NAT OPS BULLETIN

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Originator: NAT SOG

The purpose of North Atlantic Operations Bulletin **2017-002_Revision 07** is to promulgate the Oceanic Errors Safety Bulletin (OESB).

***Any queries about the content of the attached document should be addressed to**:*
ICAO EUR/NAT Office: icaoeurnat@icao.int

[1] *This NAT OPS Bulletin supersedes Serial Number: 2017-002 Revision 06.*

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*This OESB is intended for distribution to industry and training centers. The OESB will also be posted on various websites to enable broad distribution and rapid updates. In addition, the OESB should be used in conjunction with the guidance detailed in the current edition of North Atlantic Operations and Airspace Manual (NAT Doc 007). This manual can be found at http://www.icao.int/EURNAT/Pages/welcome.aspx under: "EUR/NAT Documents >NAT Documents >NAT Documents > NAT Doc 007." Operators should consult http://www.icao.int/EURNAT/Pages/welcome.aspx for the most current version of the OESB under "EUR/NAT Documents > NAT Documents > NAT OPS Bulletins." A **sample oceanic checklist** has been developed using many of the recommendations found in this OESB and can be downloaded via the same links. The OESB is promulgated by the NAT Safety Oversight Group (NAT SOG). Questions or comments regarding this Bulletin may be directed to The European and North Atlantic Office of ICAO: icaoeurnat@icao.int.*

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Safety Snapshot

The OESB is intended to help air operators transiting North Atlantic oceanic airspace avoid making commonly observed operational errors. These include **lateral deviations**, Gross Navigation Errors (GNEs) (lateral deviations of 10 NM or more), **Large Height Deviations** (LHDs) (300 feet or more) and **Erosion of Longitudinal Separation**. The following recommendations, resources, and tips may be useful in preventing these errors and should be addressed in initial and recurrent ground training. The Sample Oceanic Checklist (found in NAT Doc 007) and the Global Operational Data Link Document (**ICAO Doc 10037, GOLD Manual**) are both excellent references for oceanic flying. Additional recommendations address **General** considerations when operating in the North Atlantic, **Flight Planning**, and **SLOP**.

Revision History	
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Top Tips for Operators

- Crews should be familiar with Controller Pilot Data Link Communications (CPDLC) loadable route clearance uplink messages and how to load them properly into the Flight Management System (FMS).
- Crews should be familiar with CPDLC clearances for flight level changes, and not climb or descend without specific ATC clearance. Refer to the **Large Height Deviations** section.
- Ensure all flight crew members are briefed on details of any route amendments.
- Carefully manage the Master Document, especially when there is a route amendment. Many errors involve flying the operator-filed route, rather than the ATC-cleared route.
- Operators should plan their flights to avoid turbulence and convective activity. Coordinate with ATC early for weather deviations to reduce the need to execute the published weather deviation procedure.
- Review climb and descent clearances carefully: some conditional clearances start with "MAINTAIN FL XXX," and then describe the condition. Also, be sure to understand the meaning of "AT" and "BY".

LARGE HEIGHT DEVIATIONS

The following considerations can help flight crews avoid large height deviations.

1. The CPDLC message "HIGHER FLIGHT LEVEL MAY BE AVAILABLE IF REQUESTED," and a "STANDBY" response to a climb request are **not** a clearance to change flight level. Neither is a "REMINDER" for a planned climb or descent. The phrases "expect FLxx," or "are you able FLxx" are also **not** clearances.
2. ATC must specifically approve each flight level change. A filed flight plan with a requested change in flight level (step climb) **is not** a clearance to initiate the change in altitude.
3. Conditional clearances, especially climb clearances with delayed execution, are associated with a disproportionately high error rate. A conditional clearance is an ATC clearance given to an aircraft with certain conditions or restrictions such as changing a flight level based on a UTC time or a specific geographic position. The following is an example of a conditional clearance given via voice to a crew:

   Maintain FL330. After passing 20W, climb to FL350. Cross 25W level. Report reaching FL350.
   ***NOTE** – in this example, FL330 is the present FL.*

   The "conditional" parts of this clearance are that after 20W, the aircraft should start the climb to FL350, and prior to 25W should reach that level.
4. In oceanic, non-surveillance airspace, crews must report when vacating any previously assigned altitude or flight level and when reaching the newly assigned altitude or a flight level (for ADS-C/CPDLC aircraft, these reports are only required when ATC specifically requests them).
5. Crews must know when a climb or descent should be initiated or completed. Conditional clearances usually use the prepositions "by" or "at."
   a. "BY" means:
      i. "Before passing" when referring to a position, or
      ii. "Not later than" when referring to a time.
   b. "AT" means:
      i. "After passing" when referring to a position, or
      ii. "Not before" when referring to a time.

NOTE: *The following are examples of conditions or restrictions given to crews when the terms AT or BY are used in a conditional clearance.*

Examples: Restriction	What is Expected
CPDLC CLIMB TO REACH FL390 BY 1325 REPORT LEVEL FL390 **VOICE** CLIMB TO REACH FLIGHT LEVEL 390 AT OR BEFORE 1325 REPORT LEAVING/REACHING	**Arrange the climb so that the aircraft is at FL390 at or before 1325 UTC.** If it will not be possible to be level at FL390 at or before 1325 UTC, then: **CPDLC:** Select "REJECT/UNABLE" and do not climb. **VOICE:** Advise ATC "unable" with a short explanation and do not commence climb.
CPDLC DESCEND TO REACH FL320 BY 63N030W REPORT LEVEL FL320 **VOICE** DESCEND TO REACH FLIGHT LEVEL 320 BEFORE PASSING 63 NORTH 030 WEST REPORT LEAVING/REACHING	**Arrange the descent so that the aircraft is at FL320 before it crosses 63 North 30 West.** If it will not be possible to be level before crossing 63 North 30 West, then: **CPDLC:** Select "REJECT/UNABLE" and do not descend.

Examples: Restriction	What is Expected
	VOICE: Advise ATC "unable" with a short explanation and do not commence descent.
(In this example the aircraft is initially at FL350) **CPDLC** MAINTAIN FL350 AT 1403 DESCEND TO AND MAINTAIN FL330 REPORT LEVEL FL330 **VOICE** AT OR AFTER TIME 1403 DESCEND TO AND MAINTAIN FLIGHT LEVEL 330 REPORT LEAVING/REACHING	**The aircraft shall maintain FL350 until time 1403 UTC. At or after time 1403 UTC, commence a descent to FL330 and then maintain FL330.** If it will not be possible to meet this restriction, then: **CPDLC:** Select "REJECT/UNABLE" and do not descend. **VOICE:** Advise ATC "unable" with a short explanation and do not commence descent.
(In this example the aircraft is initially at FL350) **CPDLC** MAINTAIN FL350 AT 58N040W CLIMB TO AND MAINTAIN FL360 REPORT LEVEL FL360 **VOICE** AFTER PASSING 58 NORTH 040 WEST CLIMB TO AND MAINTAIN FLIGHT LEVEL 360 REPORT LEAVING/REACHING	**The aircraft shall maintain FL350 until passing 58N040W. After passing 58N040W commence a climb to FL360, and then maintain FL360.** If it will not be possible to meet this restriction, then: **CPDLC:** Select "REJECT/UNABLE" and do not climb. **VOICE:** Advise ATC "unable" with a short explanation and do not commence climb.

6. Crews must be diligent in reviewing aircraft climb and cruise capability to avoid either requesting or accepting clearance to flight levels outside of the aircraft performance envelope.

> ***NOTE**: Crews must carefully consider the significant temperature inversions that can occur over the Atlantic Ocean. This is particularly important with aircraft operating near maximum gross weight and when requesting flight levels approaching oceanic entry points. Crews should have an Operational Flight Plan (OFP) that reflects the actual aircraft weight. An accurate OFP will include a more realistic altitude profile. Failure to attain flight levels as assigned can result in a loss of planned separation between aircraft. In addition, making a last-minute request for a lower flight level and/or amended routing can create unnecessary challenges for ATC, and should be avoided if possible.*

7. If a crew finds itself at a flight level that becomes unsustainable due to degrading performance (e.g., when encountering low temperatures affecting fuel, or high temperatures affecting aerodynamics), it is imperative to coordinate a flight level change with ATC as soon as possible. If a climb or descent must be made without ATC clearance, applying the 5 NM lateral offset contingency procedure (as referenced below) will mitigate some of the risk. Crews should then diligently work to obtain an ATC clearance.

8. Crews must be alert for situations when ATC issues clearances that have only a latitude OR a longitude (e.g., "at/after passing 30W") rather than a latitude AND a longitude. Crews must clearly understand when they are to make a flight level change.

9. Crews must ensure they are executing the correct contingency procedure in case of lost communications. The NAT radio communications failure procedure published in the NAT section of ICAO Doc 7030 requires maintaining the last assigned flight level (Note: this NAT regional procedure differs from that published in ICAO Annex 2). ATC approval is required for all flight level changes.

10. Crews must ensure they are at their cleared flight level at all times. The altitude sent in the "request for clearance (RCL)" message is a request, not a clearance.

LATERAL DEVIATIONS

The following considerations can help flight crews avoid lateral deviations.

1. Fly the ATC cleared route – **which may differ from the filed flight plan**.
2. A route amendment [issued via ACARS (ATC/ROUTE AMENDMENT), Voice, or CPDLC] is often a contributing factor to navigational errors. Crews must ensure they correctly copy the route amendment, reprogram (and execute) the FMS /navigation systems, update the Master Document and update the plotting chart. The FMS route verification should include track and distance checks on legs with new waypoints in the amended route.
3. Crews must fly any route amendment (and not the filed flight plan). The pilot in command should ensure that details of the route amendment are recorded on the Master Document, and that all crew members are aware of any changes. A disciplined and detailed changeover briefing with reference to the Master Document is vital whenever relief pilots take their flight station seats.

   NOTES:

   1. NAT Doc 007, Chapter 8, contains guidance on use of a Master Document.
   2. Track and distance tables are available commercially for every ten degrees of longitude. Alternatively, it may be possible to obtain (from dispatch) or create (using an Electronic Flight Bag application) an updated operational flight plan, to verify new tracks and distances in the FMS.

4. For route amendments that change the oceanic exit point, crews must obtain domestic routing from ATC. ATC normally expects flights to re-join the flight plan route at the significant point that immediately follows the original oceanic exit point.

5. Pre-flight route verification of the navigation system should include track and distance checks between oceanic waypoints. Enroute procedures should also include track and distance checks prior to reaching an oceanic waypoint.

6. The crosscheck of the FMS oceanic coordinates should include comparing the expanded coordinates for the next and subsequent (“next +1”) waypoints against the flight plan, to detect and resolve waypoint insertion errors. Crews should fully understand how to enter waypoints using full latitude and longitude, and/or using the ARINC 424 paragraph 7.2.5 naming convention (e.g., 5850N = N58°/W050°). Crews must understand FMS display behavior with the chosen entry method, and that waypoints may have truncated minutes (e.g., N58°30’/W050° loaded, “N58W050” displayed), and/or generic display names (e.g., N58°30’/W050° loaded, “WPT01” displayed).

   NOTE: *In NAT airspace where unnamed, half-degree of latitude waypoints are used, waypoint display labels can be misleading (minutes can be truncated or rounded) and/or the FMC can create a generic label). It is imperative that crews check the expanded coordinates of all oceanic waypoints. Custom waypoints in aircraft navigation databases for half-degree of latitude points should use the “Hxxyy” format as introduced in Supplement 23 to ARINC 424 paragraph 7.2.5. See NAT OPS Bulletin 2018-003, “Waypoint Insertion/Verification Special Emphasis Items.”*

7. It is discouraged to add “pseudo-waypoints” to the active route, e.g., to depict Equal Time Points (ETPs), or “abeam points,” even if along the route. Pseudo-waypoints hinder ground automation out-of-conformance monitoring and ATC’s ability to alert pilots of incorrectly programmed FMS waypoints. A clean active route ensures ATC’s ability to intervene in a timely manner.

8. It is strongly recommended that a plotting/orientation chart, either hard-copy or via an Electronic Flight Bag application, be used and procedures include a position check 10 minutes after each waypoint. Compare all waypoints on the chart against the Master Document.

9. Operator flight crew procedures should focus on verifying the clearance and the route of flight while also promoting an attitude of "healthy suspicion" through independent crosschecks to verify that the clearance is correctly programmed. These procedures must also be used with any route amendments.
10. There should only be one Master Document on the flight deck. It should be labeled "Master" and should always reflect the current cleared route of flight.
11. Crews must be alert for similar sounding named oceanic waypoints (e.g. PITAX versus BERUX). Also, crews should note that oceanic tracks often contain two subsequent named waypoints (e.g., DOGAL BEXIT).
12. Crews should know that ATC coordination is necessary when transiting FIR boundaries. Pilots must give controllers adequate lead time when making requests for track deviations or altitude changes, especially in areas where multiple FIRs (e.g., Brest, Madrid, and Shanwick) are in close proximity. ATC coordination in such areas can become quite complex.

EROSION OF LONGITUDINAL SEPARATION

The following considerations can help flight crews avoid erosion of longitudinal separation.

1. When providing position reports via voice, crews must revise their estimate with ATC if a previously reported estimate is found to be in error by 3 minutes or more (see Annex 2 and ICAO Doc 7030). Accurate position reports are essential to procedural air traffic control.

> ***NOTE**: Time restrictions issued by ATC must be strictly adhered to. A restriction is issued to ensure required spacing between two aircraft.*

2. Crews must adhere to any assigned (True) Mach. Operators selecting "Long Range Cruise" or "ECON" modes are in fact flying variable Mach. As needed, crews can request speed adjustments or to "RESUME NORMAL SPEED" with ATC.

> ***NOTE**: In the NAT, an ATC instruction to "RESUME NORMAL SPEED" allows crews to fly other than a fixed speed (Mach) assignment. but still requires crews to notify ATC if the speed changes by plus or minus Mach .02 or more. Operators can find details in NAT Doc 007.*

3. Crews must ensure that the aircraft master clock (typically the FMS) is set to UTC and is used for all ETAs and ATAs. Where possible, clocks should be in GNSS-synchronized mode.

CONTROLLER PILOT DATA LINK COMMUNICATIONS (CPDLC)[2]

The following considerations can help flight crews avoid deviations associated with CPDLC.

1. Crews should understand proper responses for CPDLC messages, especially ones used frequently in the NAT, such as:

   a. "CLEARED TO {position} VIA ROUTE CLEARANCE" or "CLEARED ROUTE CLEARANCE." Some cockpits display the uplinked waypoints only when "LOAD" is selected. Once LOAD is selected and the crew confirms it loads properly and is acceptable, they should select "ACCEPT/WILCO" followed by "EXECUTE/INSERT" to activate the amended route in the FMS. It is vital to understand the menu hierarchy and how to load CPDLC clearances.

   b. "CONFIRM ASSIGNED ROUTE." Ensure the entire oceanic route is loaded in the FMS before responding to this message. When available, use the automated response, not free-text.

[2] Guidance for CPDLC communications can be found in the Global Operational Data Link Manual (GOLD, ICAO Doc 10037).

> ***NOTE**: Some aircraft/FMS combinations are experiencing a sporadic anomaly where the "SEND" prompt for down-linking a standard response to the "CONFIRM ASSIGNED ROUTE" is not displayed on the FMS.*

2. Crews should be careful not to mistake a "REMINDER" for an ATC clearance. Such reminders can appear on some avionics displays, e.g., for a planned climb, but are themselves **not** ATC clearances.

3. Conditional clearances sent via CPDLC require special attention. See examples in the section above addressing Large Height Deviations. The following is a typical scenario where a CPDLC "future execution" conditional clearance is misapplied.

   At approximately 1133Z the following CPDLC message was sent to the flight:

   MAINTAIN FL370
   AT 1205 CLIMB TO AND MAINTAIN FL390
   CLIMB TO REACH FL390 BY 1215
   REPORT LEVEL FL390

   The controller received the expected WILCO response.

   At approximately 1134Z, the controller received a Level Range Deviation Event ADS-C notification, indicating a climb inconsistent with the clearance. Shortly thereafter, the controller received a "LEVEL FL390" message.

   The pilots in this scenario violated their ATC clearance because they began their climb before 1205Z.

4. When receiving a CPDLC uplink message, it is important for both pilots to independently and silently read the message, and then verify with each other correct understanding of the clearance.

5. It is important to note that on some aircraft displays, the CPDLC uplink message may be more than one page long (requires "paging" through the display). Review the entire message carefully before taking any action. Flight crews may choose to print the message, but should be aware that printouts can depict uplinks differently than as shown on the appropriate flight deck display.

> ***NOTES**:*
>
> *1. Page acknowledgements may be unique to the avionics installed in a particular aircraft. For example, on some installations, crews cannot ACCEPT/WILCO until the last page of a message is reviewed, while in other installations, ACCEPT/WILCO may be allowed on the first page.*
>
> *2. When printed, the CPDLC message may not be an exact copy of the displayed CPDLC message.*

6. Crews should resolve any questions that they have about the clearance before initiating any action. If crews do not fully understand the CPDLC clearance, or the clearance is unexpected, such as a flight level change without having requested one, they should revert to voice communication and query ATC.

7. Crews should review the time stamp of CPDLC messages to ensure they are not old (delayed).

8. Dialogues with ATC that are initiated with CPDLC should be completed using CPDLC and dialogues begun with voice should be completed by voice. Crews should strive not to mix the two media.

9. Crews should avoid using free-text messages when standard messages are available and appropriate. Free-text messages are not machine-read, which can complicate processing of information. For example, when receiving the CPDLC uplink "CONFIRM ASSIGNED ROUTE," crews should follow CPDLC menu prompts to send the active route. A free-text reply would defeat automated conformance checking.

> ***NOTE**: Follow flight manual procedures, which specifically describe how to send standard message (non free-text) replies to CPDLC uplinks.*

10. Crews should be sure that HF SELCAL is working even when CPDLC is functioning properly – do a SELCAL check at oceanic entry and at each Oceanic Control Area (OCA) boundary.

CONTINGENCIES

The following considerations can help flight crews avoid deviations associated with in-flight contingency procedures.

1. Crews are reminded that the NAT contingency procedures that took effect March 2019 included **5 NM lateral offset** contingency procedures. This is now a global procedure published in NAT Doc 007, Chapter 13, and in Chapter 15 of *Procedures for Air Navigation – Air Traffic Management* (PANS-ATM, Doc 4444).
2. Weather Deviation Procedures using a vertical displacement of +/- 300 feet when reaching or exceeding **5 NM offset from the cleared track** are likewise a global procedure, published in Chapter 15 of Doc 4444, and also in Chapter 13 of NAT Doc 007. It is important for pilots to understand that the ICAO published Weather Deviation Procedure is a contingency and should only be flown when an ATC clearance cannot be obtained. It is also important that pilots understand that any ATC clearance to deviate for weather should be done at the ATC-cleared altitude, without any vertical displacement. Also, if ATC clears a pilot to deviate for weather and instructs the pilot to "REPORT BACK ON ROUTE," do not make this report until re-established on the original routing. Alternatively, the pilot could request new, direct routing, which if approved would supersede the "REPORT BACK ON ROUTE" instruction.

> ***NOTE**: For weather deviations, even less than 5 NM, the pilot must request clearance from ATC. However, if ATC clearance cannot be obtained and a deviation becomes necessary, pilots must follow published ICAO Weather Deviation Procedures described above.*

GENERAL

The following general considerations can help flight crews avoid deviations in oceanic airspace.

1. Having both pilots check the clearance MUST be standard flight deck procedure. Crews should avoid physiological breaks or any distractions when near the oceanic boundary or when copying and reprogramming route amendments. Any route amendments must be communicated clearly in crew changeover briefings.
2. All HF voice oceanic communications go through a radio operator. The radio operator is not an air traffic controller. Radio operators must relay all reports and requests to ATC for approval and processing. The pilot read-back to the radio operator MUST be verbatim.
3. Relays of ATC instructions between aircraft MUST be accurate. Ensure a correct read-back is received from every communication link in the relay.
4. Always read the route loaded in the FMS first and then compare it to the Master Document. This mitigates against "expectation bias," where pilots see what they expect to see.
5. Crews must immediately clarify with ATC any confusion about the clearance.

FLIGHT PLANNING

The following flight planning considerations can help flight crews avoid deviations in oceanic airspace.

1. Pilots and dispatchers should use all available resources to plan a route that avoids adverse meteorological phenomena (e.g., turbulence, volcanic ash, non-standard temperatures, convective activity, and weather at alternates). In addition, pilots should be knowledgeable about information on operational flight plans and do basic crosschecks of fuel, winds, and groundspeeds.
2. Dispatchers and flight planners should make every effort to file routes that ATC will not need to amend, in accordance with Chapter 4 of NAT Doc 007. Named oceanic points, particularly at 15W and 10W, are

frequently omitted from the flight plan when they should be included, or vice versa, either of which may cause ATC to amend the route.

> ***NOTE**: Shanwick publishes "Oceanic Tracks - Westbound Traffic Brief" on its website (https://www.customer.nats.co.uk/shanwick/, requires login) daily at approximately 8:30 AM London time. Crews not filing the preferred altitudes are more likely to receive an amended clearance.*

3. Dispatchers, flight followers, flight operations officers, flight planners and crews should ensure that items 10 and 18 of the ATC flight plan (normally reproduced on the operational flight plan) correctly reflect capabilities and authorizations. ATC uses these codes to apply separation standards.
4. Dispatchers should ensure, when filing new flight plans, that the old ones are cancelled. Having multiple flight plans in flight data systems can create confusion and system errors.

STRATEGIC LATERAL OFFSET PROCEDURES (SLOP)

(Only RIGHT offsets are authorized)

The following SLOP considerations can help flight crews avoid associated deviations in oceanic airspace.

1. Crews should use SLOP in all oceanic airspace. SLOP should be standard procedure, not a contingency, and operators should endorse using lateral offsets for safety reasons on all oceanic flights, to reduce the risk of collision and to avoid wake turbulence.

> ***NOTE 1**: SLOP should also be used on random routes due to the high traffic density and limitations of aids such as TCAS/ACAS.*

> ***NOTE 2**: Effective 12 SEPT 2019, SLOP offsets in 0.1 NM increments, up to 2 NM right of centerline, were authorized in the NAT, in accordance with Doc 4444 provisions. Consult the applicable State AIP for further details.*

2. The objective of SLOP is to reduce the risk of collision by randomly distributing flights across any of the offset positions. Operators should clearly communicate this concept in flight crew Standard Operating Procedures. In a bi-directional environment, maintaining centerline incurs more risk than offsetting.
3. Pilots may apply an offset outbound at the oceanic entry point and must return to centerline before the oceanic exit point unless otherwise authorized by the appropriate ATS authority or directed by the appropriate ATC unit.
4. Offsets to the left of centerline are NOT authorized under SLOP.
5. Crews should use sound management of automated flight guidance systems when establishing offsets, i.e., avoid using "HDG" mode due to the risk associated with neglecting to arm "LNAV/NAV" mode.
6. Crews should make sure the "TO" waypoint is correct after entering SLOP. With some avionics, when executing an offset near the active "TO" waypoint, the FMS can sequence to the "next + 1" waypoint—skipping a point.
7. Guidance on SLOP is available in the video found at this link: https://www.youtube.com/watch?v=-rigf7UngN0

- END -