POLAR AREA INCLUDING NORTH PACIFIC

UK-ALASKA

ROUTING

The western routes from UK to Japan typically take the aircraft N of Iceland, over the N of Greenland and into the latitudes N of Anchorage, Alaska.

AIRSPACE DESCRIPTION

Atlantic Oceanic Control Area
From FL 55 – Unlimited, except the Domestic Sector of Reykjavik Oceanic CTA.

> **Note:** That Sondrestrom only exercises control in the Greenland area in their FIR below FL195. Above this level is Reykjavik CTA to the N and Gander CTA to the S.

Canada
Canadian airspace is divided into 3 basic areas:

- **Arctic Control Area** – From FL 270 upwards.
- **Northern Control Area** – From FL 230 upwards.
- **Southern Control Area** – From 18,000ft upwards.

MINIMUM NAVIGATION PERFORMANCE SPECIFICATION AIRSPACE

Aircraft operating within MNPS Airspace are required to have a minimum navigational performance capability to allow reduced separation between aircraft.

Exact equipment requirements are detailed in the fleet specific MEL.

Atlantic
The MNPS airspace over the North Atlantic is that airspace:

a) FL 285 – FL 420.

b) The Southern Portion of the Santa Maria Oceanic, thence from 27°N – North Pole.

c) Bounded in the E by the E boundaries of CTAs Santa Maria Oceanic, Shanwick Oceanic and Reykjavik.

d) Bounded in the W by the W boundaries of CTAs Reykjavik, Gander Oceanic, New York Oceanic and Santa Maria Oceanic, excluding the area W of 60°W and S of 38° 30'N within New York Oceanic.

Canada
Canada has implemented RVSM/MNPS Airspace.

AIR TRAFFIC CONTROL

Atlantic
Aircraft Crossing 61°N at 10°W or East of 10°W – This is the boundary between Scottish and Reykjavik. Hand over is under radar. Oceanic Clearance should be requested from Scottish not more than 30 mins and not less than 10 mins prior to the Oceanic boundary.

Iceland
All flights routing through Reykjavik airspace onto North Canadian Arctic tracks (NCA) A, B or C shall make position reports and estimates for 60°W in latitude and longitude. All flights routing along the Polar Track Structure whilst in Reykjavik airspace shall make FULL position reports indicating both latitude and longitude. (For any 'named' points use associated name).

Polar Tracks
In order to facilitate the flow of traffic between Europe and Alaska a Polar Track structure has been established. These Polar Tracks are fixed tracks; they are located N of the airspace used by the Atlantic Organised Track System.

Note that the tracks may be defined as Magnetic or True.

Flight Plan – Flights operating on the Polar Tracks define their tracks by the appropriate Polar Track number or letter prefixed by PTS.

ATC Clearance – When the whole of a Polar Track is being followed, an abbreviated clearance may be issued which will include:

i. Track specified by the track code.

ii. FL.

iii. Mach No.

On receipt of an abbreviated clearance, the pilot shall read back the contents of the clearance message, and in addition, the full details of the Track if the clearance has been received from Reykjavik.

When W-bound a clearance along a Polar Track will normally be received through Scottish ATCC while still in Scottish airspace, and the abbreviated clearance should be read back as given.

Position Reports – Unless otherwise requested, position reports should be made at the significant points depicted on the relevant Polar Track.

When operating on a Polar Track position reports may be abbreviated, except in Reykjavik FIR, by replacing the normal latitude co-ordinate with the Track identifier, e.g.: "Speedbird 005, Polar Q 20W 1537, FL 310, Polar Q 40W 1620, "Alert" next".

Track and ETA – As with other North Atlantic routes, separation is procedural and based on Mach No Technique. Hence maintaining the cleared Track and Mach No is important.

Canada
Altimeter Setting Procedure

Canadian Airspace is divided into two regions:

i. Standard Pressure Region – Use standard pressure setting (29.92") except in controlled airspace below 18,000ft asl.

ii. Altimeter Setting Region – Use QNH below 18,000ft asl. Altimeter settings given in inches.

Northern Track System – This System consists of primary Tracks and a number of secondary Laterals. TRUE track is used as opposed to magnetic track.

ATC Clearances – When aircraft are cleared via a Northern Track the ATC clearance and pilots read back will be in the following format:

"ATC CLEARS (Identification) TO (Destination) VIA NORTHERN TRACK (Code); (flight plan route or route details); TO MAINTAIN (flight level); MACH NO.; (Mach No.); (other instructions or information)".

Position Reports

i. Identification.

ii. Reporting Point and Time.

iii. Altitude/FL.

iv. Next Reporting Point and Time (GMT).

v. Subsequent Reporting Point.

When operating along a Northern Track and making a position report, the position will be expressed by the code name of the Track and the reporting line meridian; e.g. "Speedbird 005, Bravo 80W 1700, FL 310, Bravo 90W 1740, Bravo 100W next".

Adherence to Mach No, Track and ETA – In the N of Canada, as in Oceanic Airspace, ATC is procedural. Hence adherence to track, ETA and Mach No is essential.

Flight Planning

For flights planning to operate on one of the established Tracks, the route should be defined in the Flight Plan by the abbreviation NCA followed by the letter(s) and/or number(s) of the Tracks requested, e.g.:

Lateral 3 (i.e. lateral track within the Northern Track system) – NCA3.

Northern Track Bravo – NCAB.

Alaska

The route across Alaska is controlled entirely through remote VHF from Anchorage. There is complete Radar coverage.

There is good coordination between Canadian and Alaskan ATC. On approaching Alaska from the E, flights are given a detailed clearance by Anchorage followed by direct routeings once in their FIR.

In the Anchorage area there is much low level light traffic, a significant proportion of which ignores ATC.

Within the Anchorage FIR use the MNPS position report format including 'NEXT' position.

ABNORMALLY HIGH BAROMETRIC PRESSURE

Extremely high pressures over Alaska during Winter 88/89 resulted in off scale altimeter settings. At Anchorage the maximum reached was 31.53 inches and at Fairbanks 31.85 inches.

FAA regulations require that when the Barometric Pressure exceeds 31.00 inches all aircraft set 31.00 inches for en route operations below 18,000ft altitude until beyond the affected area.

At the beginning of the final approach segment the current altimeter setting will be set if possible. If not possible 31.00 inches will remain set throughout the approach. Aircraft on departure or missed approach will set 31.00 inches prior to reaching any mandatory/crossing altitude or 1,500ft agl whichever is lower.

For aircraft with the capability of setting the current altimeter setting no additional procedures apply.

For aircraft operating IFR and unable to set the current altimeter setting the following procedures apply:

1. To determine the suitability of destination and alternate airports increase the ceiling requirements by 100ft and visibility requirements by ¼ sm for each 1/10 inch (or portion thereof) of Hg over 31.00 inches.

2. On approach 31.00 inches will remain set. Decision Ht/Alt shall be deemed to have been reached when the published minimum height/altitude is displayed on the altimeter (the aircraft will be higher than displayed).

3. These procedures do not apply to CAT II or CAT III ILS operations (i.e. using radio altimeters) nor do they apply to QFE altimetry systems.

ALTIMETERS – LOW TEMPERATURE ERRORS

Very low temperature causes an altimeter to over-read.

The AIPs of Canada and Alaska suggest that in cold conditions pilots should operate at least 1,000ft above the published minimum en-route altitude.

See also the Cold Temperature Corrections section of this manual.

FUEL – LOW EN ROUTE TEMPERATURES

At the flight planning stage consideration should be given to the forecast en route temperatures and the freeze point of fuel in tanks. Consult the FCOM for your aircraft type bearing in mind that extra fuel may be required to carry out the recommended procedures to keep fuel temperatures above limits.

COMMUNICATIONS

Generally straight forward with onward clearance being given in good time, or a frequency change to get clearance automatically given.

Rekjavik CTA is controlled through Iceland Radio.

Polar Track Structure
Clearance W bound – This should be obtained from Reykjavik by Scottish ATC, while the aircraft is still in the Scottish FIR/UIR, and relayed to the aircraft. About 100 nm before Stornaway, Scottish will ask for an estimate for the Reykjavik OCA Entry Point and the requested level and some time later will call back with the clearance.

If routeing via 61N 10W there is no need to contact Shanwick OCA even though the position 61N 10W is on the boundary between Shanwick and Reykjavik OCAs.

Clearance E bound – Either before the Reykjavik CTA boundary or on first contact, obtain clearance for the Polar Track, reading back the full coordinates. Flights will normally be handed over from Cambridge Bay to obtain clearance, or it will have been coordinated beforehand.

Maintain a listening watch at all times on 121.5 MHz, and, if necessary, transmit blind on this frequency.

Canada
Monitor 121.5 MHz.

Canadian Domestic Clearance W bound – The Polar Tracks enter Canadian airspace via Edmonton FIR. When making the 40°W position report with Iceland it is common for Cambridge Bay to acknowledge and give the onward clearance.

Arctic Radio/Baffin Radio
Arctic Radio, centred near Cambridge Bay and Baffin Radio, centred near Iqaluit are VHF networks supplementing the international HF network.

They accept IFR position reports and relay ATC clearances. They also provide weather and NOTAM information.

Initial contact is on 126.7.

Alaska
Normal ATC, as USA. There is good coordination between Edmonton ACC and Anchorage ACC.

NAVIGATION

The B747 FCOM contains POLAR FMS/IRS/CDU FAILURE PROCEDURES which define two Decision Points.

DECISION PT 1 is where the track crosses into the Magnetic Compass Unreliable Area.

DECISION PT 2 is where the track crosses into the Magnetic Compass Useless Area.

The procedures define minimum navigational equipment which must be serviceable at each Decision Point. If the minimum cannot be satisfied the aircraft may be required to return to departure point or re-route to within reception range of radio aids capable of fixing the aircraft's position at intervals not exceeding one hour. Re-routeing detail is included in the FCOM procedures.

Canada General Navigation Information
The enroute MF beacons provide 24 hour coverage. Most, such as Eureka and Mould Bay, may be received at ranges in excess of 250 nm.

ADF needles will always indicate the correct relative bearing and are the simplest form of navigation in case of compass failure.

No VORs are expected to be received in the “Compass Unuseable” area, but for information, VOR needles always read correctly against the compass card to show the QDM/radial, while the relative bearing will only be correct if the compass is aligned to the Magnetic meridian – or True meridian depending on the alignment of the VOR station.

Ground Radar coverage along the route is good. It is mainly military, and stations can be contacted routinely on 126.7 and in emergency on 121.5.

Thule, an enroute diversion aerodrome, is in the Magnetic Compass Unreliable Area.

En Route Diversion Aerodromes
The only en-route diversionary aerodromes available and suitable for large jets are:

KEFLAVIK
THULE
KANGERLUSSUAQ
IQALUIT
FAIRBANKS

There are also other, smaller aerodromes in the Arctic region which serve the needs of isolated weather or military stations, they have limited facilities. The one exception is RESOLUTE which has a Rwy 17(T)/35(T), VOR/DME, ILS and NDB but is unpaved.

Note: Thule publishes headings in °T and °G with Kangerlussuaq publishing both °T and °M. RESOLUTE VOR radiates True bearings.

Radar
Over Canada military Radar coverage is good especially in the ADIZ area. To obtain assistance call "Radar Assistance" on 122.2, 121.5 or 126.7.

Over Alaska aircraft receive a Radar service from Anchorage.

The USAF Radar Advisory Service will give assistance to civil aircraft in distress or emergency. Aircraft should establish contact on 121.5 calling "Radar Advisory Service".

ALASKA – JAPAN

ROUTEING

The route lies along the North Pacific Composite Route System. This is a system of routes linking North America with Japan. See below. Southern Alaska and the Aleutian Islands have numerous active volcanoes. Eruptions have seen volcanic dust clouds well over 30,000ft.

AIRSPACE DESCRIPTION

The route across the Pacific lies in:

- Anchorage OCA FL 55 – UNLTD.
- Tokyo OCA FL 55 – UNLTD.

The changeover point is approximately half-way across.

AIR TRAFFIC CONTROL

North Pacific (NOPAC) Routes – Composite Route System
To facilitate the movement of traffic, there is an organised route system between Anchorage and Tokyo, on which composite lateral/vertical separation is authorised at and above FL 280.

Oceanic Transition Routes (OTRs)
These routes are used to transition aircraft to/from the Composite Route System. OTRs are used in/out of Japan.

Separation
In the Composite Route System, separation is a combination of 50 nm laterally and 1,000ft vertically between aircraft on immediately adjacent routes. Aircraft at the same altitude will be laterally separated by at least 100 nm. Aircraft on the same route will be separated by 2,000ft vertically or 15 mins longitudinally.

Note that separation is procedural. Hence adherence to cleared track and Mach No. is essential.

Flight Plan
The Composite Route will be depicted in the following order: entry point, route designator, exit point. e.g. COMFE G344 CURVS. The planned Mach No shall be specified in Item 15 of the Flight Plan, and the TAS equivalent in the Remarks Section of Item 18.

Clearance
To effect more efficient use of airspace ATC may assign a Mach No as the last item of the clearance issued on departure or before entering the ATS route. In which case the Mach number should be included in Position Reports.

Clearances should be read back as given. A full read back of the coordinates of the route is not required.

Direct routeings are often possible. Variation of Mach No may well be available if needed for economy or time keeping.

There are considerable coordination problems over the ocean, as aircraft join the NOPAC routes mid-ocean having been airborne for many hours. Thus the situation may have changed considerably since they received their clearance. This may cause departure delays.

At the Anchorage/Tokyo OCA boundary control will be transferred. Coordination between the ATCCs is good.

Cruise Climbs
Cruise climbs are often available in the Anchorage OCA; a block of airspace from your present level to another level – usually 2,000ft higher – will be assigned with a request for an estimate of when you expect to be level.

Communications
E from Shemya communication with Anchorage is by remote VHF stations situated on the Aleutian Islands. Aircraft on R220 will be out of VHF range around 180° E/W for a short while, but an HF frequency is not normally assigned.

When W-bound abeam Shemya (Eareckson AS) control is transferred to Anchorage Oceanic who should be contacted through Honolulu Radio on HF. Anchorage may not assign an HF frequency to call Honolulu. On being released by Anchorage on VHF crews should immediately call Honolulu Radio and establish a SELCAL or listening watch on HF.

On making the position report at the Anchorage/Tokyo OCA boundary, control will be transferred and the onward primary and secondary HF frequencies given.

HF – As over the Atlantic, communication with Oceanic ATC is on HF via a “communicator” with no air traffic control authority. Hence there will be delays in the handling of routine aircraft requests. This should be taken into account when requesting stepped climbs, re-routes, or other requests requiring ATC action.

121.5 MHz should be monitored.

Position Reports
Position reports should be made at all designated reporting points, as this is the basis for separation. Use the MNPS position report format including “NEXT” position.

The prefix POSITION should be used for position reports.

Additional Reports – When reporting abeam Shemya (Eareckson AS) on the N.Pacific Routes, give DME distance and radial from Shemya VORTAC.

Radar – FAA Radar is available up to 150 nm W of Anchorage. A small portion of the track system is under FAA Radar cover from a site on St Pauls Island.

EN ROUTE AERODROMES

There are no diversion aerodromes W of Eareckson AS (Shemya) until Chitose in Japan.

Eareckson AS (Shemya)	Well equipped military aerodrome, 1,200nm from Anchorage. Radar, ILS etc.
Cold Bay	600 nm from Anchorage and S of the Composite Route Structure. Civil aerodrome with ILS.
Chitose	Civil aerodrome with Radar and ILS.