

**NORTH ATLANTIC AND CANADA MINIMUM NAVIGATION PERFORMANCE
SPECIFICATION (MNPS) AND
MINIMUM AIRCRAFT SYSTEM PERFORMANCE SPECIFICATION (MASPS) FOR
OPERATION IN MNPS AND RVSM AIRSPACE**

Pilots **must not** fly across the North Atlantic within MNPS Airspace, nor at flight levels 290 to 410 inclusive anywhere within the NAT Region, unless they are in possession of the appropriate Approval(s) issued by the State of Registry or the State of the Operator.

For complete information and further guidance to documents regarding North Atlantic aircraft operations refer to the North Atlantic MNPS Airspace Operations Manual – Edition 2008 (<http://www.nat-pco.org/>).

A. DESCRIPTION AND REQUIREMENTS

1. Area of application

- a) North Atlantic:
 - i) MNPS - The lateral and vertical dimension includes the following Control Areas (CTAs) between FL 285 and FL 420 : Gander, New York Oceanic (North of 27° N but excl. the area west of 60° W and south of 38° 30' N), Reykjavik, Santa Maria and Shanwick.
 - ii) RVSM - Reduced Vertical Separation to 1000 ft/300m from FL 290 to FL 410 incl.
- b) Canada:
 - i) MNPS - Arctic Control Area and portion of Southern Control Area between FL 330 and FL 410 ;
 - ii) RVSM - Reduced Vertical Separation to 1000 ft/300m from FL 290 to FL 410 incl.

2. Certification

Certification for MNPS and RVSM call for various aspects, including crew competence and drills, navigation and altimetry equipment suitability and maintenance, etc. by the State of Registry or State of the operator, as appropriate, for the conduct of such operations.

3. Navigation Requirements for unrestricted MNPSA Operations

3.1 Lateral Navigation

- a) TWO fully serviceable Long Range Navigation Systems (LRNSs). A LRNS may be one of the following
 - (i) One Inertial Navigation System (INS);
 - (ii) One Global Navigation Satellite System (GNSS);Note: Currently the only GNSS system fully operational and for which approval material is available, is GPS.
 - (iii) One navigation system using the inputs from one or more Inertial Reference System (IRS) or any other Sensor System complying with the MNPS requirement.
- b) Each LRNS must be capable of providing to the flight crew a continuous indication of the aircraft position relative to desired track.
- c) It is highly desirable that the navigation system employed for the provision of steering guidance is capable of being coupled to the auto-pilot.

3.2 Longitudinal Navigation

Longitudinal separations between subsequent aircraft following the same track (in-trail) and between aircraft on intersecting tracks in the NAT MNPSA are assessed in terms of differences in ATAs/ETAs at common waypoints. The longitudinal separation minima currently used in the NAT MNPSA are thus expressed in clock minutes. The maintenance of in-trail separations is aided by the application of the Mach Number Technique. However, aircraft clock errors resulting in waypoint ATA errors in position reports can lead to an erosion of actual longitudinal separations between aircraft. It is thus vitally important that the time-keeping device intended to be used to indicate waypoint passing times is accurate, and is synchronized to an acceptable UTC time signal before commencing flight in MNPSA. In many modern aircraft, the Master Clock can only be reset while the aircraft is on the ground. Thus the **Pre-flight Procedures** for any NAT MNPS operation **must include** a UTC time check and resynchronization of the aircraft Master Clock.

The following are examples of acceptable time standards:

- a) GPS (corrected to UTC). Available at all times via approved on-board GPS (TSO-C129) equipment.
- b) WWV (NIST - Fort Collins, Colorado) H24 on 2500, 5000, 10000, 15000 and 20000 kHz (AM/SSB).
- c) CHU (NRC - Ottawa, Canada) H24 on 3330, 7335 and 14670 kHz (SSB).
- d) BBC (UK Greenwich) H24 on 12095 kHz; 0200-2315 UTC on 9410 kHz; 0430-0030 UTC on 15070 kHz; 0800-1600 UTC on 17705, 17640, 9760 and 9750 kHz.

All times given in UTC and every minute within specified periods.

4. Altimetry Equipment required for operation in RVSM Airspace

- (i) TWO independent operational primary altimetry systems;
- (ii) One Automatic Altitude Control System; and
- (iii) One Altitude Alerting device;

Standard pre-flight checks of altimeters are required. At least two primary altimeters must agree at all times within plus or minus 200 ft. At intervals of approx one hour, crosschecks between the primary altimeters should be made.

5. ICAO Flight Plan

For flights conducted wholly or partly within MNPS and RVSM airspace:

- a) Item 10: Indicate the approval status of the aircraft by inserting after "S" the following letters: "X" for MNPS approval and additionally for those that are RVSM approved: "W", other suffix such as "I" for INS/IRS equipment etc. still need to be shown. For Data Link equipped a/c add letter "J" and specify in Item 18 the equipment carried preceded by DAT/ followed by one or more letters as appropriate (H - HF; M - Mode S; S - Satellite; V - VHF).
- b) Item 15:
 1. Include the initial cruising speed and level.
 2. Include each point at which a change in Mach No. or Flight Level is requested. This point to be specified in LAT/LONG coordinates or as a waypoint.

Notes:

1. The ATC approved Mach No. will be included in each clearance given by the respective Control Center.
 2. For flights operating in a general East-West direction, flight plans are to be broken in 10 deg Meridian intervals. For generally North-South flights in 5 deg latitude or hourly intervals.
 3. Flights operating between North America and Europe via the North Pole are considered as operating in a North-South Direction.
 4. For flights conducted along one of the organised tracks from the entry point into the NAT area to the exit point, the route will be defined by the abbreviation "NAT" followed by the code letter assigned to the track.
 5. Flights wishing to join or leave an OTS, or change from one OTS to another, at some intermediate point are considered to be Random and Full route details must be specified. The track letter is not to be used to abbreviate any portion of the flight.
- c) Item 18:
 1. Include the desired Alternative Flight Levels and/or option route(s).
 2. Include the Aircraft Registration.
 3. For flights conducted along an Organised Track, show the accumulated Estimated Elapsed Time only to the first Oceanic Entry Point. When operating wholly or partly outside of Organised Tracks, accumulated Elapsed Times to significant points enroute are required.

B. PARTIAL OR TOTAL LOSS OF LONG RANGE NAVIGATION CAPABILITY

Aircraft with triple system installed, with only TWO systems operational, can proceed normally. For aircraft with only TWO operational systems, the following guidance is offered in case of system failure.

1. North Atlantic

a) ONE system (of two operational systems) fails BEFORE TAKE-OFF

If the remaining system is fully operative, the Pilot may file a new Flight Plan using the SPECIAL ROUTES as described under paragraph D or obtain a clearance above or below MNPSA.

b) ONE system (of two operational systems) fails BEFORE ENTRY INTO MNPSA

The Pilot should consider:

1. Landing at a suitable aerodrome before the MNPSA boundary or returning to the aerodrome of departure.
2. Diverting via one of the special routes as described under para D.
3. Obtaining a reclearance above or below MNPS Airspace.

Note: A revised Oceanic ATC clearance will be issued after co-ordination between all the OACs concerned. Should the Organized Track System at the time of the incident extend to the Northern part of the NAT Region, the aircraft concerned may be required to accept a lower than optimum flight level in its revised Oceanic Clearance, especially during peak traffic periods. The above guidance material in no way relieves the pilot from the obligation to take the best possible course of action under the prevailing circumstances.

c) ONE system (of two operational systems) fails AFTER ENTRY INTO MNPSA

The Pilot should normally continue in accordance with the Oceanic Clearance already received, appreciating that the reliability of the total navigation system has been significantly reduced. However, he should:

1. Assess the prevailing circumstances (e.g. performance of the remaining system, remaining portion of the flight in MNPSA, etc.).
 2. Exercise judgement with respect to prevailing circumstances (e.g. request clearance above or below MNPSA, reverse course, obtain reclearance to the SPECIAL ROUTES, divert to a suitable aerodrome, etc.).
 3. Consult with ATC so that the most suitable action can be selected.
 4. Obtain ATC clearance prior to any deviation from current Oceanic Clearance.
- When flight continues with the original clearance, Pilot should begin special monitoring program:
5. Take special care of operation of remaining systems.
 6. Check main and stand-by compass systems against information available.
 7. Check performance record of remaining equipment, and if in doubt regarding performance and/or reliability, consider:
 - (i) Attempting visual sighting of other aircraft or their contrails to provide track indication.
 - (ii) Calling OAC for information on aircraft in vicinity, so as to obtain usable navigation information (e.g. drift, magnetic heading, wind etc.).

d) REMAINING system fails WITHIN MNPSA

1. Immediately notify ATC
2. Make best use of procedures specified in c) 7., (i) and (ii) above
3. Maintain special look-out for conflicting aircraft, make maximum use of external lights.
4. If no instructions are received from ATC within a reasonable period: consider climbing/descending 500ft / 150m, broadcast action on 121.5 MHz, and advise ATC as soon as possible.

e) Complete Failure of Navigation Systems Computers

Should the computer element of the Navigation System fail, the basic output of the IRS (LAT/LONG, drift and ground speed) should be available unimpaired. Providing a suitable plotting chart is onboard and the cleared route has been plotted:

Extract mean true tracks between waypoints.

Use the basic IRS/GPS outputs to adjust heading to maintain mean track and calculate ETAs.

At intervals of not more than 15 minutes plot LAT/LONG position on the chart and adjust heading to regain track.

2. **Canada**

In cases as outlined in B-1.a) and B-1.b) above, a Flight Plan may be filed or refiled enroute with ATC to operate below or above MNPSA via airways or random routes to join the SPECIAL ROUTES described in paragraph D at YFB/NAIN or YR.

Note: If, during any type of operation in the NAT or Canadian MNPSA, a deviation from Flight Plan track is noted, immediate corrective action to return on track is required. At the same time ATC must be advised, giving the reason for the excursion and action taken to return on route.

C. IN-FLIGHT RVSM PROCEDURES AND CONTINGENCIES

1. **Prior to entry into RVSM airspace**, crosscheck the primary altimeters of which at least two must agree within plus or minus 200 ft; record the readings to be available for use in possible contingency situations.
2. **Within RVSM airspace**, on passing waypoints, or at intervals not exceeding 60 minutes (whichever occurs earlier), or on reaching a new cleared Flight Level, cross check the primary altimeters. If at any time the readings of the two primary altimeters differ by more than 200 ft, consider the a/c altimetry system to be defective and advise ATC as soon as possible. If / when advised by ATC of an assigned altitude deviation exceeding 300 ft, return as soon as possible to the cleared FL or follow the Contingency Procedures (refer to Chart 2; panel 2). **Report immediately leaving or reaching any new cruising level, whether it will be following a re-clearance, step-climb etc..**
3. Within RVSM Airspace greater opportunity exists for step climbs. These should be included in the Flight Plan. However each change of level in climb **must** be requested from ATC and also the last assigned Mach Number should be maintained during the step climbs. If unable advise ATC.
4. **The Strategic Lateral Offset Procedure (SLOP)**

The Strategic Lateral Offset Procedures (SLOP) are now a Standard Operating Procedure throughout the NAT Region. This procedure mitigates collision risk and wake turbulence encounters. Pilots conducting oceanic flight within the NAT Region with automatic offset programming capability are recommended to fly lateral offsets of either 1 or 2 NM **right** of centerline.

The introduction of very accurate aircraft navigation systems, along with sophisticated flight management systems, has drastically reduced the number of risk bearing lateral navigation errors reported in NAT airspace. Paradoxically, the capability of aircraft to navigate to such a high level of accuracy has led to a situation where aircraft on the same track but at different levels, are increasingly likely to be in lateral overlap. This results in an increased risk of collision if an aircraft departs from its cleared level for any reason.

SLOP reduces risk by distributing aircraft laterally. It is applicable within the New York Oceanic, Gander Oceanic, Shanwick Oceanic, Santa Maria Oceanic, Sondrestrom and Reykjavik Flight Information Regions, and within the Bodo Oceanic Flight Information Region when flights are operated more than 100 NM (185 km) seaward from the shoreline.

SLOP conforms to direction in the ICAO Procedures for Air Navigation Services-Air Traffic Management (PANS-ATM, Doc 4444, 15.2.4) and is subject to the following guidelines:

- a) Aircraft without automatic offset programming capability **must** fly the route centerline.
- b) Operators capable of programming automatic offsets may fly the centerline or offset 1NM or 2NM right of centerline, allowing for 3 possible positions along route. Offsets are not to exceed 2 NM right of centerline and offsets to the left of centerline are not permitted. An aircraft overtaking another aircraft should offset within the confines of this procedure, if capable, so as to create the least amount of wake turbulence for the aircraft being overtaken. The pilot should take into account wind and estimated wake vortex drift and time to descend. (Nominal descent rates for wakes are 300 – 600 fpm).
- c) Pilots should use whatever means is available (e.g. TCAS, communications, visual acquisition) to determine the best flight path to fly. Pilots may contact other aircraft on frequency 123.45, as necessary, to coordinate the best wake turbulence offset option.
- d) Pilots may apply an offset outbound after the oceanic entry point and must return to centerline before the oceanic exit point. Position reports transmitted via voice should be based on the waypoints of the current ATC clearance and not the offset positions.
- e) Aircraft transiting oceanic radar areas may remain on their established offset positions.
- f) There is no ATC clearance required for this procedure and it is not necessary that ATC be advised.

5. **TCAS Alerts and Warnings**

Climb and descent rates in RVSM airspace and Transition areas should be limited to 1,000 fpm when operating within five (5) NM and $\pm 2,000$ ft of other aircraft to minimize the generation of TAs (Traffic Advisory) and RAs (Resolution Advisory). This can also help to ensure that the cleared FL is not under- or overshoot by more than 150ft. In the event that a TA is received, commence a visual search and prepare to respond to a RA. All RA should be reported to ATC.

TCAS equipment utilising Logic Version 6.04a in RVSM airspace can issue nuisance Traffic Advisories (TAs) relating to another aircraft on the same track which is horizontally separated by 1.3NM or less but correctly separated vertically by 1000 ft below or above.

Note that ACAS II (TCAS version 7) required (eff. 1 JAN 2005) for a/c above 5,700kg or authorized to carry more than 19 Pax should eliminate such TAs nuisance.

Upon landing an "Altitude Deviation Report Form" should be completed whenever an Altitude Deviation of 300ft or more occurs including those due to TCAS, Turbulence and Contingency events. Use the "Wake Turbulence Report Form" in instances of Wake Vortex incidents.

D. SPECIAL ROUTES FOR USE WITHIN MNPSA WITH LESS THAN ACCEPTABLE MNPS LONG RANGE NAVIGATION EQUIPMENT

No aircraft should use these routes unless specifically authorized by the State of Registry or state of the operator as appropriate.

1. **Aircraft with SHORT RANGE navigation equipment plus ONE operational LONG RANGE navigation equipment.**

a) ROUTES Europe to/from Canada via Greenland/Iceland

1. Minimum acceptable operational navigation equipment:
 - (i) VOR/DME and ADF plus
 - (ii) Single INS, or single GNSS, or one navigation system using the inputs from one or more IRSs or any other sensor system complying with MNPS specifications.
 - (iii) LORAN-C with Computer (but because of incomplete coverage the use would entail an operational restriction to routes on which unambiguous ground wave coverage is available).
 - (iv) DOPPLER with Computer (not recommended for unrestricted operation approvals).
2. Approved SPECIAL ROUTES:

BEL/GOW/MAC - GOMUP - 60N 15W - 61N 1630W - BREKI - KEF {
BEN/STN - ATSIX - 61N 1234W - ALDAN - KEF {
BEN/STN - RATSU - ALDAN - KEF {
MOXAL - RATSU - STN/BEN |
OSKUM - RATSU - STN/BEN |
KEF - EMBLA - 63N 30W - 61N 40W - OZN |
KEF - GIMLI - DA - SF - YFB |
OZN - 59N 50W - (PRAWN - NAIN) |
OZN - 59N 50W - (PORGY - HO) |
OZN - 58N 50W - (LOACH - YJR) |
Sondre Stromfjord - 67N 60W |
KU (Kook Islands) - 66N 60W |
KU (Kook Islands) - 64N 60W - 64N 63W - YFB |
RE (Reykjanesskoli) - 6930N 2240W - CP |
| HF is required.
| VHF coverage exists and can be used by Non HF equipped a/c subject to prior coordination with Scottish/Shanwick.
| VHF coverage exists on these routes at FL 300 and above.
| VHF coverage exists.

b) ROUTES UK/Spain/Portugal to/from Azores and Madeira

1. Approved SPECIAL ROUTES with Minimum acceptable operational navigation equipment according to para D, a), 1 above :

CRK - LASNO - T9 - BEGAS - STG/AVS (for HF equipped aircraft only)
GAPLI - LASNO - T9 - BEGAS - STG/AVS (for HF equipped aircraft only)
Routes between the Azores, Funchal, Porto Santo and the Portuguese mainland.
2. Other approved SPECIAL ROUTES:

CRK - OMOKO - T16 - SNT (for HF equipped aircraft only)

2. Aircraft with ONLY SHORT RANGE navigation equipment

ROUTES Europe to/from Iceland

1. Minimum acceptable operational navigation equipment:
 - VOR/DME and ADF
2. Approved SPECIAL ROUTES:
 - FLS - UN623 - VALDI - G3 - MY - ING - KEF
 - SUM - UM125 - GONUT - G11 - MY - G3 - ING - KEF

Note: The above Special Routes should also be considered when partial loss of long range navigation capacity occurs prior to take-off or prior to entry into MNPSA. In this latter case a revised Flight Plan must be filed and ATC clearance obtained.

3. Penetration of MNPS Airspace by NON-MNPS Approved Aircraft

Aircraft not approved for operation in MNPS airspace may be cleared to climb or descend through MNPS airspace provided that:

- a) the climb or descent can be completed within the usable coverage of selected VOR/DMEs and/or within radar coverage of the ATC unit issuing such clearance and
- b) the aircraft is able to maintain direct controller - pilot communication on VHF and
- c) MNPS aircraft operating in that part of the MNPS airspace affected by such climbs or descents are not penalized.

E. SPECIAL ARRANGEMENTS FOR NON-RVSM APPROVED AIRCRAFT

1. Climb/Descent through RVSM Levels

MNPS approved but NON-RVSM approved aircraft may be cleared, subject to traffic, to climb/descend through RVSM levels to cruise at levels above or below RVSM Airspace. The climb/descent should be made at normal rate without stopping at intermediate level(s) and flights **must "Report Leaving" the current level and "Report Reaching" the cleared level.**

2. Exceptional Operation at RVSM Levels

ATC may provide an altitude reservation for an MNPS approved aircraft but NON-RVSM approved to fly at RVSM levels ONLY if the aircraft:

- is on a delivery flight, or
- was RVSM approved but following equipment failure is being returned to its base, or
- is on a mercy or humanitarian flight.

Such an operation requires that the OAC be contacted by telephone not more than 12 hours and not less than 4 hours prior to the departure time to obtain an altitude reservation. This approval and flight level are to be included in Item 18 of the ICAO Flight Plan.

Note that the granting of an altitude reservation does **not** constitute an Oceanic Clearance and the service will **not** be provided to a/c that are **not** approved for MNPS operations. Written justification for the request must be submitted upon completion of the Flight Plan to the NAT Central Monitoring Agency (CMA). Any suspected misuse of the exceptions rule above will be subject to follow-up action by the State of Registry or State of the Operator as applicable.

3. RTF phraseology and Flight Planning

Pilots are reminded to comply with the requirement to state "Negative RVSM" on first contact with ATC when flying a non RVSM approved aircraft in RVSM airspace. Additionally operators have to ensure that the current RVSM status of the flight is accurately updated prior to departure by the use of Change Message.

NAT ORGANIZED TRACK SYSTEM (NAT OTS)

General

As a result of passenger demand, time zone differences and airport noise restrictions, much of the North Atlantic (NAT) air traffic contributes to two major alternating flows: a westbound flow departing Europe in the morning, and an eastbound flow departing North America in the evening. The effect of these flows is to concentrate most of the traffic unidirectionally, with peak westbound traffic crossing the 30W longitude between 1130 UTC and 1900 UTC and peak eastbound traffic crossing the 30W longitude between 0100 UTC and 0800 UTC.

Due to the constraints of large horizontal separation criteria and a limited economical height band (FL310–400) the airspace is congested at peak hours. In order to provide the best service to the bulk of the traffic, a system of organised tracks is constructed to accommodate as many flights as possible within the major flows on or close to their minimum time tracks and altitude profiles. Due to the energetic nature of the NAT weather patterns, including the presence of jet streams, consecutive eastbound and westbound minimum time tracks are seldom identical. The creation of a different organised track system is therefore necessary for each of the major flows. Separate Organised Track Structures (OTS) are published each day for eastbound and westbound flows.

It should be appreciated, however, that use of OTS tracks is not mandatory. Currently about half of NAT flights utilise the OTS. Aircraft may fly on random routes which remain clear of the OTS or may fly on any route that joins or leaves an outer track of the OTS. There is also nothing to prevent an operator from planning a route which crosses the OTS. However, in this case, operators must be aware that whilst ATC will make every effort to clear random traffic across the OTS at published levels, re-routes or significant changes in flight level from those planned are very likely to be necessary during most of the OTS traffic periods.

Over the high seas, the NAT Region is primarily Class A airspace (at and above FL55), in which Instrument Flight Rules (IFR) apply at all times. Throughout the NAT Region, below FL410, 1000 feet separation is applied. However, airspace utilisation is under continual review, and within the MNPS portion of NAT airspace, in addition to the strategic and tactical use of 'opposite direction' flight levels during peak flow periods the Mach Number Technique is applied.

Organized Tracks are developed and published for sub-sonic traffic. The daytime structure (Westbound traffic) is published by Shanwick, the nighttime structure (Eastbound traffic) by Gander. To enable oceanic planners to take into consideration the operators preferred route in the construction of the OTS all NAT operators should provide, by AFTN, their proposed flights and optimum tracks. The Preferred Route Message (PRM) should be received by Shanwick (EGGXZOZX) copy Gander (CZQZOZX) no later than 1000 UTC for the following nighttime OTS and by Gander copy Shanwick no later than 1900 UTC for the following daytime OTS.

1.1 Flight Planning on OTS

- a) NAT Track Structure Messages are identified by a 3-digit Track Message Identification number (TMI) appearing at the end of the Track Message. This number relates to the day of the year (no reference to month). Any subsequent NAT track amendment(s) on a given day will carry a successive alpha number, i.e. TMI33B would reflect the 2nd amendment of the TMI for the 33rd day of the year. **Ensuring that the flight is planned on the correct track of the day is essential.** Crews should also be given copy of the track message(s) at time of briefing.
 - b) Flight levels to be used according to the Flight Level Allocation Scheme (FLAS):
 - FL430** - May be flight planned for both East- and Westbound NON-RVSM certified aircraft
 - FL410** - Eastbound FL
 - FL320, 340, 360, 380, 400** - Westbound FL (except within Eastbound OTS)
 - FL310, 330, 350, 370, 390** - Eastbound FL (except within Westbound OTS)
 - FL300 and below** - Even FLs westbound ; Odd FLs eastbound
1. To accommodate significant single direction demand during OTS times, OACCs may exchange Flight Levels on a tactical basis. This allows additional profiles for main direction flow.
 2. During OTS times, aircraft intending to use the OTS may Flight Plan levels which are allocated to the published OTS. Additionally, to accommodate demand:
 - During the eastbound OTS, eastbound non-OTS aircraft may Flight Plan at FL360 or FL380
 - During the westbound OTS, westbound non-OTS aircraft may Flight Plan at FL310 or FL330
 3. Unless suitable eastbound Tracks exist, during the eastbound OTS times , eastbound traffic originating in New York OACC, planned to enter Shanwick OACC, is recommended to Flight Plan as follows:
 - FL310 or FL360 and restrict routing to landfall BEDRA or south
 - FL340 or FL380 and restrict routing to landfall either: BEDRA or south, or to remain south of the OTS, whichever is further south
 4. During the westbound OTS, random westbound aircraft, flight planned to enter Shanwick via Scottish airspace and routing at, or north of PRAWN, should not flight plan at FL340. FL340 is reserved for flights between Reykjavik and Gander OACCs.

1.2 Random Flight Planning

- a) At or South of 70N
The route and estimates should be given for:
 - the last domestic reporting point prior to Oceanic Entry Point;
 - the OCA boundary entry and exit point (only required by the Gander, Shanwick, New York and Santa Maria OACs);
 - significant points formed by intersection of half or whole degrees of latitude with meridians spaced at intervals of 10 degrees of longitude from the (Greenwich) Zero degree up to 70W;
 - the first domestic reporting point after ocean exit.The requested Mach Number and FL should be specified at:
 - either the last domestic reporting point prior to Oceanic Entry Point or the OCA boundary and
 - at each point at which a change of Mach Number or Flight Level is requested must be specified and followed in each case by the next significant point.
- b) North of 70N
Same as above, except that the route should be specified in terms of significant points formed by the intersection of latitude expressed in degrees and minutes with longitude spaced at intervals of 20 degrees from the Greenwich Zero degree up to 60W.
- c) Generally North or Southbound Direction
Same as a) above, except that the route should be specified in terms of significant points formed by the intersection of whole degrees of longitude with latitude spaced at 5 degrees intervals from 20N to 90N.

MACH NUMBER TECHNIQUE

The Mach Number Technique is based on the True Mach No. The Oceanic Clearance includes the assigned Mach No. which is to be maintained. It is therefore necessary that the desired Mach No. be included in the NAT Oceanic Airspace Flight Plan. ATC uses Mach No. together with pilot position reports to calculate estimated times for significant points along track. These times provide the basis for longitudinal separation between aircraft and for coordination with adjacent ATC units.

In the application of Mach Number Technique, **pilots must adhere strictly to their assigned True Mach Numbers including step climbs or descents** unless a specific re-clearance is obtained from the appropriate ATC unit. If an immediate temporary change in the Mach Number is essential e.g. due to turbulence etc., ATC must be notified as soon as possible.

After leaving Oceanic Airspace pilots must maintain their assigned Mach Number in domestic controlled airspace unless and until the appropriate ATC unit authorizes a change.

ADHERENCE TO ATC APPROVED ROUTE

If an aircraft has inadvertently deviated from the route specified in its ATC clearance, it shall take action to regain such route within 100 NM from the position at which the deviation was observed.

NORTH ATLANTIC COMMUNICATION PROCEDURES

- Most NAT air/ground communications are conducted on single side-band HF frequencies.
 - When using HF communications **and even when using ADS and/or CPDLC**, pilots should maintain a listening watch on the assigned frequency, unless SELCAL is fitted, in which case they should ensure the following sequence of actions:
 - provision of the SELCAL code in the flight plan; (any subsequent change of aircraft for a flight will require passing the new SELCAL information to the OAC)
 - checking the operation of the SELCAL equipment, at or prior to entry into Oceanic airspace, with the appropriate aeradio station. (This SELCAL check must be completed prior to commencing SELCAL watch);
 - maintenance thereafter of a SELCAL watch (even in areas of the region where VHF coverage is available and used for air/ground communications).
 - When initiating contact with an aeradio station the pilot should state the HF frequency in use (i.e. "... TWA 100 on 5649 ...etc.").
 - Aircraft are exempted from carrying HF equipment when flying: STN / BEN - RATSU - ALDAN - KEF (subject to prior coordination with Scottish/Shanwick) and KEF - 65N 30W - DA - SF (between FL 80 and FL 195).
 - In the event of HF communication failure, when so equipped, an aircraft should use Satellite Voice Communications to contact the responsible aeradio station via special telephone numbers/short codes (shown on chart proper). If not equipped with SATCOM then the pilot should attempt to use VHF and request relay of position reports via another aircraft. For this purpose the air to air VHF frequency 123.45 MHz may be used. If necessary the initial contact with the other aircraft may be made on 121.5 MHz.
 - Controller-Pilot Data Link Communications (CPDLC) and Automatic Dependent Surveillance (ADS):**
 - FANS 1/A CPDLC and ADS services are offered within Gander, Shanwick, Reykjavik, Santa Maria, Bodo (exc. CPDLC) and New York OCAs.
 - FMC Waypoint Reporting is offered within Gander, Shanwick, Reykjavik, Santa Maria and Bodo OCAs.
 - The use of CPDLC and/or ADS does not alleviate any of the equipment requirements mandated by the North Atlantic MNPS Airspace Manual - Edition 2008.
 - HF SELCAL watch is still required and specific procedures are in place governing the conduct of these data link operations.
 - Guidance detailing flight crew procedures may be found in [Guidance Material for ATS Data Link Services in North Atlantic Airspace](#) version 15.0 May 2007. This is a guidance and not a regulatory document.
- Regulatory material relating to aircraft operations is contained within the relevant ICAO Annexes, PANS ATM (ICAO Doc 4444), Regional Supplementary Procedures (ICAO Doc 7030/4), State Regulations, State AIPs and current NOTAM.

COMMON PROCEDURES FOR RADIO COMMUNICATION FAILURE

The following procedures are intended to provide general guidance for North Atlantic (NAT) aircraft experiencing a communication failure. These procedures are intended to complement and not supersede state procedures/regulations. It is not possible to provide guidance for all situations associated with a communications failure.

General

- The pilot of an aircraft experiencing a two-way ATS communications failure should operate the SSR transponder on Mode A/C, Code 7600.
- When so equipped, an aircraft should use Satellite Voice Communications to contact the responsible aeradio station via special telephone numbers/short codes (shown on chart proper).
- If the aircraft is not equipped with SATCOM then the pilot should attempt to use VHF to contact any (other) ATC facility or another aircraft, inform them of the difficulty and request that they relay information to the ATC facility with which communications are intended.
- The inter-pilot air-to-air VHF frequency, 123.45 MHz, may be used to relay position reports via another aircraft.
- In view of the traffic density in the NAT Region, pilots of aircraft experiencing a two way ATS communications failure should broadcast regular position reports on the inter-pilot frequency 123.45 MHz until such time as communications are re-established.
- Due to the potential length of time in Oceanic Airspace, it is strongly recommended that a pilot experiencing communications failure whilst still in European domestic airspace does not enter the Shanwick Oceanic Control Area.

Communications failure prior to entering NAT Oceanic Airspace

- If operating **with** a received and acknowledged Oceanic Clearance, the pilot shall enter Oceanic Airspace at the cleared Oceanic Entry Point, level and speed and proceed in accordance with the received and acknowledged Oceanic Clearance. Any level or speed changes required to comply with the Oceanic Clearance shall be completed within the vicinity of the Oceanic Entry Point.
- If operating **without** a received and acknowledged Oceanic Clearance, the pilot shall enter Oceanic Airspace at the first Oceanic Entry Point, level and speed, as contained in the filed flight plan and proceed via the filed flight plan route to landfall. That first oceanic level and speed shall be maintained to landfall.

Communications failure prior to exiting NAT Oceanic Airspace

- Cleared on filed flight plan route:

The pilot shall proceed in accordance with the last received and acknowledged Oceanic Clearance, including level and speed, to the last specified oceanic route point, normally landfall, then continue on the filed flight plan route. The pilot shall maintain the last assigned oceanic level and speed to landfall. After passing the last specified oceanic route point, the pilot shall conform with the relevant State procedures/regulations.
- Cleared on other than flight plan route:

The pilot shall proceed in accordance with the last received and acknowledged Oceanic Clearance, including level and speed, to the last specified oceanic route point, normally landfall. After passing this point, the pilot shall conform with the relevant State procedures/regulations and rejoin the filed flight plan route by proceeding, via the published ATS route structure where possible, to the next significant point ahead as contained in the filed flight plan.

Summary of Operational Procedures Required following Loss of Air/Ground ATS Communications in the NAT Region

- Equipment Failure before receiving an Oceanic Clearance:
Divert or fly the Flight Plan route, speed and initial planned oceanic level to landfall.
- Blackout encountered (in an HF comms Domestic ATC environment) before receiving an Oceanic Clearance:
Continue at Domestic cleared level and follow flight planned route and speed to landfall
- Equipment Failure or Blackout after receiving an Oceanic Clearance:
Fly that clearance to landfall.

NORTH ATLANTIC CROSSING CLEARANCE PROCEDURES AND FREQUENCIES

General

Oceanic Clearances are obtained via:

- VHF clearance delivery frequencies when in coverage;
- HF to the OAC through the appropriate radio station (if possible at least 40 minutes before the boundary/entry estimate);
- a request via domestic or other ATC agencies;
- Data link, when arrangements have been made by aircraft operators to request/receive clearances using ACARS equipment (only possible from participating OCA centers with the necessary means of automation);
- Prior departures from airports close to oceanic boundaries.

Refer to specific Center procedures in subsequent paragraphs.

Aircraft encountering enroute to the NAT oceanic airspace a critical inflight equipment failure must advise ATC at initial contact when requesting Oceanic Clearance.

Any Estimate found to be in error by 3 minutes or more for the Oceanic Boundary originally given at the time of initial contact with ATC/OCA must be passed on to ATC.

Should the Oceanic Clearance original flight level differ from the current flight level, a domestic reclearance must be obtained to ensure that the flight is in compliance with the Oceanic Clearance when entering Oceanic Airspace. Except for Shanwick OCA, flights may enter other NAT OCAs whilst pilots are awaiting receipt of a delayed Oceanic Clearance. Pilots should always endeavour to obtain Oceanic Clearance prior to entering these other NAT OCAs; however if any difficulty is encountered the pilot should **not** hold while awaiting Clearance unless so directed by ATC.

Abbreviated Clearances

An abbreviated clearance is only issued when clearing an aircraft to fly along the whole length of an organized track. In all other circumstances full details of the cleared route will be given. A pilot-in-command shall, if at any time in doubt, request a detailed description of the cleared route from ATC.

The flight crew will confirm that they are in possession of the current NAT Track Structure Message by using the Track Message Identification (TMI) number in the read back of the Oceanic Clearance:

"ACA865 is cleared to Toronto via Track Bravo 283 from Mimku (56 N 010 W), maintain Flight Level Three Five Zero, Mach Decimal Eight Zero".

If the TMI number is included in the read back there is no requirement to read back the NAT Track coordinates even if the cleared NAT track is not the one which was originally requested. If any doubt exists as to the TMI or the NAT Track coordinates, request complete track coordinates from OAC. In such event OAC will request a full read back of those coordinates. Aircraft cleared on random routings must read back the full route coordinates from the Ocean Entry Point to the Exit Point.

OCEANIC AREA CONTROL CENTERS SPECIFIC PROCEDURES

SHANWICK OCA

Oceanic Clearance (Westbound): Aircraft operating within the UK FIR/UIR and the northern part of the France UIR should request Oceanic Clearance from "Shanwick Oceanic" on VHF (VHF coverage depicted on chart). UK departures are to request clearance as soon as possible after departure. Aircraft overflying the UK FIR/UIR and the northern part of the France UIR are to request clearance when they consider that they are within the specified VHF coverage. Aircraft other than Jet should request clearance at least 40 minutes before the ETA for the OCA entry point.

Note: Flights routing via RATSU (61N 010W) do not require OCA clearance from Shanwick OCA. Therefore, aircraft intending to route via RATSU (61N 010W) must **not** contact Shanwick Clearance Delivery.

Aircraft unable to contact "Shanwick Oceanic" on VHF, should request clearance on NAT HF frequencies at least 40 minutes before the ETA for the Oceanic Boundary and thereafter maintain a SELCAL watch for receipt of the Oceanic Clearance.

Aircraft Communication Addressing and Reporting System (ACARS) equipped aircraft may request and receive their Westbound Oceanic clearance via datalink, utilizing the Oceanic Route Clearance Authorization system (ORCA), for entry points on the Shanwick eastern boundary (from ATSIX to PASAS) without the requirement to contact Shanwick on RTF. Approval for the use of this system will be given by the Head of Oceanic Engineering at Shanwick Oceanic. This system should not be used by aircraft within 30 minutes of the Shanwick boundary ; VHF or HF RTF should be used.

Requests for Oceanic Clearance shall include:

- a) Callsign
- b) OCA entry point and ETA
- c) Requested MACH number and Flight Level
- d) Any change to Flight Plan affecting OCA
- e) The highest acceptable Flight Level which can be maintained at the OCA entry point

Maintain a listening watch for receipt of the Oceanic Clearance. If successful Selcal check has been completed with the appropriate aeradio station, a Selcal watch should be maintained. Unless advised otherwise, use the following primary frequencies:

VHF: **123.95** MHz for aircraft registered in states West of 030° West.

127.65 MHz for aircraft registered in states East of 030° West.

HF: Family A for aircraft flying the Southern NAT Routes.

Family B for aircraft registered in states West of 030° West flying the Central and Northern NAT Routes.

Family C for aircraft registered in states East of 030° West flying the Central and Northern NAT Routes.

Family D for ALL aircraft flying the Central and Northern NAT Routes.

Family F may be assigned to aircraft flying the Central NAT Routes.

While in communication with Shanwick for Oceanic Clearance, aircraft must also maintain communication with the ATC authority for the airspace within which they are operating. Aircraft unable to contact Shanwick on VHF or on NARTEL HF should request the ATC authority for the airspace in which they are operating to relay their request for Oceanic Clearance to Shanwick.

Due to the short flying times between the Scottish and Irish aerodromes and the Shanwick OCA boundary, pilots may be required to request and receive an Oceanic Clearance prior to departure.

Shannon ACC will request Oceanic Clearance from Shanwick Oceanic for NAT Flights departing Irish airports excluding Dublin, Weston and Casement (Baldonnell) airports, planned to enter NAT airspace between AGORI and BEDRA (inclusive), and cause the clearance to be relayed to the flight prior to departure. Shannon ACC should be contacted 45 minutes before ETD for clearance request. Pilots should contact Shannon ACC at least 15 minutes before start up, to obtain Oceanic Clearance.

Departures flight planned to enter NAT airspace north of GOMUP, or at OMOKO or LASNO, request clearance when airborne.

Aircraft departing Dublin and Weston airports planned to enter NAT airspace north of BEDRA should request Oceanic Clearance when airborne using ORCA Datalink or Shanwick Radio 127.9 MHz.

At other airports contact local ATS unit 45 minutes before ETD for Oceanic Clearance.

- departures from Belfast Aldergrove, Belfast/City, Londonderry/Eglinton, Glasgow and Prestwick if flight planned to enter Shanwick at GOMUP, oceanic clearance required prior to departure. If flight planned to enter Shanwick at all other entry points, request when airborne. Non-jet Departures request oceanic clearance when airborne.

- departures from other Scottish FIR aerodromes (EGP*, EGQ*, EGE*) if the elapsed time to the Shanwick entry point is less than 30 minutes, oceanic clearance required prior to departure.

If oceanic clearance is not required prior to departure, pilots are reminded that they should request clearance between 90 and 30 minutes prior to the Shanwick boundary. At civil aerodromes where ATC is provided, request clearance directly by telephone to Shanwick or ask local ATC to relay the request. At Mil aerodromes and civil aerodromes where ATC is **NOT** provided, request clearance by using ORCA or HF RTF. Pilots departing from Glasgow and Prestwick should contact Shanwick directly using the appropriate VHF frequency.

Pilots are reminded that the Oceanic Clearance (including level allocation) is valid only from the OCA Entry Point. It is the responsibility of the pilot to obtain from the appropriate ATC authority any necessary clearance or re-clearance to enable him to comply with the Oceanic Clearance, especially that the flight crosses the Shanwick OCA boundary at the Flight Level contained in the clearance, or when necessary to remain clear of Oceanic Airspace whilst awaiting Oceanic Clearance.

Flights entering Shanwick directly from the Madrid FIR/UIR should request the Oceanic Clearance on HF at least 40 minutes before the ETA for 45N. If unable on HF, request the Oceanic Clearance through the Madrid Domestic ATC frequency.

Example of a Shanwick Westbound NAT Track Message:

(NAT-1/3 TRACKS FLS 310/390 INCLUSIVE

APR 01/1130Z TO APR 01/1900Z

PART ONE OF THREE PARTS-

A ATSIX 62/20 63/30 64/40 64/50 62/60 GRIBS JELCO

EAST LVLS NIL

WEST LVLS 310 320 330 350 360 370

EUR RTS WEST AKIVO

NAR N512C N514C N516H N518C N522C-

REMARKS :

1. TRACK MESSAGE IDENTIFICATION NUMBER IS 092 AND OPERATORS ARE REMINDED TO INCLUDE THE TMI NUMBER AS PART OF THE OCEANIC CLEARANCE READ BACK.
2. EIGHTY PERCENT OF GROSS NAVIGATION ERRORS RESULT FROM POOR COCKPIT PROCEDURES. ALWAYS CARRY OUT PROPER WAY POINT CHECKS.)

SHANNON OCEANIC TRANSITION AREA (SOTA), NORTHERN OCEANIC TRANSITION AREA (NOTA) & UTA

The SOTA/NOTA are included in the MNPS and RVSM airspace. ATC service in the SOTA/NOTA is provided by Shannon ACC via VHF. If unable on VHF use HF and call sign "Shannon Control". Westbound aircraft should request Oceanic Clearance from Shanwick Oceanic on the appropriate frequency. The domestic Anchor points OSBOX, ELPIN, ODLUM, BABAN, BURAK, DOLIP, GIPER, KENUK and GUNSO associated with the OCA entry points are promulgated in the Westbound NAT OTS signal.

Westbound NAT random flights and NAT OTS flights operating in the SOTA, designated as MET Reporting Flights are to treat 8W as a mid-point and 15W as a designated reporting point. The 8W and 15W MET reports are to be given with the 15W report to Shanwick on HF.

Eastbound flights are not required to make MET reports when flying in the SOTA.

Flight Plans required for the NOTA should be addressed to the IFPS addresses EBBDZMFP and LFPYZMFP.

Flights requesting a change to their Oceanic Clearance must: a) If East of 10°W make their request to Shanwick on VHF/HF or CPDLC otherwise b) If West of 10°W make their request to Shannon ACC on VHF.

BREST OCEANIC TRANSITION AREA (BOTA)

The BOTA is included in the MNPS and RVSM Airspace. ATC service in BOTA is provided by Brest ATC. Eastbound flights may be given more direct routes by Brest UAC after passing 0845W meridian. The request for the Oceanic Clearance may be relayed by Brest ATC when unable to contact Shanwick on VHF or HF.

REYKJAVIK OCA

Flights entering Reykjavik Control Area shall contact Iceland Radio with their Oceanic Clearance Request prior to entering Reykjavik OCA :

- From Edmonton/Murmansk Control Areas on HF frequencies;
- From Scottish and Stavanger Areas on VHF **127.85** or HF frequencies. The Oceanic Clearance is provided by Reykjavik OACC to Iceland Radio after coordination with Scottish or Stavanger ACCs and should be available to flights within 10 to 30 minutes prior to entering. Maintain listening watch on Scottish or Stavanger Control frequencies until instructed to contact Reykjavik Control. Aircrews that are unable to get their Oceanic Clearance prior to entry should reconfirm entry clearance with their current ATS unit (Scottish or Stavanger). They are expected to enter Reykjavik OCA at the Flight Level cleared by Scottish or Stavanger and continue attempts to obtain the Oceanic Clearance from Iceland Radio.

All routine position reports, MET or company messages shall be delivered through Iceland Radio on voice or via ADS. Aircrews are reminded to maintain listening watch when in contact with Reykjavik Control and while transmitting reports to Iceland Radio. Aircraft unable to make position reports on HF or VHF are expected to use SATCOM telephone (short code 42 51 05) , if so equipped.

BODO OCA

For aircraft transiting Bodo OCA westbound the following applies:

To obtain an Oceanic Clearance the Pilot has to call either BODO OCEANIC CONTROL on VHF **127.72** not later than 10 minutes prior entering Bodo OCA or Bodo Radio on NAT Family D frequencies not later than 30 minutes prior entering. SELCAL check is compulsory.

SANTA MARIA OCA

All Operators should request their Oceanic Clearance from Santa Maria OACC through Santa Maria Radio, on appropriate HF frequencies or on VHF 132.07 MHz, at least **40** minutes before the ETO for the OCA boundary. For flights departing from Azores all Operators should request their Oceanic Clearance from Santa Maria OACC through Santa Maria Radio, on appropriate HF frequencies or on VHF 127.90 MHz, **20** minutes before estimated departure from Azores. Pilots shall inform Santa Maria OACC whenever ETD differs by more than **6** minutes from the previously given ETD.

When entering Santa Maria OCA from the Lisbon/Madrid FIRs/UIRs and if unable to raise Santa Maria HF, request the domestic ATC to contact Santa Maria for relay of request.

The Eastern Anchor points of the Iberian Peninsula Tracks are STG VORDME, and/or DIRMA and/or BUSEN.

Tracks may be established using either one or two or all of these Anchor points. Alternatively Main Tracks may be tied to Santiago or Espichel with a tributary track from DIRMA joining one of the main tracks at the Eastern boundary of the Santa Maria OCA. Even when there is no tributary track from DIRMA pilots may flight plan via DIRMA to join a promulgated track at the OCA boundary. Regardless of the type of Oceanic Clearance received a full read back of the Oceanic Clearance is required.

GANDER OCA

Unless otherwise advised by ATC the following Oceanic Clearance Delivery (OCD) procedures are in effect daily from 2330/0730 UTC for Eastbound Flights (including datalink equipped aircraft) operating above FL 280 that enter the Gander Domestic FIR/CTA. Clearance Delivery frequencies will be published daily in the remarks section on the Eastbound NAT Track Message. Pilots are to contact "Gander Clearance Delivery" on the frequency for the track/route as per the NAT Track Message to which the aircraft is proceeding. Contact Clearance Delivery within 200 NM of the specified Clearance Delivery frequency location. If contact cannot be established, advise ATC on the assigned sector control frequency. The following frequencies and frequency locations will normally be used:

135.45 - NATASHQUAN (CYNA) N50 11 W061 47)

128.45 - ST. PIERRE (N46 45 W056 10)

128.70 - CHURCHILL FALLS (CZUM) (N53 35 W064 14)

135.05 - STEPHENVILLE (N48 34 W058 40)

119.42 - SYDNEY (N46 09 W060 03)

For operators that do not receive the NAT Track Message, pilots are to contact "Gander Clearance Delivery" on one of the above frequencies when within 200 NM of the frequency location. If contact cannot be established advise ATC on the assigned sector control frequency.

Flights intending to receive an unsolicited clearance or that are not capable of sending an RCL via data link Oceanic Clearance Delivery (OCD) should include 'AGCS' in field 18 of the ICAO Flight Plan. Flights not equipped to send an Request for Clearance (RCL), but equipped to receive a data link oceanic clearance should include 'AGCS' in field 18 of the ICAO Flight Plan and expect to receive their data link oceanic clearances automatically. The RCL should be sent when or soon after the flight is 90 minutes from the estimated time for the OEP. A significant delay or complete failure to send the RCL will result in the flight not receiving a data link clearance. The oceanic clearance will then have to be requested via voice. Departures with less than 45 minutes flying time from the OEP should request clearance 10 minutes prior to startup. Departures with 45-70 minutes flying time from the OEP should request clearance as soon as practicable after departure. An accurate time for the OEP must be included in the RCL. The call sign in the RCL must match the aircraft identification as contained in the ICAO Flight Plan, or the RCL will be rejected. Under some circumstances, a data link oceanic clearance may be received prior to the RCL being sent. The following message indicates that the RCL has been received:

IF NO CLEARANCE RECEIVED WITHIN 30 MINUTES OF OCEANIC ENTRY POINT REVERT TO VOICE PROCEDURES END OF MESSAGE.

If this message is not received within 5 minutes of sending the RCL, the crew should request the clearance via voice.

If the call sign in the data link oceanic clearance is not correct, the clearance is not valid and the crew must request the oceanic clearance via voice.

If the flight is cleared to operate on a NAT track, the crew must confirm that the route coordinates match those published in the current NAT track message. If there is a discrepancy, the crew should verify that they have the current NAT track message. If there is still a discrepancy, the clearance is not valid and the crew should request the oceanic clearance via voice. The Flight Level contained in the data link oceanic clearance is the "cleared Oceanic Flight Level" for the purpose of complying with the lost communication procedures. The data link oceanic clearance may include a reroute to an oceanic entry point which is different from the current cleared route and/or may specify an oceanic entry point which is different from the flight plan. In all cases, flights should continue to operate in accordance with the current cleared route until a verbal reclearance is received from ATC. If the clearance does not contain the line **END OF MESSAGE**, it is possible that the clearance was not complete. Crews must verify the clearance via voice.

Amendments to the data link oceanic clearance should be requested via voice. Flights equipped to send an RCL should send one before requesting the amendment via voice. Amendments to the data link oceanic clearance should be requested by contacting Gander Clearance Delivery between the hours of 2330Z-0730Z (2230Z-0630Z Daylight Standard Time), when within 200NM of a Gander Clearance Delivery frequency. Outside of those hours or when the flight will not pass within 200NM of a Gander Clearance Delivery frequency, crews should contact the current controller when the flight is no more than 90 minutes from the OEP.

When the data link oceanic clearance is received, flights equipped to send a Clearance Acknowledgement (CLA) should do so. Flights not equipped to send a CLA must verify the data link oceanic clearance via voice. The following message indicates that the data link oceanic clearance process is complete and that no further action is required by the crew to acknowledge or verify the oceanic clearance:

CLA RECEIVED CLEARANCE CONFIRMED END OF MESSAGE

If this message is not received within 5 minutes of sending the CLA, then the data link oceanic clearance must be verified via voice.

If a CLA error message is received, the data link oceanic clearance must be verified via voice.

If a data link oceanic clearance must be verified via voice, contact Gander Clearance Delivery between the hours of 2330Z-0730Z (2230Z-0630Z Daylight Standard Time), when within 200NM of a Gander Clearance Delivery frequency. Outside of those hours or when the flight will not pass within 200NM of a Gander Clearance Delivery frequency, crews should contact the current controller when the flight is no more than 90 minutes from the OEP. When verifying a data link oceanic clearance via voice the following information must be provided:

ETA for the OEP: The NAT track identifier (if operating on a NAT track); The cleared oceanic route (if operating on a random route); The cleared oceanic Flight Level and; The cleared Mach number.

If the data link oceanic clearance has been received, crews must advise the current controller via voice if the ETA for the OEP changes by 3 minutes or more. This may result in ATC providing a reclearance. The OEP estimate used by ATC when producing the oceanic clearance is located next to the OEP in the data link clearance message. This time should be used when considering whether a time revision notification to ATC is necessary. Crews should be aware that this time may not coincide with the OEP estimate they sent in the RCL.

Example of a Data Link Oceanic Clearance (on a NAT track):

CLX 1259 060224 CYQX CLRNC 026
ABC123 CLRD TO LFPG VIA CARPE
NAT W
CARPE 54N050W 56N040W 57N030W 57N020W NIBOG TADEX
FM CARPE EXPECT F330 M082
END OF MESSAGE

Example of a Gander Eastbound NAT Track Message:

(NAT-TRACKS FLS 320/400 INCLUSIVE
FEB 23/0100Z TO FEB 23/0800Z
U CYMON DENDU 51/50 52/40 54/30 55/20 RESNO ODLUM
EAST LVLS 320 330 340 350 360 370 380 390 400
WEST LVLS NIL
EUR RTS EAST NIL
NAR N95B N97B N99A-
REMARKS :

1. TMI NUMBER IS 054 AND OPERATORS ARE REMINDED TO INCLUDE THE TRACK MESSAGE IDENTIFICATION NUMBER AS PART OF THE OCEANIC CLEARANCE READ BACK.
2. 80 PERCENT OF NAVIGATIONAL ERRORS RESULT FROM POOR COCKPIT PROCEDURES. ALWAYS CARRY OUT PROPER WAYPOINT CHECKS.
3. NAT EASTBOUND FLIGHT PLANNING RESTRICTIONS IN FORCE REFER TO EGGX G0344/04.)

Communications

- (a) All flights operating in the Gander OCA should report on international air-to-ground frequencies.
- (b) In addition to maintaining a listening watch on the appropriate enroute frequency, flights are to establish and maintain communications with Gander, Moncton or Montreal (Iqaluit) as soon as possible in accordance with the following. The first two frequencies are primary:

- (i) When at or above FL 290 and within 200 NM of:
- (A) Torbay (YYT) VORDME - **132.05, 134.70** for coastal fixes BOBTU to YYT;
 - (B) Gander (YQX) VORTAC - **133.90, 125.90, 132.60** for coastal fixes CYMON to VIXUN;
 - (C) St. Anthony (YAY) VORDME - **134.30, 128.60** for coastal fixes DOTTY to CARPE;
 - (D) Goose Bay (YYR) VORDME - **133.42, 132.40** for coastal fixes OYSTR and SCROD;
 - (E) Hopedale (HO) NDB - **128.32** for coastal fixes LOACH to MOATT;
 - (F) Wabush (YWK) VORDME - **134.00**;
 - (G) Sept-Iles (YZV) VOR / (UZV) TACAN - **126.32**;
 - (H) Grindstone (YGR) VORDME - **132.80**;
 - (I) Sydney (YQY) VORTAC - **132.75, 133.70, 133.30 or 125.25**;
- (ii) When below FL 280 and within 150 NM of:
- (A) Torbay (YYT) VORDME - **133.15** for coastal fixes BOBTU to VIXUN;
 - (B) Gander (YQX) VORTAC - **132.10** for coastal fixes CYMON to YQX;
 - (C) St. Anthony (YAY) VORDME - **133.00** for coastal fixes DOTTY to CARPE;
 - (D) Hopedale (HO) NDB - **135.40** for coastal fixes LOACH to MOATT;
 - (E) St. Pierre (SP) NDB - **134.90**;
 - (F) Stephenville (YJT) VORDME - **132.30**;
 - (G) Goose Bay (YYR) VORDME - **120.40** for coastal fixes OYSTR and SCROD.

NEW YORK OCA

When a flight enters New York Oceanic Airspace direct from New York Domestic Airspace, expect to receive the Oceanic Clearance on the last Radar Sector Frequency within the Domestic Area, otherwise New York Domestic will advise the ARINC frequency to be used for obtention of the Oceanic Clearance. The Oceanic Clearance must be read back.

ARINC will advise of the Oceanic frequency to maintain contact with.

When entering New York Oceanic Airspace from south FIRs, e.g. Miami, CAR, SAM, and the Pilot has received the three clearance elements, i.e. complete route, altitude and Mach Number, even if these elements are not issued at the same time, there is no request necessary for an Oceanic Clearance.

If the pilot has not received all three Clearance elements, then a full Oceanic Clearance should be obtained prior to entering MNPS Airspace. If any difficulty is encountered obtaining the elements of the Oceanic Clearance, the pilot **should not hold** while awaiting a Clearance unless so instructed by ATC. The pilot should proceed on the cleared route into MNPS Airspace and continue to request the Clearance elements needed.

POSITION REPORTING PROCEDURES

- 1. Unless otherwise required by ATS , position reports for flights on routes not defined by designated reporting points shall be made at the significant points listed in the flight plan.
- 2. If the Estimated Time for the "next position", as last reported to ATC has changed by 3 minutes or more, a revised Estimate must be transmitted to the ATC unit concerned as soon as possible.
- 3. Position reports for aircraft operating on tracks through successive points on each boundary should also be made to the ACC serving the adjacent OCA (In practice e.g. " Shanwick copy Santa Maria ") .

EAST / WESTBOUND:

South of Latitude 70°N: at 10° Longitude intervals (between 5°W and 65°W)
North of Latitude 70°N: at 20° Longitude intervals (between 10°W and 50°W)

In requiring aircraft to report their position at intermediate points, ATC is guided by the requirement to have positional information at approximately hourly intervals and also by the need to cater for varying types of aircraft and varying traffic and MET conditions.

NORTH / SOUTHBOUND:

ATC may require any flight operating in a North/South direction to report its position at any intermediate parallel of latitude when deemed necessary.

STANDARD AIR-GROUND MESSAGE TYPES AND FORMATS

Aircraft entering, operating within, or leaving the Oceanic Control Areas of Gander, New York, Bodo, Reykjavik, Santa Maria and Shanwick will transmit the elements of information in position reports to the appropriate Oceanic Control.

FOR CONTENT AND DATA SEQUENCE REFER TO CHART/ 1 PANEL 4 OR CHART/ 2 PANEL 6.

Notes:

- 1. If the estimated time for the next position, as last reported to ATC , has changed by 3 minutes or more, a revised estimate must be transmitted to the ATS unit concerned as soon as possible.
- 2. A "When Able Higher" (WAH) report must be provided by all flights entering New York MNPSA and Santa Maria OCA. WAH reports on entering other NAT OCAs is optional but useful and may be requested by any OAC. The WAH report includes the time or location the flight will be ABLE to accept the next higher flight level. More than one level may be quoted if that information is available.
Should an aircraft desire to register a request for one or more future step climbs the word "REQUEST" must be substituted for the word "ABLE" in the report.
It should be noted that ATC acknowledgement of a WAH report (and any included request) is **NOT** a clearance to change altitude.
- 3. **Report immediately on reaching any new cruising level following a reclearance or completing a step climb etc.**

WEATHER REPORTING

All aircraft flying in the Sondrestrom, Reykjavik, Gander Oceanic, Shanwick Oceanic, New York Oceanic and Santa Maria Oceanic Flight Information Regions between North America and Europe in either direction shall make, record and report routine meteorological observations at each designated reporting point and at the intermediate mid-point between such reporting points, except that:

- a) the mid-point observation shall not be the subject of a special report, but will be retained for transmission at the next designated reporting point, and
- b) aircraft cleared on an organized track shall be required to make record and report routine observation ONLY when so designated at the time of receiving Oceanic Clearance.
- c) Pilots flying routes which are partly or wholly off the OTS should include routine MET observations with every prescribed report.

The format to be used for reporting of the additional observations shall be by reference to the latitude (degrees and minutes) and longitude (degrees only) of the intermediate mid-point. It should be recognised that the use of the term "MID" is insufficient for direct input into MET computers.

For example: - Position SWISSAIR 100, 56N 020W, 1305, FL330, Est 56N 030W, 1340, Next 55N 040W, MS56, 220/55, MS60, 230/75 at 56N 015W.

Pilots of aircraft operating in the Shannon Oceanic Transition Area (SOTA) are required to comply with the above MET reporting procedures.

Westbound NAT random flights and NAT OTS flights, designated as MET reporting flights, are to treat W008 as a mid-point and W015 as a designated reporting point. Pilots are to transmit their W015 and W008 MET reports with their W015 position report to Shanwick on HF.

Eastbound flights are not required to make routine MET reports when flying in the SOTA.

When a ground unit establishes an event contract with an aircraft to provide ADS position reports, it may also establish an additional periodic report contract (e.g. with a 30 mins interval). Such ADS periodic reports, unlike event reports, contain wind and temperature data and thereby satisfy the MET authorities requirements. Similarly, "FMC Waypoint position reports" sent via datalink also include wind and temperature data and aircraft participating in such a datalink programme are deemed to meet the MET authorities requirement for the provision of MET data. Nevertheless it must be appreciated that any such automated MET Reports do not include information on any turbulence or any other unusual meteorological phenomena. Any pilot providing position reports via datalink, who encounters turbulence, etc should report this information via voice or if appropriate via a CPDLC free text downlink message.

WEATHER DEVIATION PROCEDURES FOR OCEANIC - CONTROLLED AIRSPACE

The following procedures are intended to provide guidance for deviations around thunderstorms. All possible circumstances cannot be covered. The pilots judgement shall ultimately determine the sequence of actions taken. ATC shall render all possible assistance.

If the aircraft is required to deviate from track to avoid weather and prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time. The pilot shall inform ATC when weather deviation procedures have been terminated.

To indicate that priority is desired the pilot may obtain a rapid response when initiating communication by stating " WEATHER DEVIATION REQUIRED" or by using the urgency call "PAN PAN" .

If a revised ATC clearance cannot be obtained and deviation from track is required the pilot shall take the following actions:

- S if possible, deviate away from organized track or route system
- S establish communications with and alert nearby aircraft, broadcasting at suitable intervals : aircraft identification, flight level, aircraft position (including ATS route designator or the track code) and intentions, on the frequency in use and on frequency 121.5 MHz (or as back-up A/A 123.45 MHz)
- S watch for conflicting traffic both visually and by reference to ACAS
- S turn on all aircraft exterior lights (commensurate with appropriate operating limitations)
- S for deviations of less than 10 NM , aircraft should remain at a level assigned by ATC
- S for deviations of greater than 10 NM , when the aircraft is approximately 10 NM from track, initiate a level change based on the following criteria:

Route centerline/Track	Deviations > 10 NM	Level change
East 000° - 179° magnetic	LEFT of course RIGHT of course	DESCEND 300 ft CLIMB 300 ft
West 180° - 359° magnetic	LEFT of course RIGHT of course	CLIMB 300 ft DESCEND 300 ft

- S when returning to track, be at its assigned flight level, when the aircraft is within approximately 10 NM of centre line, and
- S if contact was not established prior deviating, continue to attempt to contact ATC to obtain a clearance. If contact was established , continue to keep ATC advised of intentions and obtain essential traffic information.

TRANSPONDER OPERATION

Unless otherwise directed by ATC, and except in cases of emergency or radio failure, pilots of aircraft flying in the NAT Region shall operate transponders continuously on Mode A/C, Code 2000 all directions, except that the last assigned Code shall be retained for 30 minutes after entry into NAT airspace.

Aircraft operating within the SOTA have to select Mode A/C, Codes will be allocated by Shannon ATCC.

Reykjavik ATC provides Radar Control service in the southeastern part of its area ; thus transponder codes issued must be retained throughout Reykjavik OCA until advised by ATC.

All aircraft transitioning from Miami Center and San Juan CERAP into the WATRS Area via fixed ATS routes shall remain on their last assigned beacon code.

SELCAL

When using HF communications, pilots should maintain a listening watch on the assigned frequency, unless prior to entry into Oceanic Airspace a SELCAL check has been successfully performed with an appropriate aeradio station.

The SELCAL watch on the assigned radio frequency should be maintained even in NAT areas where VHF coverage is available and used for air/ground communications.

Crews of aircraft equipped with a 12-tone SELCAL must be aware that SELCAL assignment is predicated on the usual geographical area of operation of that aircraft. If the aircraft is subsequently flown in other than the originally specified area, a duplicate SELCAL code situation may exist. Also note that SELCAL code do not transfer to new owner or lessee and in such instances a new SELCAL code must be obtained from the SELCAL Register at KDCAXAAG.

The correct aircraft SELCAL code must be included in the Flight Plan.

Any subsequent change of a/c will require passing the new SELCAL information to the OACs.

5- MINUTE IN TRAIL CLIMB / DESCENT PROCEDURE

A new separation minimum was introduced in the Gander, Reykjavik and Santa Maria OCAs. Utilization of this procedure will enable ATC, under specific conditions, to allow aircraft to climb/descend through the altitude of another aircraft when separated longitudinally by 5 minutes where previously 10 minutes was required.

Note: Following procedure provides provisional guidance only and will be updated as experience is gained with the new application.

Eligible flights for the 5-minute in trail climb/descent procedure must be equipped with a GPS receiver that is approved in accordance with the requirements specified in TSO C-129a or higher, and have filed the letter "G" in field 10 of their ICAO flight plan.

Application of this specific procedure will be transparent to flights that have requested and/or received an altitude change clearance.

Pilots shall advise ATC of any deterioration of navigation performance, including loss of GNSS integrity, as soon as practicable.

Application of the climb/descent procedure is based on the assumption that the last assigned Mach number will be maintained during step climbs or descents, and that in the event this is not feasible, ATC will be informed at the time of the climb/descent request or clearance.

SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES IN OCEANIC AIRSPACE

ICAO DOC 4444, SECTION 15.2

INTRODUCTION

1. Although all possible contingencies cannot be covered, these procedures provide for the more frequent cases such as:
 - a. Inability to maintain assigned flight level due to meteorological conditions, aircraft performance or pressurization failure;
 - b. En route diversion across the prevailing traffic flow; and
 - c. Loss of, or significant reduction in, the required navigation capability when operating in an airspace where the navigation performance accuracy is a prerequisite to the safe conduct of flight operations.
2. These procedures are applicable primarily when rapid descent and/or turn-back or diversion is required. The pilot's judgement shall determine the sequence of actions to be taken, having regard to the prevailing circumstances. Air traffic control shall render all possible assistance.

GENERAL PROCEDURES

1. If an aircraft is unable to continue the flight in accordance with its ATC clearance, and/or an aircraft is unable to maintain the navigation performance accuracy specified for the airspace, a revised clearance shall be obtained, whenever possible, prior to initiating any action.

2. The radiotelephony distress signal (MAYDAY) or urgency signal (PAN PAN) preferably spoken three times shall be used as appropriate. Subsequent ATC action with respect to that aircraft shall be based on the intentions of the pilot and the overall air traffic situation.

3. If prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time and, until a revised clearance is received, the pilot shall:

- a. Leave the assigned route or track by initially turning 90 degrees to the right or to the left. When possible, the direction of the turn should be determined by the position of the aircraft relative to any organized route or track system. Other factors which may affect the direction of the turn are:

- 1) The direction to an alternate airport, terrain clearance;
- 2) Any lateral offset being flown, and the flight levels allocated on adjacent routes or tracks.

NOTE: a turn of less than or greater than 90 degrees may be required depending on the type of contingency and whether the pilot intends to continue in the same direction or reverse course

- b. Following the turn, the pilot should:

- 1) If unable to maintain the assigned flight level, initially minimize the rate of descent to the extent that is operationally feasible;
- 2) Take account of other aircraft being laterally offset from its track;
- 3) Acquire and maintain in either direction a track laterally separated by 28 km (15 NM) from the assigned route; and
- 4) Once established on the offset track, climb or descend to select a flight level which differs from those normally used by 150 m (500 ft);

- c. Establish communications with and alert nearby aircraft by broadcasting, at suitable intervals: aircraft identification, flight level, position (including the ATS route designator or the track code, as appropriate) and intentions on the frequency in use and on 121.5 MHz (or, as a back-up, on the inter-pilot air-to-air frequency 123.45 MHz);

- d. Maintain a watch for conflicting traffic both visually and by reference to ACAS (TCAS) (if equipped);

- e. Turn on all aircraft exterior lights (commensurate with appropriate operating limitations);

- f. Keep the SSR transponder on at all times; and

- g. Take action as necessary to ensure the safety of the aircraft.

4. When leaving the assigned track to acquire and maintain the track laterally separated by 28 km (15 NM), the flight crew, should, **where practicable**, avoid overshooting the track to be acquired, particularly in airspace where a 55.5 km (30 NM) lateral separation minimum is applied.

EXTENDED RANGE OPERATIONS BY AIRCRAFT WITH TWO-TURBINE POWER-UNITS (ETOPS)

If the contingency procedures are employed by a twin-engine aircraft as a result of an engine shutdown or failure of an ETOPS critical system, the pilot should advise ATC as soon as practicable of the situation, reminding ATC of the type of aircraft involved, and request expeditious handling.

EMERGENCY DESCENT PROCEDURES

Descent through the MNPS airspace. An aircraft that is not MNPS/RVSM -approved and is unable to maintain a Flight Level above MNPS/RVSM airspace should descend to a Flight Level below MNPS/RVSM airspace. An aircraft compelled to make a descent through MNPS airspace, whether continuing to destination or turning back, should, if its descent will conflict with an organized track:

- a) plan to descend to a Level below FL280;
- b) prior to passing FL410, proceed to a point midway between a convenient pair of organized tracks prior to entering that track system from above;
- c) while descending between FL410 and FL280, maintain a track that is midway between and parallel with the organized tracks; and
- d) contact ATC as soon as practicable and request a revised ATC clearance.

EN-ROUTE DIVERSION

En-route diversion across the prevailing NAT air traffic flow. Before diverting across the flow of adjacent traffic, the aircraft should climb above FL410 or descend below FL280 using the procedures specified in the GENERAL PROCEDURES above. However, if the pilot is unable or unwilling to do so, the aircraft should be flown at a Level as defined in 3. b. 4) above for the diversion until a revised ATC clearance is obtained.

STANDARD AIR GROUND MESSAGE TYPES AND FORMAT

POSITION REPORT:

For routine position reports. The phraseology used to indicate the next position on the assigned route is "ESTIMATING", for the following subsequent position "NEXT", "ABLE" or "REQUEST", as applicable for the acceptable or requested next higher FL position or time.

Content and Data sequence:

- "Position"

- Flight identification (additionally state frequency when using HF)
- Present position
- Time over present position (hours and minutes)
- Present Flight level
- Next position on assigned route or OCA entry point
- Estimated time for next position or OCA entry point
- Next subsequent position
- Next higher FL acceptable or requested at Position or Time
- Any further information e.g. MET data or company message

REQUEST CLEARANCE:

- a) In conjunction with a routine position report, to request a change of Mach Number, Flight Level, or route and to request Westbound Oceanic Clearance prior to entering Reykjavik, Santa Maria and Shanwick OCA's.

Content and Data sequence:

- "Request Clearance"

- Flight identification (additionally state frequency when using HF)
- Present or last reported position
- Time over present or last reported position (hours and minutes)
- Present Flight Level
- Next position on assigned route or OCA entry point
- Estimated time for next position or OCA entry point
- Next subsequent position
- Requested Mach Number, Flight Level, or route
- Further information or clarifying remarks

- b) To request a change in Mach Number, or route when a position report message is not appropriate.

Content and Data sequence:

- "Request Clearance"

- Flight identification (additionally state frequency when using HF)
- Requested Mach Number, or route
- Further information or clarifying remarks

REVISED ESTIMATE:

To update time estimate for next position.

Content and Data sequence:

- "Revised Estimate"

- Flight identification (additionally state frequency when using HF)
- Next position on route
- Revised estimate for next position (hours and minutes)
- Further information

WHEN ABLE HIGHER

To pass information on position or time a climb to the next higher FL is acceptable or a clearance for higher FLs is requested when inclusion in a position report message is not appropriate.

Content and Data sequence:

- Flight identification (additionally state frequency when using HF)
- Requested or Acceptable FLs
- at position or time

MISCELLANEOUS MESSAGE:

To pass information or make a request in plain language that does not conform with the content of other message format. No message designator is required as this will be inserted by the ground station.

Content and Data sequence:

- Flight identification (additionally state frequency when using HF)
- General information or request in plain language and format free.