

Required Navigation Performance (RNP) and Reduced Vertical Separation Minimum (RVSM)

25 January 2006

Required Navigation Performance. States are beginning to introduce RNP as part of a world-wide ICAO effort to implement Communication, Navigation and Surveillance (CNS) and Air Traffic Management (ATM) concepts. Reduced separation minima are an integral part of these initiatives.

Through ICAO, the Informal South Pacific Air Traffic Services Coordinating Group (ISPACG) and other forums, new separation minima - 50 NM lateral and 50 NM longitudinal - have been developed for use in oceanic and remote areas. These reduced separations were introduced in the Tasman Sea area on 23 April 1998 with the reduced separation being available to operators and aircraft with RNP10 approvals.

In accordance with ICAO coordinated regional agreements, operators must obtain an RNP approval from the appropriate State of Registry or State of the Operator in order to operate to the reduced separations in RNP airspace/air routes. The RNP criteria and a means of obtaining operational approval from the Civil Aviation Authority (CAA) are described in the following advisory circulars:

- AC 91-7 : Required Navigation Performance (RNP 10)
- AC 91-8 : Required Navigation Performance in European airspace designated for Basic RNAV (BRNAV) operations (RNP 5)

Reduced Vertical Separation Minimum. In the late 1950s it was recognised that, as a result of the reduction in accuracy of the pressure-sensing capability of barometric altimeters with increasing altitude, there was a need above FL290 to increase the prescribed vertical separation of 1000ft. In 1960, an increased Vertical Separation Minimum (VSM) of 2000ft was established for aircraft operating above FL290 except where, on the basis of regional air navigational agreement, a lower flight level was prescribed for the increased VSM. FL290 was chosen mainly as a result of the operational ceiling of aircraft at that time.

In the mid-1970s, a series of world fuel shortages and the resultant rapid escalation of fuel costs, allied to the growing demand for a more efficient utilisation of the available airspace, emphasised the necessity for a detailed appraisal of the proposal to reduce VSM above FL290. The review agreed that 1000ft VSM (RVSM) was technically feasible and found that it was necessary to establish:

- Airworthiness performance requirements embodied in a comprehensive minimum aircraft performance specification (MASPS) for all aircraft utilising the reduced separation;
- New operational procedures; and
- A comprehensive means of monitoring the safe operation of the system.

Each individual aircraft operating in RVSM airspace is required to be approved for RVSM operations by the state of registry, and each approval notified to the responsible monitoring agency:

- **Central Monitoring Agency (CMA).** The CMA is based in England and is responsible for monitoring aircraft operating in the North Atlantic RVSM airspace.

- **Pacific Approvals Registry and Monitoring Organisation (PARMO).** The PARMO is based at the FAA William J Hughes Technical Center and will be responsible for monitoring aircraft operating the Pacific RVSM airspace.

Information on the RVSM approval process is available in:

- AC 91-4 : Reduced Vertical Separation Minimum (RVSM) in the North Atlantic

Additional information on the RVSM programme is available through the internet by addressing the ARINC bulletin board on http://www.arinc.com/Ind_Govt_Srv/RVSM/rvsm.html. Aircraft which are successfully monitored and advised to the CMA will be promulgated via the bulletin board on <http://www.arinc.com/rvsm/cmast-co.pdf>. Operators will be notified by fax or phone of individual access codes on the first occasion that its aircraft are placed on the board.

Copies of applicable RVSM documentation for the Pacific and North Atlantic regions are available on http://www.faa.gov/ats/ato/rvsm_documentation.htm.

RVSM airspace will be introduced to the Mid/Asia and Pacific areas (PAC region) on 24 February 2000. AC 91-4 has been amended to Revision 1 to cover the implementation of RVSM in the PAC region.

RNP and RVSM approvals for New Zealand Registered Aircraft. The following tables provide a listing of New Zealand registered aircraft with RNP and RVSM approvals. This table is for statistical purposes only and should not be used as a means of determining qualifications for approvals, for updated information please contact Mr Zahid Munawar at the CAA: MunawarZ@caa.govt.nz

RNP Approvals					
Operator	Make/Model	Registration	RNP Type	RNP 10 Time Limit (hours)	RNP 5 Time Limit (hours)
ir New Zealand	B747-475	ZK-SUH	10 and 5	Unlimited *	Unlimited
	B747-441	ZK-SUI	10 and 5	Unlimited *	Unlimited
	B747-4F6	ZK-SUJ	10 and 5	Unlimited *	Unlimited
	B747-419	ZK-NBS	10 and 5	Unlimited *	Unlimited
		ZK-NBT	10 and 5	Unlimited *	Unlimited
		ZK-NBU	10 and 5	Unlimited *	Unlimited
		ZK-NBV	10 and 5	Unlimited *	Unlimited
		ZK-NBW	10 and 5	Unlimited *	Unlimited
		ZK-NCF	10 and 5	12	2
		ZK-NCG	10 and 5	12	2
		ZK-NCH	10 and 5	12	2
		ZK-NCI	10 and 5	12	2
		ZK-NCJ	10 and 5	12	2
	ZK-NCK	10 and 5	12	2	
ZK-NCL	10 and 5	12	2		

RNP Approvals					
Operator	Make/Model	Registration	RNP Type	RNP 10 Time Limit (hours)	RNP 5 Time Limit (hours)
		ZK-NCN	10 and 5	Unlimited *	Unlimited
		ZK-NCO	10 and 5	Unlimited *	Unlimited
	B767-219	ZK-NBA	10 and 5	12	2
	B737-36Q	ZK-NGB	10	6	Not Authorised
		ZK-NGC	10	6	Not Authorised
	B737-3U3	ZK-FRE	10	6	Not Authorised
		ZK-NGD	10	6	Not Authorised
		ZK-NGE	10	6	Not Authorised
		ZK-NGF	10	6	Not Authorised
	B737-319	ZK-NGG	10	6	Not Authorised
		ZK-NGH	10	6	Not Authorised
		ZK-NGI	10	6	Not Authorised
	A320-232	ZK-OJA	10 and 5	FM	FM
		ZK-OJB	10 and 5	FM	FM
		ZK-OJC	10 and 5	FM	FM
		ZK-OJD	10 and 5	FM	FM
		ZK-OJE	10 and 5	FM	FM
		ZK-OJF	10 and 5	FM	FM
		ZK-OJG	10 and 5	FM	FM
		ZK-OJH	10 and 5	FM	FM
		ZK-OJI	10 and 5	FM	FM
Freedom Air International	B737-3M8	ZK-FDM	10	6.2	Not Authorised
	B737-33R	ZK-SJB	10	6.2	Not Authorised
	B737-33R	ZK-NGA	10	6.2	Not Authorised
	B737-3U3	ZK-SJC	10	6.2	Not Authorised
	B737-3K2	ZK-SJE	10	6.2	Not Authorised
RNZAF	B727-22C	NZ 7271	10 and 5	6.2	2
		NZ 7272	10 and 5	6.2	2
	B757-2k2	NZ 7571	10 and 5	12.6	12.6
		NZ 7572	10 and 5	12.6	12.6

RNP Approvals					
Operator	Make/Model	Registration	RNP Type	RNP 10 Time Limit (hours)	RNP 5 Time Limit (hours)
Jetconnect Ltd	B737-300	ZK-JNF	10	6.2	Not Authorised
	B737-376	ZK-JNH	10	6.2	Not Authorised
	B737-376	ZK-JNA	10	6.2	Not Authorised
	B737-376	ZK-JNB	10	6.2	Not Authorised
	B737-376	ZK-JNC	10	6.2	Not Authorised
	B737-376	ZK-JNN	10	6.2	Not Authorised
	B737-376	ZK-JND	10	6.2	Not Authorised
Air National Ltd	Gulfstream IV	ZK-KFB	10 and 5	FM	FM
Pacific Blue Airlines(NZ) Ltd	B737-8FE	ZK-PBA	10	6.2	Not Authorised
	B737-8BK	ZK-PBC	10	FM	Not Authorised
	B737-8BK	ZK-PBD	10	FM	Not Authorised
Airwork Holdings Ltd	B737-377	ZK-SLA	10	6.2	Not Authorised
	B737-33A	ZK-PLU	10	6.2	Not Authorised
* 12 hours with GPS inoperative					

RVSM Approvals

Operator	Make/Model	Registration	Serial Number	Region	RVSM Operational Approval Date
Air New Zealand	B747-475	ZK-SUH	24896	NAT, PAC, EUR	26 January 2001
	B747-441	ZK-SUI	24957	NAT, PAC, EUR	26 January 2001
	B747-4F6	ZK-SUJ	27602	NAT, PAC, EUR	26 January 2001
	B747-419	ZK-NBS	24386	NAT, PAC, EUR	26 January 2001
		ZK-NBT	24855	NAT, PAC, EUR	26 January 2001
		ZK-NBU	25605	NAT, PAC, EUR	26 January 2001
		ZK-NBV	26910	NAT, PAC, EUR	26 January 2001
		ZK-NBW	29375	NAT, PAC, EUR	26 January 2001
		B767-219	ZK-NBA	23326	NAT, PAC, EUR
		ZK-NCF	24876	NAT, PAC, EUR	26 January 2001
		ZK-NCG	26912	NAT, PAC, EUR	26 January 2001
		ZK-NCH	26264	NAT, PAC, EUR	26 January 2001
		ZK-NCI	26913	NAT, PAC, EUR	26 January 2001
		ZK-NCJ	26915	NAT, PAC, EUR	26 January 2001
		ZK-NCK	26971	NAT, PAC, EUR	26 January 2001
		ZK-NCL	28745	NAT, PAC, EUR	12 April 2001
		ZK-NCN	29388	NAT, PAC, EUR	26 January 2001
		ZK-NCO	30586	NAT, PAC, EUR	26 January 2001
		B737-319	ZK-NGG	25606	PAC
	ZK-NGH		25607	PAC	29 June 2000
	ZK-NGI		25608	PAC	29 June 2000
	ZK-NGJ		25609	PAC	29 June 2000
	B737-33R	ZK-NGA	28873	PAC	20 January 2000
	B737-33S	ZK-NGN	29072	PAC	16 May 2001
	B737-36Q	ZK-NGB	29410	PAC	20 January 2000
		ZK-NGC	29189	PAC	20 January 2000
	B737-3K2	ZK-NGK	26318	PAC	18 December 2000
	B737-3U3	ZK-FRE	28742	PAC	2 September 2000
		ZK-NGD	28732	PAC	20 January 2000

RVSM Approvals					
Operator	Make/Model	Registration	Serial Number	Region	RVSM Operational Approval Date
		ZK-NGE	28733	PAC	20 January 2000
		ZK-NGF	28734	PAC	9 May 2000
	A320-232	ZK-OJA	2085	PAC	15 Sept 2003
		ZK-OJB	2090	PAC	25 Sept 2003
		ZK-OJC	2112	PAC	15 Oct 2003
		ZK-OJD	2130	PAC	14 Nov 2003
		ZK-OJE	2148	PAC	19 Jan 2004
		ZK-OJF	2153	PAC	05 Feb 2004
		ZK-OJG	2173	PAC	23 March 2004
		ZK-OJH	2257	Global	8 Sept 2004
		ZK-OJI	2297	Global	28 Oct 2004
Freedom Air International	B737-3M8	ZK-FDM	25016	PAC	17 February 2000
	B737-33R	ZK-SJB	28868	PAC	16 August 2000
	B737-33R	ZK-NGA	28873	PAC	16 July 2005
	B737-3U3	ZK-SJC	28738	PAC	21 September 2001
	B737-3K2	ZK-SJE	27635	PAC	08 November 2001
Jetconnect Limited	B737-33A	ZK-JNE	25119	PAC	16 October 2002
	B737-376	ZK-JNF	23486	PAC	14 April 2003
	B737-376	ZK-JNG	23478	PAC	01 May 2003
	B737-376	ZK-JNH	23488	PAC	2 September 03
	B737-376	ZK-JNA	23490	PAC	21 Jan 04
	B737-376	ZK-JNB	23491	PAC	11 May 04
	B737-376	ZK-JNC	24296	PAC	02 Aug 04
	B737-376	ZK-JNN	24295	PAC	18 Oct 04
	B737-376	ZK-JND	24297	PAC	19 Jan 05
	B737-33A	ZK-CZU	27267	PAC	16 October 2002
RNZAF	B 757-2k2	NZ 7571	26633	PAC	07 July 2003
		NZ 7572	26634	PAC	07 July 2003
Air National Ltd	Gulfstream IV	ZK-KFB	1362	PAC	01 August 2003
Pacific Blue	B737-8FE	ZK-PBA	33796	PAC	26 Jan 04

RVSM Approvals					
Operator	Make/Model	Registration	Serial Number	Region	RVSM Operational Approval Date
Airlines(NZ) Ltd	B737-8BK	ZK-PBC	33017	PAC	27 Feb 04
	B737-8FE	ZK-PBD	33996	PAC	16 Aug 04
Airwork Holdings Ltd	B737-377	ZK-SLA	23653	PAC	06 May 04
	B737-33A	ZK-PLU	24094	PAC	06 July 04
Auckland Air Charter Ltd	LearJet 35A	ZK-XVL	35-649	Global	19 Aug 04