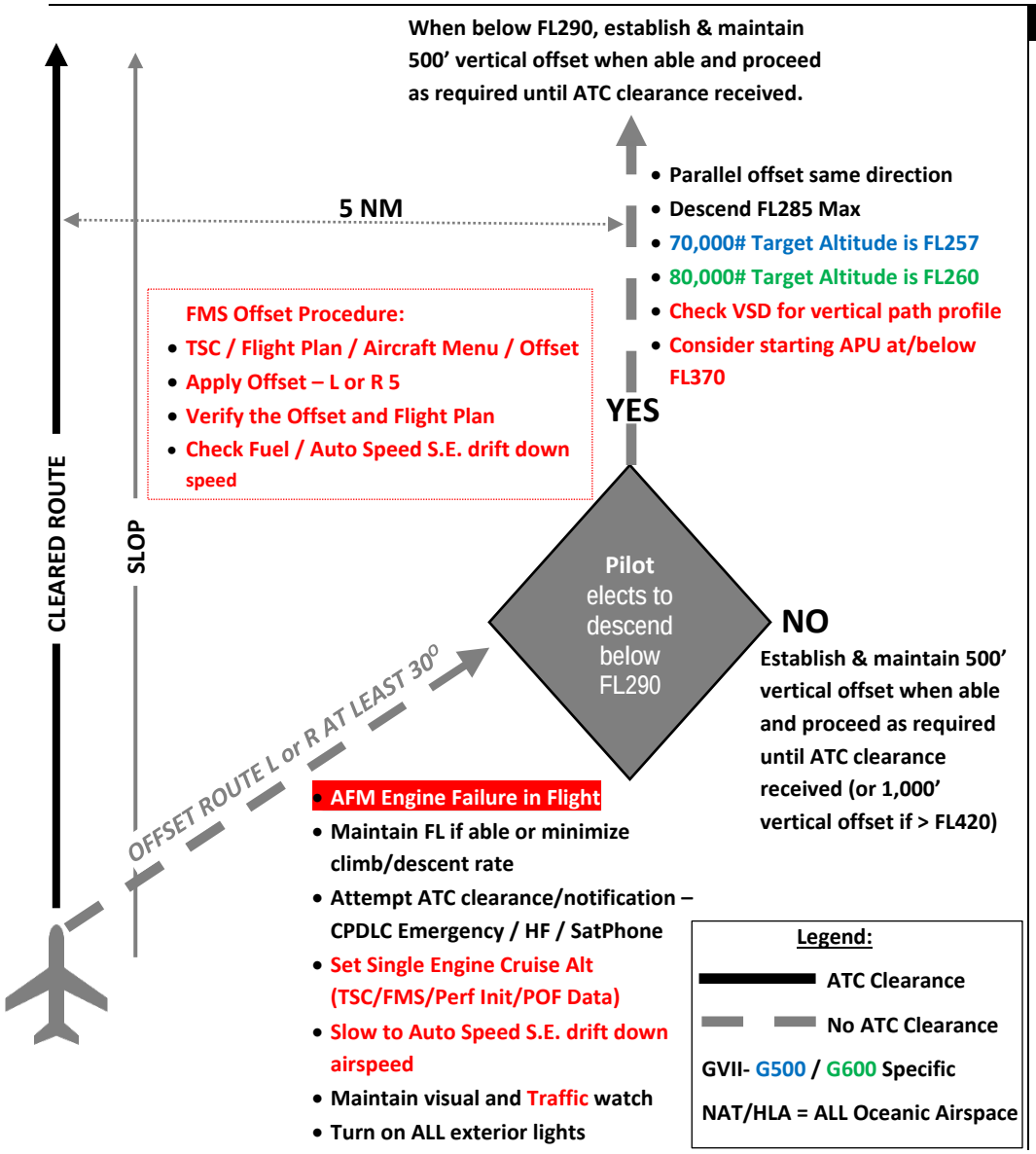
G500 / G600 Oceanic Contingency Procedures



OTS: RETURN & OFFSET

Before initiating any 180° turn-back, consider maintaining a same direction 5NM offset. Expedite climb above or descend below the majority of NAT/HLA traffic FL410-290 prior to crossing adjacent tracks or making a 180° turn-back.

1. Advise ATC when time permits – Turn on all exterior lights
2. Determine which way to turn (Consider OTS, Traffic, WX, Turn towards alternate airport)
3. Once established on the 5NM offset, expedite climb above or descend below NAT HLA airspace (FL285-FL420)
4. Turn Left or Right as required 180° to 225° from present course to intercept and re-establish on the offset course

Allow 20nm for 180° course reversal

NOTE: The FMS Offset procedure for a course reversal assumes you have inserted a contingency based turn-back flight plan in the Secondary flight plan.

FMS Procedure:

1. TSC/Flight Plan/FPLN Source/Manual Source/Swap/Accept
2. Activate appropriate leg
3. Insert Offset L5 or R5 as necessary
4. TSC/Flight Plan/Aircraft Menu/Offset
   Use caution to select the correct offset. The new course line should be very close to your current position.
5. Verify Routing on PFD and Engage LNAV/FMS
6. Confirm appropriate speed and Check Fuel

OTS DIVERSION: ACROSS PRIMARY TFC FLOW

If drifting down or descending, DO NOT cross tracks until level at an appropriate altitude for crossing tracks. Maintain established offset and expedite Climb above or Descend below the OTS (FL285-FL420). Utilize one of the previous procedures until clear of the organized track system.

1. Advise ATC when time permits – Turn on all exterior lights
2. Confirm you are level at an appropriate Offset Altitude

ABOVE FL410 CLB or DES 1000'
AT FL410 DES 500' or CLB 1000'
BELOW FL410 CLB or DES 500'

3. Request a clearance and proceed to alternate airport as per your reclearance, or direct if unable to obtain a clearance.
4. Check Fuel & Determine appropriate speed
5. Maintain extra vigilance for traffic
6. Broadcast FL & Position to nearby traffic on 121.5/123.45

ALWAYS COMPLETE ALL APPLICABLE CHECKLISTS FOR ANY SITUATION

DEPRESSURIZATION / EMERGENCY DESCENT

Manually performing the Emergency Descend Procedure once crew is on O_2 may be the safest course of action in Oceanic Airspace. Monitor for nearby traffic on TCAS/CDTI.

1. Crew and Passenger O_2 DON/100%
2. AP Disc if EDM Annunciated / Re-engage AP and select HDG and ALT, if necessary. (EDM will re-engage if above FL400)
3. Turn Left or Right as required 30-45° from present course to quickly intercept a point midway between a pair of tracks prior to entering the OTS from above. If not above tracks, establish a 5NM offset
4. Execute **AFM Automatic Emergency Descent Mode**
5. Emergency Report will automatically display if EDM is activated. Review and Press Verify/Send. If not displayed, Select TCS/Datalink/CPDLC/Emergency Review/Verify/Send
6. Advise ATC when time permits - Turn on all exterior lights
7. Maintain extra vigilance for traffic. Monitor TCAS/CDTI
8. Broadcast FL & Position to nearby traffic on 121.5/123.45

Reference Docs: ICAO DOC 4444, NAT DOC 007v-2017, ICAO Doc 10037 GOLD, FAA

G500 / G600 Oceanic Contingency Procedures

WEATHER DEVIATION

Obtain ATC Clearance via TSC/Datalink/CPDLC/Request if possible. Indicate priority using "Due to WX" checkbox. If unable, contact Radio using "PAN-PAN" x3 or "WEATHER DEVIATION REQUIRED," as necessary, to establish priority. If ATC advises, "Unable due traffic, state your intentions," consider declaring an emergency prior to utilizing this procedure.

If unable to obtain a clearance:

1 If possible, deviate away from nearby routes, tracks, or traffic
2 Broadcast FL, position, and intentions to nearby traffic on 121.5/123.45
3 Maintain extra vigilance for traffic – Monitor TCAS/CDTI
4 Turn on all exterior lights
5 If deviating **LESS** than 5NM remain at current FL
6 If deviating **MORE** than 5NM use the table below.

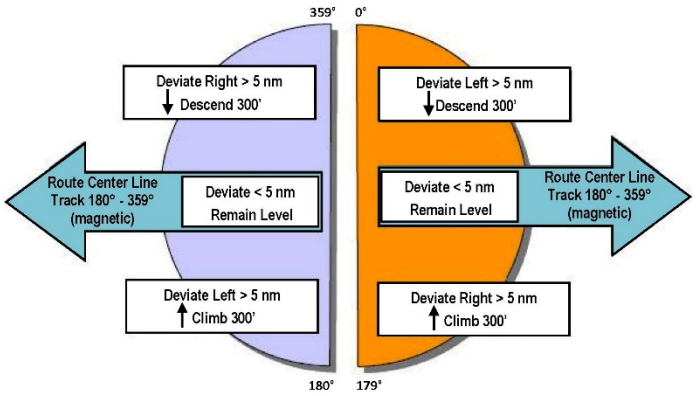
SAND – South Ascend – North Descend

EAST 000° - 179° Mag	**Deviating Left** **Deviating Right**	**Descend 300'** **Climb 300'**
WEST 180° - 359° Mag	**Deviating Left** **Deviating Right**	**Climb 300'** **Descend 300'**

6 Return to cleared FL when within 5NM of course
7 Continue broadcasting FL and position
8 Continue to attempt contact with ATC and advise them of your weather deviation.

FMS Procedure

TSC/Flight Plan/Aircraft Menu/Offset (Left XX or Right XX)



ONE REMAINING NAV SOURCE

1 Assess prevailing circumstance:
   a. Performance of remaining NAV source
   b. Remaining portion of flight in NAT/HLA Airspace
2 Exercise good judgment with respect to current situation
   a. Request clearance above or below NAT/HLA
   b. Reverse course
   c. Divert to use Special Routes (Blue Spruce)
3 Consult ATC as to the most suitable action
4 Obtain a clearance prior to any deviation from route
5 Ensure monitoring and crosscheck of remaining NAV source.
6 Check main and STBY compass systems against flight plan
7 Attempt visual sighting of other aircraft for position confirmation
8 Contact aircraft in vicinity to obtain useful info: Current Winds, Mag Heading, Drift, etc.

TOTAL NAV FAILURE

1 Notify ATC
2 Make best use of procedures specified above
3 Turn on all exterior lights
4 Maintain extra vigilance for traffic
5 All data required for Dead Reckoning along route is available on Computer Flight Plan.

COMM FAILURE

1 Check the following:
   a. TSC/Comm/ displays
   b. Volume – TSC/ATC settings
   c. Circuit Breakers POP/CPOP (Note CAS messages)
   d. Boom/Mask/Mic – 121.5 EMER Switch
   e. Replace microphone and or headset
   f. Try different frequency
2 Attempt communications on SATCOM
3 Attempt contact via Datalink/CPDLC
4 Squawk 7600
5 Broadcast in the Blind on 121.5/123.45

Remain clear of Oceanic Airspace if able

6 If failure occurs within the Oceanic airspace:
   a. **NAT/HLA** fly route you received in your clearance and maintain your last cleared/assigned flight level and Mach
   b. **PACIFIC OCA** maintain the last assigned speed and level for **60 minutes** after the last **compulsory reporting** point since the failure. **THEN** adjust speed and Altitude in accordance with the **FILED Flight Plan**
7 Rejoin FILED Route after exiting Oceanic Airspace
8 Continue attempts to regain communication

COMM RELATED CB's/SSPC's

PILOT CAU POP G-3 COPILOT CAU CPOP G-3 OBSERVER CAU CPOP G-2	VHF COMM 1 POP G-1 VHF COMM 2 TSC 2328 NAV1 POP G-2	HF 1 CPLR TSC 2301 HF 2 CPLR TSC 2302 HF 1 AMP TSC 2324 HF 2 AMP TSC 2325
SATCOM PRI SSPC #2311		

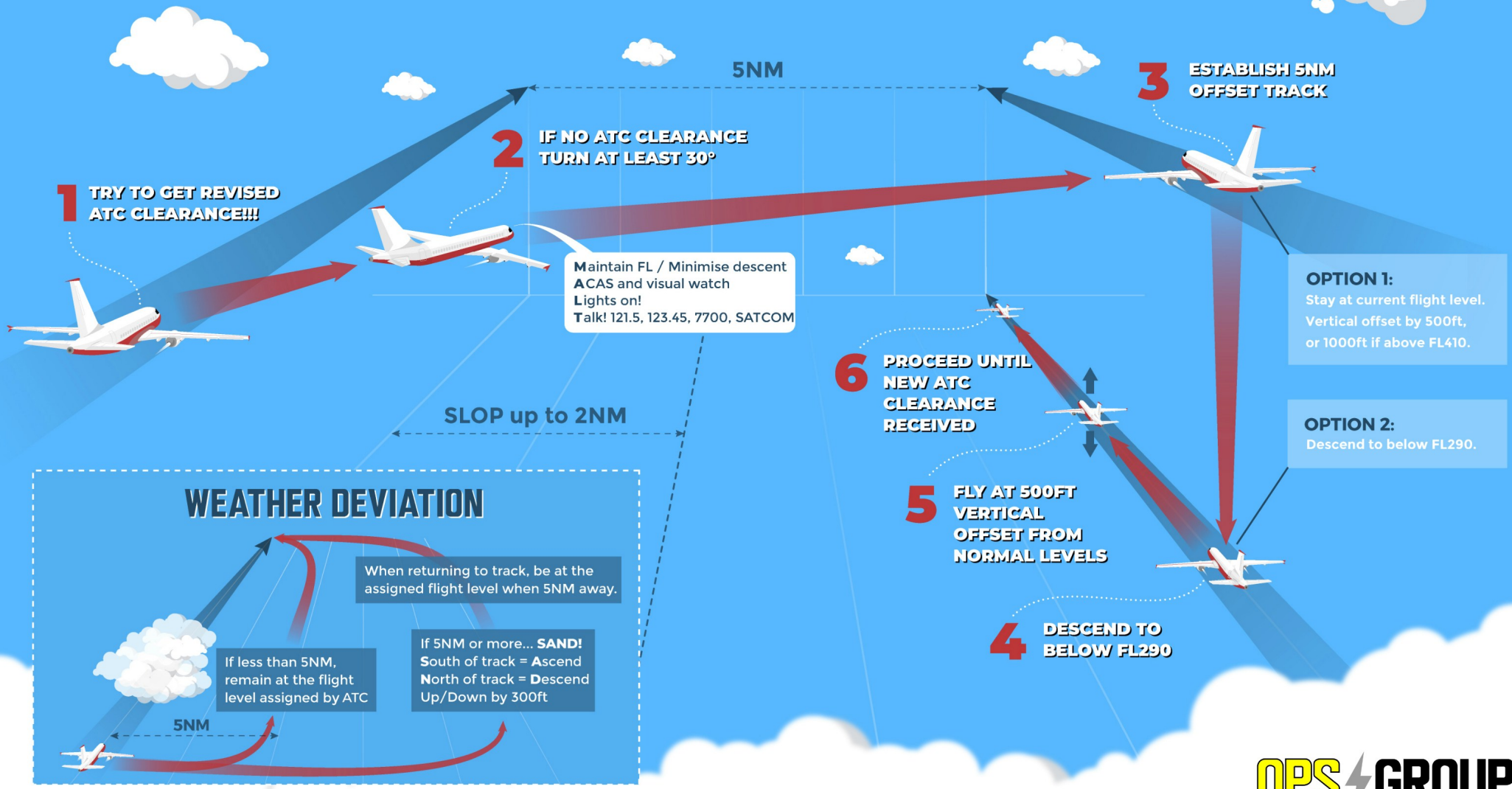
OCEANIC CONTACTS

Verify numbers on JeppFD (NC – Not Confirmed)	
OAKLAND	SATCOM 436697 +1-510-745-3415 (or 3416 NC)
GANDER OCEANIC	SATOM 431603 Oceanic / 431602 Domestic +1-709-651-5260 O / +1-706-651-5197 D
GANDER RADIO	SATCOM 431613 +1-709-651-5298
SHANWICK OCEANIC	SATCOM 423201 +353-61-368-241 (NC)
SHANWICK RADIO	SATCOM 425002 +353-61-36-86-78
NEW YORK OCEANIC (NAT)	SATCOM 436695 +1-631-468-1496
NEW YORK OCEANIC (WATRS)	SATCOM 436696 +1-631-468-1495
REYKJAVIK OAC	SATCOM 425101, 425103 +354-568-3035 (NC)
ICELAND RADIO	SATCOM 425105 +709-651-5316
SANTA MARIA RADIO	SATCOM 426302, 426305 +351-29-68-86-655

NAT CONTINGENCY!

WHAT TO DO WHEN YOU CAN'T COMPLY WITH THE ATC CLEARANCE (ROUTE, SPEED, FLIGHT LEVEL) DUE TO:

• EMERGENCY MEDICAL DIVERT • ENGINE FAILURE •
• DEPRESSURIZATION • ICING • TURBULENCE •



OPS GROUP

EVERYTHING IS LOST

UH OH

INSIDE, WITH CLEARANCE

Stick to **clearance**, transmit blind, **squawk** 7600, follow **lost comm procedures** for country you enter (as you leave NAT HLA). Follow **contingency** for weather or emergencies. Keep trying all **other systems.**

NOT ENTERED, WITH CLEARANCE

Continue (do the above).
Or divert and land.

NOT ENTERED, NO CLEARANCE

Consider diverting.
If entering through Shanwick follow their published procedures and **divert to EINN/Shannon.**

HF IS LOST

NO NO

NOT ENTERED, WITH CLEARANCE

Stick to clearance, try **CPDLC** and **VHF**. Try other HF frequencies. **Ask for relays.**
Check there is no space weather causing **blackouts.**

NOT ENTERED, WITH CLEARANCE

HF is now a requirement)as one of your two LRNS) so tell ATC.
Shanwick (even Blue Spruce routes) mandates it.

IT BROKE EARLIER

You can get **pre-approval** to enter without HF if its for a maintenance flight (going to fix it.)

DATALINK ISSUES

HI OR LO

INSIDE, WITH CLEARANCE

Let ATC know. There isn't much you can do about it now.

NOT ENTERED

There is a **Datalink Mandate** for a lot of the NAT HLA. ATC might still let you in if you ask nicely.

You don't need it if north of **80N**, in **NYC Oceanic,** on a **Tango 9** or **920** route, in the surveillance airspace over **Greenland/Iceland** or **below FL290/ above FL410.**

SATCOM is usually needed for datalink, as is CPDLC and ADS-C.

HF BLACKOUT

SPACE GLOW

INSIDE

Everyone has lost it. ATC and aircraft. Continue with clearance (domestic if that is the last received) and **don't divert** - there is no-one to coordinate.

NOT ENTERED

Chances are you won't know, you're probably **still on VHF.** ATC might let you know though.

ATC ISSUES

HELLO?

UNFORESEEN AND SUDDEN

Stick to your clearance, or until you reach the point where a **published contingency procedure** applies.
Try the next sector until contact made.

NOT ENTERED

You are unlikely to get a clearance to enter an ATC zero region.
Plan to **route around** the area.

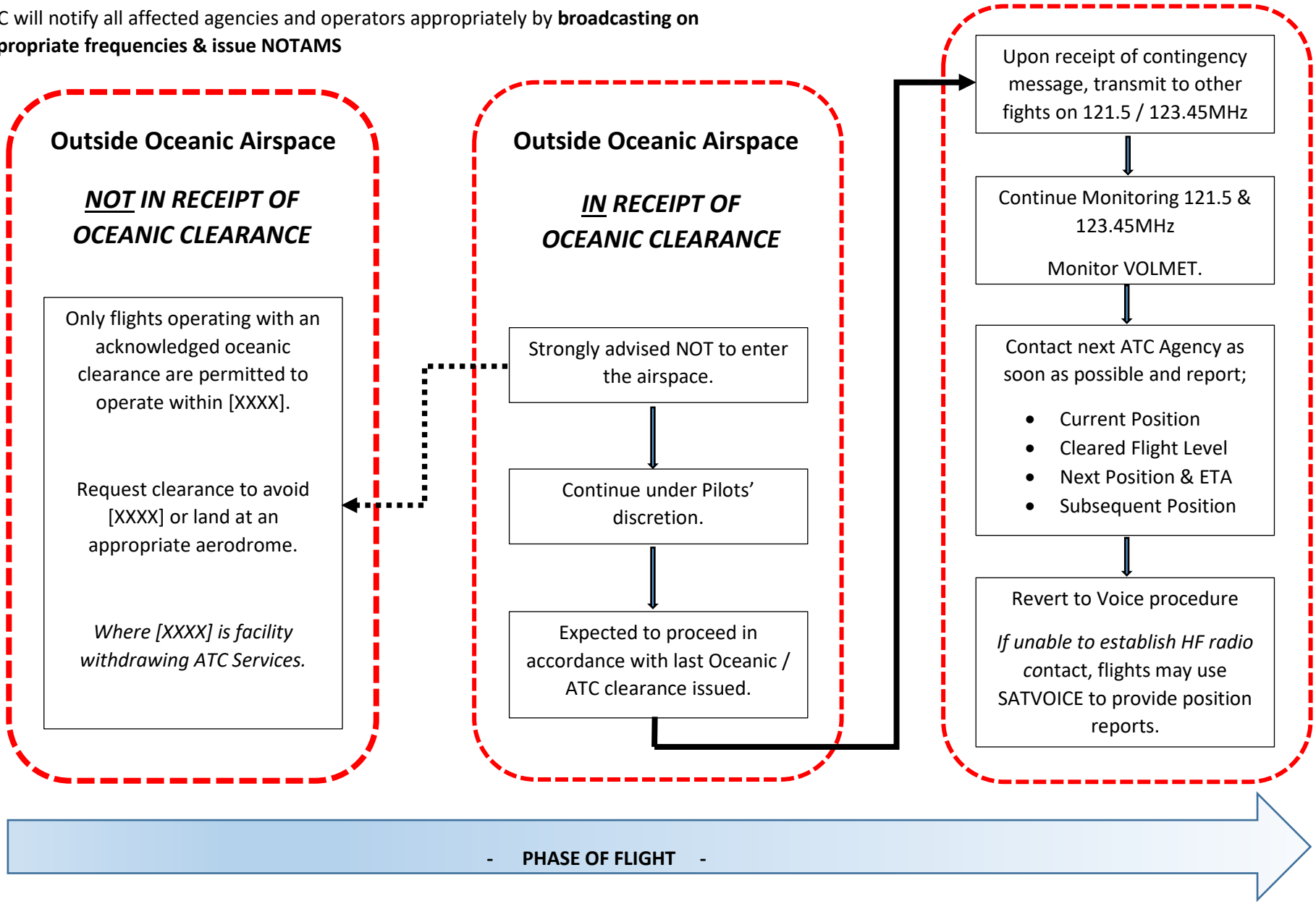
OPSICLES
Refreshing bits of ops info, just for members.

COMM ISSUES IN THE NAT HLA

CONTINGENCY CONSIDERATIONS

GUIDANCE FOR PILOTS IN THE IMMEDIATE AFTERMATH OF A SUDDEN WITHDRAWAL OF ATC SERVICES IN OCEANIC AIRSPACE

ATC will notify all affected agencies and operators appropriately by **broadcasting on appropriate frequencies & issue NOTAMS**



REF: ICAO NAT DOC006, ICAO DOC 7030, (PAC Para. 9.3), FAA SAFO 20011

V1.0 JULY 2020

CONTINGENCY CONSIDERATIONS

GUIDANCE FOR PILOTS IN THE IMMEDIATE AFTERMATH OF A SUDDEN WITHDRAWAL OF ATC SERVICES IN OCEANIC AIRSPACE

ICAO IN-FLIGHT BROADCAST BY AIRCRAFT (TIBA)

Broadcast on the last assigned frequency, 121.5 and 123.45 the following:

ALL STATIONS (call-sign),
FLIGHT LEVEL (number) (or CLIMBING/DESCENDING TO FLIGHT LEVEL (number)) (direction) (ATS Route) (or DIRECT FROM position) TO (position))
AT (time)
ESTIMATING (next reporting point, or the point of crossing or joining a designated ATS route)
AT (time) (call sign) FLIGHT LEVEL (number) (direction)

TIBA calls should be provided at the following times:

a. 10 minutes before entering the designated airspace;
b. 10 minutes prior to crossing a reporting point;
c. 10 minutes prior to crossing or joining an ATS route;
d. At 20 minute intervals between distant reporting points;
e. 2 to 5 minutes, where possible before a change in a flight level;
f. At the time of a change in flight level; and
g. At any other time considered necessary by the flight-crew.

SATVOICE

SATVOICE Numbers for ATC Centers and Radio Stations can be found on the Jeppesen enroute charts

LEVEL CHANGE WITH AN ACKOWLEDGED CLERANCE

NOTE: Flight-Crews shall use extreme caution and all available means to detect conflicting traffic

The following procedures shall be applied when conducting any level change to **comply with an acknowledged clearance** within airspace affected by the sudden withdrawal of ATC services.

At least 3 minutes prior to the commencement of a climb or descent the flight should broadcast on the last assigned frequency, 121.5 and 123.45 the following:

- ALL STATIONS (call-sign) (direction) DIRECT FROM (position) TO (position) LEAVING FLIGHT LEVEL (number) FOR FLIGHT LEVEL (number) AT (distance) (direction) FROM (position) AT (time).

When the level change begins, the flight should make the following broadcast:

- ALL STATIONS (call-sign) (direction) DIRECT FROM (position) TO (position) LEAVING FLIGHT LEVEL (number) NOW FOR FLIGHT LEVEL (number).

When level, the flight should make the following broadcast:

- ALL STATIONS (call-sign) MAINTAINING FLIGHT LEVEL (number)

REF: ICAO NAT DOC006, ICAO DOC 7030, (PAC Para. 9.3), FAA SAFO 20011

V1.0 JULY 2020

NAT OPS BULLETIN

Serial Number: 2025_001
Subject: NAT GNSS Interference Procedures
Originator: NAT SPG

Issued: 7 January 2025
Effective: 7 January 2025

The purpose of North Atlantic Operations Bulletin 2025-001 is to provide background information and guidance to aircraft operators in the North Atlantic (NAT) on the requirement to notify ATC of GNSS interference, and the Air Navigation Service Provider (ANSP) procedures that will be applied to aircraft that have been exposed to Global Navigation Satellite Systems (GNSS) interference (GNSS jamming and/or spoofing) during their flight.

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

ICAO EUR/NAT Office: icaoeurnat@icao.int

The NAT OPS Bulletin Checklist is available at www.icao.int/EURNAT/EUR & NAT Documents, NAT Documents, then NAT Ops Bulletins.

1. DEFINITIONS

The following are definitions as used in this bulletin:

a) **GNSS Jamming -** An intentional Radio Frequency Interference (RFI) with GNSS signals. The interference prevents receivers from locking on to satellite signals and has the main effect of rendering the GNSS system ineffective or degraded for users in the jammed area.

b) **GNSS Spoofing -** Involves broadcasting counterfeit satellite signals to deceive GNSS receivers, causing them to compute incorrect position, navigation, and timing (PNT) data.

2. PURPOSE OF BULLETIN

The purpose of this North Atlantic Operations (NAT OPS) Bulletin is to provide background information and guidance to aircraft operators in the North Atlantic (NAT) on the requirement to notify ATC of Global Navigation Satellite Systems (GNSS) interference (GNSS jamming and/or spoofing), and the Air Navigation Service Provider (ANSP) procedures that will be applied to aircraft that have been exposed to GNSS interference during their flight.

3. BACKGROUND

Aligned with reports in other Regions, since February 2022, the NAT has seen an increase in the frequency and severity of the impact caused by GNSS jamming and/or spoofing as well as an overall growth of intensity and sophistication of the events.

NAT ANSPs have been monitoring the effects of GNSS interference and have been working together to promote alignment and consistency in the procedures that are applied to aircraft entering the NAT Region that have been exposed to GNSS interference during their flight.

A non-exhaustive list of possible effects and impacts of GNSS jamming and/or spoofing are documented in various sources such as ***EASA Safety Bulletin SIB No: 2022-02R3*** **(**https://ad.easa.europa.eu/ad/2022-02R3*).* The following is a list of issues that are directly impacting NAT operations:

- Failure or degradation of aircraft systems which use GNSS as a time reference or source of position information, leading to;
  - loss of, or unreliable ADS-B data,
  - loss of, or unreliable ADS-C data, (for example time errors)
  - loss of Controller Pilot Data Link Communication (CPDLC).
- Inability to conduct or maintain GNSS based Area Navigation (RNAV) or Required Navigation Performance (RNP) operations.

  Note 1: Navigation specifications RNAV 10 (RNP 10) and RNP 4 are required for the application of performance-based separations.
  Note 2: RNP 4 requires at least one functioning GNSS.
  Note 3: RNAV 10 (RNP 10) is required to operate within the NAT HLA (between FL290 – FL410).

Though the majority of GNSS jamming and/or spoofing activities take place outside the NAT Region, the inability of the aircraft to recover in-flight, leads to increased workload for both flight crews and air traffic controllers in the NAT.

The primary impact to the NAT is the ability to apply performance-based separations that rely on RNP 4/10, a working CPDLC connection, receipt of valid ADS-C data and reliable ADS-B surveillance data.

4. OPERATOR & FLIGHT CREW PROCEDURES

Early Notification of GNSS interference:
Early notification of any failure or malfunction of GNSS, loss of RNP 4/10 capability, loss of CPDLC, loss of ADS-C, or loss of ADS-B enables improved ATC coordination and strategic planning of flights into the NAT utilizing non-performance-based separation minima, which could result in either no or minimal impact to the cleared profile, subject to the traffic scenario.

Late Notification of GNSS interference:
A late notification by flight crews, for example as the flight approaches the Oceanic Entry Point (OEP), or through automated ATC system alerts triggered by lack of usable ADS-B or ADS-C data, or failure to establish CPDLC connections, causes significant controller workload.

The result may be large profile changes being issued to the affected flight and in some cases to other flights to ensure the correct application of separation minima, to meet NAT requirements (e.g. HLA) or to meet coordination requirements by adjacent ANSPs.

Flight crews that experience or suspect GNSS interference enroute to the NAT Region shall notify the initial NAT ANSP in the RCL. Flights not submitting an RCL message (via New York East) shall notify New York via voice.

Notification should be included in the RCL message via ACARS or voice, confirming degradation of navigation status and detail of ongoing loss/impacts to the aircraft systems and capabilities.

Examples:
- ‘ATC REMARKS/ GNSS INTERFERENCE RNP10 ONLY’
- ‘ATC REMARKS/ NO DATA LINK’
- ‘ATC REMARKS/ DEGRADED NAVIGATION NO GNSS’

In addition, operators can also make the ANSP aware when one of their flights has been impacted by GNSS interference through direct contact.

5. NAT ANSP PROCEDURES

Upon notification or detection of a flight that has been impacted by GNSS interference, NAT ANSPs will update flight details within their Flight Data Processors (FDP) and coordinate the flight profile with adjacent ANSPs to confirm NAT HLA status, and eligibility for application of performance-based separation minima.

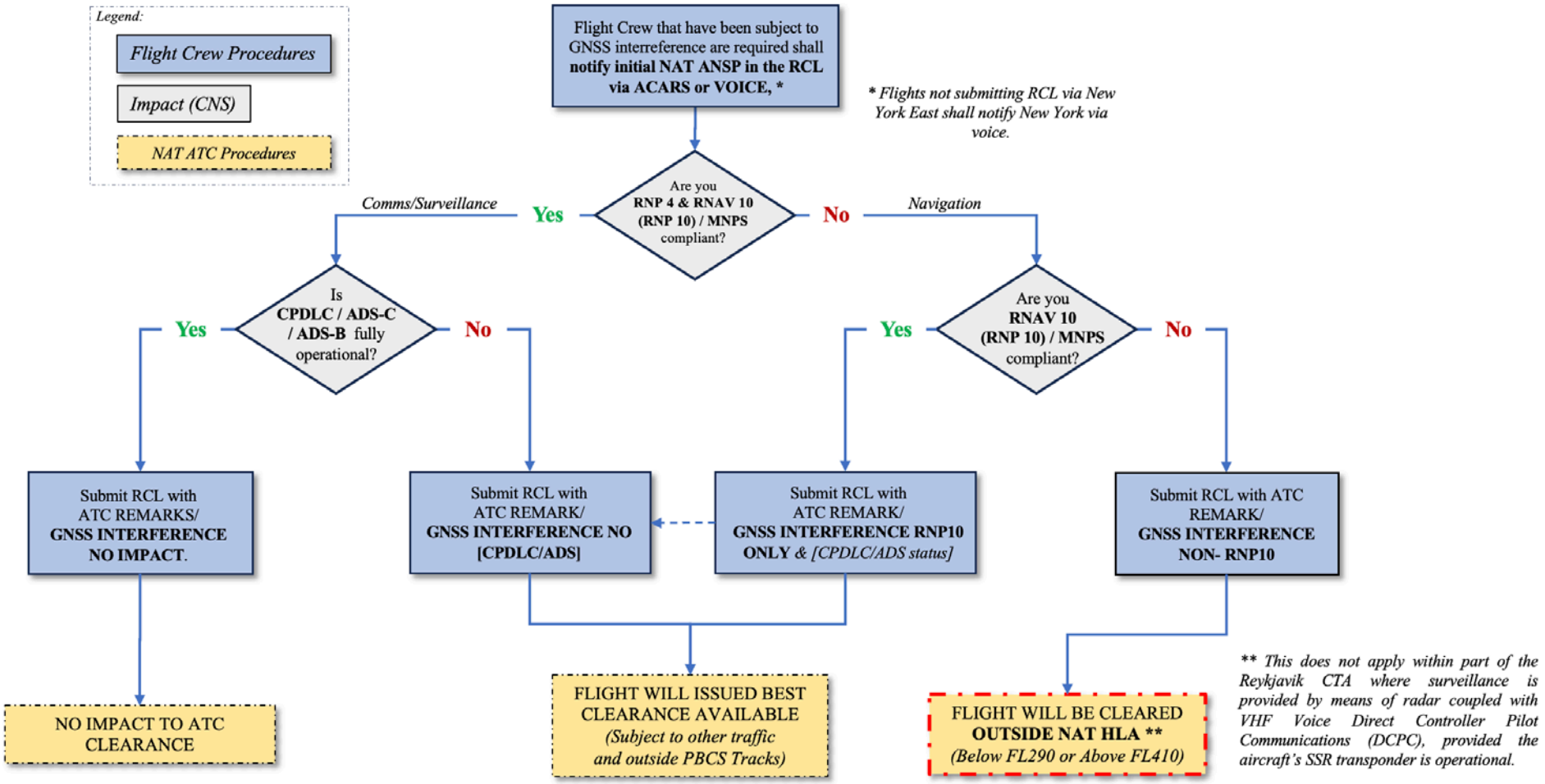
The ANSP procedures are:

- Flights that do not meet at least RNAV 10 (RNP 10) navigation capability will be cleared outside the NAT HLA (below FL290 or above FL410). This does not apply within part of the Reykjavik CTA or Santa Maria OCA where surveillance is provided by means of radar and/or Wide Area Multilateration (WAM) coupled with VHF Voice Direct Controller Pilot Communications (DCPC), provided the aircraft’s SSR transponder is operational.
- Aircraft losing RNP 4 enroute but retaining RNAV 10 (RNP 10) capability will be cleared on the most suitable profile within the NAT HLA subject to impact on other traffic and outside of PBCS tracks.
- Aircraft experiencing a CPDLC and/or ADS-C failure enroute will be cleared on the most suitable profile within the NAT Data Link Mandate airspace (FL290 – FL410) subject to impact on other traffic.
- Aircraft experiencing an ADS-B failure enroute will be cleared on the most suitable profile within the NAT HLA subject to impact on other traffic.

6. WEBSITES

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

NAT GNSS Interference Procedures



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