline for replies on 30 November 2020 to the States that are parties of the Height Monitoring Unit (HMU) arrangement that was signed in 1995 in order to gather information concerning costs for Option i. All involved States have responded to the State letter. The last answer was received on 30 December 2020.

ii) the replies to the State letter covered the issue of costs for ANSPs to provide data to the NAT CMA concerning "A/C position data" (includes SB ADS-B only, terrestrial only, or both SB and terrestrial).

iii) in addition to the ANSP costs to provide the data, there would also be costs associated with the storage of the data and the development of the system to process the data for height monitoring purposes, which would need to be factored in.

iv) the United Kingdom had informed the PT that they were willing to investigate the development of a new HMS using ADS-B data; however, prior to conducting a feasibility study for the new system, cost recovery of the feasibility study would first need to be agreed.

v) the above cost recovery decision was discussed during the NAT EFFG/39 meeting (October 2020) and the NAT Chair Team meetings. The NAT EFFG, as parent group of the NAT HMS/FA PT, advised that this decision was not within its mandate stemming from the relevant Terms of Reference and would need to come from the States that were parties of the HMU arrangement as a stand-alone action.

b) For Option ii (a SB ADS-B HMS in collaboration with Aireon LLC): Further clarity was required to determine if the Aireon costs (as NAT SOG/22-WP/06 refers) were based on geographic coverage areas or based on ADS-B Height Monitoring System (AHMS) data bundles provided to the NAT CMA as per questions below. It was noted that the responses to these questions had been provided by Aireon and the Questions Registry set up by the PT had been updated.

i) If costs are based on data bundle sets, what are the size limitations and costs associated with the data bundle?

ii) In the same vein, are there data limitations contained within a geographic area? If so, why?

4.2.4 The PT requested clarification and guidance from the NAT SPG on the following questions in order to reach a meaningful evaluation of the two options:

a) In consideration of the data bundle required or geographic coverage area, what is considered to be the minimum requirement for proper Regional Monitoring Agency (RMA) height monitoring in the NAT? Coverage area? Percentage of the data received? Percentage of the traffic volume?

4.2.5 To support the NAT SPG consideration of these questions, the lead of the NAT ADS-B HMS PT provided additional information in **Appendix F**. It was noted that the agreed minimum height monitoring requirements would also be included in the NAT *Regional Supplementary Procedures* (SUPPs, Doc 7030) and referred to by Groups that were analysing cost recovery issues in the NAT.

4.2.6 In the ensuing discussions, the NAT SPG agreed that the future NAT Height Monitoring System should be designed to be able to monitor 100% of the NAT traffic population on a 24/7 basis. It was recognised that this would require a reinforcement of the NAT CMA which required further discussions. It was also noted that the HMU arrangement signed in 1995 should be updated accordingly. However, in view of the increasing urgency for an alternative to the current low level of height monitoring provided by the Strumble HMU, the NAT SPG agreed that, as suggested by the NAT ADS-B HMS PT, the minimum height monitoring requirements will be initially set at one 24-hour period of all available NAT Regional ADS-B data on a rolling eight-day schedule which would cover at least 60% of the traffic population. It was agreed that

these requirements should be reviewed periodically by the NAT CMA and reconfirmed at the next NAT SPG meeting.

4.2.7 Based on the above, the following was endorsed:

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

That,

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

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

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

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

b) the above minimum height monitoring requirements be reconfirmed at the NAT SPG/57-1.

4.2.8 As the work on a number of issues (which were identified by the NAT HMS/FA PT) was still ongoing, the NAT SPG supported the proposal that the NAT EFFG should agree to the extension of completion deadline for the work of the PT to the end of March 2021.

5. NAT DOCUMENTATION UPDATES

5.1 2019 NAT GANP/ASBU IMPLEMENTATION STATUS REPORT

5.1.1 The NAT SPG was presented with the 2019 NAT *GANP/ASBU* (ICAO *Global Air Navigation Plan* (GANP, Doc 9750)/Aviation System Block Upgrades) *Implementation Status Report* (**Appendix G** refers) and the following was endorsed:

NAT SPG Conclusion 56-2/6 – 2019 GANP/ASBU Implementation Status Report – NAT Region

That,

a) the *2019 GANP/ASBU Implementation Status Report – NAT Region* as provided in **Appendix G** be endorsed; and

b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish and promulgate the *2019 NAT GANP/ASBU Implementation Status Report*.

5.2 NAT DOC 001 – NAT SPG HANDBOOK

5.2.1 The NAT SPG was presented with several amendments to the *North Atlantic Systems Planning Group* (NAT SPG) *Handbook* (NAT Doc 001).

5.2.2 The following updates to the *NAT SPG Handbook* (NAT Doc 001) were agreed:

a) update to the List of NAT SPG Representatives in Section 1: #13 concerning Norway and United States;

b) delete [08] ASEPS phraseology and definition (C 55/11) in Section 5:B: "Implementation Planning Policies" in view of termination of the trial implementation of Advanced Surveillance-Enhanced Procedural Separation (ASEPS) and coming into effect of the amendments to the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444) related to these provisions;

c) updates in the Section 6:A "Documents Promulgated by the NAT SPG"; and

d) inclusion of the Regional Safety Case Checklist in Appendix A, Section 2 part D. "Regional Safety Assessment" as recommended by the NAT SOG (NAT SOG/21 SoD, para. 4.55 to 4.67 refer).

5.2.3 Based on the above, the following was endorsed:

NAT SPG Conclusion 56-2/7 – Update of NAT SPG Handbook, NAT Doc 001, v2.5.0

That,

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

b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to publish and promulgate the updated NAT Doc 001, v2.5.0.

5.3 NAT DOC 006 - AIR TRAFFIC MANAGEMENT OPERATIONAL CONTINGENCY PLAN - NORTH ATLANTIC REGION

5.3.1 The NAT SPG was informed about changes related to Chapter 2 – detailed procedures of the Gander Oceanic Area Control Centre (OACC), that would be required to the *Air Traffic Management Operational Contingency Plan - North Atlantic Region* (NAT Doc 006), as provided by Canada.

5.3.2 Based on the above, the following was endorsed:

NAT SPG Conclusion 56-2/8 – PfA to NAT Doc 006, Part I, Detailed Procedures – Gander OACC

That,

a) the proposal for amendment to the *Air Traffic Management Operational Contingency Plan - North Atlantic Region* (NAT Doc 006, Part I), related to Chapter 2 - Gander OACC be endorsed (**Appendix I** refers); and;

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

5.4 NAT DOC 007 - NAT OPERATIONS AND AIRSPACE MANUAL

5.4.1 The NAT SPG was presented with proposed amendments to the *North Atlantic Operations and Airspace Manual* (NAT Doc 007) related to the removal of the HO NDB (Hopedale Non-directional Beacon), the NOROTS (Northern Organized Track Structure) and NCA (Northern Control Area) and the upcoming elimination of "turbojet" in the PANS-ATM (Doc 4444) with reference to Mach number technique.

5.4.2 The following was endorsed:

NAT SPG Conclusion 56-2/9 – PfA to NAT Doc 007 addressing the removal of the HO NDB (Hopedale Non-directional Beacon), NOROTS (Northern Organized Track Structure) and NCA (Northern Control Area) and the upcoming elimination of "turbojet" in PANS-ATM with reference to Mach number technique

That,

a) the proposal for amendment to the *North Atlantic Operations and Airspace Manual* (NAT Doc 007) be endorsed (**Appendix J** refers); and

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

5.4.3 The NAT SPG was also presented with proposed amendments related to clarifying the different voice communication requirements in NAT Doc 007 and harmonising the different aeronautical information publications (AIP) were presented. It was noted that the United States had concerns with reference to the term "special event flights" due to the ambiguity of the phrase and the potential increase of High Frequency (HF) relief requests. In principle the United States agreed to the term, however, it would closely monitor any negative impact that may arise due to the ambiguous language and report to the next NAT IMG if necessary.

5.4.4 Based on the above, the following was endorsed:

NAT SPG Conclusion 56-2/10 –PfA to Doc 007 to clarify the NAT Region HF requirements

That,

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

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

5.5 NAT DOC 010 - NAT CONSOLIDATED REPORTING RESPONSIBILITIES HANDBOOK

5.5.1 The NAT SPG was presented with proposed amendments to the *North Atlantic Consolidated Reporting Responsibilities Handbook* (NAT Doc 010) to reflect the State reporting responsibilities using the North Atlantic Reporting Application (NERA) .

5.5.2 The following was endorsed:

NAT SPG Conclusion 56-2/11 –*NAT Consolidated Reporting Responsibilities Handbook* (NAT Doc 010)

That,

a) the proposal for amendment to the *NAT Consolidated Reporting Responsibilities Handbook* (NAT Doc 010) be endorsed (**Appendix L** refers); and

b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to promulgate the amended NAT Doc 010.

5.6 NAT OPS BULLETIN 2017_004 - NAT DATA LINK SPECIAL EMPHASIS ITEMS (SEI)

5.6.1 The NAT SPG was presented with proposed amendments to the NAT OPS Bulletin 2017_004 "*NAT Data Link Special Emphasis Items (SEI)*" to further emphasize the proper loading and execution of air traffic control (ATC) CPDLC route clearance uplinks.

5.6.2 The following was endorsed:

NAT SPG Conclusion 56-2/12 –Revision of NAT OPS Bulletin 2017_004 - *NAT Data Link Special Emphasis Items (SEI)* to Include CPDLC Route Uplink Messages

That,

a) the proposed revisions to NAT OPS Bulletin 2017_004 - *NAT Data Link Special Emphasis Items (SEI)* be endorsed (**Appendix M** refers); and

b) the ICAO Regional Director, Europe and North Atlantic, take appropriate action to update and publish NAT OPS Bulletin 2017_004 Rev 1.

5.7 NAT OPS BULLETIN 2016_001 - RE-NAMING OF THE NAT MNPSA TO NAT HLA

5.7.1 The NAT SPG was informed by the Lead of the NAT Doc 7030 Review Project Team that the NAT OPS Bulletin 2016_001 *"Re-naming of the NAT MNPSA to NAT HLA"*, published on 4 February 2016, contained information concerning the Minimum Navigation Performance Specifications (MNPS) to Performance Based Navigation (PBN) transition and the re-naming of the NAT MNPS Airspace (MNPSA) as the NAT High Level Airspace (NAT HLA). This OPS Bulletin had in its Attachment a Proposal for Amendment (PfA) to the NAT *Regional Supplementary Procedures* (NAT SUPPs, Doc 7030) that was developed by the NAT MNPS to PBN transition task force, approved by NAT IMG/47 and endorsed by the NAT SPG members by correspondence.

5.7.2 During the NAT Doc 7030 review it was discovered that the actual ICAO NAT SUPPs (Doc 7030) amendments that were approved on 20 September 2016 as contained under cover of State letter ref: EUR/NAT 16-0481.TEC were different from those that had been initially proposed by the NAT SPG. As NAT OPS Bulletin 2016_001 therefore contained out-of-date and misleading information, it was agreed that the NAT OPS Bulletin 2016_001 should be removed from the ICAO Paris website.

5.7.3 Based on the foregoing, the following was agreed:

NAT SPG Conclusion 56-2/13 –Deletion of NAT OPS Bulletin 2016_001

That the ICAO Regional Director, Europe and North Atlantic, take immediate action to remove the NAT OPS Bulletin 2016_001 - *Re-Naming of the NAT MNPSA to NAT HLA* from the ICAO EUR/NAT public website.

5.7.4 In addition, the NAT SPG requested that the ICAO Secretariat (together with ICAO Headquarters) and the respective NAT SPG Subgroups establish the appropriate mechanisms to monitor changes to the NAT SPG agreed proposals for amendments to the NAT SUPPs and corresponding NAT documentation.

6. WORK PROGRAMME INCLUDING SUB-GROUPS

6.1 ORGANISATION OF NAT MEETINGS IN 2021

6.1.1 The NAT SPG reviewed the list of planned meetings for 2021. In view of the uncertainties for travel linked with the ongoing COVID-19 crisis, it was agreed that all NAT SPG and Subgroup Meetings for the first half of 2021, including the first session of the NAT SPG/57, be conducted virtually.

6.1.2 The NAT SPG Chairperson pointed out that the Group needed to focus on what had worked well during the COVID-19 crisis, how the NAT SPG could improve the current processes to further enhance the work programme for the NAT Region, where the NAT SPG structure could be enhanced and which lessons learnt the Group needed to address in the future.

6.1.3 With regard to a possible face-to-face NAT SPG/57 meeting at the end of 2021, IATA requested that the Group consider organising the NAT SOG, or potentially the next Atlantic Coordination Meeting (ACM/3) at ICAO Headquarters in Montreal, Canada, back-to-back with the NAT SPG meeting in order to reduce travel costs for participants.

7. ANY OTHER BUSINESS

7.1 NEXT MEETING

7.1.1 It was agreed that a first session of NAT SPG/57-1 be conducted by virtual meeting during the week of 21 to 24 June 2021.

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APPENDIX A — LIST OF PARTICIPANTS

(Paragraphs 0.2 and 0.3 refer)

CANADA

Jeff DAWSON*

Jean-Pierre COTÉ

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Paul KENNEDY

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Carlos ALVES

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Jennifer KILEO

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(Paragraph 0.3 refers)

To be included only on Restricted Website of NAT SPG

APPENDIX B — LIST OF MEETING DOCUMENTATION

(paragraph 0.5 refers)

WP / IP# FL /PPT	*Ag item*	*Title*	*Presented by*
WP01	0	Draft Agenda	Secretariat
WP02	5	NAT OPS Bulletin 2018_003 Waypoint Insertion/Verification SEI	Secretariat
WP03	3, 4	HMS Financial Assessment Project Team Interim Report	Secretariat
WP04	3	NAT Annual Safety Report (ASR) 2019	Secretariat
WP05	5	Deletion of NAT OPS Bulletin 2016_001	Iceland
WP06	2, 3	Extension of the NAT DLM temporary accommodation	IATA
IP01	0	Meeting schedule	Secretariat
IP02	0	Meeting documentation	Secretariat
IP03	1	Cybersecurity Action Plan (ICAO SL 20/114 of 5 November 2020)	Secretariat
IP04	1	Volcanic ash exercises	Secretariat
PPT01	All	General Items and NAT SPG Draft Conclusions for approval	Secretariat
FL01	3	In support of PPT/01, slide #22 & 23 - Use of CPDLC route clearance uplinks to reduce gross navigation errors	Iceland

APPENDIX C — NAT DATA LINK MANDATE TEMPORARY ACCOMMODATION PROJECT TEAM - DATA ON TRAFFIC PERCENTAGE COMPARED TO 2019 AND PERCENTAGE OF NON EQUIPPED FLIGHTS AT DLM LEVELS

(paragraph 2.1.2 refers)

Data Collection – 2020 vs. 2019

% Traffic (ref. same month 2019)						
	Month (2020)					
FIR	July	August	September	October	November	December
Santa Maria	31,9%	31%	33,8%	44,9% (35,6% if just overflights)	47,4% (40,4% if just overflights)	53,2% (42,6% if just overflights)
Shanwick	26%	31%	32%	35,9%	43,2%	43,5%
Gander	28%	32%	32%	37%	42%	46%
Reykjavik	28%	30,1%	32,2%	37%	34,7%	41,3%
New York	22,7%	25,3%	34,4%	41,6%	42,9%	49,9%

Data Collection - Non DL Traffic at DLM levels

% Non DLM traffic at DLM levels (Benefit)						
	Month (2020)					
FIR	July	August	September	October	November	December
Santa Maria	2,8% (excluding Azores and Tangos)	23,8% (1,2% excl. Tangos & domestic)	17,8% (1,5% excl. Tangos & domestic)	16,6% (2,1% excl. Tangos & domestic)	18,3% (2,8% excl. Tangos & domestic)	16,1% (2,5% excl. Tangos & domestic)
Shanwick	9,2%	4,9% (excl. T9 & T290)	4,0% (excl. T9 & T290)	4,5% (excl. T9 & T290)	5,3% (excl. T9 & T290)	10,7% (excl. T9 & T290)
Gander	3,1%	3%	3% (undiluted)	4,4%	3,4%	3,5%
Reykjavik	12,3%	9,1%	7,31%	6,5%	6,9%	8,9%
New York	2,4%	1,7% (excluding flts that do not enter NAT DLM)	1.3% (excluding flts that do not enter NAT DLM)	1,7% (excluding flts that do not enter NAT DLM)	2,7% (excluding flts that do not enter NAT DLM)	2,0% (excluding flts that do not enter NAT DLM)

APPENDIX D — UPDATE TO NAT OPS BULLETIN 2018_003 - *WAYPOINT INSERTION/VERIFICATION SEI*

(paragraph 2.2.3 refers)

NAT OPS BULLETIN

Serial Number: **2018_003_Revision 1** **Issued: xx MM 2021**
Subject: **Waypoint Insertion / Verification Special Emphasis Items** **Effective: xx MM 2021**
Originator: **NAT SPG**

The purpose of this North Atlantic Operations (NAT OPS) Bulletin is to provide guidance to North Atlantic (NAT) operators on material to be included in pilot and dispatcher training programs and operations manuals with the intent of raising pilot and dispatcher awareness of the importance of following existing procedures where half degree waypoint identifiers are used.

Any queries about the content of the attached document should be addressed to:

ICAO EUR/NAT Office: ***icaoeurnat@paris.icao.int***

NOTICE

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NAT OPERATIONS BULLETIN – WAYPOINT INSERTION / VERIFICATION SPECIAL EMPHASIS ITEMS

1. INTRODUCTION

1.1 **Operator attention is directed to Attachment A**. It provides a "quick reference" for the Special Emphasis Items contained in this bulletin. It is intended to be used as a job aid for operators developing pilot and dispatcher training material.

1.2 The following is an explanation of the terms "should", "must" and "shall" as used in this bulletin.

a) "Should" is used to indicate a recommended practice or policy that is considered as desirable for the safety of operations.

b) "Shall" and "must" are used to indicate a practice or policy that is considered as necessary for the safety of operations.

1.3 **Special Emphasis Items for Operators**. The Special Emphasis Items (SEI) listed below should be incorporated into operator training programs and operations manuals with the intent of raising pilot and dispatcher awareness of the importance of following procedures in an environment where half degree waypoints are applied. Each SEI is followed by an explanation of the factors leading it to be identified as an SEI.

2. PILOT TRAINING ON MAP AND FMC DISPLAYS OF HALF DEGREE AND WHOLE DEGREE WAYPOINTS:

2.1 To mitigate misinterpretation of waypoint coordinates, operator initial and re-current training programs and operations manuals must incorporate training and guidance to enable pilots to understand map and FMC displays of half degree and whole degree waypoints regardless of the waypoint format being used for waypoint FMC input.

Explanation

a) Map displays and certain FMC pages generally do not display full waypoint degrees **and** minutes, e.g. when the full 13 latitude/longitude characters are used to insert half degree waypoints. See Figure 1 and Figure 2 in **Attachment B**.

3. AIRCRAFT NAVIGATION DATABASE (NDB) WAYPOINT IDENTIFIERS:

3.1 In 2015, Canada, the United Kingdom (UK), and Iceland published Aeronautical Information Circulars (AIC) strongly advocating that aircraft NDB vendors and flight planning services not provide operators with half-degree waypoint identifiers in the ARINC 424, paragraph 7.2.5. "N-prefix" format (e.g., N5250 = 52º30' NORTH 050º00'WEST). (See Canada AIC 23/15 (23 July 2015), UK AIC 059/2015 (9 July 2015) and AIP Iceland ENR 1.3.1.2).

3.2 NAT operators should use a full latitude/longitude (e.g., 13-character) input for waypoints containing both half-degree and whole degrees of latitude and whole degrees of longitude.

3.3 NAT operators **with an operational need to populate the aircraft NDB** with a 5-character waypoint identifier should ensure that the aircraft NDB vendors and flight planning services use an alternate half-degree of latitude 5-character format such as Hxxyy, where xx = degrees and 30 minutes of NORTH latitude and yy = degrees of WEST longitude (e.g., H5250 = 52º30' NORTH 050º00' WEST). (It is recognized that, for whole degree waypoint inputs, such operators will likely continue using the ARINC 424, 7.2.5 "N-suffix" format (e.g., 5250N = 52º 00' NORTH 050º00'WEST)).

3.4 The CPDLC route clearance will be uplinked in a full Lat/Long format that will be unfamiliar to the flight crews using an ARINC 424, 7.2.5 format. **Operators with an operational need to populate**

the aircraft NDB with a 5-character waypoint identifier format need to ensure flight crews are properly trained on the use of the full Lat/Long waypoint format in uplink messages. They must also emphasize the necessity for proper waypoint verification procedures.

Explanation

a) Half-degree waypoint identifiers in the ARINC 424, paragraph 7.2.5 "N-prefix" format have led to a number of Gross Navigation Errors (GNEs) and Lateral Deviations. The guidance for waypoint insertion in this document is intended to remove the potential for such errors. They occur when a pilot intending to input a waypoint defined by a half-degree of latitude inadvertently loads a waypoint containing a whole-degree of latitude, or vice versa, because the "N" is not loaded in the correct pre-fix or suffix position.

3.5 Oceanic Clearances containing a re-route issued by voice/OCL may include half-degree waypoints. Operators should ensure that their flight crew procedures and associated training are sufficiently robust to mitigate against navigational error due to waypoint insertion errors.

3.6 NOTE - Flight Crews are reminded they have the option to respond "UNABLE" to an oceanic re-route and negotiate with ATC accordingly.

4. PILOT PROCEDURES FOR VERIFYING WAYPOINT DEGREES AND MINUTES INSERTED INTO AIRCRAFT NAVIGATION SYSTEMS:

4.1 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. (The "Sample Oceanic Checklist" NAT OES Bulletin refers).

4.2 Regardless of FMC waypoint format and entry method, 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.

- During pre-flight long-range navigation system (LRNS) programming, both pilots 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.
- Upon receipt of a revised oceanic clearance (i.e., one not conforming to the flight planned route), both pilots independently verify the full latitude and longitude coordinates of "un-named" (Lat/Long) waypoints defining the route contained in the revised oceanic clearance.
- Approaching an oceanic waypoint, one pilot should verify the full latitude and longitude coordinates of that waypoint in the FMC, the NEXT and NEXT +1 waypoints, while the other pilot crosschecks the latitude and longitude coordinates against the master flight plan/oceanic clearance.

Explanation

a) Due to the factors in the map and FMC display of half degree and whole degree waypoints, it is imperative that pilots follow the procedure in this document to avoid lateral errors caused by incorrect insertion of waypoints. Verification of the full DEGREES and MINUTES of oceanic waypoints loaded into the FMC is a critical step in ensuring a proper navigational load.

5. PILOT TRACK AND DISTANCE CHECK:

5.1 It is strongly recommended that pilot pre-flight and in-flight procedures call for the pilot to compare the track and distance between waypoints shown on the Computer Flight Plan (CFP) to those displayed by the FMC. (The NAT "Sample Oceanic Checklist" Bulletin refers).

5.2 Pilots should be aware that waypoint insertion errors of half degree of latitude may in some cases

result in only small differences in track and distance, however, the track and distance check can help prevent waypoint insertion errors of one degree or more that have been observed in oceanic operations.

Note: the currency of magnetic variation tables loaded into aircraft navigation databases and the point at which the track is measured affect the track displayed on the FMC by as much as ±3 degrees.

Explanation

a) This check remains valuable because waypoint insertion errors are **not** limited to half degree errors and waypoint insertion errors of one degree or more have been observed in oceanic operations. Waypoint insertion errors of half degree produce a small difference in leg segment track and distance, however, as noted above, waypoint insertion errors are not limited to half degree.

6. PILOT ACTION WHEN NOTIFIED BY ATC OF POSSIBLE DEVIATION FROM CLEARED TRACK:

6.1 Flight crews are advised that, should they be notified that ATC systems indicate the aircraft is not flying the cleared route, they should immediately display the full degrees and minutes loaded into the FMC for the NEXT and NEXT + 1 waypoints, and verify against the cleared route before responding.

Voice message example:

"SHANWICK CONFIRMS YOUR POSITION REPORT INDICATES INCORRECT ROUTING. CHECK FULL DEGREES AND MINUTES LOADED INTO FMC. YOUR CLEARED ROUTE IS [route]"

CPDLC message example:

"YOUR POSITION REPORT INDICATES INCORRECT ROUTING. CHECK FULL DEGREES AND MINUTES LOADED INTO FMC. YOUR CLEARED ROUTE IS [route]."

6.2 When ATC notifies the pilot that the aircraft has indicated it has already deviated from the cleared track (UM169f: ADS-C INDICATES OFF ROUTE. ADVISE INTENTIONS), the pilot shall immediately display the full DEGREES and MINUTES loaded into the FMC for the NEXT waypoint, and verify against the cleared route.

Explanation

a) Due to the factors in the map and FMC display of half degree and whole degree waypoints, it is imperative that pilots follow the procedure in this document to avoid lateral errors caused by incorrect insertion of waypoints. Verification of the full DEGREES and MINUTES of oceanic waypoints loaded into the FMC, when notified by ATC of possible deviation from cleared track, is a critical step in ensuring a proper navigational load.

7. WEBSITES

7.1 The ICAO EUR/NAT Office Website is at: **www.icao.int/eurnat**. Click on **EUR & NAT Documents** >> **NAT Documents** to obtain NAT Operations Bulletins and related project planning documents.

8. CONTACTS

8.1 The following may be contacted for information or to provide feedback: **icaoeurnat@paris.icao.int**

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ATTACHMENT A – SUMMARY OF SPECIAL INTEREST ITEMS CONTAINED IN THIS NAT OPS BULLETIN

1. *Aircraft Navigation Database (NDB) Waypoint Identifiers:*

Canadian AIC 23/15, UK AIC 059/2015 and AIP Iceland ENR 1.3.1.2 strongly advocate that aircraft NDB vendors and flight planning services **not** provide operators with **half-degree** waypoint identifiers in the ARINC 424, paragraph 7.2.5 "N-prefix" format (e.g., *N5250 = 52°30' NORTH 050°00'WEST).*

NAT operators should use a full latitude/longitude (e.g., 13-character) input for waypoint coordinates. NAT operators **with an operational need to populate the aircraft NDB** with a 5-character waypoint identifier should ensure that the aircraft NDB vendors and flight planning services use an alternate half-degree of latitude 5-character format e.g., H5250 = *52°30' NORTH 050°00' WEST* (paragraph 3 refers)

2. *Pilot Training on Map and FMC Displays of half Degree and Whole Degree Waypoints:*

Operator initial and re-current training programs and operations manuals must have incorporated training and guidance to enable pilots to understand map and FMC displays of half degree and whole degree waypoints (paragraph 2 and **Attachment B** Figure 1 and Figure 2 refer).

3. Pilot Procedures for Verifying Waypoint Degrees and Minutes Inserted into Aircraft Navigation *Systems:*

Pilot Pre-flight and In-flight procedures must call for each pilot to independently display and verify the DEGREES **and** MINUTES loaded into the Flight Management Computer (FMC) for the "un-named (Lat/Long) waypoints defining the cleared route of oceanic flight. This procedure is necessary regardless of the FMC waypoint input format being used. Procedures must call for both pilots to independently verify the waypoint coordinates inserted and concur on their accuracy prior to route activation.

4. *Pilot Track and Distance Check:*

It is strongly recommended that pilot pre-flight and in-flight procedures call for the pilot to compare the track and distance between waypoints shown on the Computer Flight Plan (CFP) to those displayed by the FMC.

Pilots should be aware that waypoint insertion errors of half degree of latitude may in some cases result in only small differences in track and distance, however, the track and distance check can help prevent waypoint insertion errors of one degree or more that have been observed in oceanic operations.

Note: the currency of magnetic variation tables loaded into aircraft navigation databases and the point at which the track is measured affect the track displayed on the FMC by as much as +/- 3 degrees.

5. *Pilot Action When Notified By ATC of Possible Deviation From Cleared Track:*

When ATC notifies the pilot that ATC systems indicate that the aircraft is not flying the cleared track, the pilot shall immediately display the full DEGREES and MINUTES loaded into the FMC for the NEXT waypoint, and verify against the oceanic clearance.

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ATTACHMENT B – EXAMPLE FMC AND MAP DISPLAYS (PARAGRAPH 2 REFERS)

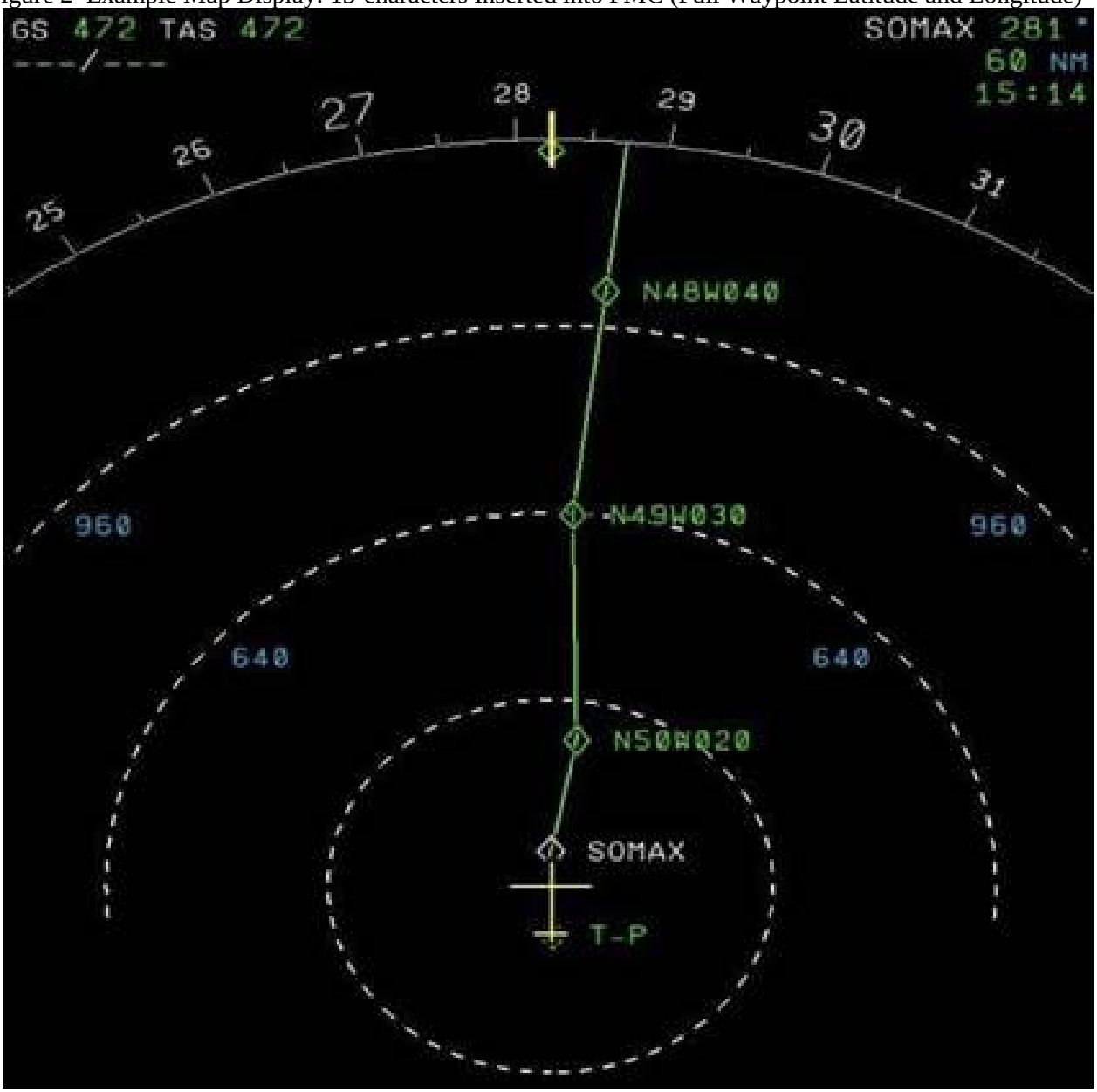
Note: Figure 1 *and* Figure 2 *are intended to support paragraph 2 (Pilot training on Map and FMC Displays of half and Whole Degree Waypoints).* **The figures emphasize that** f**or a large number of aircraft, the input of waypoints containing whole degrees of latitude and waypoints containing half-degrees of latitude will result in identical 7-character FMC and waypoint map displays.**

Figure 1 Example FMC Display: Full Waypoint Latitude and Longitude (13-characters) inserted into FMC

1. 52 degrees-30 minutes North latitude, 20 degrees West longitude inserted into the FMC using full latitude and longitude degrees, minutes and seconds (i.e., 13 characters)

2. The waypoint IDENT is truncated to 7 characters with **no display of minutes of latitude.**

Figure 2 Example Map Display: 13-characters Inserted into FMC (Full Waypoint Latitude and Longitude)



1. 50 degrees-30 minutes North, 20 degrees West is displayed in 7 characters (N50W020).

2. **Minutes of latitude are not displayed.**

3. The Map display would be the same for 50 degrees-00 minutes North, 20 degrees West.

— END —

APPENDIX E — *2019 NORTH ATLANTIC ANNUAL SAFETY REPORT*

(*paragraph 3.1.3 refers*)

Starts on next page

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ICAO

SAFETY

NORTH ATLANTIC SYSTEMS PLANNING GROUP (NAT SPG)

2019 Annual Safety Report

2020 Edition

Safety Policy

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

Objective

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

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

Guiding Principles

The NAT SPG will act to:

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

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

Executive Summary

The North Atlantic Region's seventh annual safety report is issued by ICAO's North Atlantic (NAT) Systems Planning Group (NAT SPG). This report covers calendar year 2019, but is written at a time when the global traffic picture in 2020 has been decimated by a global health crisis. While the report will stand as a record of 2019's performance, the integrity of the contributing data may not fully reflect the actual performance and will be subject to review once the health picture allows a level of "normal" business to resume. As such, those reading this report may need to take that into account, when using the data contained within.

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 2019 was 2,063,908, a slight reduction in that reported in 2018. Until the onset of SARS COVID-19, traffic had predicted to grow at a rate of 2.4% between 2020 and 2024. Although the impacts of COVID-19 on our industry are not fully understood, it is not expected that a return to traffic levels seen in 2019 will be seen again for some years.

Safety performance in the NAT HLA is monitored by the measures and targets associated with a set of 12 Safety Key Performance Indicators (SKPIs). The targets are typically set using three years of rolling data. Six (6) of the SKPIs have met their target in 2019. Improvements were seen in the following SKPIs:

- The percentage of long duration large height deviations (LHDs) events has reduced steadily.
- The rate of LHDs where datalink was not in use has reduced.
- The number of minutes spent at the wrong flight level for aircraft not using datalink has also reduced.

The measures supporting the SKPIs are benchmarked against a three-year rolling average resulting in the associated targets being adjusted year on year. In some instances, where data link was in use, safety performance appears degraded in 2019 when comparing with previous years. No specific operational causes have been identified that could result in the change in performance status. The change is primarily attributed to refinements and improvements in the measurement of flight hours and other supporting mathematical processes, data analysis and the increased operational use of data link. The NAT Safety Oversight Group will continue to monitor trends and contributory factors identified by the NAT Scrutiny Group.

The vertical collision risk estimate (CRE) for 2019 was calculated to be 52.6 x 10^{-9} fapfh for all NAT HLA. In 2018 this figure was 76.4 x 10^{-9} fapfh and represents an improvement of approximately 30%. This year's CRE can be reduced further by 77% to 12.0 x 10^{-9} fapfh by taking into account the use of the strategic lateral offset procedure (SLOP).

The lateral CRE for 2019 marginally reduced in 2019 compared to 2018 at 13.6 x 10^{-9} fapfh

The number of scrutinized events in 2019 and the type of event being scrutinized were similar in volume to those reported in 2018. In 2019, Flight plan vs clearance remained at the top of the list of contributors at 30% of the total although of the 80 reported, 49 were prevented by ATC. Remaining in the top five contributing factors are ATC coordination errors (11% vs 14% in 2018) and not adhering to ATC clearances (13% vs 10% in 2018). Weather premieres in the top five (17%)

While the use of "NEXT and NEXT +1" and "CONFIRM ASSIGNED ROUTE" again showed their worth as powerful mitigations, the introduction of ADS-B in the NAT in March 2019 also introduced benefits through enhanced controller conformance monitoring tools such as Cleared Flight Level vs Selected Flight Level (CFL/SFL) alerts and Route Assignment Monitoring (RAM) giving controller tools to intervene to reduce risk where errors occur. Performance in the 2nd half of 2019 was demonstrably improved as a result.

The North Atlantic Scenario

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

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

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

Communication is, to a large extent, based on satellite-based data link, also referred to as Controller-Pilot Data Link Communications (CPDLC) and utilization averaged out across the NAT at 83% in 2019 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.

The number of flight hours in the NAT HLA in 2019 was 2,063,908. The NAT Economic, Financial and Forecast Group (NAT EFFG) estimates that in 2019, during the peak week of July 15 to July 21, approximately, 13,733 flights crossed the North Atlantic.

Traffic forecast: The latest traffic forecast released prior to the COVID-19 pandemic pointed out to an annual average growth of 2.4% in the period 2020-2024. The NAT EFFG released a preliminary forecast of total NAT traffic for the period 2020-2025 and also a Reykjavik CTA forecast. The ad-hoc methodology used for this forecast was a weighted average of each ANSP's forecast for traffic through their respective FIR and foresees the recovery of 2019 traffic volumes only by 2024.

Safety Performance Monitoring and Measurement

Note 1: In 2020, 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 and December 2019, even though scrutinized in 2020 by a small group of experts, could not be reviewed by the usual full NAT Scrutiny Group (NAT SG) membership during a face-to-face meeting. The values for safety performance presented in this report for 2019 could therefore be revisited when full face-to-face NAT SG meetings can be reconvened, and are subject to change.

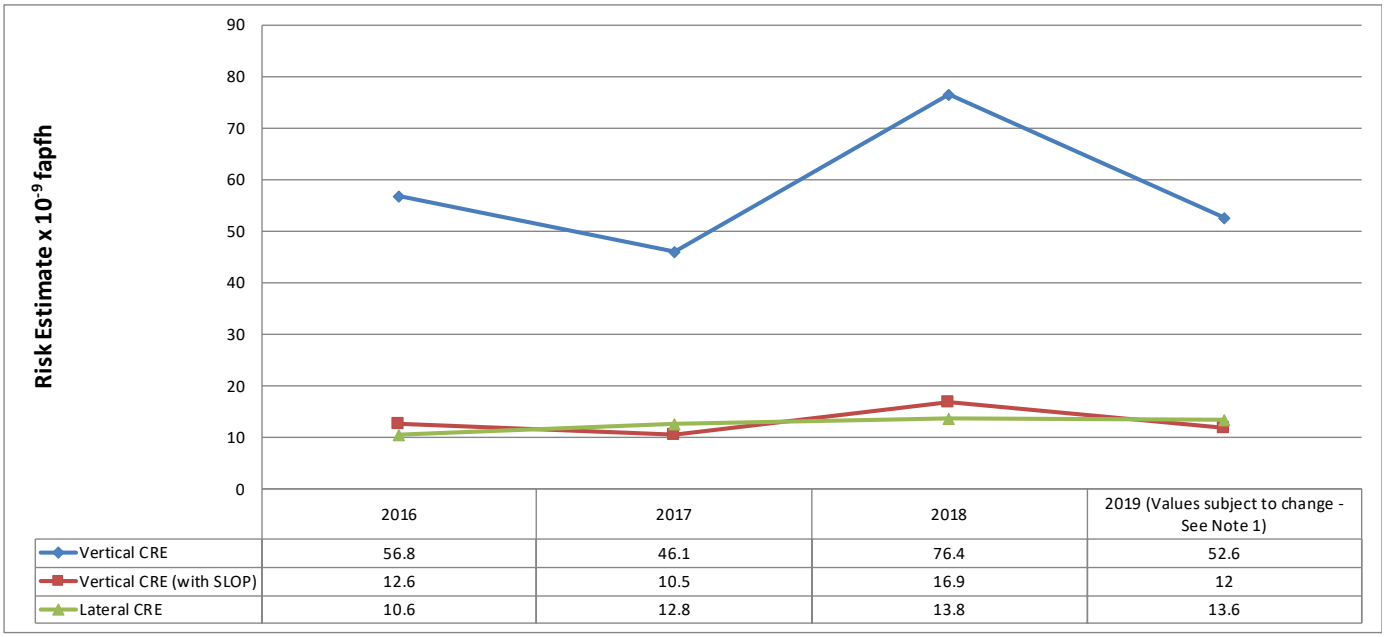
Collision Risk Estimates

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

Estimates of Vertical and Lateral Collision Risk for 2019 in the NAT HLA are based on risk bearing events reported to the NAT Central Monitoring Agency (CMA) for the period January to December 2019. 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 2019 was estimated to be 52.6 x 10^{-9} fapfh for all NAT HLA. Figure 1 shows that this reduces by 77% to 12.0 x 10^{-9} fapfh with SLOP. The Vertical Collision Risk Estimates in 2019 both with the SLOP effect incorporated and without SLOP are lower in comparison to 2018 estimates.

Figure 1 also presents the Lateral Collision Risk for the year 2019, estimated to be 13.6 x 10^{-9} fapfh, which represents a decrease of 1% compared to 2018.



	2016	2017	2018	2019 (Values subject to change - See Note 1)
Vertical CRE	56.8	46.1	76.4	52.6
Vertical CRE (with SLOP)	12.6	10.5	16.9	12
Lateral CRE	10.6	12.8	13.8	13.6

Figure 1: Collision Risk Estimates in the NAT HLA (2016-2019)

Safety Key Performance Indicators (KPIs)

The NAT SPG has established Safety KPIs and associated targets for the NAT HLA. The NAT HLA performance in 2019 is shown the table below. The 2019 figures are shown in green where the performance meets the targets and red otherwise. For those where the information was not available to calculate the baseline, these are left in black.

	Safety KPI	Target		2017 Performance	2018 Performance	2019 Performance
i	Number of accidents	0		0	0	0
ii	Number of fatal accidents	0		0	0	0
iii	Number of fatalities related to aviation fatal accidents	0		0	0	0
	Safety KPI	**Target**	**Previous rolling 3 year period of performance (2016-2017-2018)**	**2017 Performance**	**2018 Performance**	**2019 Performance (Values subject to change – See Note 1)**
iv	Rate of LHD events (No of LHD events divided by No of flight hours flown in the NAT region), involving operations with Data Link in use	Reduction over previous rolling three-year period of performance compared to 2015-2016-2017 baseline	1.85×10^{-5}	2.67×10^{-5}	2.87×10^{-5}	**3.59×10^{-5}**
v	Rate of LHD events (No of LHD events divided by No of flight hours flown in the NAT region), involving operations with Data Link not in use	Reduction over previous rolling three-year period of performance	1.09×10^{-5}	1.20×10^{-5}	7.18×10^{-6}	**3.39×10^{-6}**
vi	Percent of Long Duration[2] LHD events	Reduction over previous rolling three-year period of performance	3.36%	0.00%	2.67%	**2.47%**
vii	Rate of minutes that aircraft, with Data Link in use, spent at the wrong flight level (Amount of minutes spent at the wrong flight level divided by total duration of flights in minutes)	Reduction over previous rolling three-year period of performance	6.44×10^{-7}	8.63×10^{-7}	6.95×10^{-7}	**9.45×10^{-7}**
viii	Rate of minutes that aircraft, with Data Link not in use, spent at the wrong flight level (Amount of minutes spent at the wrong flight level divided by total duration of flights in minutes)	Reduction over previous rolling three-year period of performance	1.22×10^{-6}	4.91×10^{-7}	1.05×10^{-6}	**2.34×10^{-7}**
ix	Rate of GNE events (No of GNE events divided by No of flight hours flown in the NAT region) , involving operations with Data Link in use	Reduction over previous rolling three-year period of performance	N/A	6.54×10^{-6}	$^{1}.72 \times 10^{-5}$	**1.11×10^{-5}**
x	Rate of GNE events (No of GNE events divided by No of flight hours flown in the NAT region), involving operations with Data Link not in use	Reduction over previous rolling three-year period of performance	N/A[3]	5.45×10^{-6}	4.79×10^{-6}	**6.78×10^{-6}**
xi	Rate of losses of separation (vertical) (No of losses of separation events divided by No. of flight hours flown in the NAT region)	Reduction over previous rolling three-year period of performance compared to 2015-2016-2017 baseline	9.99×10^{-6}	1.14×10^{-5}	9.58×10^{-6}	**1.02×10^{-5}**
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 compared to 2015-2016-2017 baseline	N/A[3]	4.91×10^{-6}	3.83×10^{-6}	**8.72×10^{-6}**

Table 1: Safety Key Performance Indicators (SKPIs) and associated targets (2017-2019)

1 - The flight hours flown value for 2019 and 2018 calculations use the actual flight hours, whereas, for the previous years, the figures were calculated using the estimated flight hours of 3.25 hours per aircraft.
2 - Long Duration LHD event means an event unprotected by ATC for 20 minutes or more, based on a threshold established after review of historical data reported to the NAT CMA
3 - The 2016-2018 rolling 3-year baseline targets for lateral SKPIs are not available because of changes in methodology and data capture that occurred in 2017, rendering 2016 SKPIs not comparable to the ones of 2017 and 2018..

Scrutiny of events

The NAT SG reviewed a total of 266 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 2019. These events were categorized as follows:

- 83 Large Height Deviations (LHDs)
- 118 actual lateral deviations, including:
  - 42 GNEs and
  - 44 ATC Interventions where when the Air Traffic Controller (ATCO) caught and corrected a lateral deviation before it developed into a GNE
- 73 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.

During 2019, the NAT CMA transitioned from using multiple data sources to the NAT Event Reporting Application (NERA) as the single repository for the reporting, review and analysis of operational occurrence reports.

The NERA database was developed and is maintained by Isavia on behalf of the NAT CMA. The new application has given the NAT CMA and the NAT SG greater accuracy in recording data and improved flexibility in identifying causal and human factors which contributed to the cause and magnitude of operational events, in addition to the mitigations applied to prevent or reduce the magnitude of a deviation.

The review of these 266 events of 2019 showed that the top 10 contributing issues were:

1. *Flight Plan vs. Clearance* where flying, or intending to fly the planned route instead of the cleared route contributed in 80 (30%) of the events of 2019. In most cases (49 out of the 80), deviations did not actually occur as they were prevented by an ATCO.
2. *Weather* where weather conditions experienced during the flight contributed in 46 (17%) of the events of 2019.
3. *Did not adhere to ATC clearances* in either the vertical or the lateral dimension where a crew, for no identifiable reason, operated a flight profile different to the ATC clearance (e.g. changed vertical profile or routed to a different waypoint which was not contained in the clearance or the filed flight plan or due to contingency) contributed to 35 (13%) of the 2019 events.
4. *ATC coordination* where an error occurring during the coordination between two ATC sectors or ANSPs contributed in 29 (11%) of the events of 2019. In more than a third of those cases, deviations did not actually occur as they were prevented by an ATCO.
5. *Pertinent message not actioned by ATC*, where ATC inaction on receipt of a pertinent message contributed in 25 (9%) of the events of 2019 (e.g. a system-generated conformance alert was not actioned or erroneously discarded).
6. *CPDLC Uplink messages*, where crew misunderstood or misread a CPDLC uplink message, or indicated an issue with their CPDLC contributed in 23 (9%) of the 2019 events. In almost half of those cases (10 out of 23), deviations did not actually occur as they were prevented by an ATCO.
7. *Equipment*, where a ground-based, an airborne or a datalink system equipment issue contributed in 18 (7%) of the 2019 events.
8. *Waypoint updating* involving waypoint entry or deletion errors by flight crews contributed to 15 (6%) of the events of 2019.

9. *Dispatch*, where a flight plan issue contributed in 14 (5%) of the 2019 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.
10. *Readback/Hearback*, where incorrect read back or hear back of a clearance contributed in 13 (5%) of the 2019 events. This can for example be when crew readback an incorrect clearance which was not picked up by the receiving ATC Unit.

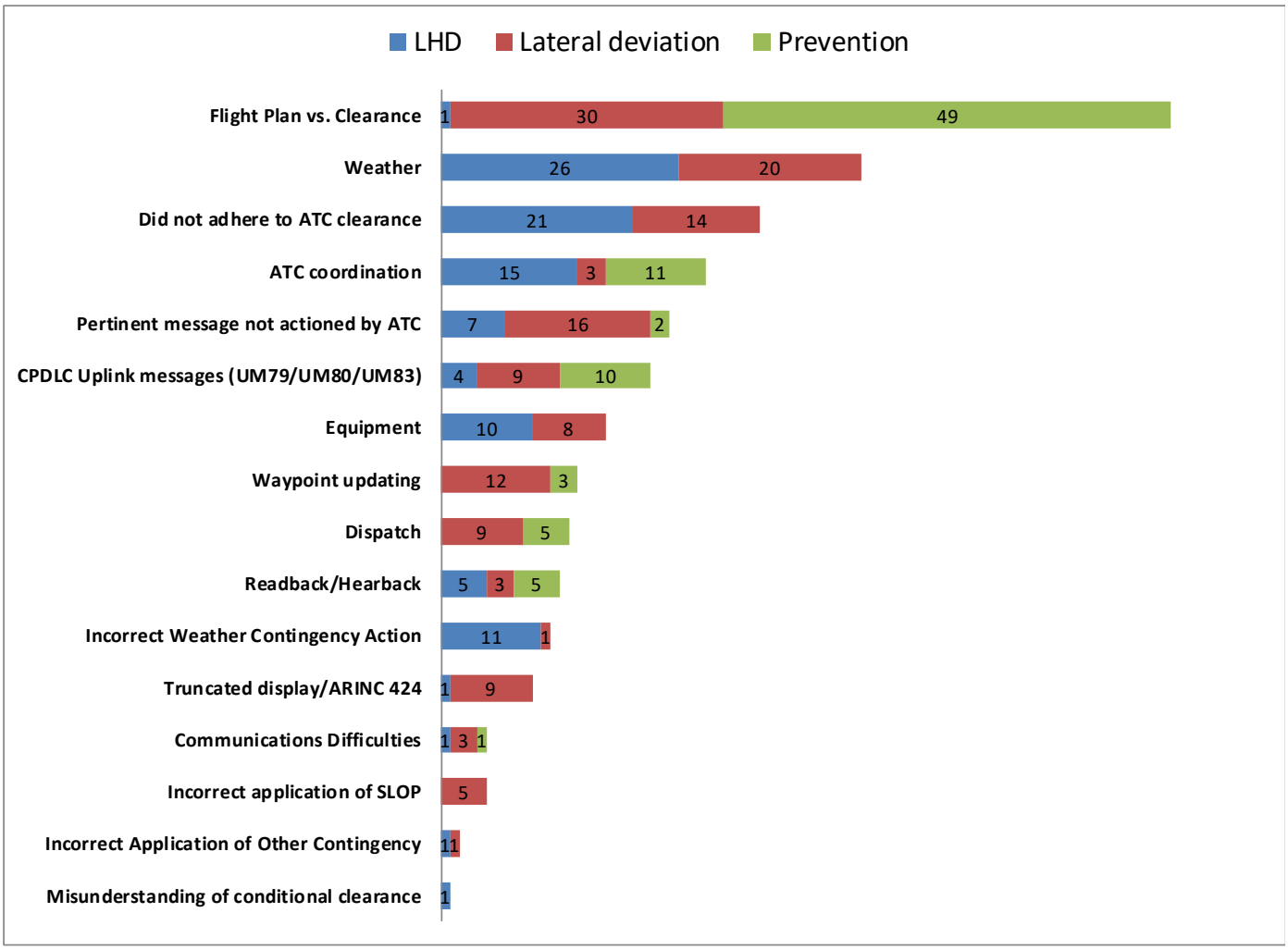


Figure 2: Contributing issues to events in the NAT HLA in 2019 (subject to change – see Note 1)

Prevented deviation events 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.

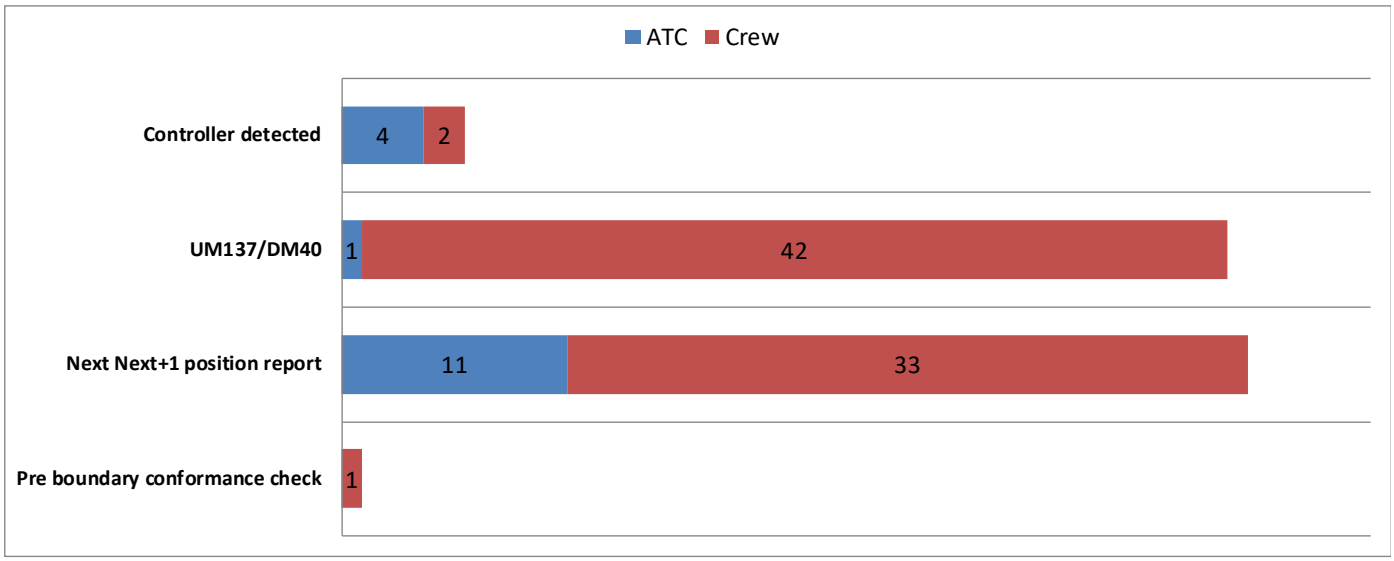


Figure 3: Mitigations used for prevented deviation events in 2019 (subject to change – see Note 1)

NAT Regional Priorities

In the NAT, 2019 was defined by significant operational transitions that not only delivered immediate positive impacts in safety performance in the North Atlantic as evidenced in the safety performance measures, and immediate service performance improvements as evidenced through the regular service updates, but also delivered a platform from which future benefits can be enabled.

In March 2019, the widespread availability and use of Spaced-based Automatic Dependent Surveillance – Broadcast (SB ADS-B) was deployed through Aireon's low Earth orbit (LEO) technology and delivered a "radar-like" capability to enhance extant procedural controlling techniques in large parts of the North Atlantic. The technology enabled a significant reduction in longitudinal separation between equipped aircraft from March and then reduced the required lateral separation in October.

During 2019, the NAT continued its' efforts in evaluating the Performance Based Communication Surveillance (PBCS) implementation and performance monitoring in the NAT region by measuring and assessing data link performance against the RSP180/RCP240 requirements. The aggregated actual surveillance performance (ASP) and actual communication performance (ACP) within the NAT region, combining the SAT, VHF, HF and transition area performance together, has remained stable for several years. It is noted that the majority of the data is delivered via SATCOM. During 2019, the 95% criteria were met for RSP 180 and RCP240 for the aggregate NAT and for the individual NAT FIRs; and the 99.9% criteria were met for RSP 180 and RCP240 at the currently accepted level of 99.0% for the aggregate NAT and for the individual NAT FIRs. To improve data link network performance in the region, the NAT is working to measure and assess availability by identifying outage impacts through analysis of the ADS-C downlinks and message failures, in conjunction with the notifications received from the CSPs. The NAT member States continue to work with the NAT CMA on the processes involved for monthly non-compliance reporting, coordinating with the regional monitoring agencies (RMAs) and States to develop and refine their processes in the full reporting and corrective action chain.

Separation was reduced as a consequence of significant improvements in the quality and frequency of aircraft position update information from eligible flights allowing controllers to intervene with confidence to prevent a deviation from a protected level or route through the utilization of controller tools only previously available in a radar environment, such as Selected vs Cleared Flight Level alerts (SFL/CFL) or through Route Adherence Messages (RAM).

In successfully delivering the improvements described above, the NAT has begun to leverage emerging technologies in order to realize efficiencies and optimize seamless airspace provision. It has laid the platform for a series of possible improvements over the coming decade as part of the NAT2030 vision.

The NAT 2030 vision is designed to deliver a proportionate series of improvements prioritized and deployed, utilizing the available technology but delivering benefits in terms of both safety and service. The global and industry context and environment will drive the deliverables, but

- It will seek to improve operational flexibility, by reducing the OTS footprint, discontinue the use of oceanic clearances and introduce procedures for the "dynamic airborne rerouting".
- It will strive to improve operational resilience through the development of its contingency procedures and improvements in communication performance all within the context of a developing cyber threat.
- It will embrace emerging technologies and techniques such as formation flights or self-separation and ready itself for new market entrants such as unmanned flight, supersonic or space flight and balloon operations.
- In delivering these priorities, it intends to meet, and where possible exceed safety, service and environmental targets while developing the available metrics to improve their relevance

Conclusion

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. The newly deployed technology along with the combined capability of those within the region to make the best use of it, conspire to make this a pivotal time in the evolution of the NAT in service of that objective.

Appendix A - Glossary

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 F — INFORMATION FROM THE NAT ADS-B HMS PT TO SUPPORT NAT SPG CONSIDERATION OF THE MINIMUM REQUIREMENT FOR PROPER RMA HEIGHT MONITORING IN THE NAT

(*paragraph 4.2.5 refers*)

To support the NAT SPG consideration of the questions raised by the NAT EFFG HMS/FA PT, as presented in NAT SPG/56-2-WP/03, the lead of the NAT ADS-B HMS PT provides the following information:

I. Additional CMA Support for the Development of the System to Process the Data for Height Monitoring Purposes

*2.3 Chapters A, B and C have been drafted and reviewed by the PT (see **Appendix B** of WP/03): With regard to Chapters B and C, the following issues were identified:*
…
a) For Option i (an HMS in collaboration with NAT ANSPs utilising existing ADS-B data):
…
iv. In addition to the ANSP costs to provide the data, there would also be costs associated with the storage of the data and the development of the system to process the data for height monitoring purposes, which would need to be factored in.

1. The system to process the ADS-B aircraft position data for height monitoring purposes would need to be technically robust in order to perform the required functions to convert the high volume of aircraft data into height monitoring data with assured accuracy.

2. The NAT CMA personnel do not have the skillset to develop such a process without suitably skilled support from NAT ANSP experts in this field.

3. A request will be made by the NAT CMA, through the NAT ADS-B HMS Project Team, to the NAT ANSPs in order to enquire:

   a) Would skilled resources be made available to support the NAT CMA in the development of the system to process the data for height monitoring purposes.
   b) If the answer to a) is "YES", could this support be provided with no additional costs recovered by the State or ANSP through the ICAO Joint Financing of the North Atlantic Height Monitoring System Agreement?
   c) If the answer to a) above is "YES" but the answer to b) above is "NO", how much will it cost to provide the support? Please detail all costs involved.

II. Minimum Requirement for Height Monitoring in the NAT

Draft NAT SPG Conclusion 56-2/1 – Minimum Height Monitoring Requirements for the NAT Region

*That, in order for proper height monitoring to be conducted by the NAT Central Monitoring Agency (NAT CMA), the minimum requirements for height monitoring as outlined in **Appendix #** shall apply in the NAT Region.*

A. One of the primary duties of a Regional Monitoring Agency (RMA) is to perform ongoing system performance monitoring as prescribed in **ICAO Doc 9574, Manual on a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive**, and in accordance **with Annex 6 to the Convention on International Civil Aviation**. Ongoing system performance monitoring provides assurance of continued safe use of reduced vertical separation minimum (RVSM) and that established safety goals are met.

B. The question of what was an acceptable level of performance monitoring within the NAT Region has been raised numerous times during the assessments of the suitability of an ADS-B height monitoring system; the level of performance monitoring impacts the volume of ADS-B data, volume of data storage, processing power required for the height monitoring system and workload burden. Subsequently, these factors impact the cost of the development, maintenance and running of a new height monitoring system.

C. The NAT CMA, as lead of the NAT SOG Height Monitoring System Project Team (NAT SOG HMS PT) has conducted an analysis of available data produced by the project team in order to recommend to the NAT SPG a minimum monitoring requirement for the NAT Region (Draft NAT SPG Conclusion 56-2/1 – Minimum Height Monitoring Requirements for the NAT Region refers).

1. Background

1.1. When conducting the verification of the first height monitoring program within the NAT Region, ICAO Doc 9547, Appendix A, 4.4 quotes –

"... in the NAT RVSM programme, somewhere in the order of 80 per cent of the predicted population was monitored as part of the verification phase. On the basis of the quality of the collected data, it was adjudged to be representative of the population."

1.2. The NAT CMA has found historical email exchanges, dating from the period when the Gander HMU was decommissioned, that reference a target monitoring level of "60%" being in place when both HMUs were operational; however, no reference to this figure has been found within ICAO documentation.

1.3. The trials conducted by the NAT SOG HMS PT to prove the subtility of ADS-B for height monitoring in the NAT Region show that the Strumble HMU currently only monitors approximately 12% of the NAT traffic.

2. Monitoring Rates of Regional Monitoring Agencies (RMA)

2.1. There is currently no standardised monitoring rate amongst RMAs. The monitoring rate utilised by RMAs (where known to the NAT CMA) is dependent on the height monitoring system used and is as follows:

RMA	Height Monitoring System	Monitoring Level
AAMA	ADS-B	24/7
ARMA	GMU	Specific aircraft on demand from operators
CARSAM	GMU	Specific aircraft on demand from operators
CHINA	ADS-B	24/7
EurRMA	3 HMUs	24/7
JASMA	3 HMUs	24/7
NAARMO	AGHMEs	24/7
	GMU	Specific aircraft on demand from operators
	ADS-B	24/7
NAT CMA	Strumble HMU	24/7

2.2 Most height monitoring systems are run on a continuous basis (24/7) within their whole region in order to allow the early detection of any aircraft operating with a non-compliant ASE value which could undermine the safety of the airspace. Additionally, it aids the monitoring of height keeping trends and early intervention of aircraft which could be heading to an unsatisfactory height keeping performance.

2.3 In addition to the above, the FAA operates their ADS-B height monitoring system 24/7 in order to facilitate Section 9 (Aircraft Equipped with Automatic Dependent Surveillance-Broadcast Out) to Appendix G of Part 91. This provision eliminates the requirement on U.S. registered operators of aircraft

equipped with a qualified ADS-B Out system to make an application for authorization to operate in U.S. domestic RVSM airspace.

3. NAT SOG HMS PT Trial Data

3.1 The NAT SOG HMS PT, working with Dr Steve Barry of AirServices Australia, conducted a 48-hour trial of ADS-B height monitoring within the NAT Region. This trial utilised a mix of space based (SB) and terrestrial (T) ADS-B data from the Shanwick, Gander and Reykjavik FIRs. Analysis of this trial data provided the following information:

- 1242 aircraft were monitored in the sample data.
- 529 of these aircraft were monitored on both days.
- 85 of these aircraft were monitored in all three FIRs.
- 19 unique aircraft were monitored in Gander data only (SB).
- 4 unique aircraft were monitored in Reykjavik data only (T).
- 320 unique aircraft were monitored in Shanwick data only (SB).

3.2 The project team then conducted a 7-day trial of height monitoring utilising ADS-B data; for this trial, only Shanwick and Reykjavik FIR data was available and it was processed on behalf of the NAT SOG HMS PT by the NAARMO team using their height monitoring system. The analysis of this data showed the following information:

	Individual Aircraft Monitored	Shanwick Published traffic count	% monitored
01/08/2019	1517	1605	95%
02/08/2019	977	1660	59%
03/08/2019	1022	1706	60%
04/08/2019	984	1717	57%
05/08/2019	993	1628	61%
06/08/2019	968	1599	60%
07/08/2019	969	1590	61%

3.3 Although limited by geographical areas due to the availability of ADS-B data for the trials, the two sets of analysis data illustrated that at least 60% of the NAT traffic could be monitored in a 24-hour period using ADS-B data and that Shanwick SB ADS-B data gave the greater opportunity to monitor more individual aircraft.

3.4 ADS-B height monitoring systems calculate the ASE by averaging the performance over the duration of a flight, within set parameters; therefore, the greater the volume of data which can be gathered for each aircraft, the greater the accuracy of the performance monitoring output. This, in turn, increases confidence in the accuracy of aircraft height keeping performance within the NAT Region. Any strict constraint on the geographical area monitored would risk degrading the accuracy of the system.

3.5 The optimal level of monitoring within the NAT would be 24/7 using all available ADS-B data sources within the NAT Region; however, following on from the trials, the NAT SOG HMS PT raised concern that if the target geographical area monitored was increased to the optimal level, the volume of ADS-B data and associated workload burden to process the output would initially be too great for the NAT CMA to handle within its current configuration.

3.6 As the NAT SOG HMS PT benefitted from the participation of the NAARMO, who shared their experience and decision-making processes from their change to an ADS-B height monitoring system in

the North American region, the subject of monitoring requirements was referred to them and their advice was as follows:
"… Since November 2019 we have collected over 72 million samples of ASE from 41,000 aircraft. The database watch list tool pulls aircraft of concern for closer review. That list contains less than 1% of those monitored and we have issued large ASE reports for about 50 aircraft so far.

While working on the NAT HMS planning and data requirements, it may be useful to keep in mind that a reduced set of processing days can still give a good view of the aircraft within your airspace. You could then process all the data on a per aircraft basis for aircraft that have an ASE of concern."

4. Conclusion

4.1 No ICAO documentation defining the minimum height keeping monitoring requirement within the NAT Region has been identified.

4.2 There are historic references to 80% and 60% of NAT traffic population being suitable levels for height monitoring purposes.

4.3 There is no standardised monitoring rate amongst RMAs.

4.4 The NAT SOG HMS PT has established that ADS-B data is a suitable source for monitoring aircraft height keeping performance in the NAT Region.

4.5 The NAT SOG HMS PT has established that 24-hours of NAT ADS-B data every 8-days would provide a monitoring rate of at least 60%.

4.6 Geographically Shanwick FIR ADS-B data would provide the largest variety of unique airframes.

4.7 The monitoring requirement should be a guideline minimum rate as this would allow flexibility should the NAT CMA requirements change or future technological developments allow an increase of monitoring levels without additional resource or financing.

5. Recommendation

5.1 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 CMA and economic constraints, it is recommended that initially, the minimum height monitoring requirement be set at one 24hour period of all available NAT Regional ADS-B data on a rolling eight-day schedule. This level of monitoring would allow for at least 60% of the NAT traffic population to be monitored on a regular basis.

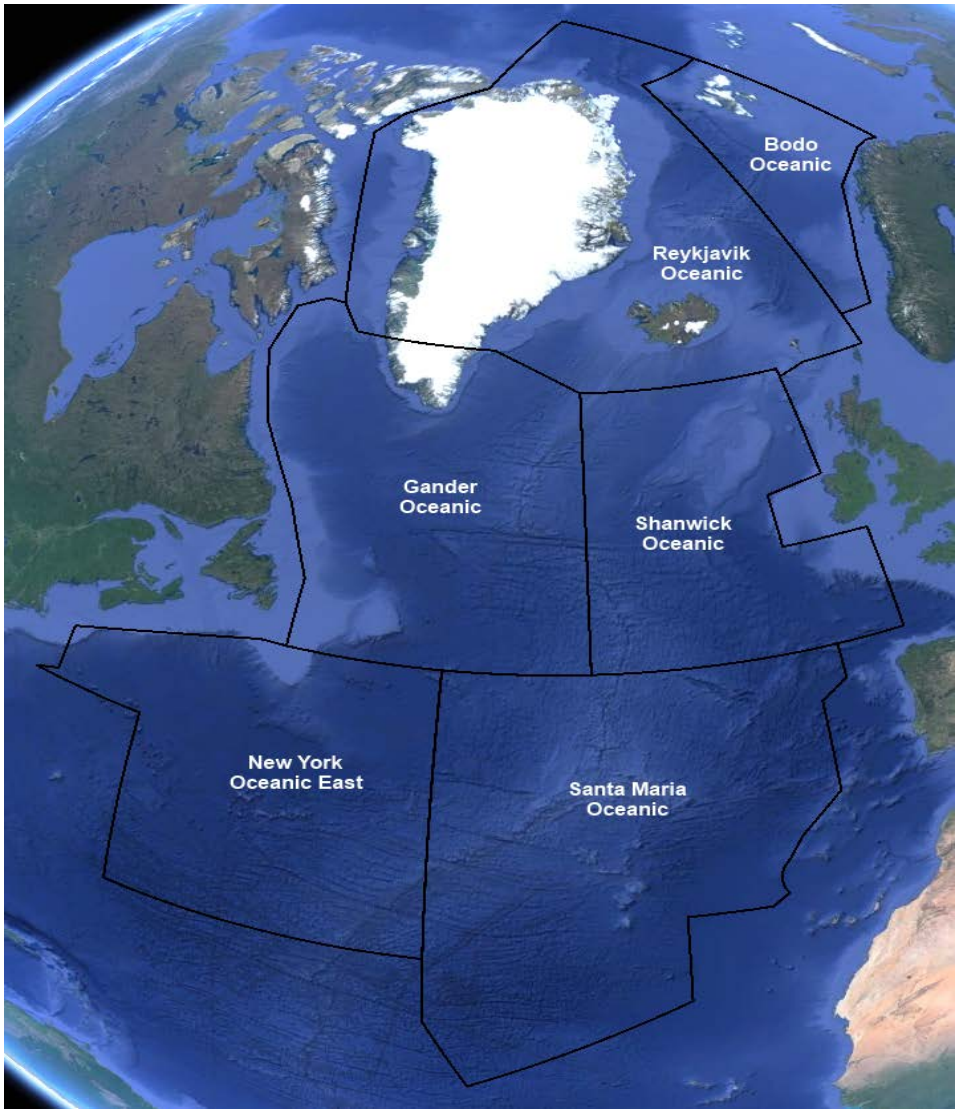
5.2 Rolling the monitoring over an eight-day period would ensure the capture of more individual aircraft frames and those which operate on a fixed schedule.

5.3 This recommended minimum height monitoring requirement should 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.

APPENDIX G — *2019 NAT GANP/ASBU IMPLEMENTATION STATUS REPORT*

(paragraph 5.1.1 refers)

GLOBAL AIR NAVIGATION PLAN (GANP)/AVIATION SYSTEM BLOCK UPGRADES (ASBU) IMPLEMENTATION STATUS REPORT - NORTH ATLANTIC (NAT) REGION



2019

1. INTRODUCTION

1.1 NAT eANP 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) and.is used as a tool for monitoring and reporting the status of implementation of the above-mentioned elements, through the use of specific tables by appropriate NAT working groups as endorsed by North Atlantic Systems Planning Group (NAT SPG). The status of implementation is updated on a regular basis as endorsed by the NAT SPG.

1.2 The management of Volume III is the responsibility of 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.

2.3. The latest 5th Edition of the GANP was endorsed by the 39th Assembly of ICAO in October 2016.

3. PLANNING METHODOLOGY

3.1 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. Available technologies and ASBU Modules are evaluated to identify which of them best provide the needed operational improvements. Depending on the complexity of the selected technology or module element, 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 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.

4. REVIEW AND EVALUATION OF AIR NAVIGATION PLANNING

4.1 The progress and effectiveness against the priorities set out in the NAT air navigation plan is periodically reported, using an agreed reporting format, to ICAO.

4.2 NAT IMG agreed (NAT IMG Decision 48/15) that the monitoring and reporting will be carried out by NAT IMG contributory groups by using the following tools:

a) NAT ASBU implementation status forms;

b) NAT Air Navigation Reporting Form-ASBU (NAT ANRF-ASBU) and NAT ANRF - Regional Aviation System Improvements (RASI) forms.

4.3 For those modules that are related to and applicable in the aerodrome areas, e.g AMAN/WAKE/A-SMGCS, the status information is provided only for those aerodromes that are listed in the NAT AOP Table.

4.4 For those modules that are applicable to the en-route phase of flight for operations in the NAT, the status is provided at the State level.

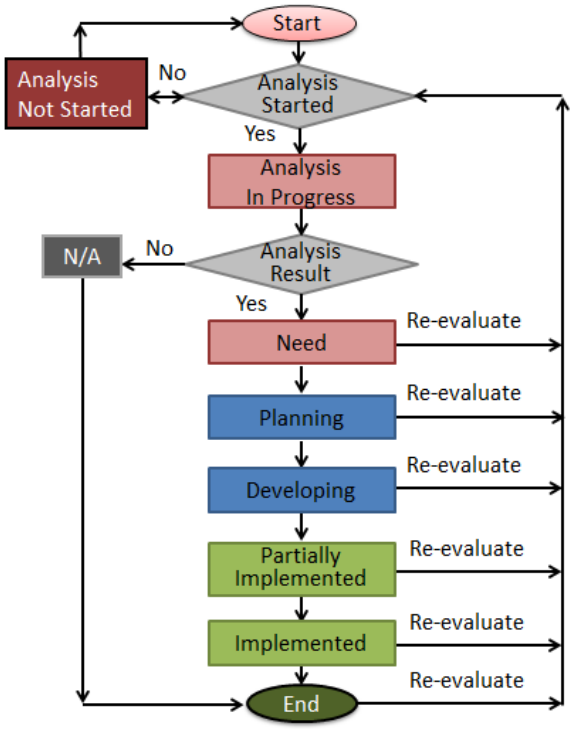
4.5 Depiction of the general planning and timelines is provided through the NAT Service Development Roadmap, which is also maintained by appropriate NAT working groups.

4.6 Figure 1 depicts the workflow for analysing and implementing ASBU Module elements.

4.7 The significance of each step in the workflow is as follows:

- **Analysis Not Started** – The requirement to implement this ASBU Module element has not yet been assessed
- **Analysis In Progress** – A Need Analysis as to whether or not this ASBU Module element is required is in progress
- **N/A** – The ASBU Module element is not required
- **Need** - The Need Analysis concluded that the ASBU Module element is required, but planning for the implementation has not yet begun
- **Planning** – Implementation of this ASBU Module element is planned, but not started
- **Developing** – Implementation of this ASBU Module element is in the development phase, but not yet operational
- **Partially Implemented** – Implementation of this ASBU Module element is partially completed and/or operational but all planned implementations are not yet complete
- **Implemented** - Implementation of this ASBU Module element has been completed and/or is fully operational where the need was identified

FIGURE 1 – ANALYSIS AND IMPLEMENTATION WORKFLOW



5. REPORTING AND MONITORING RESULTS

5.1 Reporting and monitoring results are analyzed by the NAT SPG, States and ICAO 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.

5.2 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.

———————

6. NAT ASBU planning and implementation forms

6.1 Block 0

NAT Region Implementation Status of Block Elements – Block 0 Modules

Data provided by Canada (CAN), Denmark (DK), Iceland (ISL), Ireland (IRL), Norway (NO), Portugal (PO), United States (US) and United Kingdom (UK)

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
Performance Improvement Area 1: Airport Operations									
ACDM	1. implement collaborative applications that will allow the sharing of surface operations data among the different stakeholders on the airport.	PO		ISL	DK,NO,UK		CAN		IRL,US
APTA	1. PBN Approach Procedures	PO	DK		UK			ISL,CAN	IRL, NO,US
	2. GBAS Landing System (GLS) Approach procedures	ISL, PO	DK, CAN ,IRL		NO,UK				US
RSEQ	1. AMAN and time-based metering	PO			DK,NO,UK		CAN	ISL	US,IRL
	2. Departure management	ISL, PO			NOUK,IRL	CAN		US	
	3. Point merge				ISL,DK,NO,US,CAN,UK				IRL
SURF	1. Surveillance	PO			DK,NO,UK		ISL	CAN	US,IRL
	2. Alerting	PO			DK,NO,UK		ISL	CAN	US,IRL
	3. Enhanced vision systems for taxi operations	ISL,PO	CAN		US,UK				
WAKE	1. Increasing aerodrome arrival operational capacity	ISL,CAN			DK,NO,UK, PO			IRL,US	
	2. Increasing aerodrome departure operational capacity	ISL,CAN			DK,NO,UK, PO			IRL,US	
Performance Improvement Area 2: Globally Interoperable Systems and Data									
AMET	1. WAFS				DK,IRL,NO,UK				ISL,US,PO,CAN
	2. IAVW				DK,IRL,NO,UK				ISL,US,PO,CAN
	3. TCAC forecasts				ISL,DK,IRL,NO,UK				US,PO,CAN
	4. Aerodrome warnings	ISL,PO			DK,NO,UK			CAN	IRL,US

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
	5. Wind shear warnings and alerts	ISL,PO			,UK			CAN	DK,IRL,US,NO
	6. SIGMET								ISL,DK,IRL,US,NO, UK,PO,CAN
	7. Other OPMET information (METAR, SPECI and/or TAF)		DK						ISL,IRL,US,NO,UK, PO,CAN
	8. QMS for MET								ISL,DK,IRL,US,NO, UK,PO,CAN
DATM	1. Aeronautical Information Exchange Model (AIXM)	UK			DK,NO	CAN ,PO		ISL	US,IRL
	2. eAIP						CAN		ISL,US,IRL,DK,NO, PO,UK
	3. initial introduction of digital processing and management of information, through aeronautical information service (AIS)/aeronautical information management (AIM) implementation		CAN				~~ISL~~	PO,IRL, UK, ISL	US
	4. QMS for AIM				DK				ISL,US,IRL,NO,CAN ,PO,UK
FICE	1. improve coordination between air traffic service units (ATSUs) by using ATS interfacility data communication (AIDC) defined by the ICAO Manual of Air Traffic Services Data Link Applications (Doc 9694).			CA N	DK,NO			ISL,UK	US,PO, IRL (OLDI)
Performance Improvement Area 3: Optimum Capacity and Flexible Flights									
ACAS	1. ACAS II (TCAS version 7.1)	CAN,~~UK~~			US,DK				ISL,IRL, NO,PO,UK
ASEP	1. ATSA-AIRB	ISL,PO			IRL,DK,NO,CAN,UK				US
	2. ATSA-VSA	ISL,CAN,PO			IRL,DK,NO,UK				US
ASUR	1. ADS-B				DK	~~IRL~~	NO, IRL		ISL,US,CAN,PO,UK
	2.Multilateration (MLAT)				DK,NO,UK		~~ISL~~	IRL,CA N,	US,PO, ISL

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
FRTO	1. Airspace planning				DK			PO	ISL,US,NO,CAN, IRL,UK
	2. Flexible Use of Airspace (FUA)				DK			PO	ISL,IRL,US,NO,CAN ,UK
	3. Flexible routing				DK				ISL,IRL,US,NO,CAN ,PO,UK
NOPS	1. ATFM				DK	~~ISL~~		PO	US,IRL,NO,CAN,UK , ISL
OPFL	1. ITP using ADS-B	PO			ISL,DK,NO,CAN,UK, IRL				US
SNET	1. Short Term Conflict Alert implementation (STCA)				DK			ISL,NO	US,IRL,CAN,PO,UK
	2. Area Proximity Warning (APW)	ISL			DK			PO	US,IRL,NO,CAN,UK
	3. Minimum Safe Altitude Warning (MSAW)	ISL			DK,NO,UK			PO	US,IRL,CAN
Performance Improvement Area 4: Efficient Flight Paths									
CCO	1. Implement continuous climb operations in conjunction with performance-based navigation (PBN)				DK			ISL,IRL ,PO	US, NOR,CAN,UK
CDO	1. Use performance-based airspace and arrival procedures allowing an aircraft to fly its optimum profile using continuous descent operations (CDOs).				DK			ISL,PO	US,IRL, NO,CAN,UK
TBO	1. Implement a set of data link applications supporting surveillance and communications in air traffic services				DK				ISL,IRL,US,NO,CAN ,PO,UK

6.2 Block 1

NAT Region Implementation Status of Block Elements – Block 1 Modules

Data provided by Canada (CAN), Denmark (DK), Iceland (ISL), Ireland (IRL), Norway (NO), Portugal (PO), United States (US) and United Kingdom (UK)

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
Performance Improvement Area 1: Airport Operations									
ACDM	1. enhance the planning and management of airport operations and allow their full integration in the air traffic management using performance targets compliant with those of the surrounding airspace	ISL,US,NO,PO			CAN,UK				DK,IRL
APTA	1. Progress further with the universal implementation of performance-based navigation (PBN) and ground-based augmentation system (GBAS) landing system (GLS) approaches. PBN and GLS (CAT II/III) procedures	ISL,US,NO,PO	DK,IRL		CAN,UK				
RATS	1. Provision of tower control (TWR) or aerodrome flight information service (AFIS) for single aerodrome(s) by remotely located air traffic controllers (ATCO) or aerodrome flight information service officers (AFISO)	US,PO			DK,NO,CAN,UK		ISL	IRL	
	2. Provision of TWR or AFIS for multiple aerodromes by a single ATCO or AFISO	US,PO	ISL		NO,CAN,UK			IRL	DK
	3. Remote provision of ATS for contingency situations	US, NO	ISL		DK,CAN,UK	PO		IRL	

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
RSEQ	1. Surface management of runway demand and sequencing aircraft on the ground to support departure operations based on precise surface movement tracking	ISL,US,PO			NO,CAN,UK	IRL			DK
	2. Integration of departure sequencing and surface management	ISL,US,PO			DK,NO,CAN,UK				
	3. Arrival metering extended across FIR boundaries	ISL,US,CAN,PO			DK,NO,UK				IRL
	4. Assignment of RNAV/RNP routes linked to controlled time of arrival at metering fixes	ISL,US,CAN,PO			NO,UK				DK
SURF	1. Basic surface situation awareness (SURF) through display of other aerodrome traffic to aircraft via ADS-B or TIS-B	US,PO	ISL		DK,NO,CAN,UK,IRL				
WAKE	1. PANS-ATM aircraft leader/follower pair-wise wake turbulence separation minima	ISL,US,NO,PO			DK,CAN,UK,IRL				
	2. Wake Turbulence Mitigation for Arrivals (WTMA) on parallel runways with runway centre lines spaced less than 760 m (2 500 feet) apart or on a single runway through variable application of wake turbulence separation dependant on the crosswinds present along the approach corridor	US			ISL,DK,NO,CAN,UK,PO,IRL				

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
	3. Wake Turbulence Mitigation for Departures (WTMD) on parallel runways with runway centre lines spaced less than 760 m (2 500 feet) through reduction of separation between departures when runway crosswinds are of sufficient strength and persistence	US			ISL,DK,NO,CAN,UK,PO,IRL				
Performance Improvement Area 2: Globally Interoperable Systems and Data									
AMET	1. Producing meteorological information elements that can be ingested by automated decision support tools	ISL,US	DK		NO,CAN,UK			PO	IRL
	2. Automated processing of meteorological information to derive predicted effects on airspace capacity	ISL,US,IRL,PO			DK,NO,CAN,UK				
	3. Automated processing of meteorological information to derive predicted effects on aerodrome capacity	ISL,US,IRL,PO			DK,NO,CAN,UK				
	4. Comparison of predicted meteorological airspace capacity constraints to projected demand	ISL,US,IRL,PO			DK,NO,CAN,UK				
	5. Comparison of predicted meteorological aerodrome capacity constraints to projected demand	ISL,US,IRL,PO			DK,NO,CAN,UK				
	6. Meteorological information integrated decision support that creates ranked mitigation strategies	ISL,US,IRL,PO	DK		NO,CAN,UK				

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
DATM	1. Implementation of digital information management using WXXM for meteorological information	ISL,US,PO			DK, NO,UK	IRL, CAN			
	2. Implementation of digital information management using FIXM for flight and flow information	ISL,US,IRL,PO			DK, NO,UK	CAN			
	3. Implementation of digital information management for aircraft performance-related data	ISL,US,IRL,PO			DK, NO,UK	CAN			
FICE	1. introduce FF-ICE, Step 1 providing ground-ground exchanges before departure using common flight information exchange model (FIXM) and extensible markup language (XML) standard formats. FIXM	ISL,US,IRL,PO		UK	DK, NO,~~UK~~	CAN			
SWIM	1. Implementation of system-wide information management (SWIM) services (applications and infrastructure) creating the aviation intranet based on standard data models, and internet-based protocols to maximize interoperability.	ISL,US,NO	UK		DK		CAN,PO	IRL	
Performance Improvement Area 3: Optimum Capacity and Flexible Flights									
ASEP	1. Increased capacity and efficiency through interval management	ISL,US,PO			DK,IRL,NO,CAN,UK				
FRTO	1. Free routing,.	US			DK			NO	IRL,ISL, CAN,PO,UK
	2. Reduced route spacing	US			IRL			PO	ISL,UK
	3. Dynamic sectorization	ISL,US			DK	NO			IRL,CAN,UK,PO

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
NOPS	1 Integrating ATFM and Airspace Organization and Management (AOM) in the design of alternative route options for ATFM	ISL,US			DK,NO			PO	IRL,CAN,UK
	2. Using trajectory projections as soon as possible after departure to update ATFM requirements and perform additional ATFM smoothing for single and converging flows	ISL,US			DK,NO,UK			PO	IRL,CAN
	3. Initial User Driven Prioritization Process (UDPP) whereby operators affected by ATFM measures can collaborate with each other and ATFM to devise alternative measures that serve ATFM requirements while at the same time taking account of operators' priorities	ISL,US			DK,,NO,UK			PO	CAN, IRL
	4 Full FUA	ISL,US						PO,UK	IRL
	5. Complexity management	ISL,PO,US,UK							
SNET	1. Enhance safety by reducing the risk of controlled flight into terrain accidents on final approach and the risk of unstable approach through the use of approach path monitor (APM).	ISL,US,PO			DK,NO,CAN,UK,IRL				

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
Performance Improvement Area 4: Efficient Flight Paths									
CDO	1. CDO procedures defined as vertical paths to be followed within specified tolerances	US,PO			DK,NO,CAN,UK, IRL			ISL	
RPAS	1. Streamlined process for RPA access to non-segregated airspace	US,PO			DK,NO,CAN,UK	~~ISL~~			IRL, ISL
	2. Defined airworthiness certification for RPA	US,PO			DK,NO,CAN,UK	~~ISL~~			IRL, ISL
	3. Defined operator certification for RPA operators	US,PO			DK,NO,CAN,UK	~~ISL~~			IRL, ISL
	4. Defined communication performance requirements for Command and Control (C2) links and for ATC communications	US,PO			DK,IRL,NO,CAN,UK, IRL	~~ISL~~		ISL	
	5. Defined remote pilot licencing requirements	US,PO			DK,NO,CAN,UK		ISL		IRL,~~ISL~~
	6. Defined detect and avoid technology performance requirements	US,PO			DK,NO,CAN,UK, IRL	ISL			
TBO	1. Initial 4D operations by specifying Required Time of Arrival (RTA)	ISL,US,PO			DK,NO,UK, IRL				CAN
	2. Data Link Operational Terminal Information Service (D-OTIS)	ISL,US,PO			DK,NO,CAN,UK			IRL	

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
	3. Departure clearances via data link (DCL)	US,PO	ISL		DK,NO,CAN,UK				IRL
	4. Data Link Taxi (D-TAXI)	ISL,US,PO			DK,IRL,NO,CAN,UK				

7. NAT ASBU planning and implementation analysis

7.1 Provisional implementation indicators

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	
B0-RSEQ	Improve Traffic flow through Runway Sequencing (AMAN/DMAN)	% of applicable international aerodromes having implemented AMAN / DMAN	
B0-SURF	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	% of applicable international aerodromes having implemented A-SMGCS Level 2	
B0-ACDM	Improved Airport Operations through Airport-CDM	% of applicable international aerodromes having implemented improved airport operations through airport-CDM	
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	
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.	
B0-ASEP	Air Traffic Situational Awareness (ATSA)	% of States having implemented air traffic situational awareness	
B0-OPFL	Improved access to optimum flight levels through climb/descent procedures using ADS-B	% of FIRs having implemented in-trail procedures	
B0-ACAS	ACAS Improvements	% of States requiring carriage of ACAS (with TCAS 7.1 evolution)	
B0-	Increased Effectiveness of	% of States having implemented ground-	

Module Code	Module Title	Implementation Indicator	Remarks
1	2	3	4
SNET	Ground-Based Safety Nets	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	

7.2 Implementation progress assessment for B0 modules

B0 Module	Elements	Number of fully or partially implemented	Number of N/A	% of implemented with N/A excluded
ACDM	1. Implement collaborative applications that will allow the sharing of surface operations data among the different stakeholders on the airport	2	3	40%
APTA	1. PBN Approach Procedures)	5	1	71%
	2. GBAS Landing System (GLS) Approach procedures	1	2	17%
RSEQ	1. AMAN and time-based metering via controlled time of arrival to a reference fix	3	3	60%
	2. Departure management	1	3	20%
	3. Point merge	1	6	50%
SURF	1. Surveillance	3	3	60%
	2. Alerting	3	3	60%
	3. Enhanced vision systems for taxi operations	0	2	0%
WAKE	1. Increasing aerodrome arrival operational capacity	2	4	50%
	2. Increasing aerodrome departure operational capacity	2	4	50%
AMET	1. WAFS	4	4	100%
	2. IAVW	4	4	100%
	3. TCAC forecasts	3	5	100%
	4. Aerodrome warnings	3	3	60%
	5. Wind shear warnings and alerts	5	1	71%
	6. SIGMET	8	0	100%
	7. Other OPMET information (METAR, SPECI and/or TAF)	7	0	88%
	8. QMS for MET	8	0	100%
DATM	1. Aeronautical Information Exchange Model (AIXM)	3	2	50%
	2. eAIP	7	0	88%

B0 Module	Elements	Number of fully or partially implemented	Number of N/A	% of implemented with N/A excluded
	3. initial introduction of digital processing and management of information, through aeronautical information service (AIS)/aeronautical information management (AIM) implementation	5	0	63%
	4. QMS for AIM	7	1	100%
FICE	1. improve coordination between air traffic service units (ATSUs) by using ATS interfacility data communication (AIDC) defined by the ICAO Manual of Air Traffic Services Data Link Applications (Doc 9694).	5	2	83%
ACAS	1. ACAS II (TCAS version 7.1)	5	2	83%
ASEP	1. ATSA-AIRB	1	5	33%
	2. ATSA-VSA	1	4	25%
ASUR	1. ADS-B	5	1	71%
	2.Multilateration (MLAT)	5	3	100%
FRTO	1. Airspace planning	7	1	100%
	2. Flexible Use of Airspace (FUA)	7	1	100%
	3. Flexible routing	7	1	100%
NOPS	1. ATFM	7	1	100%
OPFL	1. ITP using ADS-B	1	6	50%
SNET	1. Short Term Conflict Alert implementation (STCA)	7	1	100%
	2. Area Proximity Warning (APW)	6	1	86%
	3. Minimum Safe Altitude Warning (MSAW)	4	3	80%
CCO	1. Implement continuous climb operations in conjunction with performance-based navigation (PBN)	7	1	100%
CDO	1. Use performance-based airspace and arrival procedures allowing an aircraft to fly its optimum profile using continuous descent operations (CDOs	7	1	100%
TBO	1. Implement a set of data link applications supporting surveillance and communications in air traffic service	7	1	100%

7.3 Implementation progress assessment for B1 modules

B1 Module	Elements	Number of fully or partially implemented	Number of N/A	% of implemented with N/A excluded
ACDM	1. Enhance the planning and management of airport operations and allow their full integration in the air traffic management using performance targets compliant with those of the surrounding airspace	2	2	33%
APTA	1. Progress further with the universal implementation of performance-based navigation (PBN) and ground-based augmentation system (GBAS) landing system (GLS) approaches. PBN and GLS (CAT II/III) procedures.	0	2	0%
RATS	1. Provision of tower control (TWR) or aerodrome flight information service (AFIS) for single aerodrome(s) by remotely located air traffic controllers (ATCO) or aerodrome flight information	1	4	25%

B1 Module	Elements	Number of fully or partially implemented	Number of N/A	% of implemented with N/A excluded
	service officers (AFISO)			
	2. Provision of TWR or AFIS for multiple aerodromes by a single ATCO or AFISO	2	3	40%
	3. Remote provision of ATS for contingency situations	1	3	20%
RSEQ	1. Surface management of runway demand and sequencing aircraft on the ground to support departure operations based on precise surface movement tracking	1	3	20%
	2. Integration of departure sequencing and surface management	0	4	0%
	3. Arrival metering extended across FIR boundaries	1	3	20%
	4. Assignment of RNAV/RNP routes linked to controlled time of arrival at metering fixes	1	2	17%
SURF	1. Basic surface situation awareness (SURF) through display of other aerodrome traffic to aircraft via ADS-B or TIS-B	0	5	0%
WAKE	1. PANS-ATM aircraft leader/follower pair-wise wake turbulence separation minima	0	4	0%
	2. Wake Turbulence Mitigation for Arrivals (WTMA) on parallel runways with runway centre lines spaced less than 760 m (2 500 feet) apart or on a single runway through variable application of wake turbulence separation dependant on the crosswinds present along the approach corridor	0	7	0%
	3. Wake Turbulence Mitigation for Departures (WTMD) on parallel runways with runway centre lines spaced less than 760 m (2 500 feet) through reduction of separation between departures when runway crosswinds are of sufficient strength and persistence	0	7	0%
AMET	1. Producing meteorological information elements that can be ingested by automated decision support tools	2	3	40%
	2. Automated processing of meteorological information to derive predicted effects on airspace capacity	0	4	0%
	3. Automated processing of meteorological information to derive predicted effects on aerodrome capacity	0	4	0%
	4. Comparison of predicted meteorological airspace capacity constraints to projected demand	0	4	0%
	5. Comparison of predicted meteorological aerodrome capacity constraints to projected demand	0	4	0%
	6. Meteorological information integrated decision support that creates ranked mitigation strategies	0	3	0%
DATM	1. Implementation of digital information management using WXXM for meteorological information	0	3	0%
	2. Implementation of digital information management using FIXM for flight and flow information	0	3	0%
	3. Implementation of digital information management for aircraft performance- related data	0	3	0%
FICE	1. introduce FF-ICE, Step 1 providing ground-ground exchanges before departure using common	0	2	0%

B1 Module	Elements	Number of fully or partially implemented	Number of N/A	% of implemented with N/A excluded
	flight information exchange model (FIXM) and extensible markup language (XML) standard formats.			
SWIM	1. Implementation of system-wide information management (SWIM) services (applications and infrastructure) creating the aviation intranet based on standard data models, and internet-based protocols to maximize interoperability.	1	1	14%
ASEP	1. Increased capacity and efficiency through interval management	0	5	0%
FRTO	1. Free routing.	6	1	86%
	2. Reduced route spacing	3	1	43%
	3. Dynamic sectorization	4	1	57%
NOPS	1. Integrating ATFM and Airspace Organization and Management (AOM) in the design of alternative route options for ATFM	4	2	67%
	2. Using trajectory projections as soon as possible after departure to update ATFM requirements and perform additional ATFM smoothing for single and converging flows	3	3	60%
	3. Initial User Driven Prioritization Process (UDPP) whereby operators affected by ATFM measures can collaborate with each other and ATFM to devise alternative measures that serve ATFM requirements while at the same time taking account of operators' priorities	3	3	60%
	4 Full FUA	3	0	38%
	5. Complexity management	0	0	0%
SNET	1. Enhance safety by reducing the risk of controlled flight into terrain accidents on final approach and the risk of unstable approach through the use of approach path monitor (APM).	0	5	0%
CDO	1. CDO procedures defined as vertical paths to be followed within specified tolerances	1	5	33%
RPAS	1. Streamlined process for RPA access to non-segregated airspace	2	4	50%
	2. Defined airworthiness certification for RPA	2	4	50%
	3. Defined operator certification for RPA operators	2	4	50%
	4. Defined communication performance requirements for Command and Control (C2) links and for ATC communications	1	5	33%
	5. Defined remote pilot licencing requirements	1	4	25%
	6. Defined detect and avoid technology performance requirements	0	5	0%
TBO	1. Initial 4D operations by specifying Required Time of Arrival (RTA)	1	4	25%
	2. Data Link Operational Terminal Information Service (D-OTIS)	1	4	25%
	3. Departure clearances via data link (DCL)	1	4	25%
	4. Data Link Taxi (D-TAXI)	0	5	0%

8. NAT ANRF-ASBU and ANRF-RASI forms

8.1 NAT ANRF ASBU

<table>
<tr><td colspan="6">NAT ASBU Air Navigation Reporting Form (NAT ANRF-ASBU)</td></tr>
<tr><td>PIA</td><td>4-Efficient Flight Path</td><td>Block - Module</td><td>B0- TBO</td><td>Date</td><td>April 2019</td></tr>
<tr><td colspan="6">Module Description
Improved Safety and Efficiency through the initial application of Data Link En-Route</td></tr>
<tr><td colspan="6">Element Implementation Status</td></tr>
<tr><td rowspan="2">1</td><td colspan="2">Element Description
Data Link Mandate (DLM) over oceanic and remote areas</td><td colspan="2">Date Planned/Implemented
Phased implementation from Feb 2013 to Jan 2020</td><td>Status
<s>Partially</s> Fully implemented</td></tr>
<tr><td colspan="5">Status Details
Feb 2013 - Implemented on 3 core tracks FL350-390
Feb 2015 - Implemented on all NAT OTS FL350-390
Dec 2017 –Implemented in all NAT HLA FL350-390
Jan 2020 – <s>Planned</s> Implemented in all NAT <s>above</s> FL290-FL410
FAA Response: Status=Data Link is implemented, but no mandate by the FAA.</td></tr>
<tr><td rowspan="2">2</td><td colspan="2">Element Description
FANS 1/A</td><td colspan="2">Date Planned/Implemented</td><td>Status
N/A</td></tr>
<tr><td colspan="5">Status Details
FAA Response: Status=Implemented in 2005.</td></tr>
<tr><td rowspan="2">3</td><td colspan="2">Element Description</td><td colspan="2">Date Planned/Implemented</td><td>Status</td></tr>
<tr><td colspan="5">Status Details</td></tr>
<tr><td rowspan="2">4</td><td colspan="2">Element Description</td><td colspan="2">Date Planned/Implemented</td><td>Status</td></tr>
<tr><td colspan="5">Status Details</td></tr>
<tr><td colspan="6">Achieved Benefits</td></tr>
<tr><td colspan="6">Access and Equity
Improved</td></tr>
<tr><td colspan="6">Capacity
Increased</td></tr>
<tr><td colspan="6">Efficiency
Increased access to the most fuel efficient flight profile</td></tr>
<tr><td colspan="6">Environment
Less fuel burn, reduced GHG emissions</td></tr>
<tr><td colspan="6">Safety
Lateral, longitudinal and vertical risk is reduced. Reduction of coordination errors
More timely detection of errors, supporting reduced time at unprotected profile
More accurate position reports and automated processing of position reports. Support normal flight tracking capability.</td></tr>
<tr><td colspan="6">Implementation Challenges</td></tr>
</table>

Ground system Implementation *Monitoring of flight capability against DLM airspace.*
Avionics Implementation FANS 1/A equipage is required
Procedures Availability
Operational Approvals Operators need to obtain PBCS and data link approvals, where applicable
Notes

NAT ASBU Air Navigation Reporting Form (NAT ANRF-ASBU)					
PIA	2-Globally interoperable system and data	**Block - Module**	B0-FICE	**Date**	April 2019
Module Description *Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration*					
Element Implementation Status					
1	**Element Description** *AIDC to provide initial flight data to adjacent ATSUs*		**Date Planned/Implemented** *2013*	**Status** *Implemented*	
	Status Details				
2	**Element Description** *AIDC to update previously coordinated flight data*		**Date Planned/Implemented** *2013*	**Status** *Partly implemented*	
	Status Details *Iceland planned implementation ~~2020~~2022.* *Fully implemented in Portugal* *FAA Response: Status=Implemented. Updating of data is performed in the AIDC coordination functionality. The United States updates AIDC flight data within system messaging in all of their interfaces with adjacent FIRs. This falls within the coordination phase of AIDC.* *Fully implemented in United Kingdom*				
3	**Element Description** *AIDC for control transfer*		**Date Planned/Implemented** *Note 1*	**Status** *Note 1*	
	Status Details Iceland is not planning to implement Element 3. United Kingdom is not planning to implement Element 3. FAA Response: Status=Implemented. AIDC protocols as implemented within the United States ATOP system supports the notification, coordination and specifically the transfer of communications and control phases as defined in bilateral agreements between the United States and interfaced ATSUs.				
4	**Element Description** *AIDC to transfer CPDLC logon information to the Next Data Authority*		**Date Planned/Implemented** *Note 1*	**Status** *Note 1*	
	Status Details *Iceland is not planning to implement Element 4.* *United Kingdom no planning to implement Element 4.* *FAA Response: Status=Planning. The US is not scheduled to support this capability until 2020 when AIDC Version 3.0 is projected for implementation.*				
Achieved Benefits					
Access and Equity Improved					
Capacity Increased					
Efficiency Increased access to the most fuel efficient flight profile					
Environment Less fuel burn, reduced GHG emissions					

Safety *Reduction of coordination errors* More timely detection of errors, supporting reduced time at unprotected profile
Implementation Challenges
Ground system Implementation Automation upgrades for full AIDC capability
Avionics Implementation
Procedures Availability
Operational Approvals
Notes 1 Elements 3 and 4 will probably not be implemented.

<table>
<tr><td colspan="6">NAT ASBU Air Navigation Reporting Form (NAT ANRF-ASBU)</td></tr>
<tr><td>PIA</td><td>3-Optimum capacity and flexible flights</td><td>Block - Module</td><td>B0- ASUR</td><td>Date</td><td>April 2019</td></tr>
<tr><td colspan="6">Module Description
Initial capability for ground surveillance</td></tr>
<tr><td colspan="6">Element Implementation Status</td></tr>
<tr><td rowspan="2">1</td><td colspan="2">Element Description
ADS-B</td><td colspan="2">Date Planned/Implemented
Phased implementation from 2010 to 2020</td><td>Status
Partially implemented</td></tr>
<tr><td colspan="5">Status Details
2010-Ground based ADS-B services provided from 6 sites in Canada and 4 sites in Greenland
2011- 8 ADS-B stations installed in Iceland at 8 sites, 4 ADS-B stations installed in the Faroe Islands at two sites, 10 ADS-B stations installed in Greenland at 5 sites. 11 ADS-B stations installed in the central group of the Azores Islands at 11 sites
2014 - ADS-B services implemented in Iceland.6 ADS-B stations installed in the western group of the Azores Islands at 6 sites
2019 - 1 ADS-B station to be installed in the eastern group of the Azores Islands at 1 site
2018 – 1 ADS-B station installed in Madeira archipelago
2019 – ADS-B stations to be installed in Portugal mainland allowing surveillance coverage along the FIR boundaries between Santa Maria and Lisboa/Madrid
2019 - Space based ADS-B services ~~to be~~ fully implemented ~~as~~ following a trial in Shanwick and Gander
FAA Response: Status=Implemented. The ADS-B surveillance coverage for the continental United States is completed in 2014. Update on April 16, 2019: The ADS-B OUT mandate starts on January 1, 2020 to fly in most controlled airspace (Class B & C and above 10,000 feet, for example) For more detail, visit www.faa.gov/nextgen/equipadsb/.
2020 – 1 ground based ADS-B station added in the northern part of Iceland.
2020 – 3rd of December, Space based ADS-B services to be implemented in Iceland, all of BIRD CTA south of 70N</td></tr>
<tr><td rowspan="2">2</td><td colspan="2">Element Description
Multilateration(MLAT)</td><td colspan="2">Date Planned/Implemented</td><td>Status</td></tr>
<tr><td colspan="5">Status Details
2011- 11 MLAT stations installed in the central group of the Azores Islands at 11 sites
2014 - 6 MLAT stations installed in the western group of the Azores Islands at 6 sites
2019 –MLAT, as part of ATS Surveillance service in Iceland, implemented within the approach area for BIRK and BIKF (60NM radius from BIKF)
FAA Response: Status=Implemented. Note from December 2013: The FAA has implemented ADS-B and surface multilateration called ASDE-X at 35 aerodromes. The list of 35 aerodromes are below:
KATL KCLT KDTW KBOS KMEM KMDW KPDX
KORD KIAH KJFK KMIA KSLC KFLL KCLE
KDFW KPHL KMSP KIAD KMCO KSAN KSTL
KDEN KPHX KSFO KLGA KDCA KTPA KCVG
KLAX KLAS KEWR KSEA KBWI KHNL KPIT
The FAA has implemented of Wide Area Multilateration (WAM) in Juneau (JNU) in Alaska and Telluride, Montrose, Gunnison, Durango, Rifle and Hayden in Colorado.</td></tr>
<tr><td>3</td><td colspan="2">Element Description</td><td colspan="2">Date Planned/Implemented</td><td>Status</td></tr>
</table>

	Status Details		
4	**Element Description**	**Date Planned/Implemented**	**Status**
	Status Details		
5	**Element Description**	**Date Planned/Implemented**	**Status**
	Status Details		
Achieved Benefits			
Access and Equity Improved			
Capacity Increased			
Efficiency Increased access to the most fuel efficient flight profile			
Environment Less fuel burn, reduced GHG emissions			
Safety Provide for surveillance capability in oceanic airspace. Provides for normal flight tracking capability and location of aircraft in distress.			
Implementation Challenges			
System Implementation Timely availability of SB ADS-B system and completion of standardisation work			
Avionics Implementation			
Procedures Availability			
Operational Approvals			
Notes			

<table>
<tr><td colspan="6">NAT ASBU Air Navigation Reporting Form (NAT ANRF-ASBU)</td></tr>
<tr><td>PIA</td><td>2-Globally interoperable system and data</td><td>Block - Module</td><td>B0- ATM</td><td>Date</td><td>April 2019</td></tr>
<tr><td colspan="6">Module Description
Service Improvement through Digital Aeronautical Information Management.</td></tr>
<tr><td colspan="6">Element Implementation Status</td></tr>
<tr><td rowspan="2">1</td><td colspan="2">Element Description
Aeronautical Information Exchange Model (AIXM)</td><td colspan="2">Date Planned/Implemented
Dec 2018</td><td>Status
Partially implemented</td></tr>
<tr><td colspan="5">Status Details
Iceland fully compliant.
Portugal plans to be fully compliant by end of 2020
FAA Response: Status=Implemented. Comment from 2013: The introduction of digital processing and digital management of information using the aeronautical information exchange model (AIXM) has been initiated, but not complete. The FAA currently provides a subset of Aeronautical Information in AIXM including digital NOTAM in AIXM 5.1. Comment on April 16 2019: The FAA knows how to use AIXM and has been demonstrated. The FAA operates multiple systems that can use AIXM and will convert those systems to use AIXM as we update them. We consider this capability is implemented and will not keep track of each and all systems within the FAA. However we will ensure that our systems to be interoperable with other states' systems where AIXM should be used for the communication.</td></tr>
<tr><td rowspan="2">2</td><td colspan="2">Element Description
eAIP</td><td colspan="2">Date Planned/Implemented
Dec 2018</td><td>Status
Partially implemented</td></tr>
<tr><td colspan="5">Status Details
Iceland fully compliant.
Portugal eAIP fully implemented.
United Kingdom eAIP fully implemented.
FAA Response: Status=Implemented. An HTML version of eAIP is available via https://www.faa.gov/air_traffic/publications/.</td></tr>
<tr><td rowspan="2">3</td><td colspan="2">Element Description
Digital NOTAM</td><td colspan="2">Date Planned/Implemented
Dec 2016</td><td>Status
Partially implemented</td></tr>
<tr><td colspan="5">Status Details
Iceland planned to be fully compliant by end of ~~2023~~2021.
Portugal plans to be fully compliant by end of 2020
FAA Response: Status=Implemented. Comments on December 2013: Digital NOTAM has been implemented. More than 400 airports are capable of producing Digital NOTAM. Update Comments on June 12, 2018 - The legacy (analog) United States NOTAM system (USNS) is migrating to the digital Federal NOTAM System (FNS), with FNS now generating around 80% of NOTAMs digitally. The new system has SWIM connectivity, resulting in improvements to efficiency and safety for airspace users. FNS allows for the automatic transformation from the US NOTAM format to ICAO and plain language formats. It uses business rules for validation and allows for information exchange by using AIXM 5.1 format.</td></tr>
<tr><td>4</td><td colspan="2">Element Description
eTOD</td><td colspan="2">Date Planned/Implemented
Dec 2018</td><td>Status
Partially implemented</td></tr>
</table>

	Status Details *Iceland fully compliant.* *Portugal plans to be fully compliant by end of 2020* *FAA Response: Status=Implemented. Comments on December 2013: Currently providing point data in NAD83/NAVD88. Plans in place to provide AIXM 5.1 obstacle point data in WGS-84. Update Comments on June 12, 2018 - The majority of eTOD related terrain collection is the responsibility of the United States Geologic Survey (USGS) and is available for download from their website, free of charge.*		
5	**Element Description** *WGS-84*	**Date Planned/Implemented** Sep 2015	**Status** *Implemented*
	Status Details *Iceland fully compliant.* *Portugal fully compliant*		
6	**Element Description** *QMS for AIM*	**Date Planned/Implemented** Sep 2015	**Status** *Implemented*
	Status Details *Iceland fully compliant.* *Portugal QMS implemented*		
Achieved Benefits			
Access and Equity Improved			
Capacity Increased			
Efficiency Increased			
Environment Less fuel burn, reduced GHG emissions			
Safety *Improved*			
Implementation Challenges			
System Implementation			
Avionics Implementation			
Procedures Availability			
Operational Approvals			
Notes			

NAT ASBU Air Navigation Reporting Form (NAT ANRF-ASBU)					
PIA	2-Globally interoperable system and data	**Block - Module**	B0- AMET	**Date**	Sep 2016
Module Description *Meteorological information supporting enhanced operational efficiency and safety*					
Element Implementation Status					
1	**Element Description** *WAFS*		**Date Planned/Implemented** *SADIS FTP* *(1 September 2015)*		**Status** *Implemented*
	Status Details *Secure SADIS FTP is implemented*				
2	**Element Description** *IAVW*		**Date Planned/Implemented** *Sep 2015*		**Status** *Implemented*
	Status Details • *(Canada, France United Kingdom, United States) All VAACS issue fully compliant volcanic ash advisory (VAA) and volcanic ash advisory information in graphical format (VAG)* • *(Iceland, Portugal) All volcanic observatories issue fully compliant volcano observatory notice for aviation (VONA)*				
3	**Element Description** *TCAC forecasts*		**Date Planned/Implemented** *Sep 2015*		**Status** *Implemented*
	Status Details *The TCAC issues fully compliant tropical cyclone advisory (TCA) and tropical cyclone advisory in graphical format (TCG).*				
4	**Element Description** *Aerodrome warnings*		**Date Planned/Implemented**		**Status** *Need Analysis Not Started*
	Status Details *FAA Response: Status=Implemented. Airport weather warnings are issued for US civil airports by the National Weather Service (NWS) Weather Forecast Offices (WFOs) based on agreed airport warning criteria and dissemination procedures.*				
5	**Element Description** *Wind shear warnings and alerts*		**Date Planned/Implemented**		**Status** *Need Analysis Not Started*
	Status Details FAA Response: Status=Implemented. Wind shear warnings and alerts are provided for major civil airports. Over 120 US airports have ground-based wind shear detecting systems installed. These systems included the Low Level Wind Shear System (LLWS) and the Terminal Doppler Weather Radar (TDWR) as an input component of the Integrated Terminal Weather System (ITWS).				
6	**Element Description** *SIGMET*		**Date Planned/Implemented** Nov 2018		**Status** *Partially Implemented*
	Status Details Not all States issue fully compliant SIGMET For the NAT, the target level of performance is: - 98% of SIGMETs coded in compliance with Annex 3 SARPs FAA Response: Status=Implemented. The NWS provides SIGMETs for all US controlled airspace in compliance with ICAO Annex 3 with filed State exceptions as well as supporting NWS, FAA or DoD publications.				
7	**Element Description** *Other OPMET information (METAR, SPECI and/or TAF)*		**Date Planned/Implemented**		**Status** *Partially Implemented*

	Status Details For the NAT, the target level of performance is: - 95% of required METAR disseminated within 5 minutes of METAR observation time - 95% of required TAF disseminated within 35 minutes (30 minutes lead time plus 5 minutes transit time) FAA Response: Status=Implemented. The NWS issues TAFS for all major civil airports and METAR/SPECI reports are provided at all major airports by the NWS, FAA, Department of Defense (DoD), or other local or state authorities. The TAFS and METAR/SPECI reports are provided in compliance with ICAO Annex 3 with filed State exceptions.		
8	**Element Description** *QMS for MET*	**Date Planned/Implemented** Sep 2015	**Status** *Implemented*
	Status Details		
Achieved Benefits			
Access and Equity Improved			
Capacity Increased			
Efficiency *Increased*			
Environment Less fuel burn, reduced GHG emissions			
Safety Improved			
Implementation Challenges			
System Implementation			
Avionics Implementation			
Procedures Availability			
Operational Approvals			
Notes			

NAT ASBU Air Navigation Reporting Form (NAT ANRF-ASBU)					
PIA	3-Optimum capacity and flexible flights	**Block - Module**	B1- FRTO	**Date**	June 2018

Module Description *Implementation of reduced longitudinal separation minima*			
Element Implementation Status			
1	**Description** *RLongSM Validation Trial*	**Date Planned/Implemented** *2010*	**Status** *Implemented*
	Status Details *Applied between eligible pairs (FANS 1/A CPDLC /ADS-C (RCP240/RSP180 measured)) in Gander, Shanwick and Reykjavik OCA)*		
2	**Element Description** *PBCS*	**Date Planned/Implemented** *March 2018*	**Status** *Implemented*
	Status Details *Upgrade ground automation systems to process PBCS designators- Done* *Establish and implement the PBCS approval process-Done*		
3	**Element Description** *5 minutes longitudinal separation*	**Date Planned/Implemented** *March 2018*	**Status** *Implemented*
	Status Details *Implemented in accordance with the new PANS-ATM separation minima applicable from Nov 2016.*		
4	**Element Description**	**Date Planned/Implemented**	**Status**
	Status Details		
5	**Element Description**	**Date Planned/Implemented**	**Status**
	Status Details		
Achieved Benefits			
Access and Equity Improved			
Capacity Increased			
Efficiency Increased access to the most fuel efficient flight profile			
Environment Less fuel burn, reduced GHG emissions			
Safety Lateral, longitudinal and vertical risk do not increase			
Implementation Challenges			
Ground system Implementation Ground automation systems need to be updated			
Avionics Implementation FANS 1/A is required for PBCS separation.			
Procedures Availability			

Operational Approvals Operators need to obtain PBCS and PBN approvals
Notes *Detailed information is provided in the NAT RlongSM, RLatSM, PBCS implementation plans and tasks list. Visit http://www.icao.int/EURNAT/Pages/EUR-and-NAT-Document.aspx?RootFolder=%2FEURNAT%2FEUR%20and%20NAT%20Documents%2FNAT%20Documents%2FPlanning%20documents%20supporting%20separation%20reductions%20and%20other%20initiatives&FolderCTID=0x012000DAF95319EADD9946B510C5D7B595637D00AA5EB47B299B9A4BAD1968B24E18655C&View={2666E7DD-5F4E-4E64-B16A-CF142A1E5BC9}*

<table>
<tr><td colspan="6">NAT ASBU Air Navigation Reporting Form (NAT ANRF-ASBU)</td></tr>
<tr><td>PIA</td><td>3-Optimum capacity and flexible flights</td><td>Block - Module</td><td>B1- FRTO</td><td>Date</td><td>June 2018</td></tr>
<tr><td colspan="6">Improvement Description
Implementation of reduced lateral separation minima</td></tr>
<tr><td colspan="6">Element Implementation Status</td></tr>
<tr><td rowspan="2">1</td><td colspan="2">Element Description
RLatSM validation trial Phase 1</td><td>Date Planned/Implemented
Dec 2015</td><td colspan="2">Status
Implemented</td></tr>
<tr><td colspan="5">Status Details
Applied on 3 core tracks in Gander, Shanwick and Reykjavik OCA. RNP 4 and FANS 1/A CPDLC /ADS-C (RCP240/RSP180 measured) are required</td></tr>
<tr><td rowspan="2">2</td><td colspan="2">Element Description
RLatSM validation trial Phase 2</td><td>Date Planned/Implemented
Nov 2016</td><td colspan="2">Status
Implemented</td></tr>
<tr><td colspan="5">Status Details
Applied on all NAT OTS in Gander, Shanwick and Reykjavik OCA. RNP 4 and FANS 1/A CPDLC /ADS-C (RCP240/RSP180 measured) are required</td></tr>
<tr><td rowspan="2">3</td><td colspan="2">Element Description
23 NM reduced lateral separation</td><td>Date Planned/Implemented
March 2018</td><td colspan="2">Status
Implemented</td></tr>
<tr><td colspan="5">Status Details
Upgrade ground automation systems to process PBCS designators- ongoing
Establish and implement the PBCS approval process- ongoing</td></tr>
<tr><td rowspan="2">4</td><td colspan="2">Element Description
23 NM reduced lateral separation</td><td>Date Planned/Implemented
March 2018</td><td colspan="2">Status
Implemented</td></tr>
<tr><td colspan="5">Status Details
Obtaining RNP 4 approvals ongoing. Equipage is increasing</td></tr>
<tr><td rowspan="2">5</td><td colspan="2">Element Description
23 NM reduced lateral separation</td><td>Date Planned/Implemented
March 2018</td><td colspan="2">Status
Implemented</td></tr>
<tr><td colspan="5">Status Details
Applied in New York Eats and Santa Maria OCAs, and on all NAT OTS in Gander, Shanwick and Reykjavik OCAs. RNP 4 and FANS 1/A CPDLC /ADS-C (RCP240/RSP180) are required</td></tr>
<tr><td colspan="6">Achieved Benefits</td></tr>
<tr><td colspan="6">Access and Equity
Improved</td></tr>
<tr><td colspan="6">Capacity
Increased</td></tr>
<tr><td colspan="6">Efficiency
Increased access to the most fuel efficient flight profile</td></tr>
<tr><td colspan="6">Environment
Less fuel burn, reduced GHG emissions</td></tr>
<tr><td colspan="6">Safety
Lateral, longitudinal and vertical risk do not increase</td></tr>
</table>

Implementation Challenges
Ground system Implementation Ground automation systems need to be updated
Avionics Implementation RNP 4 and FANS 1/A equipage is required for the lateral reduction of separation minima.
Procedures Availability
Operational Approvals Operators need to obtain PBCS and PBN approvals
Notes *Detailed information is provided in the NAT RlongSM and RLatSM implementation plans and tasks list. Visit http://www.icao.int/EURNAT/Pages/EUR-and-NAT-Document.aspx?RootFolder=%2FEURNAT%2FEUR%20and%20NAT%20Documents%2FNAT%20Documents%2FPlanning%20documents%20supporting%20separation%20reductions%20and%20other%20initiatives&FolderCTID=0x012000DAF95319EADD9946B510C5D7B595637D00AA5EB47B299B9A4BAD1968B24E18655C&View={2666E7DD-5F4E-4E64-B16A-CF142A1E5BC9}*

8.2 NAT ANRF RASI

NAT RASI Air Navigation Reporting Form (NAT ANRF-RASI)			
RASI # - Title	Greenland ATM Improvement Program	**Date**	June 2018

Improvement Description

The Greenland ATM Improvement Program applies to the airspace in the Nuuk FIR north of 6330N between F195 and F285. Traffic in this airspace is mostly domestic traffic in Greenland as well as international traffic to/from airports in Greenland. The applicable separation standards have for the most part been 120 NM lateral separation and 30 minutes longitudinal separation which has precluded efficient operations in the airspace.

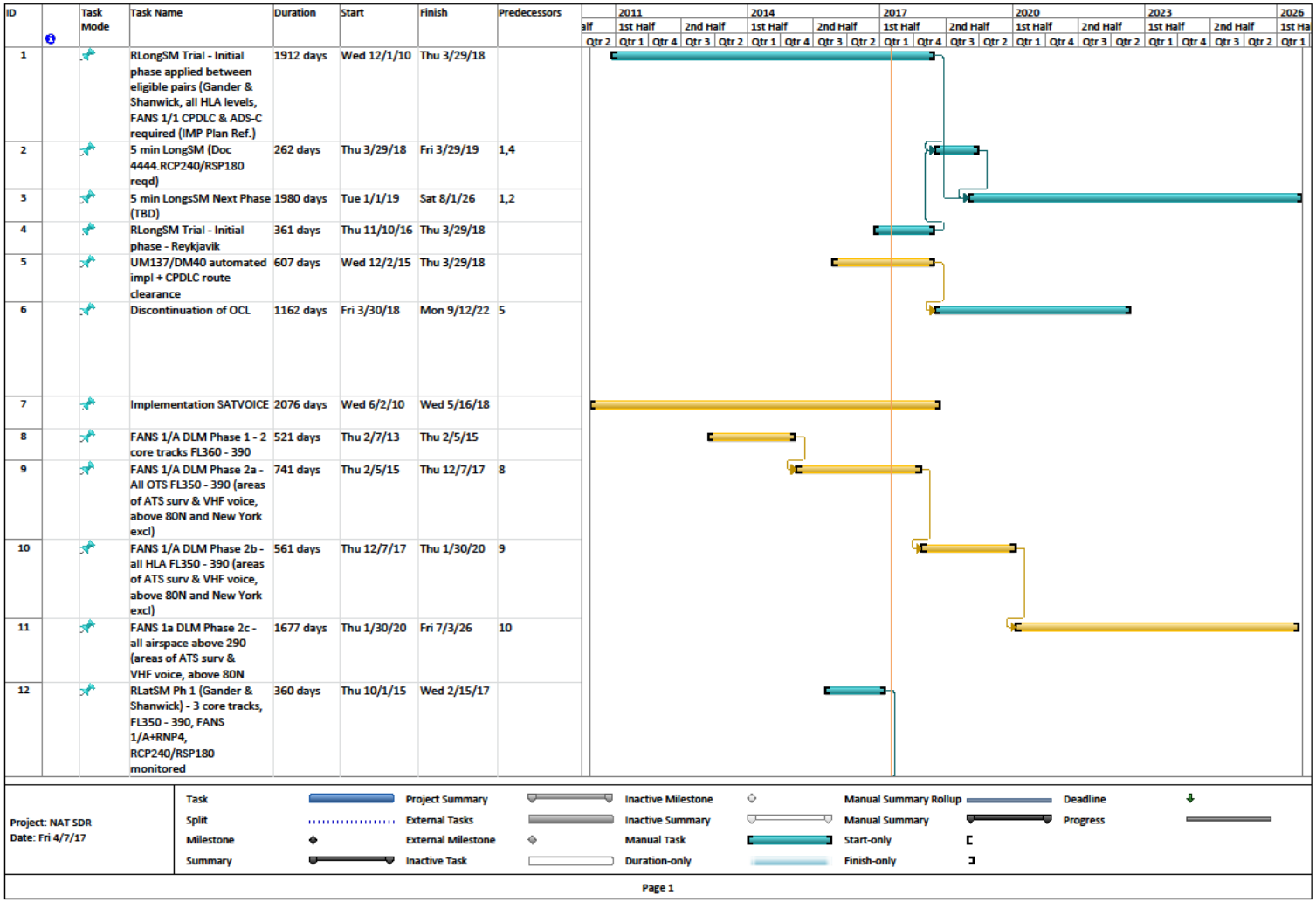
The aim of the Greenland ATM Improvement Program is implementation of new and improved procedural separation standards, introduction of ADS-B surveillance services and Direct Controller Pilot (DCPC) VHF voice communications.

Element Implementation Status

1	**Description** Operational trial of 20 NM lateral separation between GNSS equipped aircraft climbing/descending through the level of other GNSS equipped aircraft.	**Date Planned/Implemented** 2013	**Status** Implemented
	Status Details		
2	**Description** Implementing 15 minutes longitudinal separation between other than turbojet aircraft using third party VHF communication.	**Date Planned/Implemented** 2013	**Status** Implemented
	Status Details		
3	**Description** Implementing 15 minutes longitudinal separation between other than turbojet aircraft using DCPC VHF communication.	**Date Planned/Implemented** 2015	**Status** Implemented
	Status Details		
4	**Description** Implementing 15 NM lateral separation between GNSS equipped aircraft in DCPC VHF voice communication.	**Date Planned/Implemented** 2015	**Status** Implemented
	Status Details		
5	**Description** Implementing 7 NM lateral separation between GNSS equipped aircraft in DCPC VHF voice communication and climbing/descending through the level of other GNSS equipped aircraft	**Date Planned/Implemented** 2015	**Status** Implemented
	Status Details		
6	**Description** Implementing ADS-B surveillance separation of 10 NM	**Date Planned/Implemented** 2015	**Status** Implemented

	Status Details		
7	**Description** Application of “traditional” PANS-ATM procedural separation between aircraft in DCPC VHF voice communication.	**Date Planned/Implemented** 2016	**Status** Implemented
	Status Details		
8	**Description** Implementing all the Greenland ATM Improvement program separation rules, both lateral and longitudinal in BIRD FIR	**Date Planned/Implemented** 2017	**Status** Implemented
	Status Details		
Achieved Benefits			
Access and Equity Improved			
Capacity Increased			
Efficiency Increased access to the most fuel efficient flight profile			
Environment Less fuel burn, reduced GHG emissions			
Safety No increase in safety risk			
Implementation Challenges			
Ground system Implementation			
Avionics Implementation			
Procedures Availability			
Operational Approvals			
Notes			

9. NAT SDR



ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		RLongSM Trial - Initial phase applied between eligible pairs (Gander & Shanwick, all HLA levels, FANS 1/1 CPDLC & ADS-C required (IMP Plan Ref.)	1912 days	Wed 12/1/10	Thu 3/29/18	
2		5 min LongSM (Doc 4444.RCP240/RSP180 reqd)	262 days	Thu 3/29/18	Fri 3/29/19	1,4
3		5 min LongsSM Next Phase (TBD)	1980 days	Tue 1/1/19	Sat 8/1/26	1,2
4		RLongSM Trial - Initial phase - Reykjavik	361 days	Thu 11/10/16	Thu 3/29/18	
5		UM137/DM40 automated impl + CPDLC route clearance	607 days	Wed 12/2/15	Thu 3/29/18	
6		Discontinuation of OCL	1162 days	Fri 3/30/18	Mon 9/12/22	5
7		Implementation SATVOICE	2076 days	Wed 6/2/10	Wed 5/16/18	
8		FANS 1/A DLM Phase 1 - 2 core tracks FL360 - 390	521 days	Thu 2/7/13	Thu 2/5/15	
9		FANS 1/A DLM Phase 2a - All OTS FL350 - 390 (areas of ATS surv & VHF voice, above 80N and New York excl)	741 days	Thu 2/5/15	Thu 12/7/17	8
10		FANS 1/A DLM Phase 2b - all HLA FL350 - 390 (areas of ATS surv & VHF voice, above 80N and New York excl)	561 days	Thu 12/7/17	Thu 1/30/20	9
11		FANS 1a DLM Phase 2c - all airspace above 290 (areas of ATS surv & VHF voice, above 80N	1677 days	Thu 1/30/20	Fri 7/3/26	10
12		RLatSM Ph 1 (Gander & Shanwick) - 3 core tracks, FL350 - 390, FANS 1/A+RNP4, RCP240/RSP180 monitored	360 days	Thu 10/1/15	Wed 2/15/17	

- END -

APPENDIX H — UPDATE OF *NAT SPG HANDBOOK*, (NAT DOC 001), V2.5.0

(paragraph 5.2.3 refers)

European and North Atlantic Office

NAT Doc 001

NAT SPG HANDBOOK

Second Edition

~~***Version 2.4.0 – July 2019***~~***Version 2.5.0 – 2021***

~~*Approved by NAT SPG/55*~~*Approved by NAT SPG/56-2*

Prepared by the ICAO European and North Atlantic Office

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

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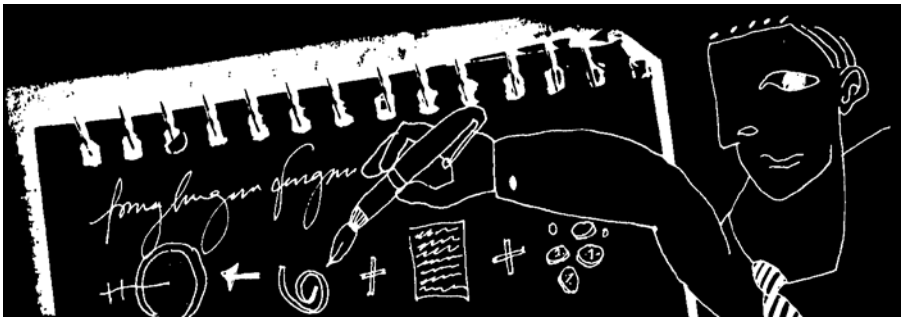
6 — REFERENCE DOCUMENTATION



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

(Anstey)

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

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

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

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

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

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

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

0 — INTRODUCTION

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

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

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

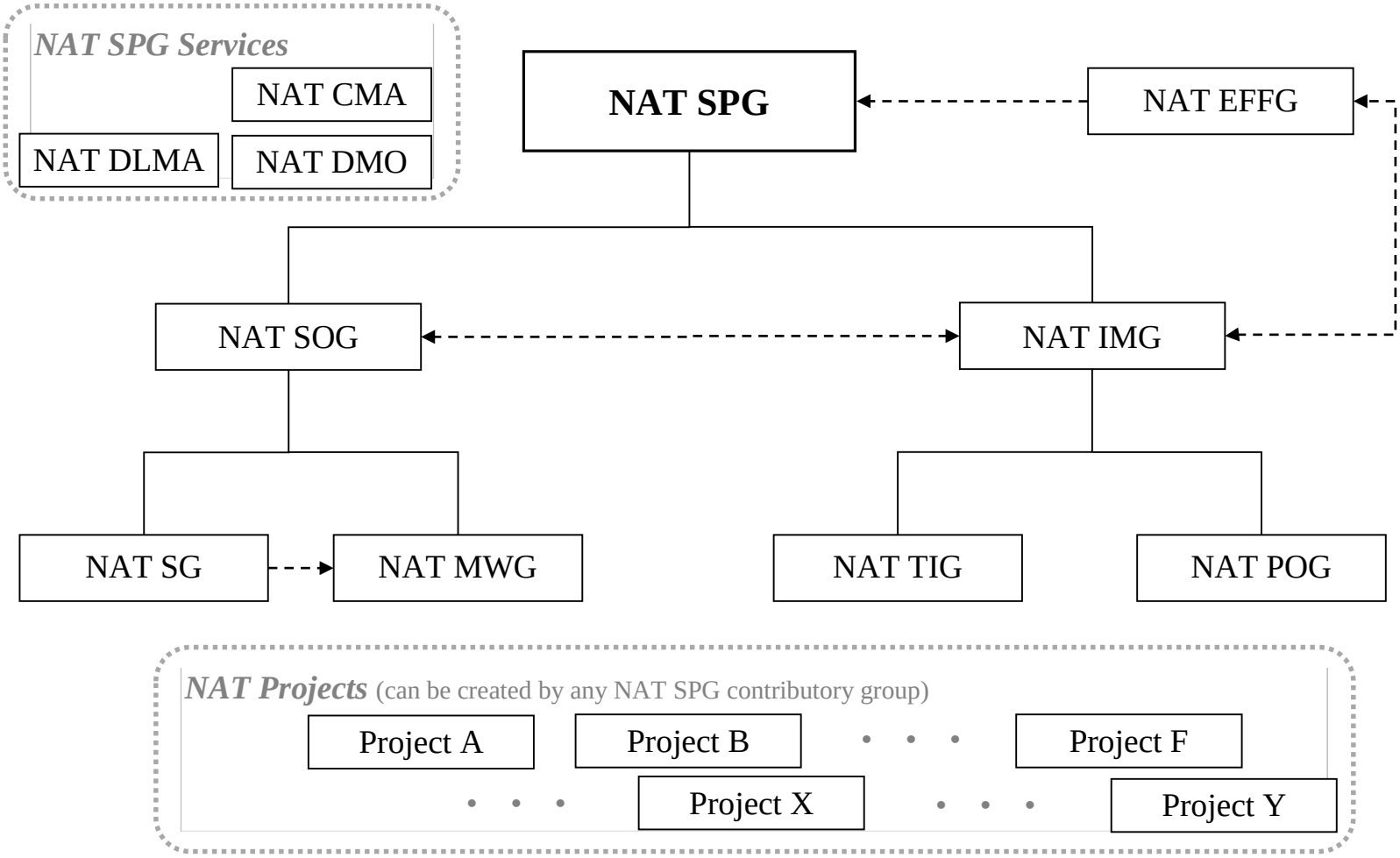
At NAT SPG/45, Paris, 23-26 June 2009, it was agreed to make adjustments to the NAT SPG working structure and to the terms of reference of its contributory bodies to accommodate the change in emphasis to performance based requirements, as driven by the Global ANP, and to take account of the Global Aviation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

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

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

Hlin HOLM
Chairperson of the NAT SPG

0:A — NAT SPG WORKING STRUCTURE



0:B — SAFETY POLICY STATEMENT

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

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

OBJECTIVE

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

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

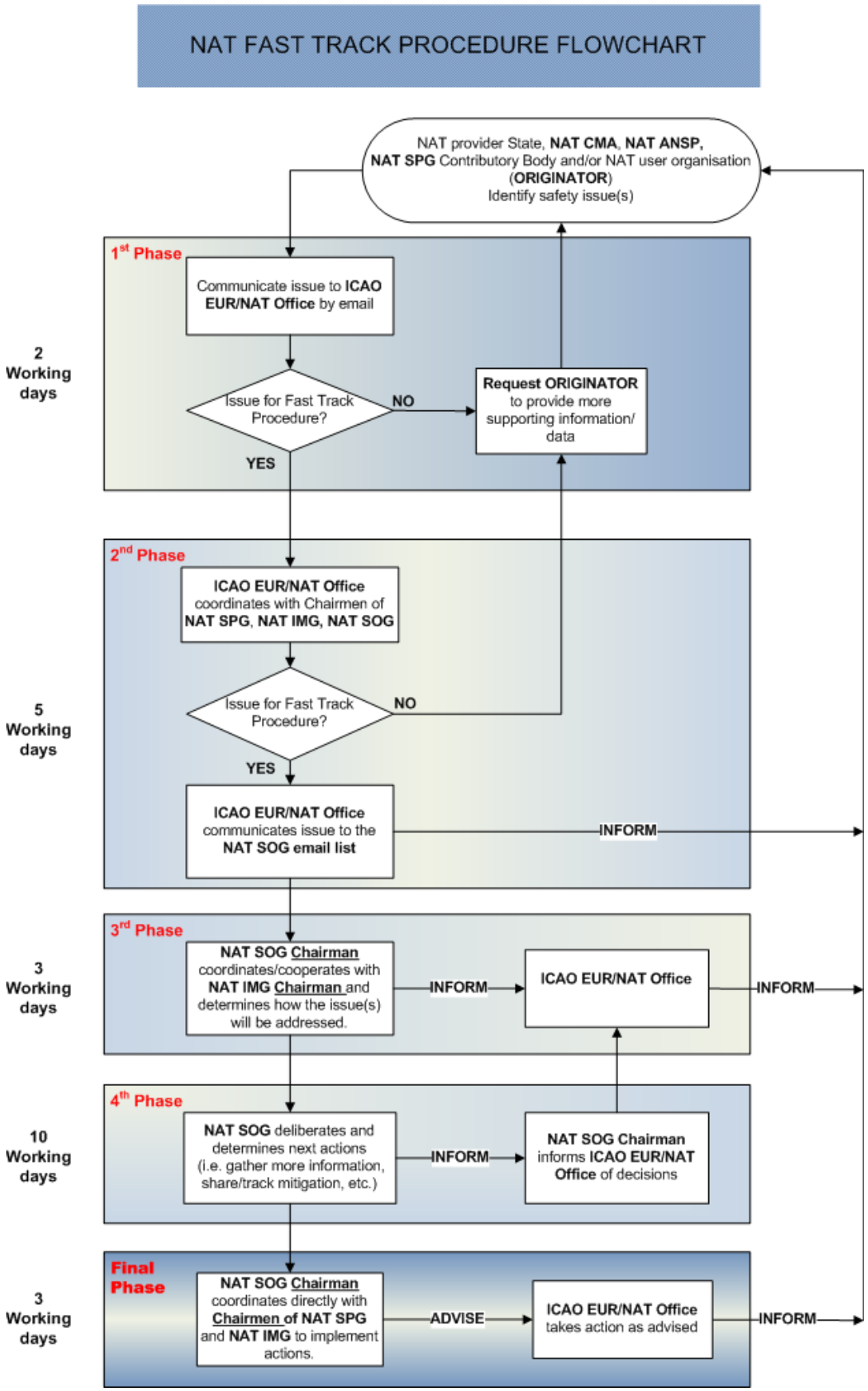
Guiding Principles

The NAT SPG will act to:

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

0:C — NAT FAST TRACK PROCEDURE FOR SAFETY OCCURRENCES

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



NAT FAST Track Procedure for Safety Occurrences Reporting Form

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

1 — NORTH ATLANTIC SYSTEMS PLANNING GROUP

(NAT SPG)

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

1. Terms of Reference (ToR)

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

Recommendation 4/1: North Atlantic Systems Planning Group

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

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

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

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

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

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

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

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

2. Members

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

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

3. Observers

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

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

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

4. Chairperson

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

5. Vice-Chairperson

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

6. Secretary

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

7. Meeting Documentation

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

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

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

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

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

8. 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, 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[2].

9. Election of Chairpersons/vice-Chairpersons/Rapporteurs of the NAT SPG and its Contributory Groups[3]

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Table 1:

Why	
What	
Who	
When	

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

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

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

a) AA;

b) BB; and

c) CC.

Where:

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

is the designation of the next NAT SPG meeting;

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

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

11.4. When formulating each (draft) NAT SPG Conclusion, all acronyms except NAT SPG shall be decoded when they are initially used. This shall be true even for acronyms which have appeared in a

previous draft Conclusion. It is acceptable to use an acronym in the title, so long as it is decoded in the body of the draft Conclusion.

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

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

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

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

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

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

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

Table 2: Project Definition Contents

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

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

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

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

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

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

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

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

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

13. NAT SPG REPRESENTATIVES

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

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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.

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 safety oversight 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.
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 safety cases in progress and review completed 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. Address other safety-related issues as necessary.
12. Use the fast track to advance safety concerns between formal meetings.
13. Report to the NAT SPG.

Composition

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

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

3:B — THE NAT SOG CONTRIBUTORY GROUPS

1. Formulation of recommendations to the NAT SOG

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

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

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

3:C — NAT MATHEMATICIANS' WORKING GROUP

(NAT MWG)

Terms of Reference

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

1. Estimate annually the lateral and vertical occupancies (traffic densities) in the NAT Region.
2. Estimate the current lateral 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. Periodically perform other data collections (e.g. core navigation studies) in order to ensure that the parameter values within the mathematical collision risk models remain current.
6. Review other mathematical aspects as directed by the NAT SOG and/or the NAT SPG.
7. Coordinate with the NAT SG.
8. Report to the NAT SOG.

Composition

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

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

Working Methods

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

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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.

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. Apprise the ICAO EUR/NAT Office in matters pertaining to the NAT Region of any need for changes to NAT documentation and seek approval for such work.

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

Composition

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

5 — NAT SPG POLICIES

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

5:A — SAFETY RELATED POLICIES

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

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

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

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

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

Table 1 - Safety Key Performance Indicators and related targets

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

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

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

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

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

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

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

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

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

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

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

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

[04] Definition and Components of 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 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 safety case may be prepared by NAT IMG and/or a designated sub-group or project team within the NAT IMG working structure, or by one or several NAT ANSPs, and is owned by the change advocate.

[1] *Fatal accidents per flight hour*

2) Proposed safety case(s) prepared to support changes within the NAT Region requiring NAT SPG approval should be presented to the NAT SOG for review 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 safety cases shall be to assess the validity of given safety arguments, confer that applicable regional hazards were systematically identified and associated safety risks addressed, and provide assurance to the NAT SPG that all the established components of a regional safety case were accomplished. For a NAT SOG review, the following should be taken into account:

   a) the timely review of a completed safety case is dependent on information being provided in a timely manner to the NAT SOG;

   b) the review should be conducted by a group of representatives affected by the change that have not been directly involved with the development of the safety case to ensure an objective assessment; and

   c) the aim should be to monitor safety cases in progress and review completed safety cases at the biannual SOG meetings.

———————————

5:B — IMPLEMENTATION PLANNING POLICIES

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

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

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

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

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

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

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

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

[07] 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.

~~**[08] ASEPS phraseology and definitions (C 55/11)**~~

~~The NAT SPG, having noted the differences in interpretation of the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444) provisions concerning identification of ADS-B aircraft and the termination of surveillance services for aircraft transitioning into airspace where space-based ADS-B surveillance service is provided and ASEPS is applied, agreed that no evidence has been presented that indicates that there was unmitigated risk involved, and therefore the trial implementation of ASEPS using ADS-B in the NAT should continue.~~

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	Amendments approved by	Remarks
NAT Doc 001	NAT SPG Handbook	Version 2.54.0 – ~~July 2019~~ February 2021	ICAO Secretariat	NAT SPG*	Except for the following: * *1 — 13 – NAT SPG Representatives*: kept up-to-date by the Secretariat upon reception of nomination to the NAT SPG. * 6 – Reference Documentation*:* kept up-to-date by the Secretariat, upon approval or revision of a NAT Document promulgated by the NAT SPG.
NAT Doc 002	*Discontinued*				*Superseded by the Pan-Regional (APAC and NAT) Interface Control Document for ATS Inter-facility Data Communication (PAN ICD AIDC)*
NAT Doc 003	High Frequency Management Guidance Material for the North Atlantic Region	Version 3.0 – June 2015	NAT POG in coordination with NAT TIG	NAT IMG	
NAT Doc 004	Common Aeradio Communications Interface Control Document	Version 1.4 – Nov. 2011	NAT TIG	NAT IMG	

Number	Title	Current edition/version	Kept under review by	Amendments approved by	Remarks
NAT Doc 005	Future ATM Concept of Operations for the North Atlantic Region	2nd Edition,– Nov. 2012	NAT IMG	NAT SPG	
NAT Doc 006 - Part I	Air Traffic Management Operational Contingency Plan – North Atlantic Region	Version 1.~~12~~ 15 – ~~July 2019~~ February 2021	NAT IMG	NAT SPG	
- Part II EUR/NAT VACP	Volcanic Ash Contingency Plan – Europe and North Atlantic Regions	Version 2.0.0 – July 2016	NAT IMG and EANPG COG in accordance with the process described in the body of the document –	Coordinated approval of main document body by both NAT SPG and EANPG	
NAT Doc 007	North Atlantic Operations and Airspace Manual	Version V-2021-1~~19 3~~ - ~~July 2019~~ February 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~~8~~ – December 2018~~8~~20	NAT POG	NAT IMG after coordination with NAT SOG	

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

Number	Title	Current edition/version	Kept under review by	Amendments 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.		*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.*
	NAT OESB - NAT Oceanic Errors Safety Bulletin	NAT OPS Bulletin 2017_002_rev3~~1~~	NAT SG	NAT SOG	*The NAT Oceanic Error Safety (OES) Bulletin (NAT OESB) is used to distribute information on best practices used to avoid errors when operating in the NAT Region. The NAT OESB is mainly addressed to the attention of pilots, dispatchers, industry and training centers. It complements and does not contradict, the guidance detailed in the current edition of North Atlantic Operations and Airspace Manual (NAT Doc 007).*
	NAT OESB Supplements - NAT Sample Oceanic Checklists	NAT OPS Bulletin 2017_005	NAT SG	NAT SOG	*The NAT Sample Oceanic Checklist (NAT SOC) is a companion document of the NAT OESB.*

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

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

Section 1. Executive Summary

Section 2. NAT Safety Case Components

A. Change Advocate(s)

B. Description of and Rationale for Proposed Change

C. NAT Airspace System Assurance

D. Regional Safety Assessment

E. Conclusion of Safety Assessment

F. Post-implementation Monitoring and Reversion Plan

G. Supporting Evidence

H. State Approvals/Requirements

Section 3. NAT Safety Case Terms and Definitions Section 4. Appendices

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~~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
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 Managemen
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
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.	ICAO Annex 19
	See Safety Performance Indicator.	
Safety Performance Indicator	A data-based parameter used for monitoring and assessing safety performance.	ICAO Annex 19
	See also Safety	
Severity	The extent of loss or harm associated with consequences of a hazard.	SM ICG
Likelihood	The frequency, in quantitative or qualitative terms, that an unsafe event may occur.	SM ICG
Acceptable Risk	The level of risk that individuals or groups are willing to accept given the benefits gained. Each organization will have its own acceptable risk level, which is derived from its legal and regulatory compliance responsibilities, its threat profile, and its business/organizational drivers and impacts.	SM ICG
NAT SOG review	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.	

[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

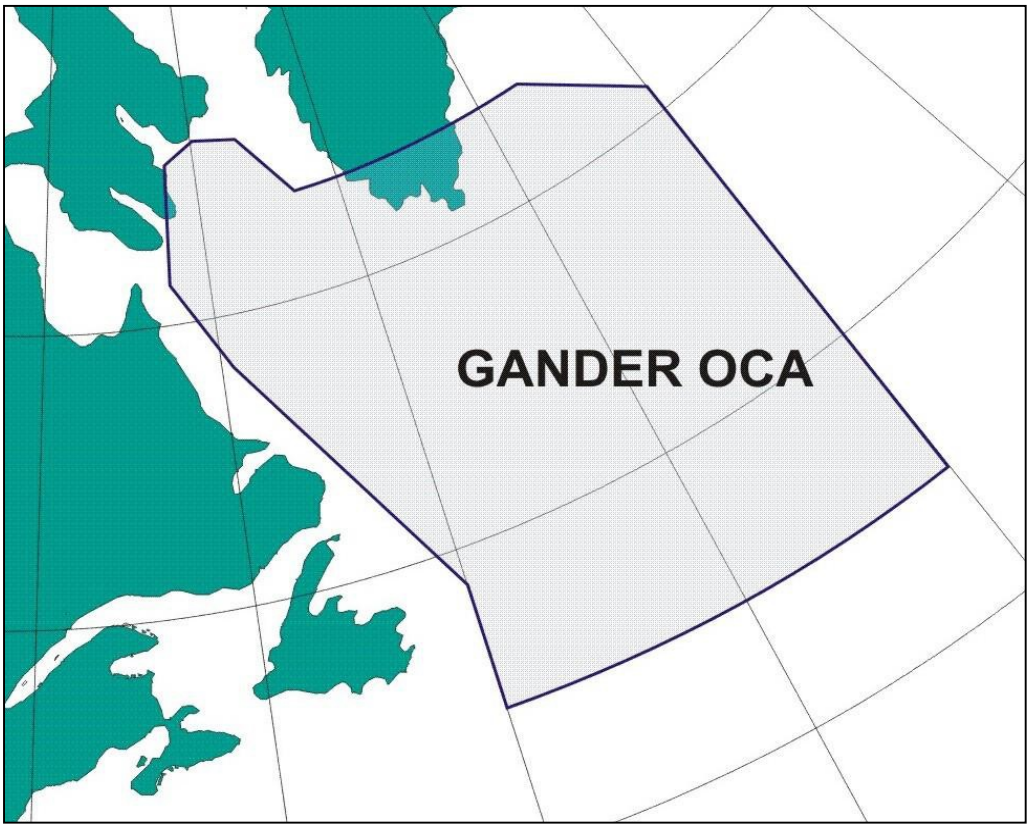
NAT MWG	North Atlantic Mathematicians' Working Group
NAT POG	North Atlantic Procedures and Operations Group
NAT SDR	*North Atlantic Services Development Roadmap* (NAT Doc 009) - *DISCONTINUED*
NAT SG	North Atlantic Scrutiny Group
NAT SOC	NAT Sample Oceanic Checklist
NAT SOG	North AtlanticSafety Oversight 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 I — *NAT AIR TRAFFIC MANAGEMENT OPERATIONAL CONTINGENCY PLAN - NORTH ATLANTIC REGION* (NAT DOC 006, PART I, V1.15)

(paragraph 5.3.2 refers)

1. CHAPTER 2: DETAILED PROCEDURES – GANDER OACC



2.1 FIR FOR WHICH THE CONTINGENCY PLAN APPLIES

Gander Oceanic FIR

~~Including ADS-B designated airspace over Greenland, see map Appendix E~~

COMMENT	Remove Appendix E. Gander no longer provides ground based ADS-B separation

2.2 FIRs WITH SUPPORTING PROCEDURES

Shanwick

Oceanic FIR

Reykjavik

Oceanic FIR

2.3 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 and through NAV CANADA National Operations Centre.

In a **no service** situation the OACC 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, ~~detailed in Appendix A.~~ In turn they are expected to advise the affected traffic.

COMMENT	Appendix A is; Shanwick procedures in event of Gander evacuation and does not detail the agencies receiving the NAT track message.

2.4 LIMITED SERVICE - PROCEDURES

2.4.1 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 CYQX International Flight Service Station will be delegated to the other International radio stations; New York AIRNC, Iceland Radio, Santa Maria Radio and Shannon Radio. Appropriate frequency will be published in the daily ATFM messages (NOTAM, Advisory)

VHF Frequencies used in ADS-B airspace over Greenland are included in Appendix F as reference information for adjacent units to use in contacting affected flights.

2.4.2 *Disruption of ability to provide control services*

Gander shall determine, co-ordinate and promulgate any necessary restrictions to meet the service limitation. Traffic in possession of a valid oceanic clearance shall have priority over any other traffic. En-route reclearance of such traffic shall not be permitted except in emergency.

Traffic without a valid oceanic clearance may be subject to tactical traffic management measurements to meet the requirements of the service limitation.

Separation standards

Gander will be responsible for ensuring the co-ordination and implementation of any additional separation requirements.

ADS-B Airspace

Gander will be responsible for re-establishing procedural separation standards for aircraft within ADS-B airspace as practicable.

Contingency tracks

~~Dependant~~ Dependent on the nature of the service limitation, Gander may promulgate and activate contingency tracks for use in addition to the OTS.

COMMENT	Change from noun to adjective

Air Traffic Flow Management

Gander shall co-ordinate any necessary traffic management measures where necessary with the NAV Canada National Operations Centre. Such measures may include, but are not limited to, temporary capacity restrictions and tactical rerouting measures.

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

Responsibilities of adjacent ANSPs

The action required of adjacent ANSPs will vary ~~dependant~~ dependent 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.

COMMENT	Change from noun to adjective

2.5 *NO SERVICE - PROCEDURES*

2.5.1 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

In the event Gander ACC is evacuated, an agreement between UK NATS and NAV Canada will have Shanwick Oceanic assume responsibility for the provision of Air Traffic Services (ATS) within the Gander OCA to the best of their ability. ~~, but~~ Shanwick will not normally issue re-clearances to aircraft within the Gander Oceanic CTA. Moncton and Montreal ACCs will assume responsibility for the provision of en-route ATS within the Gander FIR to the best of their abilities.

COMMENT	Added Shanwick for clarity

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.

Until these contingency plans can be implemented, it is possible that the Gander Oceanic CTA may contain unexpected (non-OTS) traffic en-route to adjacent facility airspace. It is suggested that facilities adjacent to Gander take the following action:

- Increase or extend HF communication position report monitoring to include aircraft in Gander airspace;
- Pass traffic information on known Gander traffic to the next en-route facility after Gander; and:
- Prohibit profile changes (altitude and route) for aircraft exiting the Gander area until it can be safely assumed that there is no unknown traffic in that aircraft's vicinity.

All traffic en-route to transition Gander airspace without Gander approval shall be routed to remain clear of Gander airspace. **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.

2.6 FLIGHT CREW AND OPERATOR PROCEDURES

2.6.1 For flights within the Gander OCA – General

The procedures outlined below are to be used as guidance for pilots in the immediate aftermath of a sudden withdrawal of the ATC service as described above.

On receipt of the contingency message pilots are requested to re-broadcast the message to other flights on 121.5 and 123.45. A listening watch on these frequencies must be maintained.

COMMENT	clarified

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

COMMENT	Edited for brevity

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

If unable to establish radio contact, flights may use any communication means necessary to provide position reports.

Oceanic Centre	**Telephone Number**	**SATCOM Inmarsat Short Code**
Reykjavik, via Iceland Radio	+354 568 4600	425105
Santa Maria	+351 296 820 438 +351 296 886 042 (satellite link)	426305
New York	+1 631 468 1413	436623
Ballygirreen (Shanwick Aeradio)	+353 61 368241 Ground/Air Ops +353 61 471199 Ground/Air Ops via Switchboard	425002

COMMENT	Moved from Westbound section into general as it applies to both east and west bound aircraft

2.6.2 *For flights within the Gander OCA – Westbound*

Shanwick OACC will endeavor to provide an ATC service throughout the Gander OCA as soon as evacuation commences.

Flights are expected to continue in accordance with the last clearance issued and acknowledged.

COMMENT	Duplicated from Eastbound section as it applies here as well

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/FMC) as these reports may not have been received by the next agency.

~~**Oceanic Centre**~~	~~**Telephone Number**~~	~~**SATCOM Inmarsat Short Code**~~
~~Reykjavik, via Iceland Radio~~	~~+354 568 4600~~	~~425105~~
~~Santa Maria~~	~~+351 296 820 438~~ ~~+351 296 886 042 (satellite link)~~	~~426305~~
~~New York~~	~~+1 631 468 1413~~	~~436623~~
~~Ballygirreen (Shanwick Aeradio)~~	~~+353 61 368241 Ground/Air Ops~~ ~~+353 61 471199 Ground/Air Ops via Switchboard~~	~~425002~~

COMMENT	Moved to general section above

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.

2.6.3 *For flights within the Gander OCA – Eastbound*

Shanwick OACC will endeavor to provide an ATC service throughout the Gander OCA as soon as evacuation commences.

Flights operating with a received and acknowledged oceanic clearance will be expected to continue in accordance with the last clearance issued unless otherwise advised by ATC.

~~Flights making automatic position reports are required to make voice position reports whilst within the Gander OCA, unless advised otherwise.~~

COMMENT	Covered in general section

Communications with the next ATSU should be established at the earliest opportunity. Where no contact with the next agency can be established, Shanwick radio should be contacted on HF for advice.

~~***2.6.4 For flights within the Gander Oceanic ADS-B airspace- eastbound and westbound***~~

~~Shanwick OACC will endeavour to provide an ATC service throughout the Gander OCA as soon as evacuation commences.~~

~~Flights operating with a received and acknowledged oceanic clearance will be expected to continue in accordance with the last clearance issued unless otherwise advised by ATC.~~

~~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/FMC) as these reports may not have been received by the next agency.~~

~~Flights in contact with Gander via VHF frequencies located in Greenland should contact Shanwick OACC on published HF frequencies.~~

COMMENT	No longer applicable

2.6.5 *For flights approaching the Gander OCA when the contingency is activated*

Not in Receipt of an Oceanic Clearance

In the event that Gander OACC must be evacuated, only aircraft with received and acknowledged oceanic clearances shall be permitted to transit Gander OCA.

If aircraft are unable to obtain or acknowledge an oceanic clearance, flights must plan to re-route around the Gander OCA or to land at an appropriate aerodrome. Request the appropriate re-clearance on the current frequency. Frequency congestion is likely.

In receipt of an acknowledged Oceanic Clearance

Aircraft operating with a received and acknowledged ocean clearance should proceed in accordance with the clearance. Flights should not request changes in altitude, speed or route except for reasons of flight safety or to comply with the oceanic clearance.

However, due to the uncertainty surrounding the contingency situation pilots are strongly advised to comply with the procedures detailed above for flights not in receipt of an oceanic clearance even if they are in receipt of an acknowledged Oceanic clearance.

Entering from another OCA

While flights with an acknowledged oceanic clearance may transit Gander's oceanic airspace, flights not yet within Gander OCA are strongly advised not to enter the airspace.

Flights operating with an acknowledged oceanic/ATC clearance that continue under pilot's discretion are expected to proceed in accordance with the last oceanic/ATC clearance issued.

Enroute requests for changes to route, level or speed should be limited to those required for flight safety.

~~Flights within Reykjavik, New York or Santa Maria oceanic airspace, can anticipate a large re-route to avoid the Gander OCA and Gander FIR. Reykjavik and Santa Maria will issue advice on procedures to be followed~~

COMMENT	Remove original wording and replace with phrasing reflecting agreed NOTAM

2.7 *GANDER OACC – CONTINGENCY ROUTE STRUCTURE*

~~i) In the event that Gander ACC must be evacuated, only aircraft with received and acknowledged oceanic clearances will be permitted to transit the Gander OCA.~~

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

~~iii) If aircraft are unable to obtain or acknowledge an oceanic clearance, flights must plan to re-route around the Gander OCA or to land at an appropriate aerodrome. Request the appropriate re-clearance on the current frequency. Frequency congestion is likely.~~

COMMENT	Remove i) and iii) as information is already covered and not applicable for contingency route section. Renumber as needed

Westbound flights

~~iv) Based on where they exit oceanic airspace,westbound~~ 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.~~In the event that Gander ACC must be evacuated, only aircraft with received and acknowledged oceanic clearances will be permitted to transit the Gander OCA.~~

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
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

COMMENT	Westbound added and clarified. Removed already covered information. New tables with additional routes. Remove old tables.

~~*Note – the landfall fix is the fix after the oceanic exit point.*~~

~~Ocean Exit~~	~~Unless otherwise instructed proceed:~~	~~Next agency/frequency~~
~~6500N06000W or AVPUT~~	~~NALDI DUTUM~~	~~Montreal ACC 132.800~~
~~6400N06000W or CLAVY~~	~~KAGLY TEFFO~~	~~Montreal ACC 132.800~~
~~6300N06000W or EMBOK~~	~~IKMAN FEDDY~~	~~Montreal ACC 132.800~~
~~6200N06000W or KETLA~~	~~GRIBS JELCO~~	~~Montreal ACC 134.800~~
~~6100N06000W or MAXAR~~	~~MIBNO RODBO~~	~~Montreal ACC 134.800~~
~~6000N06000W or PIDSO~~	~~PEPKI LOPVI~~	~~Montreal ACC 135.800~~
~~5900N06000W or SAVRY~~	~~LAKES~~	~~Montreal ACC 132.450~~
~~URTAK or MOATT~~	~~MOATT LOMTA TEALS VANSI~~	~~Montreal ACC 132.45~~
~~AVUTI or PRAWN~~	~~PRAWN YDP YKL ROUND~~	~~Montreal ACC 132.45~~
~~CUDDY or PORGY~~	~~PORGY HO YBC ANCER~~	~~Moncton ACC 132.95 or Montreal ACC 132.90 @ 63W~~
~~DORYY~~	~~BORUB YZV*~~	~~Moncton ACC 132.95 or Montreal ACC 132.90@ 63W~~
~~HOIST~~	~~YYR YRI*~~	~~Moncton ACC 132.52 or Montreal ACC 132.90 @ 63W~~

~~JANJO~~	~~QUBIS*~~	~~Moncton ACC 132.52 or Montreal ACC 132.90 @ 63W~~
~~LOMSI~~	~~TAFFY~~	~~Moncton ACC 132.52~~
~~NEEKO~~	~~MILLS~~	~~Moncton ACC 132.52~~
~~RIKAL~~	~~YAY DANOL~~	~~Moncton ACC 133.55~~
~~TUDEP~~	~~TOPPS~~	~~Moncton ACC 133.55~~
~~ALLRY~~	~~EBONY~~	~~Moncton ACC 132.75~~
~~ELSIR~~	~~ALLEX~~	~~Moncton ACC 132.75~~
~~JOOPY~~	~~TUSKY~~	~~Moncton ACC 132.75~~
~~NICSO~~	~~YYT BRADD~~	~~Moncton ACC 125.25~~
~~PORTI~~	~~KANNI~~	~~Moncton ACC 125.25~~
~~SUPRY~~	~~WHALE~~	~~Moncton ACC 125.25~~
~~VODOR~~	~~RAFIN NANSO VITOL*~~	~~Moncton ACC 125.25~~
~~BOBTU~~	~~JAROM LOMPI DOVEY*~~	~~Moncton ACC 125.25~~
~~** Aircraft may not be able to contact next control agency until established on this route*~~		

~~Eastbound Aircraft operating with a received and acknowledged ocean clearance should proceed in accordance with the clearance. Flights should not request changes in altitude, speed or route except for reasons of flight safety or to comply with the oceanic clearance.~~

COMMENT	Remove- already covered and not a contingency route

Eastbound flights

~~v) The Eastbound Organized Track System will be extended to begin at fixes on or near the western boundary between the Gander FIR and the Moncton and Montreal FIR's.~~ 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	URTAL
ALSOP		VESMI
YWK	YDP	AVUTI
DUVBI	VOKET	BOKTO
MUNBO		CUDDY
BORUB		DORRY
TEXUN		ENNSO
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	

COMMENT	Add Eastbound header. Remove OTS reference as this applies to all eastbound flights. Add new tables and remove old

~~vi) Based on the Oceanic Entry Point, eastbound flights shall proceed in accordance with the following table, until communication is established with, and a re-clearance issued by the next agency.~~

~~***Aircraft north of MOATT continue on oceanic clearance as received from YUL ACC.***~~		
~~FIR boundary fix~~	~~Landfall fix~~	~~Oceanic Entry Point in OTS message~~
~~KENKI~~		~~AVPUT~~
~~MUSVA~~		~~CLAVY~~
~~BERUS~~		~~EMBOK~~
~~GRIBS~~		~~KETLA~~
~~MIBNO~~		~~MAXAR~~
~~PEPKI~~		~~PIDSO~~
~~LAKES~~	~~5900N06000W~~	~~SAVRY~~
~~YKL~~	~~LOMTA~~	~~MOATT or URTAK~~
~~YWK~~	~~YDP~~	~~PRAWN or AVUTI~~
~~MUNBO~~	~~HO~~	~~PORGY or CUDDY~~
~~BORUB~~		~~DORYY~~
~~TASTI~~	~~YYR~~	~~HOIST~~
~~SERBO~~		~~JANJO~~
~~VERTU~~		~~LOMSI~~
~~PIKNA~~		~~NEEKO~~
~~NAPLO~~	~~YAY~~	~~RIKAL~~
~~MIGLI~~		~~TUDEP~~
~~LOPRO~~		~~ALLRY~~
~~VINSI~~	~~YQX~~	~~ELSIR~~
~~TAGRA~~		~~JOOPY~~
~~SUTKO~~	~~YYT~~	~~NNICSO~~

~~RUBDA~~		~~PORTI~~
~~PEPRA~~		~~SUPRY~~
~~NANSO~~	~~RAFIN~~	~~VODOR~~
~~LOMPI~~	~~JAROM~~	~~TALGO~~

2.8 *LONG TERM CONTINGENCY ARRANGEMENTS*

~~Until full service can be re-established, Gander ACC will delegate the control of aircraft within the Gander Oceanic Control Area to Shanwick Oceanic. Level 2 of NAV Canada's Oceanic recovery will have Gander establish a Planning/Coordination Centre. This Planning/Coordination Centre will maintain responsibility for planning of all eastbound flights, and coordination of eastbound and westbound flights with NAV Canada Domestic Facilities. Gander will coordinate all eastbound flights that penetrate New York Oceanic Control Area directly from Gander Domestic Airspace. The provision of ADS-B services in Gander OACC ADS-B airspace will remain suspended until such time as full service can be re-established.~~

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.

COMMENT	Amended.

~~The Facility recovery Document and Business Resumption plan for Gander Area Control Centre is broken down into a 5 step process.~~

~~*Level 1: Emergency Services*~~

~~Control service to EMERGENCY and HUMANITARIAN Flights, along with limited Airspace Reservations (no aircraft joining or departing).~~

~~*Level 2: Single Stand Operation*~~

~~Emergency and Humanitarian flights, along with limited Airspace Reservations (no aircraft joining or departing) would take priority. Control service provided through minimum staff with limited equipment. This would result in a metered flow through the Gander Oceanic Area, of commercial, general aviation, military and state aircraft.~~

~~*Level 3: Capacity Limited, Normal Control Service*~~

~~Emergency and Humanitarian flights, along with limited Airspace Reservations (no aircraft joining or departing) would take priority. Control service with accompanying clearance delivery communication would be offered through an increased number of operating positions. Flow restrictions and metering would be established to reduce congestion.~~

~~*Level 4: Normal Control Service*~~

~~Provide control service using the Planning/Coordination Centre. All required communication will be available. The Gander Planning/Coordination Centre would provide the full range of services required by eastbound aircraft, and act as the coordinator between Shanwick Oceanic and NAV Canada domestic facilities. Control of Gander's Oceanic Area would be maintained by Shanwick.~~

~~*Level 5: Total Restoration of Services by Gander Oceanic*~~

~~Full Oceanic en-route and planning services restored to a NAV Canada facility and provided by Gander Oceanic control staff. Control of Gander Oceanic Area would be returned to NAV Canada by Shanwick. ADS-B services resume once control of Gander Oceanic Airspace is returned to NAV Canada by Shanwick.~~

COMMENT	Levels either 1-5 or A-F are internal to Nav Canada and not applicable here. Remove

~~***2.9 DATA LINK SYSTEM FAILURE***~~

~~**2.9.1 Gander OACC Procedures**~~

~~In the event of an unexpected data link shutdown, Gander shall inform:~~

~~a. All currently connected FANS-1/A equipped aircraft via voice.~~

~~b. The adjacent ANSPs by direct coordination; and~~

~~c. All relevant parties via the publication of a NOTAM, if appropriate~~

~~d. Aircraft using separations standards requiring FANS1/A shall be transitioned to non FANS oceanic standards~~

~~***2.9.2 Pilot Procedures***~~

~~Pilots shall terminate the data link connection and use voice until further informed by Gander that the data link system has resumed normal operations.~~

COMMENT	Not a contingency procedure as expected in 006. Remove

Appendix A –

Shanwick procedures in event of Gander evacuation

Shanwick Oceanic will endeavor to provide an ATC service throughout the Gander OCA as soon as evacuation commences.

Shanwick will ensure and verify that information on all cleared aircraft proceeding westbound from Shanwick's area, through Gander's Oceanic Airspace is passed to the next affected unit.

Moncton	Telephone 506-867-7173 or 7175
Montreal	Telephone 514-633-3365 or 3278
Edmonton	Telephone 780-890-8397 or 8306

Shanwick will co-ordinate with other Oceanic service providers (New York, Santa Maria, Reykjavik) to ensure that information on flights proceeding from their airspace directly into Gander OCA is coordinated with enroute agencies.

Appendix B – Contact Details - Gander OACC

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 5315
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

COMMENT	Updated to include contact information for Gander domestic and IFSS plus SATVOICE numbers for all GANDER ACC contacts

Appendix C –

Evacuation Messages - Gander OACC

"Emergency evacuation of Gander Centre and Gander Radio in progress. No IFR control or HF communication service will be provided by Gander, I repeat, no IFR Control or HF communication service will be provided by Gander. Use extreme caution and monitor this frequency, emergency frequencies and air to air frequencies. Westbound flights west of 50 west contact Moncton Centre or Montréal Centre as soon as possible. Eastbound flights west of 50 west not in receipt of an oceanic clearance must land at an appropriate aerodrome, or request appropriate re-clearance to avoid Gander OCA/FIR. All other flights contact Shanwick radio, New York ARINC, ~~Søndrestrøm~~ Nuuk FIC, Iceland Radio or Santa Maria Radio as soon as possible. Please broadcast this information on 123.45, 121.5 and 243.0"

COMMENT	Amended form Sondrestrom to Nuuk

Appendix D –

Common NAT NOTAM example

DUE TO EMERGENCY EVACUATION OF [OACC] DUE [REASON, e.g. COVID19] AIR TRAFFIC CONTROL SERVICES ARE UNAVAILABLE IN THE [NAME] OCA.

FLIGHTS NOT IN RECEIPT OF AN OCEANIC CLEARANCE SHOULD REQUEST CLEARANCE TO AVOID [NAME] OAC/FIR OR LAND AT AN APPROPRIATE AERODROME.
ONLY FLIGHTS OPERATING WITH AN ACKNOWLEDGED OCEANIC/ATC CLEARANCE ARE PERMITTED TO OPERATE WITHIN [NAME] OCA.

FLIGHTS NOT YET OPERATING WITHIN THE [AIRSPACE NAME] OCA BUT IN RECEIPT OF AN [OCEANIC] OR [ATC] CLEARANCE ARE STRONGLY ADVISED NOT TO ENTER THE AIRSPACE.

FLIGHTS OPERATING WITH AN ACKNOWLEDGED OCEANIC/ATC CLEARANCE THAT CONTINUE UNDER PILOTS DISCRETION ARE EXPECTED TO PROCEED IN ACCORDANCE WITH THE LAST OCEANIC/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 CONNECT 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.

~~**Gander International Flight Service Station**~~

~~**Procedures in Event of a Data Link System Failure**~~

~~A. The communications service provider (CSP) will advise participating airlines and the OACC if there is a widespread ADS Failure~~

~~B. The CSP will provide the OACC with a list of all aircraft that were logged on to the NAV Canada Gateway.~~

~~C. The OACC will provide the list to IFSS including the last WPR received~~

~~D. IFSS will prioritise the list and retrieve associated SELCAL~~

~~E. IFSS will advise aircraft that limited data link capabilities may result in voice~~

~~WPR NOTES~~

~~1. One NOTAM may be issued for all participating OACCs if there is a widespread ADS Suspension. In event that the failure is localized, Gander OACC may suspend ADS-WPR in Gander's FIR. Resumption of ADS WPR will be at the discretion of the ACC Shift manager/Oceanic Supervisor.~~

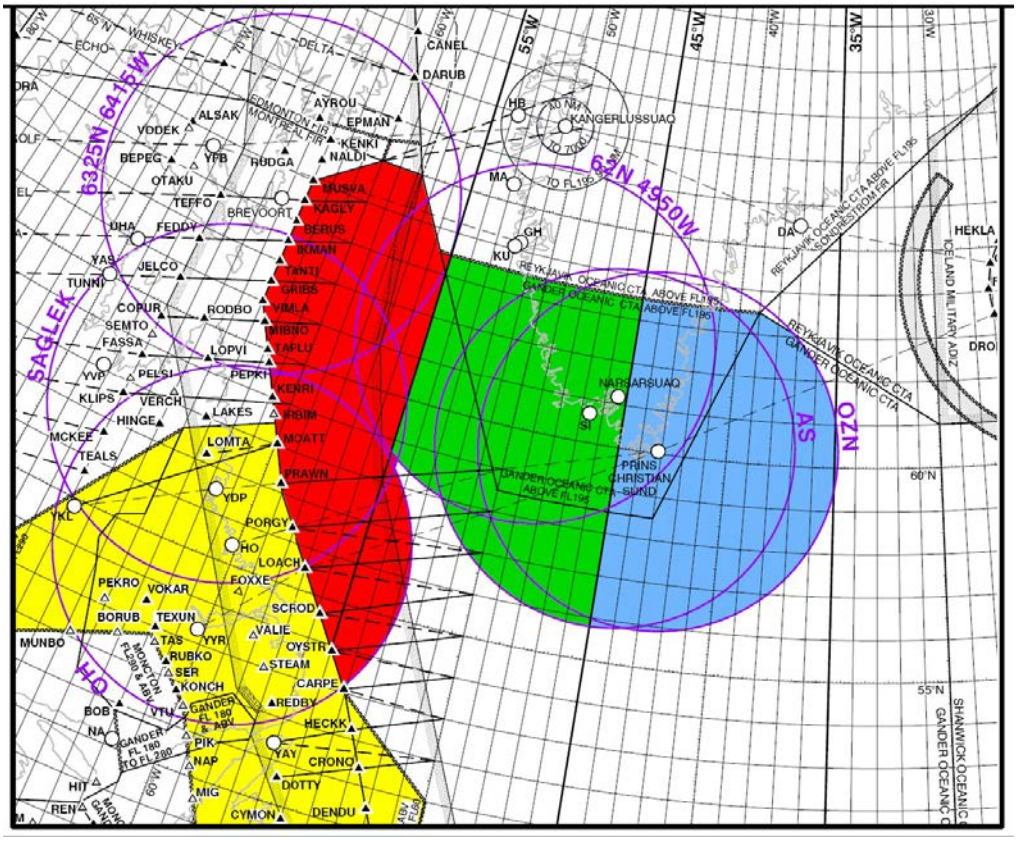
~~2. The CSP will issue e-mail bulletins to users, including NAV Canada, advising of the outages and including any available extent/duration information.~~

~~3. Gander radio will SELCAL flights to advise of the failure, as per the North Atlantic Region Data Link Initiative.~~

COMMENT	Not a contingency procedure as expected in 006. Remove

~~Appendix E – ADS-B airspace MAP~~

~~ICAO airspace delegated to Canada generally falling within an area west of 35 degrees longitude and north of 56 degrees latitude. ADS-B services will be available at FL290 and above.~~



COMMENT	No longer pertinent. Remove

~~Appendix F –~~

~~Communications and Position Reporting Procedures in NAT MNPS ADS-B Airspace~~

~~VHF Frequencies (see attached table) to provide DCPC for ADS-B coverage area within the Gander OCA will be located at:~~

- ~~Brevoort, Canada~~
- ~~Saglek, Canada~~
- ~~Hopedale, Canada~~
- ~~Paamiut, Greenland~~
- ~~Frederiksdal, Greenland~~
- ~~Prince Christian Sund, Greenland~~
- ~~Simiutaq, Greenland~~

~~Site~~	~~Designator~~	~~Power (W)~~	~~Frequency~~	~~VSCS Name~~	~~Radio No.~~
~~Saglek~~	~~SV~~	~~300~~	~~135.325~~	~~135.32 SV~~	~~96~~
~~Saglek~~	~~SV~~	~~50~~	~~123.75~~	~~123.75 SV~~	~~79~~
~~Breevort~~	~~BZ~~	~~50~~	~~128.075~~	~~128.07 BZ~~	~~104~~
~~Breevort~~	~~BZ~~	~~50~~	~~124.825~~	~~124.82 BZ~~	~~95~~
~~Hopedale~~	~~HO~~	~~300~~	~~132.65~~	~~132.65 HO~~	~~80~~
~~Paamiut~~	~~PA~~	~~50~~	~~135.15~~	~~135.15 PA~~	~~97~~
~~Paamiut~~	~~PA~~	~~50~~	~~132.375~~	~~132.37 PA~~	~~98~~
~~Paamiut~~	~~PA~~	~~50~~	~~127.55~~	~~127.55 PA~~	~~89~~
~~Simiutaq~~	~~SM~~	~~50~~	~~134.475~~	~~134.47 SM~~	~~99~~
~~Simiutaq~~	~~SM~~	~~50~~	~~132.85~~	~~132.85 SM~~	~~100~~
~~Simiutaq~~	~~SM~~	~~300~~	~~126.825~~	~~126.82 SM~~	~~90~~
~~Simiutaq~~	~~SM~~	~~50~~	~~120.7~~	~~120.7 SM~~	~~91~~
~~Frederiksdal~~	~~FD~~	~~300~~	~~135.675~~	~~135.67 FD~~	~~101~~
~~Frederiksdal~~	~~FD~~	~~50~~	~~119.8~~	~~119.8 FD~~	~~102~~
~~Frederiksdal~~	~~FD~~	~~50~~	~~118.425~~	~~118.42 FD~~	~~92~~
~~Prins Christian Sund~~	~~PC~~	~~50~~	~~134.95~~	~~134.95 PC~~	~~103~~
~~Prins Christian Sund~~	~~PC~~	~~50~~	~~133.05~~	~~133.05 PC~~	~~93~~
~~Prins Christian Sund~~	~~PC~~	~~50~~	~~124.0~~	~~124.0 PC~~	~~94~~

COMMENT	No longer pertinent. Remove

APPENDIX J — PFA TO *NORTH ATLANTIC OPERATIONS AND AIRSPACE MANUAL* (NAT DOC 007) RELATED TO REMOVAL OF HO NDB, NOROTS AND NCA AND DELETION OF "TURBOJET" IN PANS-ATM WITH REFERENCE TO MACH NUMBER TECHNIQUE

(*paragraph 5.4.2 refers*)

3.2.1 Routes within the NAT HLA (illustrated in Figure 3-1) are as follows:

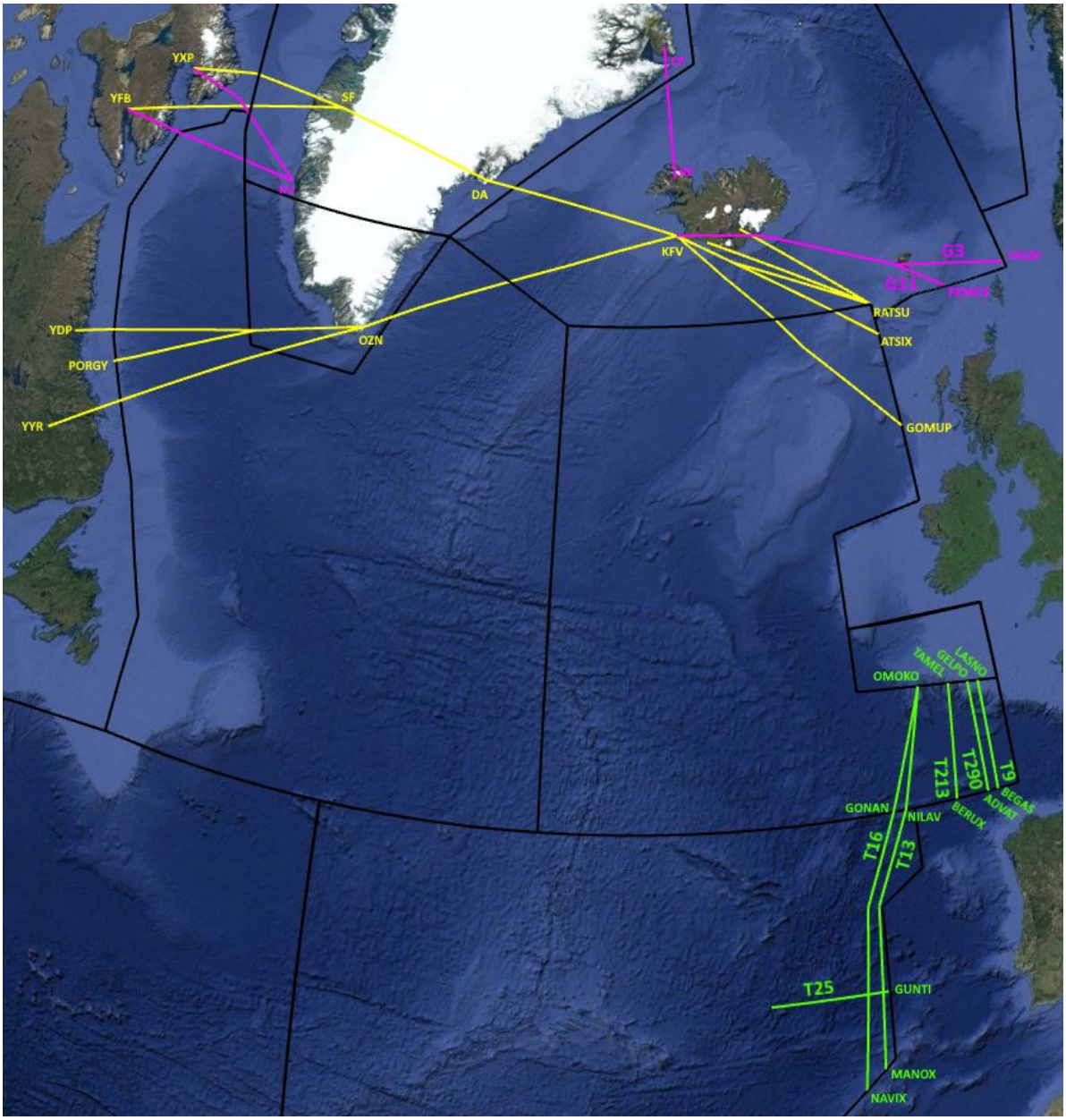
a) *Blue Spruce Routes require state approval for NAT HLA operations, and are listed below:

…..

-OZN – 59°N 50°W – CUDDY (FL290 to FL600) - PORGY – ~~HO,~~

FIGURE 3-1 – OTHER ROUTES AND STRUCTURES WITHIN THE NAT HLA

Replace Figure 3-1 with:



4.2.11 Canadian Domestic route schemes and the US East Coast Link Routes are also published. ~~Flights entering the NAM region north of 65N must be planned in accordance with the NCA and/or NOROTS as appropriate.~~ 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.

…

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 ~~are~~ is the NAR ~~and NOROTS~~ structures. Details of these routes and ~~their~~ 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.

16.6.6….

- 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)~~, the Northern Organised Track System (NOROTS)~~ 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 reroutes and/or the flight not receiving requested altitudes.

…..

7.1.1 Mach Number Technique (MNT) is a technique whereby ~~turbojet~~ aircraft operating successively along suitable routes are cleared by ATC to maintain a Mach number for a portion of the enroute phase of flight.

7.3.1 Oceanic clearances include assigned Mach numbers (when required) which are to be maintained. ~~Turbojet aircraft~~ Aircraft capable of maintaining an assigned Mach ~~intending to fly in NAT oceanic airspace~~ must flight plan their requested Mach number. ATC uses assigned Mach number along with position reports to calculate estimated times along the cleared route. These times are used as the basis for longitudinal separation and for coordination with adjacent units.

APPENDIX K — PFA TO *NORTH ATLANTIC OPERATIONS AND AIRSPACE MANUAL* (NAT DOC 007) TO CLARIFY THE NAT REGION HF REQUIREMENTS

(*paragraph 5.4.4 refers*)

CHAPTER 4 FLIGHT PLANNING

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. ~~VHF coverage charts are shown in Attachment 4. Some may permit the use of SATVOICE to substitute for or supplement HF communications. However, it must also be recognised that the Safety Regulator of the operator may impose its own operational limitations on SATVOICE usage. Any operator intending to fly through the NAT HLA without fully functional HF communications or wishing to use an alternative medium should ensure that it will meet the requirements of its State of Registry and those of all the relevant ATS providers throughout the proposed route.~~

CHAPTER 6 COMMUNICATIONS AND POSITION REPORTING PROCEDURES

6.1 ATS COMMUNICATIONS

Equipage Requirements

6.1.1 ~~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.~~ Operations in the NAT outside VHF coverage require the carriage of two long range communication systems, one of which must be HF. SATVOICE and CPDLC (appropriate to route of flight) may satisfy the requirement of the second-long range communication system. Due to coverage limitations, an Inmarsat CPDLC or SATVOICE system does not qualify as a long range communication system when operating north of 80N. Aircraft that are equipped with both Inmarsat (J5) and Iridium (J7) data link capability should use Iridium when north of 80N.

Comment:	The deleted text is moved to 6.1.4.

6.1.2 ~~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).~~ 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

Comment:	Deleted text moved to 6.1.5

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.

Comment:	Previous 6.1.1

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).

Comment:	Previous 6.1.1.1

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.

Comment:	• Included for renumbering- edits to text are shown as strikethroughs or grey highlights • 6.1.6 up to and including 6.1.28 have no editorial changes except for renumbering

6.1.7 There are a number of factors which affect the optimum HF 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.

6.1.8 The 24 NAT frequencies are organized into six groups known as Families. The families are identified as NAT Family A, B, C, D, E and F. Each family contains a range of frequencies from each of the HF frequency bands. A number of stations share families of frequencies and co-operate as a network to provide the required geographical and time of day coverage. A full listing of the frequencies operated by each NAT radio station is contained in the "HF Management Guidance Material for the North Atlantic Region" (NAT Doc 003), available at www.icao.int/EURNAT/, following "EUR & NAT Documents", then "NAT Documents", in folder "NAT Doc 003".

6.1.9 Each individual flight may be allocated a primary and a secondary HF frequency before the oceanic boundary.

6.1.10 Radio operators usually maintain a listening watch on more than one single frequency therefore it is useful for flight crews to state the frequency used when placing the initial call to the radio station.

HF Phraseology applicable when using data link ~~– Flight Crew Procedures Prior to or upon entering each NAT oceanic CTA~~

6.1.11 The integrity of the ATC service remains wholly dependent on establishing and maintaining HF or VHF voice communications with each ATS unit along the route of flight. The procedures in this section are applicable only in NAT airspace and pertain only to ATS data link operations.

6.1.12 Prior to or upon entering each NAT oceanic CTA, the flight crew should contact the appropriate aeronautical radio station.

6.1.13 If the flight enters an oceanic CTA followed by another oceanic CTA, the flight crew should, on initial contact:

a) not include a position report;

b) after the radio operator responds, request a SELCAL check and state the next CTA;

c) The radio operator will assign primary and secondary frequencies, perform the SELCAL check and designate the position and frequencies to contact the aeronautical radio station serving the next oceanic CTA. If the communications instructions are not issued at this stage, the crew should assume that the frequencies to use prior or upon entering the next CTA will be delivered at a later time by CPDLC or voice.

Example (Initial contact from an eastbound flight entering GANDER Oceanic)

GANDER RADIO, AIRLINE 123, SELCAL CHECK, SHANWICK NEXT

AIRLINE 123, GANDER RADIO, HF PRIMARY 5616 SECONDARY 2899, AT 30 WEST CONTACT SHANWICK RADIO HF PRIMARY 8891 SECONDARY 4675, (SELCAL TRANSMITTED)

GANDER RADIO, AIRLINE 123, SELCAL OKAY, HF PRIMARY 5616 SECONDARY 2899. AT 30 WEST CONTACT SHANWICK RADIO, HF PRIMARY 8891 SECONDARY 4675

6.1.14 If the flight will exit an oceanic CTA into continental airspace or airspace where the primary means of communication is VHF voice and an ATS surveillance service is available, on initial contact with the oceanic CTA, the flight crew should:

a) not include a position report;

b) after the radio operator responds, request a SELCAL check;

Example (Initial contact from an eastbound flight about to enter SHANWICK Oceanic)

SHANWICK RADIO, AIRLINE 123, SELCAL CHECK

AIRLINE 123, HF PRIMARY 2899 SECONDARY 5616 (SELCAL TRANSMITTED) SHANWICK RADIO, AIRLINE 123, SELCAL OKAY, HF PRIMARY 2899 SECONDARY 5616.

c) for flights on T9 and T290, monitor VHF channel 128.360 as advised by Shanwick Radio. Exceptionally, in the event of navigational non-conformance or in an emergency, controllers may communicate directly with the flight. Controllers will use the callsign “Shanwick Control”.

6.1.15 Depending on which data link services are offered in the oceanic CTA and the operational status of those services, the aeronautical radio operator will provide appropriate information and instructions to the flight crew.

6.1.16 If a data link connection cannot be established, maintain normal voice communication procedures. In the event of data link connection failure in a NAT CTA after a successful logon revert to voice and notify the appropriate radio station. Inform the OAC in accordance with established problem reporting procedures.

Note: Flights on Tango 9 or Tango 290 should contact Shanwick Radio on HF voice.

6.1.17 To reduce frequency congestion, flight crews of flights using ADS-C should not additionally submit position reports via voice unless requested by aeronautical radio operator.

6.1.18 ADS-C flights are exempt from all routine voice meteorological reporting; however, the flight crew should use voice to report unusual meteorological conditions such as severe turbulence to the aeronautical radio station.

6.1.19 For any enquiries regarding the status of ADS-C connections, flight crew should use CPDLC. Should the ATS unit fail to receive an expected position report, the controller will follow guidelines for late or missing ADS-C reports.

6.1.20 When leaving CPDLC/ADS-C or ADS-C-only airspace, the flight crew should comply with all communication requirements applicable to the airspace being entered.

6.1.21 If the flight crew does not receive its domestic frequency assignment by 10 minutes prior to the flight's entry into the next oceanic CTA, the flight crew should contact the aeronautical radio station and request the frequency, stating the current CTA exit fix or coordinates.

Note: Flights on Tango 9 or Tango 290 should contact Shanwick Radio on HF voice.

SELCAL

6.1.22 When using HF, SATVOICE, or CPDLC, flight crews should maintain a listening watch on the assigned frequency, unless SELCAL equipped, in which case they should ensure the following sequence of actions:

a) provide the SELCAL code in the flight plan; (any subsequent change of aircraft for a flight will require refiling of the flight plan or submitting a modification message (CHG) which includes the new registration and SELCAL);

b) check the operation of the SELCAL equipment, at or prior to entry into oceanic airspace, with the appropriate radio station. (This SELCAL check must be completed prior to commencing SELCAL watch); and

c) maintain thereafter a SELCAL watch.

6.1.23 It is important to note that it is equally essential to comply with the foregoing SELCAL provisions even if SATVOICE or CPDLC are being used for routine air/ground ATS communications. This will ensure that ATC has a timely means of contacting the aircraft.

6.1.24 Flight management staff and flight crews of aircraft equipped with SELCAL equipment should be made aware that SELCAL code assignment is predicated on the usual geographical area of operation of the aircraft. If the aircraft is later flown in geographical areas other than as originally specified by the aircraft operator, the aircraft may encounter a duplicate SELCAL code situation. Whenever an aircraft is to be flown routinely beyond the area of normal operations or is changed to a new geographic operating area, the aircraft operator should contact the SELCAL Registrar and request a SELCAL code appropriate for use in the new area.

6.1.25 When acquiring a previously owned aircraft equipped with SELCAL, many aircraft operators mistakenly assume that the SELCAL code automatically transfers to the purchaser or lessee. This is not true. As soon as practical, it is the responsibility of the purchaser or lessee to obtain a SELCAL code from the Registrar, or, if allocated a block of codes for a fleet of aircraft, to assign a new code from within the block of allocated codes.

6.1.26 Issues associated with duplicate SELCALS should be made to the SELCAL registrar, Aviation Spectrum Resources, Inc. (ASRI). The SELCAL registrar can be contacted via the AFTN address

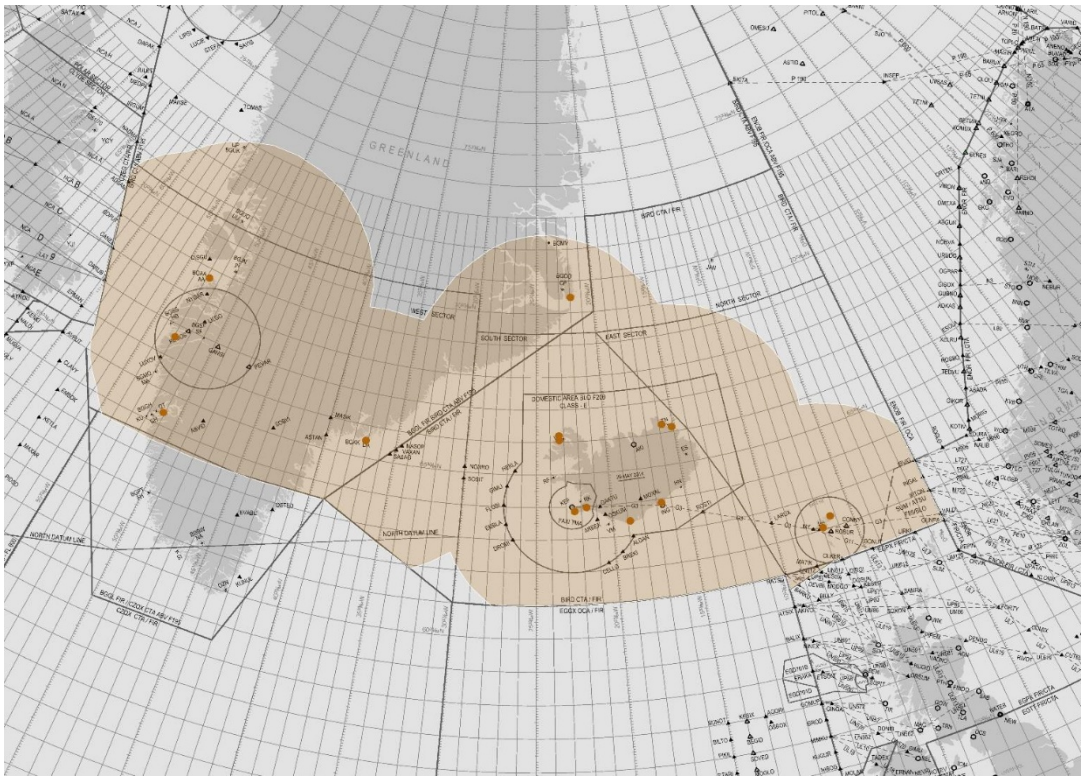
KDCAXAAG, and by including “ATTN. OPS DEPT. (forward to SELCAL Registrar)” as the first line of message text or via online at https://www.asri.aero/selcal/ .

VHF Voice Communications

6.1.27 Radio stations are also responsible for the operation of General Purpose VHF (GP/VHF) outlets. North Atlantic flights may use these facilities for all regular and emergency communications with relevant OACCs, except that VHF Channel 128.360 may not be used for routine communication on routes Tango 9 and Tango 290. Such facilities are especially valuable in the vicinity of Iceland, Faroes and Greenland since VHF is not as susceptible to sunspot activity as HF. Outlets are situated at Prins Christian Sund, which is operated by Gander Radio, and at Kangerlussuaq (Nuuk), Kulusuk, several locations in Iceland and the Faroes, via Iceland Radio. Theoretical VHF coverage charts are shown at Attachment 4. It is important for the flight crew to recognise that when using GP/VHF, as with HF and SATVOICE, these communications are with a radio station and the flight crew is not normally in direct contact with ATSU. However, contact between the flight crew and ATC can be arranged, for example via patch-through on HF or GP/VHF frequencies by Iceland Radio and Shanwick Radio.

6.1.28 Reykjavik centre operates a number of Direct Controller Pilot Communications (DCPC) VHF stations in Iceland, Faroe Islands and Greenland. At jet flight levels the coverage is approximately 250 NM as indicated in the map below. Those stations are used to provide tactical procedural control and ATS Surveillance services within the South, East and West sectors of the Reykjavik area. The callsign of the Reykjavik centre is “Reykjavik Control” or just “Reykjavik” and indicates that the flight crew is communicating directly with an air traffic controller. The callsign of Iceland radio is “Iceland radio” and indicates that the flight crew is communicating with a radio operator who is relaying messages between the flight crew and the appropriate control facility.

Note: Due to technical data link interoperability requirements, CPDLC uplink messages refer to Iceland Radio as "Iceland Radio Center". This is done to enable the flight crew of capable aircraft to automatically load the specified frequency into the aircraft communication system.



~~6.1.27 Gander OACC operates a number of VHF remote outlets in the southern part of Greenland and in the adjacent eastern seaboard of Canada, providing DCPC service for ADS-B operations in those parts of its airspace. For details of this ADS-B service, participation requirements and coverage charts, operators should consult the Canadian AIP. A brief description of the service is provided in Chapter 10 of this document.~~

Comment:	Gander no longer provides separation based on ground based sites.

~~6.1.28 The carriage of HF communications equipment is mandatory for flight in the Shanwick OCA. Aircraft with only functioning VHF communications equipment should plan their route outside the Shanwick OCA and ensure that they remain within VHF coverage of appropriate ground stations throughout the flight. Details of communication requirements are published in State AIPs and ICAO publications.~~

Comment:	With the new text all ANSPs will be the same

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).

Comment:	Revised numbering picks up here

6.1.30 The provisions governing the use of SATVOICE for ATS communications in the NAT region are contained in Doc.7030. These provisions include that even when using SATVOICE, flight crews must simultaneously operate SELCAL or maintain a listening watch on the assigned HF/VHF frequency.

6.1.31 Operators must also recognise that they are bound by their own State of Registry's regulations regarding carriage and use of any and all long-range ATS communications equipment. Some States do not authorise the carriage of SATVOICE as redundancy for HF equipage. ~~However, in other instances MMEL remarks for HF systems do provide relief for SATVOICE equipped aircraft, thereby making the requirement for the carriage of fully serviceable/redundant HF communications equipment less of an issue (See also Section 6.6 regarding the use of SATVOICE in the event of "HF Communications Failure").~~

Comment:	With the clarity of the new text this is no longer required

Comment: Jump to 6.6.17	No changes required between 6.1.31 and 6.6.17

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 entering the NAT, while still in domestic airspace and still in VHF contact with the domestic ATC Unit, does not enter NAT airspace but adopts the procedure specified in the appropriate domestic AIP and lands at a suitable airport. Should the flight crew, nevertheless, elect to continue the flight then every effort must be made to obtain an oceanic~~ clearance and the routing, initial level and speed contained in that clearance must be maintained throughout the entire oceanic segment. ~~Any level or speed changes required to comply with the oceanic clearance must be completed within the vicinity of the oceanic entry point.~~

- Prior to departure
  - Coordinate with the initial NAT OAC according to flight planned route to determine if eligible for HF relief waiver as outlined in 6.1.1
  - Include any coordinated HF waiver relief details in section 18 of the flight plan

- After departure and prior to entering the NAT
  - Coordinate with the initial NAT OAC according to flight planned route to determine if eligible for HF relief waiver as outlined in 6.1.1

Comment:	Suggested new text to address possibility of HF relief

CHAPTER 16 GUIDANCE FOR DISPATCHERS

16.2.5 Many NAT air/ground ATC communications are still conducted on single side-band HF frequencies. For ~~unrestricted~~ operations in the NAT region fully functioning HF communications equipment is required when operating outside VHF coverage. ~~While SATVOICE and data link communications are now in widespread use in NAT operations, HF also constitutes a required back-up.~~

Comment:	Simplified for consistency "unrestricted" removed since "when operating outside VHF coverage" has been added.

Communications

~~16.6.16 The availability of functioning HF ATS communications is mandatory for flights through the Shanwick OCA. Many States of Registry insist on two functioning long range communications systems for flights in oceanic or remote areas. Some States of Registry will allow their operators to substitute SATVOICE for one HF system. Dispatchers should ensure that they are fully aware of their State of Registry requirements in this regard. VHF communications (123.450 or 121.5 MHz) can be used as relay air-ground ATS communications as backup in case of en route HF failure.~~ 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

Comment:	Simplified for consistency

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. ~~HF is required for entering the Shanwick OACC. Many airline Operations Specifications require dual HF for operation in remote or oceanic airspace, even when aircraft are SATVOICE equipped. However, some States may permit Dispatch with only one serviceable HF system providing the aircraft is equipped with SATVOICE.~~

Comment:	Simplified for consistency and to reflect new text.

APPENDIX L — *NAT CONSOLIDATED REPORTING RESPONSIBILITIES HANDBOOK* (NAT DOC 010)

(*paragraph 5.5.2 refers*)

Starts on next page

European and North Atlantic Office

NAT DOC 010

Consolidated Reporting Responsibilities Handbook

North Atlantic Region

Draft December 2020

Prepared by the ICAO European and North Atlantic Office

on behalf of the North Atlantic Safety Oversight Group (NAT SOG)

EUROPEAN AND NORTH ATLANTIC OFFICE OF ICAO

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1. FOREWORD

This document is for guidance only. Regulatory material relating to North Atlantic Region (NAT) operations is contained in relevant *ICAO Annexes, PANS-ATM (ICAO Doc 4444), Regional Supplementary Procedures (ICAO Doc 7030),* State *Aeronautical Information Publications (AIPs)* and current Notices to Airmen (NOTAMs), which should be read in conjunction with the material contained in this document.

1.1 This document is primarily for the information of the ICAO North Atlantic Region States and their air navigation service providers (ANSPs). It compiles relevant reporting requirements and guidance in response to the NAT Systems Planning Group (NAT SPG), **Conclusion 48/20 - Consolidated ICAO NAT Region safety occurrence reporting requirements document,** which directed the NAT Safety Oversight Group (NAT SOG) to develop a document in which all region-specific safety occurrence reporting requirements are consolidated.

Edited by

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1.2 This manual has been produced on behalf of the NAT SPG; a North Atlantic regional planning body established under the auspices of the International Civil Aviation Organization (ICAO). This group is responsible for developing operational requirements, 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, which is available from the ICAO website: under "Regional Offices," "Paris," the location of the European and North Atlantic Regional Office.

1.3 This document can be accessed and downloaded from the ICAO website http://portal.icao.int/ as described in the paragraph above. This website will also include any noted post publication errata (changes) or addenda (additions) to the current edition. The document will be reissued on a recurrent basis as needed.

1.4 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 and/or suggestions for possible amendments and/or/additions to the ICAO EUR/NAT Office at the email address: icaoeurnat@paris.icao.int.

RECORD OF AMENDMENTS

Provisional Edition, 2015 [C48/20]
Edition - June 2019 [C55/23]
Edition – December 2020

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2. REGION-SPECIFIC REPORTING RESPONSIBILITIES

~~Report vertical deviations of 90m (300ft) or more, lateral deviations, and longitudinal losses of separations with the following data to the NAT CMA in a timely manner if the event occurred in the NAT HLA via email, or the North Atlantic Deviations and Error Monitoring Application (NAT DEMA)~~

Report to the NAT CMA in a timely manner all: vertical deviations of 90m (300ft) or more; lateral deviations (except where SLOP is correctly applied); longitudinal losses of separations; coordination errors; and prevented deviations occurring in the NAT HLA. The following information should be reported using the NAT Events Reporting Application (NERA):

Event Type	**MINIMUM DATA TO BE PROVIDED TO THE NAT CMA**	**Reference**
Vertical Deviation of 90m (300ft) or more	• Event type • Date and time the event occurred • Start and end locations of the occurrence, where available • Indication whether the event occurred on the NAT OTS or Random route • Aircraft identification, type, departure and destination, equipment carried • Flight level assigned by ATC or, coordinated between ATC Units or, correct level to be flown in accordance with contingency procedures, as applicable • Observed uncleared/uncoordinated flight level • Indication whether Loss of separation occurred and if yes, details of Loss of Separation • Filed flight plan details • FDPS System Logs • Event summary • Operator responses, findings and conclusions (including causes and contributory factors) arising from the reporting	NAT SPG Conclusion 56/xx

All Lateral Deviations (except where SLOP is correctly applied)	• Event type • Date and time the event occurred • Start and end locations of the occurrence, where available • Indication whether the event occurred on the NAT OTS or Random route • Aircraft identification, type, departure and destination, equipment carried • ATC cleared route and if different, the observed or reported route, including for a subsequent route portion not yet flown • Maximum distance deviated off cleared track (NMs) • Indication whether Loss of separation occurred and if yes, details of Loss of Separation • Filed flight plan • FDPS System Logs • Event summary • Operator responses, findings and conclusions (including causes and contributory factors) arising from the reporting Unit's investigation of the event	NAT SPG Conclusion 56/xx

Longitudinal Loss of Separation	• Event type • Date and time the event occurred • Start and end locations of the occurrence, where available • Indication whether the event occurred on the NAT OTS or Random route • Aircraft identification, type, departure and destination, equipment carried • ATC cleared route • Details of Loss of Separation • Filed flight plan details of all aircraft involved • FDPS System Logs • Event summary • Operator responses, findings and conclusions (including causes and contributory factors) arising from the reporting Unit's investigation of the event	NAT SPG Conclusion 56/xx

Coordination Error	• Event type • Date and time the event occurred • Start and end locations of the occurrence, where available • Indication whether the event occurred on the NAT OTS or Random route • Aircraft identification, type, departure and destination, equipment carried • Coordinated route • Duration unprotected by ATC • Indication whether loss of separation occurred and if yes, details of loss of separation • Filed flight plan • FDPS System Logs • Event summary • Operator/ANSP responses, findings and conclusions (including causes and contributory factors) arising from the reporting Unit's investigation of the event	NAT SPG Conclusion 56/xx

MINIMUM DATA TO BE PROVIDED TO THE NAT CMA
~~event type~~
~~date and time the event occurred~~
~~start and end locations of the occurrence, where available~~
~~whether the event occurred on the NAT OTS~~
~~aircraft identification, type, departure and destination~~
~~assigned flight level and, if different, the observed flight level~~
~~assigned speed and, if different, the observed or reported speed~~
~~assigned route and if different, the observed or reported route, including for a subsequent route portion not yet flown~~
~~details of Loss of Separation~~
~~flight plan~~
~~FDPS System Logs~~
~~communications or surveillance mode used to detect the event (i.e. Mode C, ADS-B, ADS-C, pilot report, etc.)~~
~~an initial event summary~~
~~Operator responses, findings and conclusions (including causes and contributory factors) arising from the unit's investigation of the event~~

Report to Wake.WakeTurbulence@nats.co.uk and natcma@nats.co.uk

Type of Information	Contents:	Reference
Wake Turbulence Events	Use the Wake Turbulence Reporting Form Information goes into the Wake Vortex database	North Atlantic Operations and Airspace Manual (NAT Doc 007) Attachment 3

Report traffic activity data to NAV Canada.

Type of Information	Contents:	Reference:
Traffic Activity Data	i. Gregorian Date, Julian Day and Year for the Oceanic Control Area Entry Date; ii. Flight Registration, Class, Aircraft Type and Equipment; iii. Direction, Track, Origin and Destination; iv. Oceanic Point of Entry (POE) and Point of Exit (POX) as fix name or 4900N02000W format, time and flight level of Oceanic POE and Oceanic POX; v. Speed at Oceanic point of entry vi. Latitude (half degree if necessary), time and flight level at 00W, 10W, 20W, 30W, 40W, 50W, 60W (as appropriate); vii. Latitude, longitude, time and flight level for the Oceanic Control Area Point of Entry (OCAPOE) and Oceanic Control Area Point of Exit (OCAPOX) viii. In comma-separated-variable (CSV) format. For further details per refer to the NAT MWG Handbook.	NAT SPG conclusion 55/23

Report the following to the DLMA through the website, http://www.fans-cra.com/

Type of Information	Contents:	Reference
Data Link Issues	Required content: http://www.fans-cra.com/	NAT SPG Conclusion 46/3

Note: in some cases a report may be required (depending on the nature of the event) to both the DLMA and CMA.

– END –

APPENDIX M — REVISION OF NAT OPS BULLETIN 2017_004 - *NAT DATA LINK SPECIAL EMPHASIS ITEMS (SEI)* TO INCLUDE CPDLC ROUTE UPLINK MESSAGES

(paragraph 5.6.2 refers)

NAT OPS BULLETIN

Serial Number: 2017_004_Rev 1
Subject: NAT Data Link Special Emphasis Items
Originator: NAT SPG

Issued: ~~06 August 2018~~ Xx MM 2021
Effective: ~~06 August 2018~~ Xx MM 2021

The purpose of North Atlantic Operations Bulletin 2017-004 is to provide background information and guidance material to North Atlantic (NAT) operators that could be included in pilot and dispatcher training programs and operations manuals to best prepare them for FANS 1/A (CPDLC/ADS-C) operations in the NAT to include the use of CPDLC route clearance uplinks.

Introduction

FANS data link is utilized in the NAT Region for communication via Controller Pilot Data Link Communication (CPDLC) and position reporting via Automatic Dependent Surveillance-Contract (ADS-C).

AIS publications of the NAT ATS Provider States should be consulted to determine the extent of current implementation in each of the NAT OCAs. Operational procedures to be used are specified in the **ICAO Doc 10037 Global Operational Data Link (GOLD) Manual**. These procedures are intended to facilitate the uniform application of Standards and Recommended Practices contained in:

- Annex 2 — Rules of the Air,
- Annex 10 — Aeronautical Telecommunications and
- Annex 11 — Air Traffic Services,
- The provisions in the Procedures for Air Navigation Services — Air Traffic Management (PANS ATM, Doc 4444) and, when applicable, the Regional Supplementary Procedures (Doc 7030).

Chapter 4 of the GOLD 'Flight Crew Procedures' is intended to assist operators in the development of appropriate procedures, documentation and training programs that ensure flight crews are knowledgeable in data link operations specific to aircraft type.

Chapter 4 is constructed as follows:

- General overview
- Differences between voice communications and CPDLC
- Logon procedures
- CPDLC messaging
- ADS-C contracts
- Non routine and emergency procedures.

This Bulletin may be updated, as necessary, as progress is made toward improved FANS 1/A (CPDLC/ADS-C) data link connectivity in the NAT region.

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NAT OPERATIONS BULLETIN – FANS 1/A (CPDLC/ADS-C) SPECIAL EMPHASIS ITEMS

1. Purpose of Bulletin – FANS 1/A (CPDLC/ADS-C) Special Emphasis Items.

1.1 The purpose of this bulletin is to provide background information and guidance material to North Atlantic (NAT) operators that could be included in pilot and dispatcher training programs and operations manuals to best prepare them for FANS 1/A (CPDLC/ADS-C) operations in the NAT to include the use of CPDLC route clearance uplinks.

1.2 With the increasing application of performance-based separations within the NAT Region, it is important that FANS 1/A (CPDLC/ADS-C) data link operations are functional so as to reduce impact and workload on both ATC and flight crews.

1.3 Operator attention is directed to Attachment A. which provides a "quick reference" for FANS 1/A (CPDLC/ADS-C) flight crew procedures. It is intended to be used as an aid for operators developing pilot training material.

1.4 The following is an explanation of the terms "should", "must" and "shall" as used in this bulletin.

a) "Should" is used to indicate a recommended practice or policy that is considered as desirable for the safety of operations.
b) "Shall" and "must" are used to indicate a practice or policy that is considered as necessary for the safety of operations.

2. FANS 1/A (CPDLC/ADS-C) Overview

2.1 Data link services, such as CPDLC and ADS-C, provide communications and position report information that are intended to support safer and more efficient air traffic management and increase capacity.

2.2 Controller Pilot Data Link Communications (CPDLC)

2.2.1 CPDLC significantly improves ATC intervention capabilities through enhanced communications which allows the exchange of uplink and downlink messages between an aircraft and an ATS Unit.

2.2.2 An aircraft can have a maximum of two CPDLC connections established concurrently, each with a different ATS Unit.

a) A CPDLC connection immediately becomes active when established if **no** previous CPDLC connection exists at that time. An active CPDLC connection allows an ATS Unit and the aircraft to exchange CPDLC messages. The ATS Unit with which an aircraft has an active CPDLC connection is referred to as the Current Data Authority (CDA).
b) An inactive connection Next Data Authority (NDA) can be established upon completion of the logon procedure if a previous CPDLC connection exists with the aircraft.

2.2.3 Under normal circumstances, the ATS Unit with the CDA connection will manage its CPDLC connections, including transferring and terminating the connection when no longer needed. CPDLC transfers will be initiated before the aircraft transits from the current ATS Unit to another CPDLC-capable ATS Unit, and will terminate the connection as the aircraft leaves the ATS Unit's airspace. These transfers are automatic and should be seamless to the crew without any action required.

2.2.4 Should a datalink transfer fail to complete, the transferring ATS Unit will be alerted, which may result in a request to the crew to disconnect CPDLC and to either perform a re-logon to recycle the transferring process, or to logon to the next ATS Unit.

2.2.5 It is imperative that equipped aircraft are logged on CPDLC/ADS-C prior to oceanic entry. This can be accomplished with an initial logon with a "domestic" FANS capable ATS Unit which then allows for an automatic transfer to the oceanic ATS Unit. If entering from an area where a data link connection has not been established, initiate the logon with the oceanic ATS Unit between 15 and 25 minutes prior to the boundary. Pilots should ensure the correct CPDLC identifier is populated for the "active centre" [active ATC] (CDA).

2.3 **Automatic Dependent Surveillance-Contract (ADS-C)**

2.3.1 ADS-C uses various systems on board the aircraft to automatically provide aircraft position, altitude, speed, intent and meteorological data, which can be sent in a report to an ATS Unit or AOC facility ground system for surveillance and route conformance monitoring.

2.3.2 When the ATS ground system receives a logon request message, the Flight Data Processing System (FDPS) will automatically initiate ADS contracts with the aircraft. These contract requests are dealt with by the avionics systems and are transparent to the flight crew. The following contracts are typically formed and provide alerts to the controller;

a) Periodic contract with a typical interval of 10-14 minutes. Aircraft avionics will send an updated position report which will include level, time and NEXT and NEXT+1 waypoints inserted in the active flight plan.

b) Event contract for the following events:
- Waypoint change event (WCE). Waypoint change event will trigger an automatic position report (which will include level, time and NEXT and NEXT+1 waypoints) whenever the aircraft passes a waypoint contained within the active flight plan, or whenever a crew amends a waypoint that is either NEXT waypoint or NEXT+1 waypoint in the active flight plan.

- Lateral deviation event (LDE). Deviation contract that will trigger an automatic position report (which will include level, time and NEXT and NEXT+1 waypoints) whenever the aircraft deviates from the cleared route beyond Strategic Lateral Offset (SLOP) provisions.

- Level range deviation event (LRDE). Deviation contract that will trigger an automatic position report (which will include level, time and NEXT and NEXT+1 waypoints) whenever the aircraft deviates from the cleared level by 300ft or more.

- Vertical Rate Change Event (VRE). Deviation contract that will trigger an automatic position report (which will include level, time and NEXT and NEXT+1 waypoints) whenever the rate of descent exceeds 5000 feet per minute.

c) Demand contract which can be used by the controller to trigger an instantaneous position report by the aircraft avionics.

d) Emergency contract ADS-C also supports emergency alerting. An ADS-C emergency report is a periodic report that is tagged as an 'emergency' report, allowing the emergency situation to be highlighted to ATC.

3. FANS 1/A (CPDLC/ADS-C) LOGON and Subsequent Transfers.

3.1 The logon is the first step in the data link process and is initiated either by the flight crew, or automatically following data link transfer from a previous ATS Unit. Once the logon is complete, the ATS Unit will request a CPDLC connection and/or ADS-C contracts, which should be automatically accepted by the aircraft.

3.2 Provisions concerning the establishment of FANS (CPDLC/ADS-C) connection are contained within Annex 10, Volume II, Chapter 8, 8.2.8 and ICAO Doc 4444, paragraph 14.2.

3.3 An initial logon request, when the aircraft is south of 82° North, is required regardless of whether or not ATS surveillance services are being provided. CPDLC provides communication redundancy and controllers will in many cases use CPDLC for communication even though the pilot is maintaining a listening watch on the assigned Direct Controller Pilot Communication (DCPC) VHF frequency.

3.4 At and north of 82° North, data link services cannot be guaranteed for aircraft equipped with Inmarsat SATCOM due to limitations in satellite coverage. However, this does not prevent flights from trying to establish a data link connection. Such limitations do not apply to aircraft equipped with Iridium SATCOM.

Note: Data link services for Northbound flights that fly north of 82° North and are not equipped with Iridium SATCOM data link are terminated at 82° North.

3.5 If not already logged on prior to North Atlantic entry, pilots should initiate a FANS 1/A (CPDLC/ADS-C) logon in the following circumstances;

a) Flights departing airports in close proximity to the oceanic boundary that have not established a FANS logon with the ATS Unit prior to the oceanic ATS Unit.
b) Flights that will enter the NAT Region from an area where data link connections have not been established or maintained or,
c) When instructed to do so by ATC (i.e. following a failed data link transfer).

3.6 Pilots should enter the CPDLC/ADS-C 4 letter identifier located on the charted FIR boundary for the appropriate ATS Unit ensuring that the aircraft registration and flight number are correct.

3.7 Once the unique aircraft registration and flight number are correlated by the FDPS, the ATS Unit will automatically establish the appropriate CPDLC connections and the ADS-C contracts.

3.8 Because of the necessity for the Oceanic ATS Units to ensure FANS data link capability, all flights equipped with and prepared to operate FANS 1/A (or equivalent) CPDLC and ADS-C data link systems ***must*** have either an established FANS 1/A (CPDLC/ADS-C) connection, or make an initial logon between 15 and 25 minutes prior to the oceanic boundary.

If no logon is detected by ATS Unit prior to the oceanic boundary, the air traffic controller will be alerted and a late revision to the oceanic clearance could occur.

3.9 Under normal circumstances following initial logon, data link operations are seamless. However, the data link communications network is complex and made up of a number of components which can result in unsuccessful operation. Whenever a connection or transfer issue is identified, the controlling ATS Unit will normally try a reset of the connection by requesting the logon be re-cycled, even though the aircraft may be indicating that the connection is working normally.

3.10 Despite indications in the cockpit of the correct active centre (CDA), ATC may issue an instruction to "DISCONNECT CPDLC AND LOG ON TO [ATSU]." It is vitally important to act on this instruction to ensure that the current flight profile can be maintained.

4. CPDLC Route Clearance Uplinks

4.1 CPDLC route clearance uplinks are used by ATC to amend oceanic routing.

4.2 ~~These uplinks are loadable in the FMS.~~ If a clearance is received that can be automatically loaded into the FMS (e.g. via a LOAD prompt), the flight crew should load the clearance into the FMS and review it before responding with WILCO.

4.3 Flight crews must be familiar with the proper loading and execution of the following CPDLC route clearance uplinks;

a) PROCEED DIRECT TO (position)
   I. Instruction to proceed directly to the specified position

b) CLEARED TO (position) VIA (route clearance)
   I. Instruction to proceed to the specified position via the specified route
   II. This uplink may not show the "VIA ROUTE CLEARANCE" until it is loaded
   III. This is not a "direct" to the CLEARED TO waypoint. It is a clearance to the waypoint via the route specified.

c) CLEARED (route clearance)
   I. Instruction to proceed via the specified route
   II. This uplink may not show the "ROUTE CLEARANCE" until it is loaded

~~d) CLEARED TO (position) VIA (route clearance)~~
   ~~I. Instruction to proceed to the specified position via the specified route~~
   ~~II. This uplink may not show the "VIA ROUTE CLEARANCE" until it is loaded~~
   ~~III. This is not a "direct" to the CLEARED TO waypoint. It is a clearance to the waypoint via the route specified.~~

~~e)~~d) AT (position) CLEARED (route clearance)
   I. Instruction to proceed from the specified position via the specified route
   II. This uplink may not show the "ROUTE CLEARANCE" until it is loaded

Note. — Experience shows that flights crews often misunderstand the uplink message CLEARED TO (position) VIA (route clearance) when they fail to load the message and incorrectly fly directly to the CLEARED TO position. Or, even after loading, they perceive the clearance as "direct" to the "CLEARED TO" position.

Note. — FMS waypoint weather data (winds and temperature) may be lost depending on the route clearance message received. Flight crews should verify the weather data as they may need to re-enter the weather data for proper FMS predictions. ~~that is sent in an uplink message will not contain forecast weather data (winds and temperature) in the FMS. Flight crews will need to re-enter the weather data~~.

5. Operator/Aircraft Eligibility.

5.1 Operators should ensure that all flights filed to operate in Data Link Mandate (DLM) airspace are:

a) Equipped with and prepared to operate FANS 1/A (or equivalent) CPDLC and ADS-C datalink systems. (NAT Regional Supplementary Procedures (ICAO Doc 7030) paragraphs 3.3.2 and 5.4.2 for CPDLC and ADS-C respectively.)

6. Flight Planning Provisions

6.1 Operators must file the correct ICAO Flight Plan annotations in Items 10 and 18 to indicate that FANS 1/A (CPDLC/ADS-C) required are operational for the flight;

a) Item 10a (Radio communication, navigation and approach aid equipment and capabilities).
- Insert "J2" to indicate FANS 1/A (or equivalent) CPDLC HFDL and/or "J5" to indicate FANS 1/A (or equivalent) Inmarsat CPDLC SATCOM and/or "J7" to indicate FANS 1/A (or equivalent) CPDLC Iridium SATCOM data link equipage and operation;

b) Item 10b (Surveillance equipment and capabilities)
- Insert "D1" to indicate FANS 1/A (or equivalent) ADS-C equipage and operation.

Note: Although J2, J5 or J7 meet the eligibility requirements for NAT DLM airspace, some ATS Units will only initiate CPDLC connections if a flight has filed J5 or J7.

7. Additional Requirements

7.1 Since SATCOM is required in oceanic airspace to maintain data link connectivity, pilots should ensure that SATCOM is functional prior to oceanic entry.

7.2 Even though a CPDLC connection may be active, flight crews are responsible for responding to SATVOICE calls, conducting HF SELCAL checks or maintaining a listening watch on the assigned frequency while in the NAT region.

7.3. Prior to exiting NAT oceanic airspace and transitioning into a domestic area, the transferring ATS Unit will uplink the appropriate voice frequency. If no such message is received prior to exiting, crews should request the frequency by voice to ensure contact with the ATS Unit ***before*** oceanic exit.

8. Contingency Procedures

8.1 FANS 1/A (CPDLC/ADS-C) procedures for loss of data link connectivity.

- **FANS 1/A (CPDLC/ADS-C) Data Link Equipment Failure Prior to Departure.** If a flight experiences a FANS data link failure **PRIOR TO DEPARTURE**, the flight should flight plan so as to remain clear of NAT DLM airspace

- **FANS 1/A (CPDLC/ADS-C) Data Link Equipment Failure After Departure But Prior to NAT DLM Airspace**. If a flight experiences a FANS data link failure **AFTER DEPARTURE BUTPRIOR TO ENTERING AIRSPACE**, the flight should contact ATC and request a revised clearance that will keep it clear of NAT DLM airspace.

- **FANS 1/A (CPDLC/ADS-C) Data Link Equipment Failure After Entering NAT DLM Airspace Track.** If a flight experiences a FANS data link failure **WHILE OPERATING IN NAT DLM AIRSPACE**, ATC must be immediately advised. Such flights may be re- cleared to exit NAT DLM airspace, but consideration will be given to allowing the flight to remain in the airspace, based on tactical considerations.

9. Websites

The ICAO EUR/NAT Office Website is at: **www.icao.int/eurnat**. Click on **EUR & NAT Documents** >> **NAT Documents** to obtain NAT Operations and NAT Region Update Bulletins and related project planning documents.

10. Contacts

The following individuals may be contacted for information or to provide feedback on FANS 1/A (CPDLC/ADS-C) operations:

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Tim Murphy
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Oceanic Services
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NAV CANADA
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Gander, NL A1V 1W7 Attn: Jeffrey Edison Manager, ACC Operations
Direct line: +1 709-651-5223
E-mail: **edisonj@navcanada.ca**

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ATTACHMENT A – SUMMARY OF FANS 1/A (CPDLC/ADS-C) SPECIAL EMPHASIS ~~INTEREST~~ ITEMS CONTAINED IN THIS NAT OPS BULLETIN

Special Emphasis Items for FANS 1/A (CPDLC/ADS-C) Procedures. The Special Emphasis Items (SEI) listed below should be incorporated into operator training programs and operations manuals with the intent of raising pilot and dispatcher awareness of the importance of following proper FANS 1/A (CPDLC/ADS-C) procedures in the NAT.

Planned Vertical and Horizontal Boundaries for NAT Region DLM Airspace

☑ Phase 2B, commencing 7 December 2017: FL 350 to FL 390 (inclusive) throughout the ICAO NAT region;

☑ Phase 2C, commencing 30 January 2020: FL 290 and above throughout the ICAO NAT Region.

Operator/Aircraft Eligibility and Flight Planning Provisions;

- Equipped with and prepared to operate FANS 1/A (or equivalent) CPDLC and ADS-C datalink systems. (NAT Regional Supplementary Procedures (ICAO Doc 7030) paragraphs 3.3.2 and 5.4.2 for CPDLC and ADS-C respectively.)
- Insert "J2" to indicate FANS 1/A (or equivalent) CPDLC HFDL, "J5" to indicate FANS 1/A (or equivalent) Inmarsat CPDLC SATCOM and/or "J7" to indicate FANS 1/A (or equivalent) CPDLC Iridium SATCOM data link equipage and operation in Item 10a (Radio communication, navigation and approach aid equipment and capabilities) of flight plan.
- Insert "D1" in field 10b to indicate FANS 1/A (or equivalent) ADS-C equipage and operation.

Flight Crew

- Must ensure a FANS (CPDLC/ADS-C) connection prior to entering NAT oceanic airspace, Connections are essential for ATC to be able to issue the most optimal oceanic clearance, provide more capacity, and to use ADS-C for route conformance along with efficient and expeditious communications through CPDLC.
- Must be proactive in ensuring the flight is connected to the correct ATS Unit.
- Must follow ATC instruction to "DISCONNECT CPDLC AND LOG ON TO [ATSU]" if advised.
- Must ensure SATCOM and HF functionality
- Must be familiar with the proper loading and execution of the following CPDLC route clearance uplinks;
  a) PROCEED DIRECT TO (position)
     I. Instruction to proceed directly to the specified position

  b) CLEARED TO (position) VIA (route clearance)
     I. Instruction to proceed to the specified position via the specified route
     II. This uplink may not show the "VIA ROUTE CLEARANCE" until it is loaded
     III. This is not a "direct" to the CLEARED TO waypoint. It is a clearance to the waypoint via the route specified

  c) CLEARED (route clearance)
     I. Instruction to proceed via the specified route
     II. This uplink may not show the "ROUTE CLEARANCE" until it is loaded

  d) AT (position) CLEARED (route clearance)
     I. Instruction to proceed from the specified position via the specified route
     II. This uplink may not show the "ROUTE CLEARANCE" until it is loaded

- Must contact the domestic ATS Unit on the frequency provided ***before*** exiting oceanic airspace.

Common Pre-Defined Freetext CPDLC Uplink Messages

CPDLC Pre-Defined Uplink Text	Reason ATS Unit would uplink	Crew Action
DIVERGENCE FROM ATC ROUTE AFTER NEXT WAYPOINT IS DETECTED. CHECK FMS	Out of conformance of NEXT+1 waypoint contained within ADS-C report.	Check loaded routing, and confirm if any changes have been made.
YOUR POSITION REPORT INDICATES INCORRECT ROUTING. CHECK FULL DEGREES AND MINUTES LOADED INTO FMC.	Out of conformance contained within ADS-C report.	Check full degrees and minutes loaded to ensure no half or whole degree latitude errors, and report deviations from route to ATC immediately. Immediately display the full DEGREES and MINUTES loaded into the FMC for the NEXT waypoint and verify against the cleared route.
CONFIRM ASSIGNED ROUTE DOWNLINK OUT OF CONFORMANCE.	Route contained within 'CONFIRM ASSIGNED ROUTE' downlink out of conformance.	
CHECK FMS AND CORRECT ACTIVE WAYPOINT	Incorrect Sequence (after Weather Dev, the ADS track is moving backward)	
ADS-C DEVIATION DETECTED. VERIFY AND ADVISE.	ADS-C Present Position is off-route	
ADS-C ESTIMATES APPEAR INACCURATE. CHECK FMS	Estimate for next waypoint contained in ADS differs from ATS Unit estimate	Confirm latest estimate for next Waypoint to ATS Unit
CONFIRM ASSIGNED ROUTE	Request to confirm assigned route	Respond to the uplink. If an anomaly occurs that prevents the pilot from responding, send free text UNABLE TO SEND ROUTE
DATA LINK SERVICES WILL BE TERMINATED WHEN LEAVING SATELLITE COVERAGE AT 82N. AT AND NORTH OF 82N USE VOICE FOR POSITION REPORTS AND OTHER COMMUNICATIONS	Northbound aircraft (not equipped with Iridium SATCOM data link) estimated to exit data link coverage area at 82° degrees North.	Resume voice communications including position reporting at and north of 82° degrees North.

Contingency Procedures

1. Advise ATC immediately of any data link issues that might affect FANS (CPDLC/ADS-C) data link operations.

–END–

LIST OF ACRONYMS

ACM	Atlantic Coordination Meeting
ADS	Automatic Dependent Surveillance
ADS-B	Automatic Dependent Surveillance – Broadcast
AHMS	ADS-B Height Monitoring System
AIP	Aeronautical Information Publication
AIRAC	Aeronautical Information Regulation And Control
ANSP	Air Navigation Service Provider
ASBU	Aviation System Block Upgrades
ASEPS	Advanced Surveillance-Enhanced Procedural Separation
ASR	Annual Safety Report
ATC	Air Traffic Control
COVID-19	Coronavirus disease 2019
CPDLC	Controller Pilot Data Link Communications
CRE	Collision Risk Estimates
DARP	Dynamic Airborne Reroute Procedures
DENICE	Danish and Icelandic Joint Financing
DLM	Data Link Mandate
Doc 10004	*Global Aviation Safety Plan* (GASP)
Doc 4444	*Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM)
Doc 7030	*Regional Supplementary Procedures* (SUPPs)
Doc 9750	*Global Air Navigation Plan* (GANP)
EACCC	European Aviation Crisis Coordination Cell
EUR	(ICAO) European (Region)
EUR/NAT	European and North Atlantic
FIR	Flight Information Region
FMC	Flight Management Computer
GANP	*ICAO Global Air Navigation Plan* (Doc 9750)
GASP	*ICAO Global Aviation Safety Plan* (Doc 10004)
GNE	Gross Navigational Error
HF	High Frequency
HMS	Height Monitoring System
HMU	Height Monitoring Unit
IATA	International Air Transport Association
IBAC	International Business Aviation Council
IFALPA	International Federation of Air Line Pilots' Associations
MNPS	Minimum Navigation Performance Specifications
MNPSA	Minimum Navigation Performance Specifications Airspace
NAT	North Atlantic Region
NAT CMA	North Atlantic Central Monitoring Agency
NAT Doc	
NAT Doc 001	*North Atlantic Systems Planning Group Handbook , North Atlantic Systems Planning Group Handbook*
NAT Doc 006, Part I	*Air Traffic Management Operational Contingency Plan – North Atlantic Region*

NAT Doc 007	*North Atlantic Operations and Airspace Manual*
NAT Doc 010	*North Atlantic Consolidated Reporting Responsibilities Handbook*
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 Project Team	
NAT ADS-B HMS PT	NAT ADS-B Height Monitoring System Project Team
NAT DLMTA PT	NAT Data Link Mandate Temporary Accommodation Project Team
NAT Doc 7030 Review PT	NAT Doc 7030 Review Project Team
NAT HMS/FA PT	NAT EFFG Height Monitoring System Financial Assessment Project Team
NAT SG	North Atlantic Scrutiny Group
NAT SOG	North Atlantic Safety Oversight Group
NAT SPG	North Atlantic Systems Planning Group
NERA	North Atlantic Reporting Application
NCA	Northern Control Area
NDB	Non-directional Beacon
NOROTS	Northern Organized Track Structure
OACC	Oceanic Area Control Centre
OCL	Obstacle Clearance Limit
PANS	Procedures for Air Navigation Services
PANS-ATM	*Procedures for Air Navigation Services – Air Traffic Management* (Doc 4444)
PBCS	Performance-Based Communication and Surveillance
PBN	Performance-Based Navigation
PfA	Proposal for Amendment
RMA	Regional Monitoring Agency
SB ADS-B	Space-Based ADS-B
SEI	Special Emphasis Items
SKPI	Safety Key Performance Indicators
STATFOR	EUROCONTROL Statistics and Forecast Service
SUPPs	*Regional Supplementary Procedures* (Doc 7030)
VOLCEX	Volcanic Ash Exercises for the EUR Region
VOLKAM	Volcanic Ash Exercises for the (far) Eastern part of the EUR Region

— END —