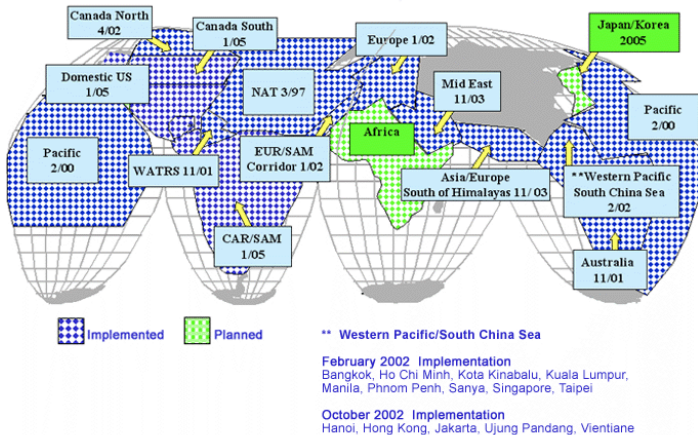


# PDX RVSM/Oceanic Guide

## Overview

Reduced Vertical Separation Minima covers the North Atlantic, Europe, Middle East, and Pacific. The goal of RVSM is to reduce the vertical separation above flight level (FL) 290 from the current 2000-ft minimum to 1000-ft minimum.



Key things you need to know are: Where you're going—are you going through RVSM airspace? What equipment is required? What info do I need to file and fly the airspace? What do I do when things go wrong?

## Basic Terms

**ACFP—Advanced Computer Flight Planning System**—Computer flight planning system used by TACC for air mobility missions. Most flight plans are built by flight planners in the flight planning shop and should reflect your mission (times, appropriate tracks, DIP CLNC, etc.) The flight plan is requested either through Command Post at an AMC base or direct to them (DSN 779-3325/3415/3490/3426). Flight plans are optimized (current winds, altitude, NAT, etc.), so expect min fuel after flying high flight levels—plan accordingly. Also, even though these are built by big heads, you need to sanity check them.

**Air Traffic Flow Mgmt/Central Flight Mgmt Unit**—the office in Eurocontrol that calculates airspace capacity and issues slot times. If you get a slot time, the tolerance for takeoff is -5/+10 minutes—if you can't make it, re-coordinate early with clearance delivery. This office also requires early filing of flight plans (>4 hours prior to takeoff). Slot times are N/A for STS/State and OAT.

**European RVSM**—requires RNP-5 (BRNAV). See AP2 ch 1 & 5.  
**EUR RVSM transition airspace**—Areas between non-RVSM and European RVSM airspace that allow ATC to change aircraft altitude from conventional flight levels to RVSM flight levels. Mandatory entry & exit points are found on the Eurocontrol website.

**General Air Traffic (GAT)**—air traffic that can comply with standard IFR flight rules, follow standard ATC instructions & communication on standard frequencies, and have the navigational equipment to follow standard routing.

**Integrated Flight Management**—Designated AMC missions that are flight managed (“dispatched”) by an AMC flight manager. If you are on a designated mission a flight manager will mission plan all aspects of your flight (weather, file flight plan, load plan, NOTAMs, etc.) allowing you to show at command post, pick up your paperwork package, verify the info, and proceed to the plane. See the website and carry the booklet (aircrew flimsy has good comm info for everyone)

**MNPS—Minimum Navigation Performance Specifications**—aircraft navigation system able to stay within 12.6 NM of track 95% of time

**NAT—North Atlantic Tracks**—specific area in North Atlantic that requires modified RVSM procedures. Tracks are separated by 60 nm, and require MNPS (RNP-6.3). Track info found on NAT message—ask base ops for a copy before attempting to file/fly these. Tracks change daily, and are based on your 30° west crossing time (Westbound 1130-1900z under Shanwick control, Eastbound 0100-0800z under Gander). Area covered is 27°N to north pole. Common freq is 123.45, squawk 2000. See AP2 ch 5

**NOPAC—North Pacific Routes**—Established routes between Alaska and Japan.

RVSM and RNP-10 required, 50 nm separation between routes. AP3  
**NRP—North American Route Program**—in the Canadian Supp (pg. C112)—these routes are the “connection” between the NAT tracks and domestic US and Canadian airspace. Expect to get the common portions of these.

**Operational air traffic (OAT)**—flights that use TACAN and military ATC. Traffic that can't comply with standard routing, communication, etc. (vice GAT).

**PACOTS—Pacific Organized Track System** between Hawaii/West coast and Japan. Separation at least 50 nm. RNP-10. See AP3 and NOTAM website.

**Polar Track System (PTS)**—Established routes between Europe and Alaska, MNPS/RVSM. Clearance required from Reykjavik prior to entry. Issues with HF reliability, see AP2.

**RNP—Required Navigation Performance**—Navigation precision required for a specific route, varies depending on location. Navigation is accurate to this level 99% of the time.

**RVSM—Reduced Vertical Separation Minima**—Application of 1000' vertical separation between FL290 and FL410—requires properly equipped (and certified) aircraft and flight crew. Don't overshoot or undershoot assigned altitude by >150', and report arriving at any assigned altitude. Climb or descend in RVSM airspace at 500-1000 fpm. Check NOTAM website.

**Pacific Flex Tracks**—Track system between Hawaii and Japan, can be found on the NOTAM website.

## Required Equipment

### Generic Equipment Required:

**RVSM**—Two independent altitude measurement systems (with ice protection), one transponder (with mode C), an altitude alerting system, and an automatic altitude control system. Altimeter error tolerance is 200' apart.

**Navigation**—meet MNPS within the NAT, RNP to the appropriate level in other Regions.

### KC-135 Specific Equipment:

**RVSM**—Two DADCs, Pilot & copilot altimeters operable in normal & stby modes), altitude alerter, operable transponder including Mode C and S, operable autopilot (altitude hold function), and TCTO 1585 skin waviness inspection. TCAS required with pax—smart even without pax due to 1000' separation. Be sure command post puts aircraft RVSM status in GDSS.

**Navigation**—With GPS aircraft is RNP-5/BRNAV capable. INU/GPS must include GPS RAIM for oceanic flights, without GPS, must do auto update every two hours. Oceanic-minimum is one INS capable of updates or INS with GPS and RAIM. If you lose one INS prior to airspace entry, return for MX. Do a full ground alignment on INUs—no fast alignments.

See 11-2KC-135V3 ch 6.34

## Preflight Planning

**Cruising levels**—Between FL290 and FL410 the separation is 1000' instead of 2000'. The direction will be based on the magnetic heading—odd FL=000°-179°, even FL=180°-359° (in Italy, France, Portugal, and Spain— odd FL=270°-089°, even FL=090°-269°)

**North Atlantic Track Message**—produced daily (and changes daily) to account for favorable winds and traffic requirements over the North Atlantic. Get from Base Ops(at an east coast or European base if necessary) or notam website.

**Flight plans**—ACFP flight plans are the best choice to use in NAT area since they reflect the current NAT message. Everywhere else can use CFPS built or ACFP flight plans. Be sure to request RVSM flight plans the day prior, or ACFP may not plan to use those altitudes.

**Height measuring units**—Flights may be requested to fly over these points to verify the accuracy of aircraft equipment. They're located at Strumble (UK), Nattenheim (GE), Geneva (Switzerland), and Linz (Austria)(in reality the only points we may be asked to use are in UK and Germany, since our DIP CLNC rarely lets us into Swiss or Austrian Airspace.

**Entry/exit points**—transition points into European RVSM airspace that must be filed in block 15, followed by the requested flight level

**1801 completion**—RVSM capable aircraft enter a “W” in block 10 to show RVSM capable (even if you intend to fly above or below RVSM airspace), and enter “R” for RNP-5/BRNAV capable. In Europe enter a “Y” if equipped for 8.33 VHF freq separation (enter “STS/EXM833” in block 18 if not 8.33 capable). On NAT, Shanwick requires “X” for MNPS. Time is takeoff minus 20 minutes (std taxi/block time—see AP2 for Europe). Enter in block 15 the entry and exit point for RVSM airspace (see Mach technique below), as well as requested flight level. If you are operating as GAT and non-RVSM, enter “STS/NONRVSM” in block 18 (and no “W” in block 10—and coordinate this early!!) In Europe, entering “STS/???” may affect clearance & status (OAT/GAT)—see AP2 ch 1; also, enter your minimum RVR in meters. For Air Refueling in Europe, see AP2 ch 1 for flight plan entries.

**Mach Technique**—over land, ATC prefers TAS on the flight plan, and in oceanic airspace Mach is required. At the oceanic entry point enter the point, then Mach and flight level (example-HAPPY/M077F310). At the oceanic exit, you enter the point, then TAS/flight level (FOGGY/N440F370). This is also the format used to change speed or flight level.

**Elapsed enroute time**—EET—first line of block 18, contains a sequential list of FIRs/UIRs and the elapsed time into mission you will cross those points. ATC bases their handoff messages on these times—make sure they're close. ACFP flight plans have a line at end (above alternates) with these times, but it is important to do a sequential check on charts to make sure they were all entered. Example for Pease to Iceland via Canada: EET/CZQX0116 0150 BGGL0248 CZQX0257 BIRD0340

**Formation Flights**—are considered non-RVSM regardless of individual aircraft capability. Since you are a state aircraft (military) you can request formation flight in RVSM airspace (you might even get it—if it's your lucky day)—but you won't get it in NAT airspace. Best to flight plan for an altitude lower (below FL280). Don't enter the “W” in block 10, and enter STS/NONRVSM in block 18. ALTRV-no “W” in block 10.



## Inflight

**Clearances**—when entering RVSM everywhere but the NATs, the clearance is received as normal. For NATs, it gets more complicated—your clearance issued on the ground will usually only get you as far as the oceanic entry point, you must get oceanic clnc prior to coast out (30 min prior preferred). Westbound you'll need oceanic clearance prior to 2° west from Shanwick ACC on freq 123.95 or 135.525 (see European IFR supp & FIH for map), Santa Maria get clnc prior to their airspace (or on ground at Lajes) on 127.9 or 17946. Eastbound get it from Gander on 134.9 (northern routes) or 135.05 (southern routes) or New York center on ATC primary or 129.9. Iceland Radio (Reykjavik) gives clearance on their VHF or HF prior to their airspace. If you need to verify the NAT message (which you MUST have with you!!) over Europe dial up freq 133.8--it has a recording of the NAT message.

**Check FLIP for current freqs.** Call for clearance with the following format:

You: Shanwick, Stout 91 estimates 52N15W at 0230

Them: Stout 91, go ahead

You: Stout 91 request NAT-C, FL340, Mach .80

Them: Stout 91 is cleared 52N15W, NAT-C, FL340, Mach .80

You: Stout 91 is cleared NAT-C, FL340, Mach .80 via 52N15W,

TMI #115 (TMI #115 is the track message identifier

(Julian day) found on the current NAT message).

If you don't have the current TMI# off the NAT message, or have a routing question, read back the entire clearance (every waypoint). If you can't contact the clearance delivery facility due to radio traffic congestion or radio problems, continue on filed oceanic routing at current altitude. Do not hold at the oceanic entry point, EXCEPT when eastbound in Shanwick airspace, hold at the oceanic entry point if unable to obtain clearance (talk to your current ATC controller!!). If the entry point is different than you're planned entry point, request rerouting from ATC ASAP. If the altitude is different from your present altitude, request climb/descent approaching the oceanic entry point, or where appropriate.

**Position Reports**—see flight info handbook, remember you only have to report mandatory waypoints and revised estimate for points when in error by 3 min or more. When able higher—when entering NATs your initial position report to the FIR controller should include the time or position you can accept the next three higher flight levels.

**Position Monitoring**—The Alaska Supplement (in the Notices section) has an excellent discussion—basically remember that most navigation errors are flight crew error, be sure of your clearance, and regularly track your position vertically and horizontally. Master Document—one copy of a chart used to note position and altitude accuracy (the Blue Oceanic Planning Charts). Plot the route prior to takeoff, then make a coast out check using a navaid cross-checked with INU positions. Also, note the altimeter accuracy (including the standby altimeter). Note any changes to clearance on this chart. Verify all points on the flight plan both when entered initially in the FMS and upon crossing each waypoint inflight. Ten minutes after crossing each oceanic waypoint plot/compare nav solutions. Compare altimeters once per hour minimum. Also see AFI 11-2KC-135v3 ch 6.33

**NOPAC position verification**—When flying a NOPAC route, crosscheck your position abeam Shemya VORTAC. The radial/DMEs are: Nates SYA329152, Oneil SYA329102, Pinso SYA329052, and Chipt SYA148100

**Strategic Lateral Offset**—allows for up to 2 nm right of centerline to provide additional safety margin, no ATC clearance required and not necessary to advise. Implemented in WATRS airspace (NY FIR west of 60° W and south of 38° 30' N for normal traffic, referenced in NOPAC and NAT procedures for wake turbulence. Coordinate between acft on common freq and talk to ATC as soon as possible, and report back on track when able. ATC won't issue a clearance to lateral offset.

**Loss of required equipment**—if you lose any of the required equipment prior to entering RVSM, let ATC know—they will most likely issue a new clearance. The same thing applies once you're in RVSM airspace—its up to ATC. They can give you a clearance below (or above if you can climb to FL430—can you say hang the hose time??)

**Communication**—monitor 123.45 as pilot common, and 121.5/243.0 for emergency. Squawk 2000 when not in radar contact. On NATs at 40W going east, position reports are given to Gander and copied by Shanwick (position report would be "Gander copy Shanwick, Okie 41 51N40W at..") Same thing at 30W going west ("Shanwick copy Gander, Okie 41.."). Shanwick is primary agency for position reports at 30W.

**8.33 Khz VHF**—required for Europe >FL245. See 1801 section for filing instructions—have it or plan on UHF and non-std routing/altitudes. AP2 ch1.

**E-TCAS**—see the web site for restrictions in Europe—some countries have restrictions on extended range (Germany, UK, and others)

**Africa/Caribbean region**—review flight information handbook about IATA inflight broadcast procedures, ch B. Maintain a listening watch on 126.9, broadcast your position in the blind 10 minutes before entering the airspace, 5 minutes prior to crossing routes, 20 minute intervals between distant reporting points, 2-5 minutes before and at the time of flight level change. Sample broadcast is shown--read the book!!!

## Emergencies

**Loss of equipment**—Report to ATC—expect to get a new clearance.

**Turbulence**—Report to ATC if turbulence affects ability to maintain altitude (and suspected cause, if wake turbulence—may be able to offset)

**Weather deviations**—Advise ATC as soon as possible, get clearance to deviate.

If necessary to get priority, state "weather deviation required." If still no help, may use "PAN, PAN, PAN", if still not able, may need to use emergency authority—TALK (121.5/123.45), and do what makes sense. Advise ATC ASAP. See FAA NOTAM book, ch 3. If you have to deviate >10 miles and can't get clearance, use this table

Route center line track	Deviations >10 NM	Level change
EAST (000-179 magnetic)	LEFT	DESCEND 300 ft
	RIGHT	CLIMB 300 ft
WEST (180-359 magnetic)	LEFT	CLIMB 300 ft
	RIGHT	DESCEND 300 ft

**NORDDO**—On the NATs—if able to continue navigation and no degradation of altitude—continue as filed. Use every means available to try to communicate—remember there are many other aircraft around that were just as bored as you were prior to your problem—see if you can contact them for help. Squawk 7600. Prior to oceanic entry with oceanic clearance—proceed as filed making any level or speed changes necessary to comply with the clearance in the vicinity of oceanic entry point. Without oceanic clearance—continue as filed maintaining the level and speed at the oceanic entry point. See Canadian Supp pg F11.

**Emergency Descent**—FLY FIRST—if you are in radar contact—talk to the controlling agency. If you are not in radar contact, talk to the controlling agency, initiate a 90° turn to offset ½ the track separation (NATs 30 nm, NOPAC 25 nm, away from track system) before descending. If you can maintain altitude offset 500', otherwise descend below FL280. Let other aircraft around you know who you are, where you are, and what you're doing using 121.5 and 123.45. Turn on all exterior lights (IAW ops limits). If you have to--squawk EMER—remember that aircraft are probably close both horizontally and vertically, and they are not just a collision threat but a possible resource in an emergency!!

**Resources:** (.gov/.mil sites may require .mil connection)

Current Implementation map-and lots of info

[www.faa.gov/ats/ato/status\\_wv.htm](http://www.faa.gov/ats/ato/status_wv.htm)

[www.eurocontrol.be/](http://www.eurocontrol.be/)

North Atlantic Tracks: AP2 ch 5 (NIMA website)

<https://164.214.2.62/products/digitalaero/index.cfm>

<http://www.nat-pco.org/mnpsa.htm>

NAT tracks, RVSM notams

<https://www.notams.ics.mil>

General Oceanic Procedures

Alaska Supplement, Canadian Supplement

<https://www.arinc.com/index.html>

KC-135 Navigation Procedures

[AFI 11-2KC-135V3](http://www.faa.gov/ats/ato/135v3), Ch 4 and 6.

General RVSM and RNP planning info

[FLIP General Planning](#) ch 5

Advanced Computer Flight Plan

<https://acfp.scott.af.mil/>

European entry & exit points + much planning info

<http://www.cfm.eurocontrol.be/rvsm/entry.html>

FAA RVSM + Strategic lateral offset (look in documentation-WATRS)

[www.faa.gov/ATS/ATO/RVSM1.HTM](http://www.faa.gov/ATS/ATO/RVSM1.HTM)

<http://www.faa.gov/ATS/ATO/130.htm>

FAA NOTAM book for international oceanic procedures

[www.faa.gov/NTAP](http://www.faa.gov/NTAP)

AMC Integrated Flight Management

<https://amc.af.mil/m21/index.html>

FAA International Flight Information Manual

<http://www.faa.gov/ats/aat/IFIM/index.htm>

TCAS restrictions for Pacer CRAG (buried in lots of other good stuff)

<https://private.amc.af.mil/a3/a37t/dot/dot.cfm>

Phraseology

AP2 chapters 1 and 5

National Route Program/North American Routes (NARs)

AP2 ch 5 and Canadian Supplement

AMC Aircrew Portal

<https://private.amc.af.mil/a3/aircrewportal/>

Lots of other miscellanea...

<http://www.baseops.net>

**No warranties—check everything in this guide yourself!!!**  
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**As of: 1 Sep 05**