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Half-Degree Waypoints

North Atlantic Reduced Lateral Separation to Begin This Fall

By Brock Graham

The release of North Atlantic Operations (NAT OPS) Bulletin 2015_003 has raised questions as to how the Honeywell Business and General Aviation (BGA) Flight Management System (FMS) will comply with the rules related to the use of half-degree waypoints. This article discusses some of the issues surrounding the implementation of half-degree waypoints and how flight crews can prepare for the upcoming change.

The North Atlantic (NAT) Datalink Mandate has become a reality as Phase 2A was implemented February 5, 2015, requiring FANS 1/A to be used on all organized tracks between FL350 and FL390, inclusive. Phase 2B is set to begin December 7, 2017, and will expand the Datalink Mandate throughout the entire NAT region between FL350 and FL390, inclusive. These mandates are essential to the advancement of other programs designed to increase the safety and efficiency within the region. For more information about these mandates, please review the FAA NAT Resource Guide for U.S. Operators (http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/afs400/afs470/media/NAT.pdf) or the ICAO EUR and NAT Documents (http://www.icao.int/EURNAT/Pages/EUR-and-NAT-Document.aspx?RootFolder=%2FEURNAT%2FEUR%20and%20NAT%20Documents%2FNAT%20Documents%2FNAT%20OPS%20Bulletins&FolderCTID=0x012000DAF95319EADD9946B510C5D7B55F4E-4E64-B16A-CF142A1E5BC9%7d) page.

According to NAT OPS Bulletin 2015_003, released June 1, 2015, the North Atlantic Reduced Lateral Separation Minimum (NAT RLatSM) trials will begin in November 2015. The trial will be conducted in phases, beginning with reduced lateral separation of the two core tracks by using half-degree latitude waypoints to insert an additional track. This track will be uniquely identified in the remarks section of the Organized Track System (OTS) Message, as highlighted in Figure 1.

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(NAT-1/3 TRACKS FLS 310/390 INCLUSIVE
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EAST LVLS NIL
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EUR RTS WEST NIL
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WEST LVLS 310 320 330 340 350 360 370 380 390
EUR RTS WEST NIL
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EUR RTS WEST NIL
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END OF PART ONE OF THREE PARTS)

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EUR RTS WEST NIL
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END OF PART TWO OF THREE PARTS)

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(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
...

Figure 1 – Example OTS Message From NAT OPS Bulletin 2015_003

As seen in the remarks (section 3), tracks B, C, and D will use RLatSM, which means that only those operators eligible for RLatSM will be allowed to utilize these tracks. Tracks B and D will use whole-degree latitude for their definition, and Track C will use half-degree course definition as noted in section C of the OTS Message (5530/20, 5630/30, 5730/40, 5630/50).

You can access a copy of the RLatSM Special Emphasis bulletin by clicking here (http://www.ifalpa.org/downloads/Level1/Briefing%20Leaflets/Air%20Traffic%20Services/NAT%20OPS%20Bulletin%202015_003.pdf). The bulletin contains several sections that describe the program in great detail; however, this article focuses on implementation of the half-degree latitude waypoint.

Section 5.3 of NAT OPS Bulletin 2015_03 notes a special emphasis item that discusses waypoint identifiers within the navigation database. The bulletin specifically states that navigation database vendors should not provide operators with half-degree waypoints using ARINC 424, paragraph 7.2.5 format. This format would place the N as a *prefix* to the latitude and longitude, whereas the N as a *suffix* defines whole degrees of latitude. For example, a half-degree waypoint using ARINC 424 criteria would define a waypoint located at 55°30 north latitude and 020°00 west longitude as N5520, which could easily be confused with the whole-degree waypoint of 55°00 north latitude and 020°00 west longitude (5520N).

In early 2014, certain Honeywell FMS navigation databases included half-degree latitude waypoints in the NAT region. The half-degree latitude waypoints were added by the data supplier in the proper format prescribed in ARINC 424 Chapter 7.2.5. This chapter defines how waypoints within Oceanic Control Areas often use waypoints that do not have a five-character name assigned. When these waypoints are encoded into the navigation database, specific rules are provided to ensure standardization. While this guidance has been the standard for many years, the waypoint entry format continues to be very confusing. Unfortunately, in 2014 the addition of half-degree latitude waypoints in one of the busiest oceanic airspaces exposed a weakness around grid waypoint formatting that was difficult to detect. Figure 2 shows an FMS with whole-degree waypoints using the N in the suffix position, while Figure 3 shows half-degree waypoints using the N as a prefix, and Figure 4 displays both whole- and half-degree waypoints on the MFD. One would think this would be easy to detect; however, if all waypoints were entered incorrectly, the courses between the waypoints as well as the distances would not raise any red flags as they are simply paralleling the correct ones, as shown in Figure 4. During the flight plan track and distances check, it would be difficult to detect the entry was incorrect.

Figure 2 – ARINC 424 Whole-Degree Latitude Waypoint

Figure 3 – ARINC 424 Half-Degree Latitude Waypoint

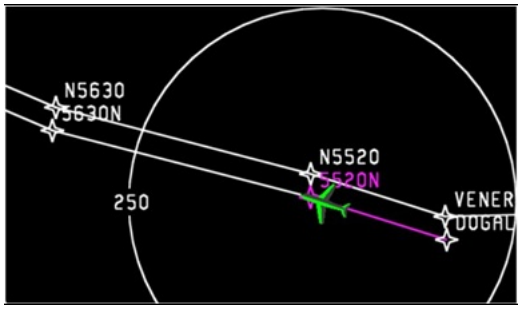

Figure 4 – MFD Plan View With Whole- and Half-Degree Waypoints

One of the only ways to verify the waypoint coordinates is to verify the waypoint using the database waypoint tool within the FMS (NAV -> WPT LST), as shown in Figure 5. The result of the inclusion of these half-degree waypoints demonstrates the criticality of understanding ARINC 424 waypoint naming conventions. It also reiterates the need for surveillance in oceanic and remote regions, which is well on its way with the Datalink Mandates.

Figure 5 – Database Waypoint Data Information

As a result of the initial release of the half-degree waypoints leading to a large number of gross navigational errors, a task force was assembled to understand the issue and recommend solutions. Several ideas are being evaluated to reduce the risk of lateral deviations that do not rely solely on flight crew training, including the use of Controller Pilot Data Link Communications (CPDLC) route clearance that will alleviate the need for flight crews to manually enter the waypoints, though this does not take away the need for flight crews to remain vigilant when entering and verifying waypoints in the FMS.

On July 30, 2015, Jeppesen published a Navigation Data Alert (http://ww1.jeppesen.com/documents/aviation/notices-alerts/bulletins/Half_Degree_Grid_Waypoints_(2).pdf) announcing the inclusion of half-degree waypoints in their source data beginning September 17, 2015. The inclusion of these waypoints is in support of the RLatSM program within the NAT region and will comply with the recommendations of NAT OPS Bulletin 2015_003, Section 5.3. The half-degree waypoints will be coded using the letter H followed by the latitude and longitude. An example would be H5520 to define 55°30 north latitude and 020°00 west

longitude. These waypoints will be coded as floating waypoints, which not all databases include due to FMS memory limitations. Review the navigation database content letter to determine whether floating waypoints are included. Click on the following links to access the Aerospace Data Service (https://ads.honeywell.com/search/contentSearch)or Integrated Navigation Data Service (https://inds.epicinds.com/epic/login) pages. Content letters are specific to aircraft configurations, which are collocated with the removed procedures list as shown in Figure 6, and can be found by clicking on Flight Info then Contents/Procedures.

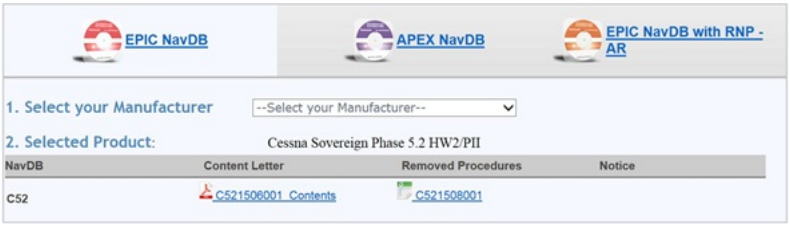

Figure 6 – Content Letter, Removed Procedures, and Notices on the INDS Website

Honeywell databases that are supplied by other vendors are still being evaluated to determine whether they will adopt the H character to denote the half-degree waypoints. If the FMS database does not contain the half-degree waypoint, the pilot can simply use the long entry format shown in Figure 7. Latitude and longitude waypoints are entered with no space or slash between latitude or longitude entries. Leading zeroes must be entered and all digits and decimal points (to 1/10 minute) must be entered, unless the latitude or longitude is in full degrees.

Figure 7 – Manual Entry of a Latitude and Longitude Waypoint

By entering the waypoint location in this format into the scratch pad, waypoints can be line selected into the flight plan, creating an *LLxx waypoint that can be verified on the Waypoint Data information page (Figure 8). Refer to your FMS Pilot's Guide for more information on manual entry of waypoints.

Figure 8 – Waypoint information

Summary

1. The NAT RLatSM trials will begin in November 2015 in portions of Gander and Shanwick oceanic control areas.

2. During the trial, an additional track, defined by half-degree waypoints, will be added between the two core tracks. The lateral separation of these three tracks will be reduced to 25 NM.
3. Aircraft must be properly equipped to operate on the RLatSM tracks. The ICAO Flight Plan must also be filed showing the required equipment (see NAT OPS Bulletin 2015_03 for aircraft eligibility and filing requirements).
4. Half-degree waypoints will be added to Jeppesen-supplied databases in September 2015, identified by the “H” prefix.
5. **To avoid gross navigaton errors, it is imperative that flight crews are familiar with the navigation data within the FMS and understand how to properly enter flight plans and view oceanic waypoints in long format** (refer to the FMS Pilot’s Guide)**.**

Please do not hesitate to contact us (mailto:FTS@Honeywell.com) if you have any questions regarding half-degree waypoints or any other questions.

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