European and North Atlantic Office

NORTH ATLANTIC SAFETY ANALYSIS AND REDUCED SEPARATION

IMPLEMENTATION GROUP

TWENTY-FIRST MEETING

(Reykjavik, Iceland, 7 to 10 April 2015)

Agenda Item 2:

Update to Draft North Atlantic (NAT) Operations Bulletin - Special Emphasis Items for Operation in NAT Reduced Lateral Separation Minimum (RLatSM) Trials

(Presented by the United States)

SUMMARY

This working paper presents an updated draft of the NAT Operations (OPS) Bulletin containing RLatSM Special Emphasis Items (SEI). It is based on the draft posted in Appendix F of the Summary of Discussions (SoD) of the Forty-Fifth Meeting of the NAT Implementation Management Group (IMG/45) and contains text proposed by the March 2015 meetings of the Air Traffic Management Group (ATMG) and Operations/Airworthiness Group (OPS/AIR). Attachment A of the paper lists follow up actions tasked in the IMG/45 SoD that affect the wording of the bulletin. Attachment B is the 13 March 2015 draft of the bulletin. The paper notes that the Safety Analysis and Reduced Separation Implementation Group (SARSIG/21) will consider NAT Subgroup comments and report to IMG/46 (11 to 14 May 2015) with the goal of publishing the bulletin after IMG/46.

1. Introduction

1.1 The purpose of the North Atlantic Operations (NAT OPS) Bulletin is to provide guidance to NAT operators on material to be included in pilot and dispatcher training programs and operations manuals to prepare them for NAT Reduced Lateral Separation Minimum (RLatSM) operations. The draft document includes Special Emphasis Items (SEI) for dispatchers and pilots that are intended to raise their awareness of the need to follow procedures when operating in the RLatSM environment where ½ degree track spacing and 25 NM lateral separation are applied.

1.2 As is noted in paragraph 2.3 below, SARSIG is tasked by IMG with the responsibility to ensure that the appropriate wording is adopted in the draft bulletin and reporting to IMG. OPS/AIR through its parent NAT Communications, Navigation and Surveillance (CNSG) group, the NAT CNSG and NAT Air Traffic Management Group (ATMG) have provided input for SARSIG/21 consideration.

1.3 Attachment A is a listing of tasks assigned to NAT subgroups in the IMG/45 SoD that affect the wording in the draft bulletin. IMG/45 SoD reference paragraphs are listed in the table with the

exception of row 2 which is an editor's suggestion. Attachment B is a draft of the bulletin with suggested updates for OPS/AIR/14 to consider for input to NAT CNSG and NAT SARSIG.

2. Discussion

2.1 The draft RLatSM SEIs were originally developed with the intent of addressing NAT SPG Conclusion 49/09, paragraph b) which directs that the:

> *b) NAT IMG work programme be updated to include actions **to address the mitigation of ½ degree misconstrued flight routes,** and to facilitate the use of automated systems to upload routes directly into the flight management computer (FMC).*

2.2 A draft NAT OPS Bulletin incorporating the SEIs was reviewed at the Twentieth Meeting of the Safety Analysis and Reduced Separation Group (SARSIG/20, October 2014), IMG/45 (November 2014), OPS/AIR/14 (March 2015) and ATMG/45 (March 2015).

NAT IMG/44 Decision 44/5 (May 2014)

2.3 The 44th meeting of the NAT IMG took Decision 44/5 that "the NAT SARSIG, in coordination with the ICAO Secretariat and NAT OPS/AIR, review the *NAT Bulletin – Special Emphasis Items for RLatSM Operators* to ensure that the appropriate wording is adopted in regard to operator practices and policies such that language used would avoid flight crew confusion" and directed SARSIG to report progress to IMG/45.

2.4 As a follow-up to NAT IMG Decision 44/5, the United States (U.S.) has coordinated drafts of the RLatSM SEI NAT OPS Bulletin with the different NAT IMG contributory bodies.

IMG/45 review and guidance on progressing the RLatSM SEI NAT OPS Bulletin

2.5 The SARSIG/21 draft of the RLatSM SEI NAT OPS Bulletin was presented to NAT IMG/45 (November 2015) by the U.S. on behalf of the SARSIG in NAT IMG/45 WP/19. IMG/45 reviewed the draft and provided the following guidance for NAT IMG contributory groups in their Spring 2015 meetings (NAT IMG/45 Summary of Discussions (SoD) paragraph 4.31 refers):

a) explanation of the meaning of words "should", "must" and "shall" to be added in the preamble of the NAT OPS Bulletin;

b) mentioning the current ARINC 424 paragraph 7.2.5 format for half-degree waypoints in the aircraft database should be avoided, as NAT air navigation service providers (ANSPs) agreed to issue a common language Aeronautical Information Circular (AIC) requesting that databases not include such waypoints in the NAT Region.

   Note: the editors of the RLatSM SEI NAT Ops Bulletin should consider the effect of this guidance on certain aircraft avionics systems, particularly affecting international business aviation aircraft.

c) mentioning the "MNPS authorization" was considered as superfluous and should be removed;

d) provide for an example of an air traffic control (ATC) message notifying aircraft of possible deviation from cleared route; and

e) 'Figure 3' should illustrate waypoint input errors.

2.6 NAT IMG Decision 45/5 (Mitigation measures to navigation errors associated with pilot navigation procedures and the ARINC 424 half-degree waypoint naming convention) also contains IMG tasking for the NAT contributory groups that will affect further drafting of the document. (Decision 45/05 will be discussed during the Agenda Item 1 review of activities since the last SARSIG meeting).

2.7 IMG/45 established a target to publish the bulletin by IMG/46 and continued to support the work by the U.S. to progress the bulletin and coordinate the inputs from the NAT Stakeholders. (IMG/45 SoD paragraph 4.33 refers).

Objective of Attachment A and Attachment B of this WP

2.8 **Attachment A** provides a listing of NAT subgroup tasks that affect the drafting of the bulletin. It contains a table that reflects IMG/45 SoD 4.31 and IMG Decision 45/05 tasking, as well as, tasking suggested by the document editor. It identifies the responsible subgroup, the paragraph in the draft bulletin that is affected and the action to be taken.

2.9 **Attachment B** is an updated draft of the bulletin. It was developed from IMG/45 SoD Appendix F and reflects the inputs of the March 2015 meetings of OPS/AIR/14 and ATMG/45. (Significant IMG/45 changes are marked in grey shading). Suggested edits added subsequent to IMG/45 and reviewed by OPS/AIR/14 and ATMG/45 are marked in blue shading. Inputs provided by OPS/AIR/14 and ATMG/45 in March are marked in green shading.

2.10 The significant Attachment B edits provided by ATMG/45 are: paragraph 4.4 (Example Westbound Track Message With Changes Noted For RLatSM Tracks) and paragraph 5.5 (Pilot Action When Notified By ATC of Possible Deviation From Cleared Track). The significant edit provided by OPS/AIR/14 is to paragraph 5.3 (Pilot Procedures for Verifying Waypoint Degrees and Minutes Inserted into Aircraft Navigation Systems).

2.11 The draft RLatSM SEI NAT OPS Bulletin contains the following major paragraphs:

1 Purpose of Bulletin

2 RLatSM Project Plan Overview

3 Operator/Aircraft Eligibility

4 Flight Planning Provisions

5 Special Emphasis Items for RLatSM Operators

- 5.1 Requirement to use the CNS equipment that is indicated in the ICAO flight plan
- 5.2 Pilot Training on Map and FMC Displays of ½ Degree and Whole Degree Waypoints
- 5.3 Pilot Procedures for Verifying Waypoint Degrees and Minutes Inserted into Aircraft Navigation Systems
- 5.4 Pilot Track and Distance Check
- 5.5 Pilot Action When Notified By ATC of Possible Deviation from Cleared Track
- 5.6 Policy for Operational Airborne Collision Avoidance System II (ACAS II)
- 5.7 Pilot In-flight Contingency Procedures and Weather Deviation Procedures (Diversions, Turn-backs, etc.)
- 5.8 RLatSM Operational policies (aircraft CNS system failure, data link system failure, etc.)

6 Websites

7 Contacts

Attachment A Summary of RLatSM Special Interest Items contained in this NAT OPS Bulletin

Attachment B Example FMC and Map displays

3. Action by the Meeting

3.1 The NAT ATMG is invited to:

a) note the information provided;

b) review the NAT Subgroup tasks at Attachment A and the actions taken by ATMG/45 and OPS/AIR/14 and address those identified for NAT SARSIG action.

c) note the intent to provide an updated draft of the NAT OPS Bulletin (RLatSM Special Emphasis Items) to NAT IMG/46.

ATTACHMENT A - LISTING OF IMG/45 TASKS THAT AFFECT THE NAT RLATSM OPS BULLETIN (13 MARCH 2015)

The table below lists NAT subgroup tasks assigned by IMG/45 that are likely to affect the wording of the bulletin. IMG/45 SoD reference paragraphs are noted in the "Action" column. Paragraph numbers refer to the draft NAT OPS Bulletin (Operator SEI).

Responsible NAT Subgroup meeting	Paragraph in draft NAT RLatSM OPS Bulletin	ACTION
SARSIG/21	**General comment:** SARSIG work on half-degree navigation error mitigation measures **will** affect the draft bulletin.	Process results of work of Ad Hoc "Mitigations" Task Force considering IMG/45 SoD inputs. (IMG SoD paragraph 5.15, Decision 45/05 e) refers). EDITOR'S NOTE: suggest that mitigation measures agreed will need to be clearly explained in the final NAT RLatSM OPS Bulletin.
OPS/AIR/14	Appropriate paragraphs	Recommend whether or not RNP 2 should be added in appropriate paragraphs of the NAT OPS Bulletin at this time. (Editor suggestion). **STATUS: OPS/AIR/14 recommended not to include RNP 2 at this time. (OPS/AIR/14 SoD paragraph 6.2 refers).**
SARSIG/21	Paragraph TBD	NAT OPS Bulletin editors consider the effect of half-degree waypoints NOT being incorporated into aircraft Nav Databases on certain avionics systems (e.g., international business aviation aircraft). (IMG 45 SoD 4.31 refers).
OPS/AIR/14	New paragraph 1.3	Review suggested explanation of "should", "must" and "shall". (IMG/45 SoD paragraph 4.31 refers). See Attachment B of this WP). **STATUS: Complete. Reviewed and accepted.**
SARSIG/21	Paragraph 2d) (Strategic Lateral Offset Procedures)	SARSIG requested to review status of SASP (Separation and Airspace Safety Panel) actions to amend ICAO Doc 4444 to allow SLOP positions at 0, 1 NM or 2 NM to continue to be used when 25 NM lateral separation is applied. (IMG/45 SoD paragraph 7.8 refers) (The SASP Proposal for Amendment on this matter is planned for ICAO Air Navigation Commission review in March 2015).
ATMG/45, SARSIG/21	Paragraph 4.1 (Flight Plan Provisions: example RLatSM OTS Track Message).	Canada to provide example RLatSM OTS track message for incorporation into NAT OPS Bulletin. (IMG/45 draft NAT RLatSM OPS Bulletin refers). **STATUS: Complete. Example provided and incorporated into draft NAT OPS Bulletin.**

Responsible NAT Subgroup meeting	Paragraph in draft NAT RLatSM OPS Bulletin	ACTION
SARSIG/21	Paragraph 4.2 (ICAO Flight Plan Provisions: annotations referring to "MNPS authorization".	Review reference to "MNPS authorization" in paragraph 4.2 for before and after planned replacement of NAT MNPS Airspace with NAT High Level Airspace on 4 February 2016. (IMG/45 SoD paragraph 4.31 c) refers).
OPS/AIR/14	Paragraph 5.3 (Pilot Procedures for Verifying Waypoint Degrees and Minutes Inserted into Aircraft Navigation Systems).	Review, develop and revise, as necessary, pilot procedures to verify waypoint coordinates loaded into the FMC for the cleared route of flight. (IMG Decision 45/05 b) refers). A separate NAT OPS/AIR WP will be presented on this matter. **STATUS: new paragraph provided and incorporated into draft NAT OPS Bulletin.**
ATMG/45 & CNSG/12	Paragraph 5.5 (Standard phraseology for ATC to communicate to flight crew detection of a lateral deviation from cleared route).	Confirm, develop or revise standardized radio phraseology for ATC to communicate to the flight crew detection of a lateral deviation from cleared route. (IMG Decision 45/05 d) refers). **STATUS: Complete. Paragraph provided and incorporated into draft NAT OPS Bulletin.**
IMG/46	Paragraph 7.1 (Contacts).	NAT IMG requested to provide ANSP and Regulator contacts for inclusion in NAT RLatSM OPS Bulletin. (IMG/45/05 SoD draft NAT OPS Bulletin Editor's note refers).
U.S (as bulletin editor)	Attachment B, Figure 1 and Figure 2.	Review Figures 1 and 2, as discussion proceeds through NAT Sub-groups to IMG/46 (11-14 May 2015). (Editor's suggestion).
OPS/AIR/14	Attachment B (Figure 3)	Review explanation of new Figure 3 added by IMG/45 **and** provide reference to Figure 3 in the NAT OPS Bulletin text. (IMG 45/04 SoD 4.31 e) refers). **STATUS: Complete.**
IMG/46	NAT RLatSM OPS Bulletin	Target is for Bulletin to be endorsed and published by IMG/46. (IMG/45 SoD, 4.33 refers).

ATTACHMENT B: DRAFT NAT RLATSM OPS BULLETIN (13 March 2015)

Blue shading: changes accepted by OPS/AIR/14 and ATMG/45.

Grey shading: ATMG/44, SARSIG/20 & IMG/45 changes endorsed at IMG/45 in November 2015.

Green shading: paragraphs added by OPS/AIR/14 or ATMG/45 and marked with Editor's Note.

DRAFT NAT OPERATIONS BULLETIN (RLATSM SPECIAL EMPHASIS ITEMS)

1. Purpose of Bulletin. The purpose of this bulletin is to provide guidance to North Atlantic (NAT) operators on material to be included in pilot and dispatcher training programs and operations manuals to prepare them for NAT RLatSM operations.

1.1 This Bulletin may be updated, as necessary, as progress is made toward the start date for Phase 1 of the RLatSM trial. Any necessary updates will be distributed through industry organizations and posted on the ICAO EUR/NAT Website. (See paragraph 6).

1.2 See **Attachment A** for a summary listing of RLatSM Special Emphasis Items contained in this bulletin.

1.3 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. RLatSM Project Plan Overview. On or soon after 12 November 2015, Phase 1 of the NAT 25 NM Reduced Lateral Separation Minimum (RLatSM) trial is planned to commence in portions of the Gander, Shanwick and Reykjavik oceanic control areas (OCA). During the RLatSM Phase 1 trial:

a) The 25 NM lateral separation minimum will be implemented by applying ½ degree track spacing between three core NAT Organized Track System (OTS) tracks. 25 NM lateral separation will be applied between flight level (FL) 350-390 (inclusive).

b) OTS tracks separated using the reduced lateral separation minimum will be ~~established using~~ established by publishing one track defined by ½ degree waypoints (e.g., 54 degrees-30 minutes NORTH latitude/50 degrees WEST longitude) between two adjacent tracks defined by whole degree waypoints (e.g. 54 degrees NORTH latitude/50 degrees WEST longitude, respectively).

c) Only those operators/aircraft eligible for RLatSM operations will be allowed to operate on designated RLatSM tracks between FL 350-390 (inclusive). See paragraph 3 (Operator/Aircraft Eligibility).

d) Strategic Lateral Offset Procedures (SLOP) will continue to be used in accordance with NAT Doc 007, paragraph 8.5. EDITOR'S NOTE: to revisit this based on outcome of discussions on SLOP.

e) Enhanced ATC surveillance and communication will be provided via FANS 1/A (or equivalent) data link systems. Automatic Dependent Surveillance (ADS-C) will provide route conformance monitoring, periodic aircraft reporting and controller alerts for Lateral Deviation Events (LDE) and vertical deviation events (Level Range Deviation Events (LRDE). Controller-Pilot Data Link Communications (CPDLC) will enhance ATC intervention and communication capabilities.

3. Operator/Aircraft Eligibility. Operators do not need to apply to NAT ANSPs to be part of the trial, however, operators should consult with the State authority responsible for their operation prior to starting RLatSM operations. Operators will be eligible to flight plan and fly RLatSM tracks provided the flights are:

a) Authorized Required Navigation Performance 4 (RNP 4)

b) ADS-C and CPDLC equipped and, where applicable, authorized; and,

c) Operating required Communications, Navigation and Surveillance (CNS) systems

Note: Job Aids for RNP 4 and Data Link operations authorization are posted on the ICAO European and North Atlantic (EUR/NAT) Office website. See paragraph 6 below – Websites.

4. Flight Planning Provisions

4.1 Only those operators/aircraft eligible for RLatSM operations will be allowed to operate on designated RLatSM tracks between FL 350-390 (inclusive). All RLatSM tracks and FLs will be uniquely identified in the OTS Track Message as shown below:

Example Westbound NAT Track Message With Changes Noted For RLatSM Tracks

(ED. Note: ATMG/45 input)

FF CYZZWNAT
102151 EGGXZOZX
(NAT-1/3 TRACKS FLS 310/390 INCLUSIVE
FEB 11/1130Z TO FEB 11/1900Z
PART ONE OF THREE PARTS-
A PIKIL 57/20 58/30 59/40 58/50 DORYY
EAST LVLS NIL
WEST LVLS 310 320 330 340 350 360 370 380 390
EUR RTS WEST NIL
NAR NIL-
B RESNO 56/20 57/30 58/40 57/50 HOIST
EAST LVLS NIL
WEST LVLS 310 320 330 340 350 360 370 380 390
EUR RTS WEST NIL
NAR NIL-
C ~~DOGAL~~ VENER 5530/20 5630/30 5730/40 5630/50 ~~JANJO~~ IRLOK
EAST LVLS NIL
WEST LVLS ~~310 320 330 340~~ 350 360 370 380 390
EUR RTS WEST NIL
NAR NIL-
END OF PART ONE OF THREE PARTS)

FF CYZZWNAT
102151 EGGXZOZX
(NAT-2/3 TRACKS FLS 310/390 INCLUSIVE
FEB 11/1130Z TO FEB 11/1900Z
PART TWO OF THREE PARTS-
D ~~MALOT~~ DOGAL ~~54~~ 55/20 ~~55~~ 56/30 ~~56~~ 57/40 ~~55~~ 56/50 ~~LOMSI~~ JANJO
EAST LVLS NIL
WEST LVLS 310 320 330 340 350 360 370 380 390
EUR RTS WEST NIL
NAR NIL-
E MALOT ~~LIMRI~~ ~~53~~ 54/20 ~~54~~ 55/30 ~~55~~ 56/40 ~~54~~ 55/50 LOMSI ~~NEEKO~~
EAST LVLS NIL
WEST LVLS 310 320 330 340 350 360 370 380 390
EUR RTS WEST NIL
NAR NIL-
END OF PART TWO OF THREE PARTS)

FF CYZZWNAT
102152 EGGXZOZX
(NAT-3/3 TRACKS FLS 310/390 INCLUSIVE
FEB 11/1130Z TO FEB 11/1900Z
PART THREE OF THREE PARTS-
REMARKS.
1. TMI IS 042 AND OPERATORS ARE REMINDED TO INCLUDE THE
TMI NUMBER AS PART OF THE OCEANIC CLEARANCE READ BACK.
2. ADS-C AND CPDLC MANDATED OTS ARE AS FOLLOWS
TRACK A 350 360 370 380 390
TRACK B 350 360 370 380 390
TRACK C 350 360 370 380 390
TRACK D 350 360 370 380 390
TRACK E 350 360 370 380 390
END OF ADS-C AND CPDLC MANDATED OTS
3 RLATSM OTS TRACKS AND FLIGHT LEVELS ARE AS FOLLOWS
TRACK B 350 360 370 380 390
TRACK C 350 360 370 380 390
TRACK D 350 360 370 380 390

EDITOR'S NOTE: Example track message provided by ATMG/45.

4.2 Operators must file the correct ICAO Flight Plan annotations in Items 10 and 18 to indicate that RLatSM required CNS systems are operational for the flight.

a) Item 10a (Radio communication, navigation and approach aid equipment and capabilities).

- Insert "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;
- Insert "X" to indicate MNPS authorization until 4 February 2016;

  EDITOR'S NOTE: the use of "X" on/after 4 Feb 2016 is under MNPS to PBN Task Force consideration.

b) Item 10b (Surveillance equipment and capabilities)

- Insert "D1" to indicate FANS 1/A (or equivalent) ADS-C equipage and operation

c) Item 18 (Other information)

- Insert the characters "PBN/" followed by "L1" to indicate RNP 4 authorization.

5. Special Emphasis Items for RLatSM 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 ½ degree waypoints and a lateral separation minimum of 25 NM are applied. Each SEI is followed by an explanation of the factors leading it to be identified as an RLatSM SEI.

5.1 Requirement to use the CNS equipment that is indicated in the ICAO flight plan:

ATC uses the Flight Plan annotations in Items 10 and 18 to apply the reduced separation between aircraft. Therefore, before entering the NAT, the pilot must ensure that:

1. the aircraft is logged on when data link capability (J5, J7, D1) has been filed in the FPL; and
2. RNP 4 is inserted into the FMC, when RNP4 capability (L1) has been filed in the FPL. This is to enable aircraft navigation system monitoring and alerting against the required RNP 4 Navigation Specification.

5.2 Pilot Training on Map and FMC Displays of ½ Degree and Whole Degree Waypoints:

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 ½ degree and whole degree waypoints.

Explanation

5.2.1 Map displays and certain FMC pages ~~for some aircraft types may~~ generally do not display full waypoint degrees **and** minutes, e.g., when the full 13 latitude/longitude characters are used to insert ½ degree waypoints. ~~This condition exists both when the full 13 latitude/longitude characters are used to insert ½ degree waypoints and also when the ARINC 424 format is used for waypoint insertion.~~ See Figure 1, Figure 2, and Figure 3, in **Attachment B**.

5.3 Pilot Procedures for Verifying Waypoint Degrees and Minutes Inserted into Aircraft Navigation Systems (ED. NOTE: OPS/AIR/14 input)

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 OPS Bulletin refers).

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 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.

- In the event of a revised oceanic clearance, 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.

~~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 each waypoint defining the cleared route of flight. (The "Sample Oceanic Checklist" NAT OPS Bulletin refers). Procedures must call for both pilots to independently verify the waypoint coordinates inserted and concur on their accuracy prior to activation.~~

EDITOR'S NOTE: paragraph 5.3 revision provided by OPS/AIR/14.

Explanation

5.3.1 Due to the factors in the map and FMC display of ½ degree and whole degree waypoints, it is imperative that pilots follow the procedure in paragraph 5.3 above to avoid lateral errors caused by incorrect insertion of ½ degree waypoints. Pre-flight verification of the full DEGREES and MINUTES of each oceanic waypoint loaded into the FMC is a critical first step in ensuring a proper navigational load. A verification of the full DEGREES and MINUTES of each oceanic waypoint should also take place when confirming the oceanic clearance. In the event of a track change, both the pre-flight and in-flight verification

process should be conducted.

5.4 **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. (The NAT "Sample Oceanic Checklist" Bulletin refers).

Pilots should be aware that waypoint insertion errors of ½ 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

5.4.1 This check remains valuable for RLatSM operations because waypoint insertion errors are **not** limited to ½ degree errors and waypoint insertion errors of one degree or more have been observed in oceanic operations. Waypoint insertion errors of ½ degree produce a small difference in leg segment distance and course, however, as noted above, waypoint insertion errors are not limited to ½ degree.

5.5 Pilot Action When Notified By ATC of Possible Deviation from Cleared Track:

ED. NOTE: new paragraph below provided by ATMG/45.

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:

UM140: CONFIRM NEXT WAYPOINT
and/or
UM142: CONFIRM ENSUING WAYPOINT
+ free text message:
YOUR POSITION REPORT INDICATES INCORRECT ROUTING. CHECK FULL DEGREES AND MINUTES LOADED INTO FMC. YOUR CLEARED ROUTE IS [route]

When ATC notifies the pilot that the aircraft has ~~is not~~ 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.

~~When ATC notifies the pilot that the aircraft is not flying the cleared track e.g. "*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.~~

EDITOR'S NOTE: paragraph 5.5 above updated by ATMG/45.

5.6 Policy for Operational Airborne Collision Avoidance System II (ACAS II):

Prior to departure for flight on an NAT OTS track at a flight level where RLatSM is applied, the ACAS II system shall be fully operational for the pilot flying (i.e., the TA and RA visual display and audio function will be operative for the pilot flying). If the ACAS II system is not fully operational for the pilot flying, the operator has the option of requesting clearance to operate on a track and/or at a FL where RLatSM is not applied. If the ACAS II system fails after departure, the aircraft may continue on the cleared route.

Note: The ACAS II (TCAS II) system must be a Version 7.0 or more recent version).

Explanation

5.6.1 ACAS II provides a valuable situational awareness tool and safety net for pilots operating in NAT airspace including those where aircraft separation standards have already been reduced in the vertical and longitudinal dimensions. The carriage and operation of ACAS II is emphasized here in the context of RLatSM trials for the following reasons:

a) The introduction of ½ degree OTS waypoints is an operational change that introduces the use of

½ degree waypoints into NAT OTS operations. Although both pilot procedures and ADS-C conformance monitoring capabilities should mitigate the occurrence of lateral deviations related to ½ degree waypoints, ACAS II provides an independent margin of safety should lateral deviations occur during the RLatSM trial period.

b) ACAS II will provide a **situational awareness tool** that will enable pilots to be better prepared to safely execute weather deviation and contingency procedures necessitating lateral deviations (e.g., diversions and turn-backs). In the RLatSM operational environment, such deviations will occur in airspace where the minimum lateral separation is to be 25 NM.

5.7 **Pilot In-flight Contingency Procedures and Weather Deviation Procedures (Diversions, Turn- backs, etc.):**

In training and checking programs, operators shall place special emphasis on pilot knowledge of and preparation to execute the *Special Procedures for Inflight Contingencies in Oceanic Airspace* published in ICAO Doc 4444, paragraph 15.2 and *Weather deviation procedures* (paragraph 15.2.3).

Pilots must be aware that when crossing adjacent tracks without an ATC clearance, the potential vertical separation provided by the In-flight Contingency Procedure is 500 ft. Pilots must use all the steps called for in the Contingency Procedures to avoid conflict with other aircraft.

Pilots must also be aware that when unable to obtain an ATC clearance, Weather Deviation Procedures call for a climb or descent of 300 ft. based on direction of flight and direction of deviation, and, in addition, guidance to the pilot is to adjust the path of the aircraft, if necessary, to avoid aircraft at or near the same flight level.

Pilots must stringently follow all measures for avoiding conflict with other aircraft provided for in the Doc 4444 Contingency and Weather Deviation Procedures.

Explanation

5.7.1 The implementation of RLatSM (25 NM) separation and ½ degree track spacing significantly reduces the distance and time a diverting aircraft has to maneuver when executing a diversion, turn-back or weather deviation without an ATC clearance before approaching adjacent tracks. It also reduces the time that a pilot has to obtain an ATC clearance. (An aircraft deviating from track can be in the proximity of aircraft on an adjacent track within approximately 4 minutes, depending on the angle of deviation from cleared track). In addition, as discussed above, the margin for safety for aircraft crossing adjacent tracks is 150 m (500 ft.) of vertical separation when executing In-flight Contingency Procedures.

5.8 **RLatSM Operational policies (aircraft CNS system failure, data link system failure, etc.):**

5.8.1 Objective. The guidance provided in section 5.8 is intended to apply during the RLatSM trials that are scheduled to start on 12 November 2015. It is intended to supplement the Global Operational Data Link Document (GOLD) guidance to controllers and flight crew on data link service failures and aircraft data link system failures (GOLD paragraphs 4.9.4 and 5.9.4 respectively).

5.8.2 RLatSM Required CNS System Failure Prior to Departure. If a flight experiences a failure of an RLatSM required CNS system **PRIOR TO DEPARTURE,** the flight should flight plan so as to remain clear of NAT RLatSM tracks between FL 350-390 (inclusive).

5.8.3 RLatSM Required CNS System Failure After Departure But Prior to Entering On To RLatSM Tracks Between FL 350-390 (Inclusive). If a flight experiences a failure of an RLatSM required CNS system **AFTER DEPARTURE BUT PRIOR TO ENTERING RLATSM AIRSPACE,** the flight should contact ATC and request a revised clearance that will keep it clear of NAT RLatSM tracks between FL 350-390 (inclusive).

5.8.4 RLatSM Required CNS System Failure ~~to~~ After Entering On To RLatSM Tracks Between FL 350-390 (Inclusive). If a flight experiences a failure of an RLatSM required CNS system **WHILE OPERATING IN RLATSM AIRSPACE**, ATC must be immediately advised. Such flights may be re-cleared to exit RLatSM airspace, but consideration will be given to allowing the flight to remain in the airspace, based on tactical considerations. (GOLD paragraph 4.9.4.8 refers).

5.8.5 Continuous Climb or Descent of Aircraft Not RLatSM Eligible. Any aircraft that is not RLatSM eligible may request continuous climb or descent without intermediate level off through the vertical extent of the NAT RLatSM airspace. Such requests will be considered on a tactical basis.

5.8.6 Altitude Reservation (ALTRV) Requests. ALTRV requests will be considered on a case by case basis (as is done today regarding NAT MNPS airspace), irrespective of the RLatSM eligibility status of the participating aircraft.

5.8.7 Contingency Situations. NAT RLatSM airspace restrictions are not applicable to aircraft experiencing a contingency situation.

6. Websites

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

6.2 Job Aid Templates. Click on EUR & NAT Documents >> NAT Documents >> Job Aid Templates for:

a) RNP 4 Job Aid Template (Application to conduct RNP 4 operations), and,

b) Data Link Job Aid Template (Operator Application to Conduct Data Link Operations).

7. Contacts

7.1 The following individuals may be contacted for information or to provide feedback on RLatSM operations:

EDITOR'S NOTE: Request NAT IMG advice to provide ANSPs' and/or regulators' contact for their operators.

NAT IMG Action to provide contact points.

ATTACHMENT A – SUMMARY OF RLatSM SPECIAL INTEREST ITEMS

CONTAINED IN THIS NAT OPS BULLETIN

1. Operator/Aircraft Eligibility and Flight Planning Provisions

Only operators that are authorized RNP 4 and equipped with and operating CPDLC and ADS-C will be eligible for RLatSM operations. In addition, the ICAO Flight Plan must be correctly annotated to indicate that RLatSM required CNS systems are operational for the flight. (Paragraph 4 refers).

2. Requirement to use the CNS equipment that is indicated in the flight plan

The pilot must use that CNS systems indicated on the ICAO Flight Plan because ATC uses the Flight Plan annotations in Items 10 and 18 to apply the reduced separation between aircraft (Paragraph 5.1 refers).

The pilot must also confirm that RNP4 is inserted into the FMC to enable aircraft navigation system monitoring and alerting against the required RNP4 Navigation Specification (Paragraph 5.1 refers).

3. Pilot Training on Map and FMC Displays of ½ 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 ½ degree and whole degree waypoints. (Paragraph 5.2 and **Attachment B**, Figure 1, Figure 2, and Figure 3 refer).

4. 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 each waypoint defining the cleared route of flight. Procedures must call for both pilots to independently verify the waypoint coordinates inserted and concur on their accuracy prior to route activation. (Paragraph 5.3 refers).

5. 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 ½ 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. (Paragraph 5.4 refers)

6. 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 cleared route.

7. Policy for Operational Airborne Collision Avoidance System II (ACAS II):

Prior to departure for flight on in airspace where RLatSM is applied, the ACAS II system shall be fully operational for the pilot flying (i.e., the TA and RA visual display and audio function will be operative for the pilot flying). If the ACAS II system is not fully operational for the pilot flying, the operator has the option of requesting clearance to operate on a track and/or at a FL where RLatSM is not applied. If the ACAS II system fails after departure, the aircraft may continue on the cleared route.

Note: The ACAS II (TCAS II) system must be a Version 7.0 or more recent version). (Paragraph 5.6 refers)

8. Pilot In-flight Contingency Procedures and Weather Deviation Procedures (Diversions, Turn-backs, etc.):

In training and checking programs, operators shall place special emphasis on pilot knowledge of and preparation to execute the *Special Procedures for Inflight Contingencies in Oceanic Airspace* published in ICAO Doc 4444, paragraph 15.2 and *Weather deviation procedures* (paragraph 15.2.3).

Pilots must be aware that when crossing adjacent tracks without an ATC clearance, the potential vertical separation provided by the In-flight Contingency Procedure is 500 ft. Pilots must use all the steps called for in the Contingency Procedures to avoid conflict with other aircraft.

Pilots must also be aware that when unable to obtain an ATC clearance, Weather Deviation Procedures call for a climb or descent of 300 ft. based on direction of flight and direction of deviation, and, in addition, guidance to the pilot is to adjust the path of the aircraft, if necessary, to avoid aircraft at or near the same flight level.

Pilots must stringently follow all measures for avoiding conflict with other aircraft provided for in the Doc 4444 contingency procedures. (Paragraph 5.7 refers).

9. RLatSM Operational policies (aircraft CNS system failure, data link system failure, etc.)

Operators must be aware of the RLatSM operational policies posted in paragraph 5.8 In particular, operators must be aware that all RLatSM required aircraft CNS systems must be operational PRIOR TO DEPARTURE and PRIOR TO ENTRY on to RLatSM tracks between FL 350-390 (inclusive). In addition, if RLatSM required aircraft systems fail WHILE OPERATING IN RLATSM AIRSPACE, ATC must be advised immediately so that an appropriate course of action can be determined. (Paragraph 5.8 refers).

10. Correct Format In the Event that CPDLC Is Used to Communicate Position or Waypoint Information

In the event that CPDLC is used to provide ATSUs with waypoint or route request information, pilots must **not** use the ARINC 424 format for that information. (Reference GOLD paragraph 5.6).

EDITOR'S NOTE: OPS/AIR/14 supported the current text, but suggested that further examination would be needed on this subject to account for differences in avionics implemented.

ATTACHMENT B – EXAMPLE FMC AND MAP DISPLAYS **(paragraph 5.2 refers)**

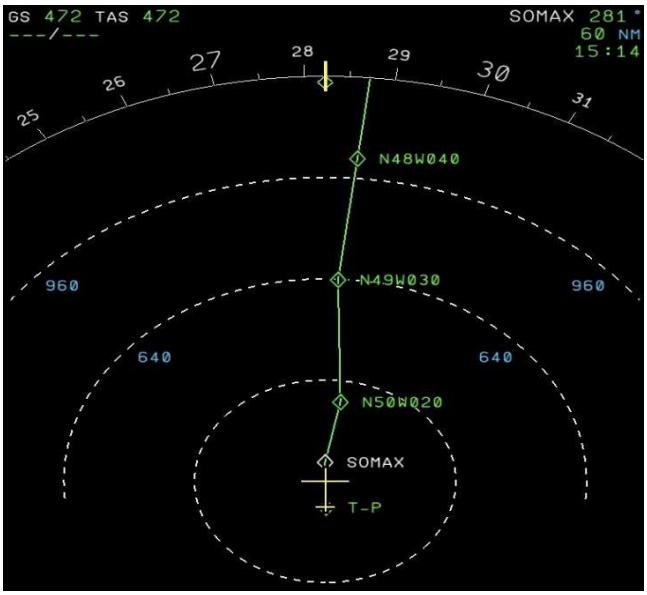
Note: Figures 1 to 3 are intended to support paragraph 5.2 (Pilot Training on Map and FMC Displays of ½ Degree and Whole Degree Waypoints).

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

1. 50 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: Full Waypoint Latitude and Longitude (13-characters) Inserted into FMC

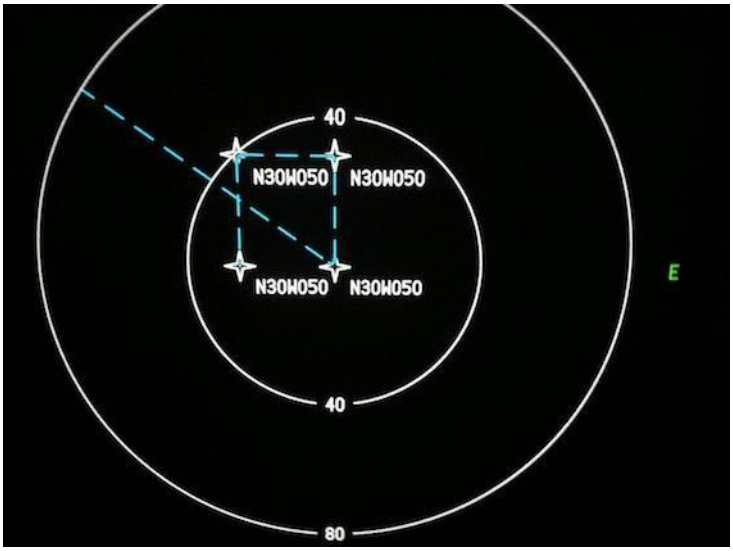


1. 50 degrees-30 minutes North, 20 degrees West displayed is displayed in 7 characters.

2. Minutes of latitude are not displayed.

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

Figure 3. Example Map Display showing the potential for the same map display for different FMC inputs.



1. Top left FMC input: N30°30.0'W050°30.0'

2. Top right FMC input: *N30°30.0'W050

3. Bottom right FMC input: *N30°W050°

4. Bottom left FMC input: N30°W050°30.0'

* Significant NAT RLatSM waypoints are planned with whole and half degrees of latitude and whole degrees of longitude. The two asterisked inputs are example of waypoints that will be used in RLatSM operations. For a large number of aircraft FMS navigation displays, the waypoint input will result in the identical 7-character waypoint map display.

— END —