ICAO Europe and North Atlantic

NORTH ATLANTIC
HALF DEGREE
AD HOC TASK FORCE MEETING

FIRST MEETING

(Paris, France, 4-5 September 2014)

Agenda Item 4: Mitigation discussions

b) Analyze list for possible inclusion in mitigation strategy

PROPOSALS FOR MITIGATING LATERAL ERRORS

(presented by IATA)

SUMMARY

This paper presents the NAT Half Degree Ad Hoc Task Force with "perspective and proposals for mitigating lateral errors" of the IATA NATNAM RCS and IATA members operating in the NAT region, for information.

1. Introduction

1.1. For the initial RLatSM Trial, IATA's proposes (considering human factor issues and standard operating procedures in the cockpit) full LAT/LONG waypoints should be used by all NAT operators for the following reasons:

a) ICAO NAT Doc 007 (North Atlantic Operations and Airspace Manual) recommends in the chapter 16 "Prevention of Deviations from Track as a result of Waypoint Insertion Errors" to "…review the LRNS stored co-ordinates in expanded LAT/LONG format (not abbreviated ARINC 424 format)."
b) Does not impact the a/c database
c) Allows full CPDLC route uplink and downlink functionality
d) Allows UM 137 CONFIRM ASSIGNED ROUTE functionality.

e) Allows for "status quo" on ANSP use of Lat/Long in regard to computer programming, controller and radio operator training, all "ocean" related phraseology for route clearances, position report etc.
f) A full Lat/Long waypoint is "truncated" on the FMS LEGS page and requires the proper verification procedures to display the full coordinates of the waypoint. With proper procedures in place for verification, the use of full Lat/Long provides the flight crew with a Lat/Long display of waypoints vs. one with "coded" waypoints.
g) Replacement of current ARINC 424 format with a "new naming convention" cannot be "evaluated and digested" globally by IATA, ICAO, Human Factors Analysis, Flight Crews, AOCs, and ANSPs worldwide prior to the initial RLatSM trial.

IATA Proposals for ATC Mitigation of Lateral Errors in an RLatSM Environment

a. Develop the use of CPDLC route uplinks for Oceanic Clearances
b. Develop the use of CPDLC route uplinks in the event of a track change
c. Consider the use of CPDLC UM 137 CONFIRM ASSIGNED ROUTE in the event of a track change

IATA Proposals for Operators to Mitigate Lateral Errors in a RLatSM Environment

1.2. All NAT operators should develop procedures for uplinking the flight plan during preflight.

IATA Proposals for Mitigating Full Lat/Long FMS "Truncation" Concerns

1.3. Use of full Lat/Long requires line selecting the waypoint to the FMS scratch pad to see the full coordinates in the case of a "confirm assigned route/position/waypoint" before responding. In conjunction with the NAT OPS AIR Special Emphasis Items (SEI) for RLatSM, develop a "generic" oceanic checklist for ALL operators regardless of full Lat/Long or ARINC 424 usage to include, as a minimum, the following:

a. Preflight—All Lat/Long ocean waypoints should be line selected to the scratchpad to verify the full coordinates of each waypoint.
b. Oceanic Clearance Verification—Procedure in place to have PM read oceanic clearance to PF who line selects from FMS LEGS page all Lat/Long ocean waypoints and verbalizes same.
c. Approaching each Lat/Long ocean waypoint—PF line selects from FMS LEGS page and verbalizes approaching Lat/Long ocean waypoint, the next Lat/Long ocean waypoint and the subsequent one. PM verbalizes and agrees on each waypoint.

1.4. IATA agrees that a technological "global" solution might be explored for the long term to include an FMS display capable of displaying 9 characters (N5030W050) and further consideration of a new naming convention to replace ARINC 424 "Ocean Waypoints)

2. Expanded Discussion

Data Base Issues

2.1. Because of their global footprint, NAT operators are concerned about aircraft data base issues. A global solution of using the proposed new naming convention could be problematic for operators who in some cases already have full time employees tasked with data base management because of memory size issues.

Example: Delta Air Lines

747	DL4	94%	1M
757/767	DL6	97%	2.097M
777	DL7	92%	1.4 M

Proposed New Naming Convention : Replace all of the ARINC 424 "Ocean Waypoints"

Proposed Change to ARINC 424 Para 7.2.5 Naming Convention			
	Quad	Half Degree	Whole Degree
Long <100	NW	**H**xxyy	xxyy**A**
	NE	**J**xxyy	xxyy**B**
	SE	**K**xxyy	xxyy**C**
	SW	**L**xxyy	xxyy**D**
Long ≥100	NW	xxyy**H**	**A**xxyy
	NE	xxyy**J**	**B**xxyy
	SE	xxyy**K**	**C**xxyy
	SW	xxyy**L**	**D**xxyy

2.2. Any new naming convention would require a Human Factors evaluation to determine potential issues such as waypoints that have a letter designation on one end or the other depending on LAT/LONG, i.e., 5030A and A5030 (whole degrees), H5050 and 5050H (half degrees). The same waypoints in full LAT/LONG format even, with ambiguity, do not present the same confusion. Verification procedures to display the full coordinates are paramount.

N50W050 and N50W150

Track Message

2.3. Although there has been no discussion to include a new naming convention in either the NAT Track Message or the PACOTS Message (respectively of the AUSOTS Track Publication), the examples below show the "confusion" factor of "coded waypoints" vs. the use of LAT/LONG. IATA has noted there are no proposals for half-degree waypoints in the Pacific, but given 30nm separation already in place, it seems inevitable that half degrees would eventually become part of the PACOTS navigational environment.

North Atlantic NAT Track Message Potential Formats:

NAT-1/2 TRACKS FLS 320/400 INCLUSIVE

SEP 02/0100Z TO SEP 02/0800Z
Y NICSO 48/50 50/40 51/30 53/20 MALOT GISTI
EAST LVLS 320 330 340 350 360 370 380 390 400
WEST LVLS NIL
EUR RTS EAST NIL
NAR N141C N153D-

Current/Proposed Format

Whole	*48/50*	*50/40*	*51/30*	*53/20*
Half	*4730/50*	*4930/40*	*5030/30*	5230/20
Combination	*50/50*	*5130/40*	*52/30*	5330/20

New Naming Convention

Whole	*4850A*	*5040A*	*5130A*	*5320A*
Half	*H4750*	*H4940*	*H5030*	H5220
Combination	*5050A*	*H5140*	*5230A*	H5320

Full Lat/Long Format

Whole	*N48W050*	*N50W040*	*N51W030*	*N53W020*
Half	*N4730W050*	*N4930W040*	*N5030W030*	N5230W020
Combination	*N50W050*	*N5130W040*	*N52W030*	N5330W020

ICAO Phraseology Format

Whole	*48N050W*	*50N040W*	*51N030W*	*53N020W*
Half	*4730N050W*	*4930N040W*	*5030N030W*	5230N020W
Combination	*50N050W*	*5130N040W*	*52N030W*	5330N020W

Pacific PACOT Message Potential Formats:

A3164/14 *- (TDM TRK E 140819190001*
1408191900 1408200800
ALCOA CEPAS COBAD 39N140W 40N150W 41N160W 42N170W 43N180E 43N170E
40N160E EMRON

Current Format	*39N40W*	*40N150W*	*41N160W*	*42N170W*	*43N180E*	*43N170E*

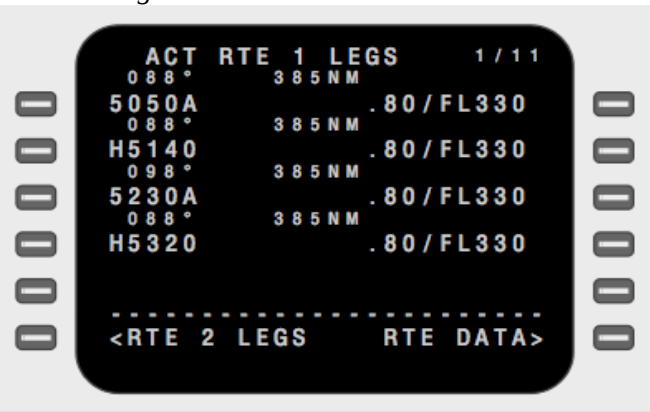
New Naming Convention	*A3940*	*A4050*	*A4160*	*A4270*	*B4380*	*B4370*

Full Lat/Long	*N39W140*	*N40W150*	*N41W160*	*N42W170*	*N43E180*	*N43E170*

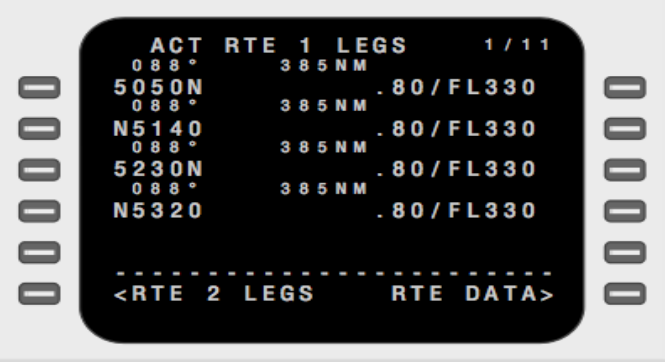
Flight Crew FMS Display

2.4. An entire new naming convention would offer the flight crew a "coded" format that lacks the situational awareness that a full LAT/LONG display offers. Both formats would require waypoint verification procedures.

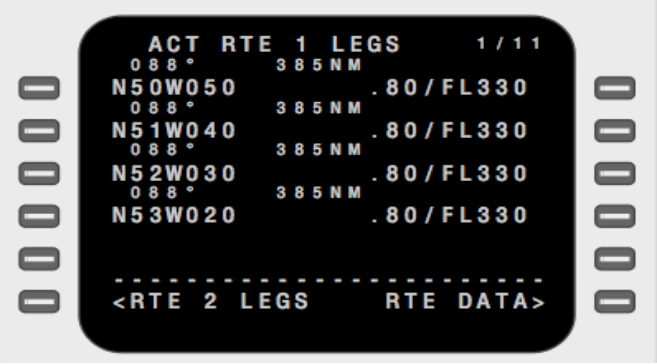
Atlantic
New Naming Convention



ARINC 424

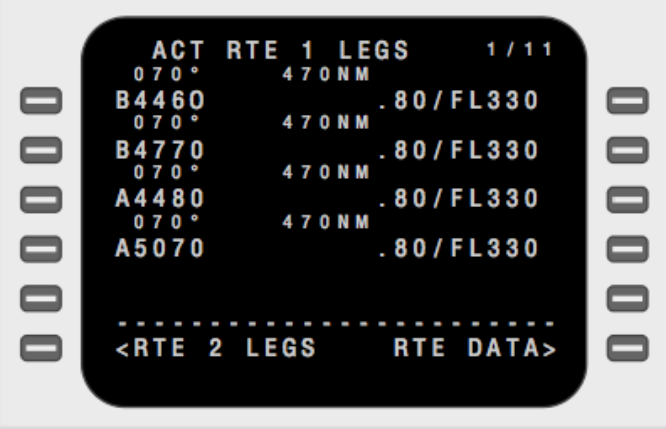


Full Lat/Long Format

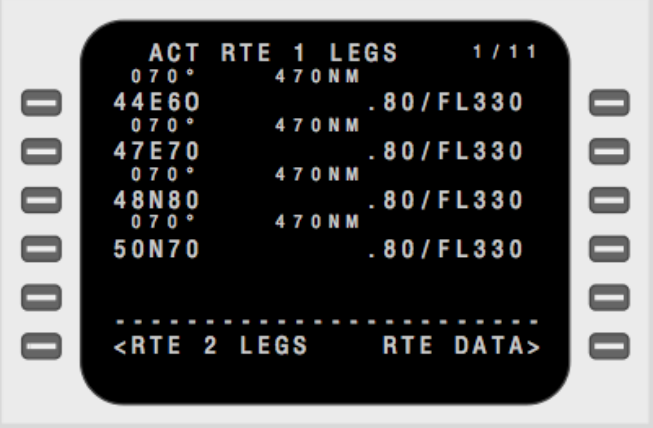


Pacific

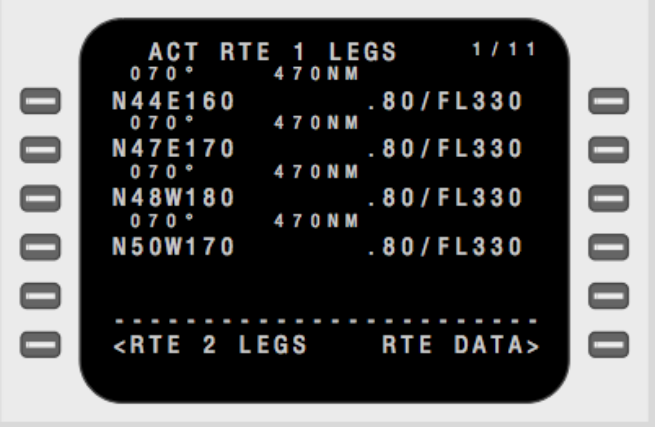
New Naming Convention



ARINC 424



Full Lat/Long Format



Current CPDLC Functionality

All route and conditional clearance [position] uplinks are in a full LAT/LONG format:

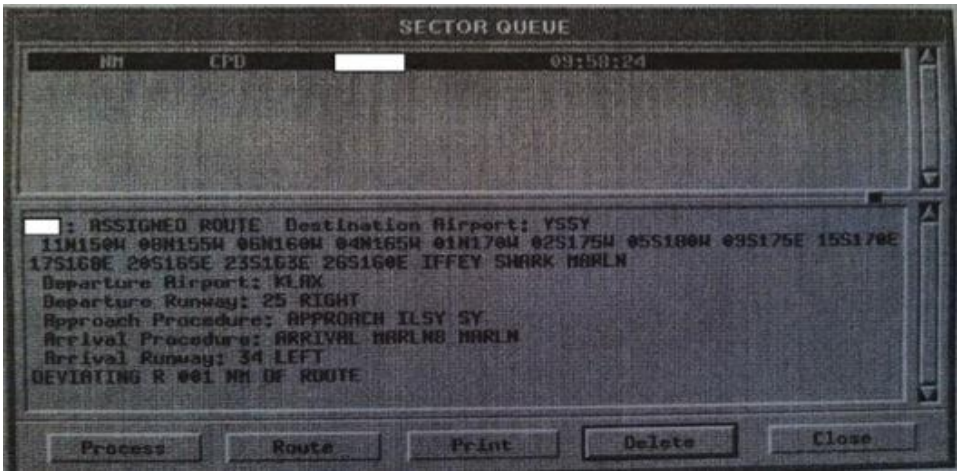
UM 74, 79, 80, and 83
CLIMB TO REACH FL330 BY N5000.0 W04300.0

ARINC 424 / New Naming Convention operators will receive uplinks in a full LAT/LONG format. In an RLATSM environment with half degree waypoints, crews will need to be trained on procedures necessary to "verify" the full Lat/Long coordinates of the uplinked waypoints.
Most ATSUs can only accept a CPDLC route request in full Lat/Long format.

a. ARINC 424 / New Naming Convention operators would not be supported by CPDLC unless:
    i. They are part of the a/c data base
    ii. They are part of all "oceanic" ANSP computer systems
    iii. All controllers worldwide were trained in their use

CPDLC CONFIRM ASSIGNED ROUTE Functionality

Ocean 21



GAATS

Status Quo of ANSP Functionality

- ✓ No change in the current use of Lat/Long by ANSPs worldwide for full Lat/Long and ARINC 424 users;
- ✓ A "voice" track change by ATC or a Radio Operator would continue to use Lat/Long to assign the route of flight vs. "coded" waypoints
- ✓ Clearances "direct" to an ocean waypoint would continue to be in Lat/Long vs. "coded" waypoints
- ✓ CPDLC conditional clearances would continue to be in Lat/Long vs. "coded" waypoints
- ✓ Position reports to ATC or Radio Operators would continue to be in Lat/Long vs. "coded" waypoints
- ✓ Oceanic Orientation charts would continue to be in Lat/Long vs. "coded" waypoints

3. Summary

3.1. Any FMS format requires structured crew waypoint verification procedures; the full LAT/LONG format is no exception. The "ambiguity" issue aside, it still offers better situational awareness than a format of "coded" waypoints whose naming scheme places a letter on one end of a set of numbers in one part of the world and the other end in another.

3.2. CPDLC route functionality will be a key player in mitigating errors in an RLatSM environment. For operators using full Lat/Long format, this is a seamless transition.

3.3. CPDLC UM 137 CONFIRM ASSIGNED ROUTE can only be used with operators using full Lat/Long

3.4. Because of CPDLC functionality, global harmonization of LAT/LONG formats should be our goal. IATA believes we should focus every resource available to facilitate the use of full LAT/LON nomenclature as the worldwide standard.

3.5. Operators who must, or choose to, continue using ARINC 424 should develop procedures and training to minimize waypoint errors.

Long Term Changes: Latitude/Longitude Format Harmonization – Requirements

3.6. A harmonization of the LAT/LONG format on a global basis and for all stakeholders and environments need to be initialized - from a human factors perspective it is very confusing that the same Latitude/Longitude is used in different formats in different environments for the same flight – this involves/includes:

- ATC environment (ATC COMs)
- Airline environment (Operational Flight Plan)
- Oceanic Track Messages
- ICAO ATS FPL
- Intl. Class-1-NOTAMs
- FMS NavDB

References:
ICAO NAT Doc 007 (North Atlantic Operations and Airspace Manual), Edition 2013
ICAO Global Operational Data Link Document (GOLD), Second Edition 2013

4. Action by the meeting

4.1. The NAT Half Degree Ad Hoc Task Force Meeting is invited to note the content of this information paper which will be taken into account during the preparation of the Group's report.

ATTACHMENT A - IATA OPERATOR SURVEY DE-IDENTIFIED (27 AUGUST 2014)

Operators	Flight Plan Uplinked	Full Lat/Long or ARINC 424	Data Base Issues	Support New Naming Convention
A	Y	Full Lat/Long	Y	N
B	Y	Full Lat/Long	Y	N
C	Y	Full Lat/Long	Y	N
D	Y	Full Lat/Long	Y	N
E	Y	Full Lat/Long	Y	N
F	Y	Full Lat/Long	Y	N
G	Y	Full Lat/Long	Y	Y
H	Y	Full Lat/Long	Y	Y
I	Y	Full Lat/Long	Y	U
J	Y	Full Lat/Long	Y	U
K	Y	Full Lat/Long	N	N
L	Y	Full Lat/Long	N	N
M	Y	Full Lat/Long	N	Y
N	Y	Both	Y	Y
O	Y	Both	Y	U
P	Y	Both	Y	Y
Q	Y	ARINC 424	Y	Y
R	Y	ARINC 424	Y	N
S	Y	ARINC 424	Y	N
T	Y	ARINC 424	Y	Y
U	Y	ARINC 424	U	U
V	Y	ARINC 424	N	N
W	Y	ARINC 424	Y	U
X	N	ARINC 424	Y	Y
Y	N	ARINC 424	N	Y
Z	N	U	Y / N	U

U= Undecided or Undetermined

Flight Plan Uplink	Full Lat/Long	ARINC 424	Data Base Issues			Support New Naming Convention		
			Y	N	U	Y	N	U
88%	62%	46%	77%	30%	4%	35%	42%	23%

-END-