



*International Civil Aviation Organization*

**The Third Meeting of the Regional Airspace Safety Monitoring Advisory Group  
(RASMAG/3)**

Bangkok, Thailand, 6 – 7 June 2005

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**Agenda Item 6: Airspace safety monitoring documentation and regional guidance material**

**INTRODUCTION OF THE ICAO REGIONAL MONITORING AGENCY MANUAL**

(Presented by the Secretariat)

**SUMMARY**

This paper introduces the First Edition (2004) of the ICAO *Manual of Operating Procedures and Practices for Regional Monitoring Agencies in relation to the use of a 300m (1000 ft) Vertical Separation Minimum above FL290*. The paper highlights the ICAO RVSM minimum monitoring requirements in the Manual for review.

**1 INTRODUCTION**

1.1 The ICAO *Manual of Operating Procedures and Practices for Regional Monitoring Agencies in relation to the use of a 300m (1000 ft) Vertical Separation Minimum above FL290* has been developed in order to provide guidance to Regional Monitoring Agencies (RMAs) in the performance of their functions associated with RVSM operations. These include aspects of system performance monitoring during implementation planning and post-implementation operational use of RVSM and the consideration of aircraft technical and operational requirements for RVSM operations.

1.2 The Manual has recently been published as an unedited version to the ICAO internal data network – “ICAO Net”. Copies of the FOREWORD and Table of Contents have been reproduced as **Attachment A** to this paper.

**2 DISCUSSION**

2.1 RASMAG/2 (October 2004) was informed that the draft RMA Manual had been completed by ICAO and agreed to by the approved global RMAs, to be published in the first quarter of 2005. RASMAG/2, whilst noting small discrepancies between the RVSM minimum monitoring requirements (MMRs) being used by PARMO and MAAR and those contained in the draft Manual, agreed that RMAs of the Asia/Pacific Region should adopt the MMRs as recommended by ICAO and contained in the Manual. RASMAG/2 noted that the draft RMA Manual requirements were being reviewed and any updating would be taken into account by all RMAs concerned.

2.2 As the draft manual reviewed by RASMAG/2 has now been updated and published, the MMRs contained at Appendix E to the Manual have been reproduced as **Attachment B** to this paper for review. An electronic copy of the complete Manual will be available for consideration during the RASMAG/3 meeting.

**3 ACTION BY THE MEETING**

3.1 The meeting is invited to:

- a) note the introduction of the ICAO *Manual of Operating Procedures and Practices for Regional Monitoring Agencies in relation to the use of a 300m (1000 ft) Vertical Separation Minimum above FL290*, and
- b) review the minimum monitoring requirements contained at Appendix E to the Manual.

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**RMA Manual**

*Manual of Operating Procedures and Practices for Regional  
Monitoring Agencies in relation to the use of a 300 m  
(1 000 ft) Vertical Separation Minimum above FL 290*

*First Edition— 2004*

## FOREWORD

The requirements and procedures for the introduction of 300 m (1000 ft) vertical separation between FL290 and FL 410, generally referred to as the reduced vertical separation minimum (RVSM) were developed by the Review of the General Concept of Separation Panel (RGCSPP), which has since been renamed the Separation and Airspace Safety Panel (SASP). The provisions necessary for the application of RVSM were incorporated in Annex 2 — *Rules of the Air*, Annex 6 — *Operation of Aircraft*, Annex 11 — *Air Traffic Services* and the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444). More detailed guidance material was provided in the *Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive* (Doc 9574)<sup>1</sup>.

In order to ensure that the overall safety objectives for the air traffic services (ATS) system can be met, all aircraft operating in airspace where RVSM is implemented are required to hold an approval, issued by the State of the Operator or State of Registry as appropriate, indicating that they meet all the technical and operational requirements for such operations. This requirement, and the responsibility of States with regard to the issuance of these approvals, are specified in Annex 6, Part I — *International Commercial Air Transport — Aeroplanes*, 7.2.3 b) and Annex 6, Part II — *International General Aviation — Aeroplanes*, 7.2.3 b).

Doc 9574 indicates that there is a need for system performance monitoring during both implementation planning and the post-implementation operational use of RVSM. The principles and procedures for monitoring are described in Chapter 6 of Doc 9574. In all regions where RVSM has been implemented, Regional Monitoring Agencies (RMA) have been established, by the appropriate Planning and Implementation Regional Groups (PIRGs), to undertake these functions. The objectives of the RVSM monitoring programme include, inter alia:

- a) verification that the RVSM approval process remains effective;
- b) verification that the target level of safety will be met on implementation of RVSM, and will continue to be met thereafter;

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<sup>1</sup> *This Note applies only to the unedited version being made available via ICAO-Net. State letter AN 13/13.1-04/71 of 30 June 2004 circulated a proposal for amendments to Annex 6, Parts I and II, and Annex 11, relating to aircraft height-keeping performance in RVSM airspace, the need for height monitoring, and the role of RMAs. The new provisions in this amendment proposal already exist as guidance material in Doc 9574, and are in addition to the existing provisions relating to RVSM in these Annexes. The purpose of the amendments is to raise this material to the status of Standards. Because it is expected that the new Standards will be applicable by the time this manual is published, and for completeness, any references to these provisions in the manual refer to the expected new Annex provisions. Readers should bear in mind that their expected applicability date as Standards is 24 November 2005.*

- c) monitoring the effectiveness of the altimetry system modifications which have been implemented to enable aircraft to meet the required height-keeping performance criteria; and
- d) evaluation of the stability of altimetry system error (ASE).

This manual was developed to provide guidance for RMAs in the performance of these functions.

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**APPENDIX E**

**MINIMUM MONITORING REQUIREMENTS**

Monitoring prior to the issue of RVSM approval is not a requirement. However, operators should be prepared to submit monitoring plans to their State aviation authority to demonstrate how they intend to meet the requirements specified in the table below. Monitoring in accordance with this table may be carried out:

- a) pre-RVSM-implementation, once the aircraft has received RVSM airworthiness approval;
- b) post-RVSM-implementation, only after the aircraft operator has been approved for RVSM operations.

Table E-1. Minimum monitoring requirements

MONITORING IS REQUIRED IN ACCORDANCE WITH THIS CHART		
MONITORING PRIOR TO THE ISSUE OF RVSM APPROVAL IS <u>NOT</u> A REQUIREMENT		
CATEGORY	AIRCRAFT TYPE	MINIMUM OPERATOR MONITORING FOR EACH AIRCRAFT GROUP
1	<p>GROUP APPROVED: DATA INDICATES COMPLIANCE WITH THE RVSM MASPS</p> <p>[A30B, A306], [A312 (GE) A313(GE)], [A312 (PW) A313(PW)], A318, [ A319, A320, A321], [A332, A333], [A342, A343], A345, A346</p> <p>B712, [ B721, B722], B732, [B733, B734, B735], B737(Cargo), [B736, B737/BBJ, B738/BBJ, B739], [B741, B742, B743], B745, B744 (5" Probe), B744 (10" Probe), B752, B753, [B762, B763], B764, B772, B773</p> <p>CL60(600/601), CL60(604), C560, [CRJ1, CRJ2], CRJ7, DC10, F100, GLF4, GLF5, L780, MD10, MD11, MD80 (All series), MD90, T154</p>	<p>10% or two airframes from each fleet* of an operator to be monitored as soon as possible but not later than 6 months after the issue of RVSM approval and thereafter as directed by the RMA.</p> <p>* <i>Note.</i> — For the purposes of monitoring, aircraft within parenthesis [ ] may be considered as belonging to the same fleet. For example, an operator with six A332 and four A333 aircraft may monitor one A332 and one A333 or two A332 aircraft or two A333 aircraft.</p>

	CATEGORY	AIRCRAFT TYPE	MINIMUM OPERATOR MONITORING FOR EACH AIRCRAFT GROUP
2	GROUP APPROVED: INSUFFICIENT DATA ON APPROVED AIRCRAFT	Other group aircraft other than those listed above including:  A124, A5TR, B703, B731, BE20, BE40, C500, C25A, C25B, C525, C550**, C56X, C650, C750, CRJ9, [DC86, DC87], DC93, DC95, [E135, E145], F2TH, [FA50 FA50EX], F70, [F900, F900EX], FA20, FA10, GLF3(II), GLF3(III), GLF3, GALX, GLEX, H25B(700), H25B(800), H25C, IL62, IL76, IL86, IL96, J328, L101, L29(2), L29(731), L331, [LJ35, LJ36], L345, LJ55, SBR1, T134, T204, P180, FRM1, YK42	60% of airframes from each fleet of an operator or individual monitoring, as soon as possible but not later than 6 months after the issue of RVSM approval and thereafter as directed by the RMA.  ** Refer to aircraft group table for detail on C550 monitoring.
3	NON-GROUP	Non-group approved aircraft	100% of aircraft shall be monitored as soon as possible but not later than 6 months after the issue of RVSM approval.

Note.— The above table represents the minimum monitoring requirements, but RMDs may increase these requirements at their discretion.

Table E-2. Aircraft type groups for aircraft certified under group approval provisions

Monitoring Group	A/C ICAO	A/C Type	A/C Series
A124	A124	AN-124 RUSLAN	ALL SERIES
A300	A306 A30B	A300 A300	600, 600F, 600R, 620, 620R, 620RF B2-100, B2-200, B4-100, B4-100F, B4-120, B4-200, B4-200F, B4-220, C4-200
A310-GE	A310	A310	200, 200F, 300, 300F
A310-PW	A310	A310	220, 220F, 320
A318	A318	A318	ALL SERIES
A320	A319 A320 A321	A319 A320 A321	CJ, 110, 130 110, 210, 230 110, 130, 210, 230
A330	A332, A333	A330	200, 220, 240, 300, 320, 340
A340	A342, A343,	A340	210, 310
A345	A345	A340	540
A346	A346	A340	640
A3ST	A35T	A300	600R ST BELUGA



Monitoring Group	A/C ICAO	A/C Type	A/C Series
AN72	AN72	AN-74, AN-72	ALL SERIES
ASTR	ASTR	1125 ASTRA	ALL SERIES
ASTR-SPX	ASTR	ASTR SPX	ALL SERIES
AVRO	RJ1H, RJ70, RJ85	AVRO	RJ70, RJ85, RJ100
B712	B712	B717	200
B727	B721 B722	B727	100, 100C, 100F, 100QF, 200, 200F
B732	B732	B737	200, 200C
B737CL	B733 B734 B735	B737	300, 400, 500
B737NX	B736 B737 B738 B739	B737 B737 B737 B737	600 700, 700BBJ 800, BBJ2 900
B737C	B737	B737	700C
B747CL	B741 B742 B743	B747	100, 100B, 100F, 200B, 200C, 200F, 200SF, 300
B74S	B74S	B747	SR, SP
B744-5	B744	B747	400, 400D, 400F (With 5 inch Probes)
B744-10	B744	B747	400, 400D, 400F (With 10 inch Probes)
B752	B752	B757	200, 200PF
B753	B753	B757	300
B767	B762 B763	B767	200, 200EM, 200ER, 200ERM, 300, 300ER, 300ERF
B764	B764	B767	400ER
B772	B772	B777	200, 200ER, 300, 300ER
B773	B773	B777	300, 300ER
BE40	BE40	BEECHJET 400A	ALL SERIES
BE20	BE20	BEECH 200 -KINGAIR	ALL SERIES
C500	C500	500 CITATION, 500 CITATION I, 501 CITATION I SINGLE PILOT	ALL SERIES
C525	C525	525 CITATIONJET, 525 CITATIONJET I	ALL SERIES

Monitoring Group	A/C ICAO	A/C Type	A/C Series
C525-II	C25A	525A CITATIONJET II	ALL SERIES
C525 CJ3	C25B	CITATIONJET III	ALL SERIES
C550-552	C550	552 CITATION II	ALL SERIES
C550-B	C550	550 CITATION BRAVO	ALL SERIES
C550-II	C550	550 CITATION II, 551 CITATION II SINGLE PILOT	ALL SERIES
C550-SII	C550	5550 CITATION SUPER II	ALL SERIES
C560	C560	560 CITATION V, 560 CITATION V ULTRA, 560 CITATION V ULTRA ENCORE	ALL SERIES
C56X	C56X	560 CITATION EXCEL	ALL SERIES
C650	C650	650 CITATION III, 650 CITATION VI, 650 CITATION VII	ALL SERIES
C750	C750	750 CITATION X	ALL SERIES
CARJ	CRJ1, CRJ2	REGIONALJET	100, 200, 200ER, 200LR
CRJ-700	CRJ7	REGIONALJET	700
CRJ-900	CRJ9	REGIONALJET	900
CL600	CL60	CL-600 CL-601	CL-600-1A11 CL-600-2A12, CL-600-2B16
CL604	CL60	CL-604	CL-600-2B16
BD100	CL30	CHALLENGER 300	ALL SERIES
BD700	GL5T	GLOBAL 5000	ALL SERIES
CONC	CONC	CONCORDE	ALL SERIES
DC10	DC10	DC-10	10, 10F, 15, 30, 30F, 40, 40F
DC86-7	DC86, DC87	DC-8	62, 62F, 72, 72F
DC93	DC93	DC-9	30, 30F
DC95	DC95	DC-9	SERIES 51
E135-145	E135, E145	EMB-135, EMB-145	ALL SERIES
F100	F100	FOKKER 100	ALL SERIES
F2TH	F2TH	FALCON 2000	ALL SERIES
F70	F70	FOKKER 70	ALL SERIES
F900	F900	FALCON 900, FALCON 900EX	ALL SERIES
FA10	FA10	FALCON 10	ALL SERIES

Monitoring Group	A/C ICAO	A/C Type	A/C Series
FA20	FA20	FALCON 20 FALCON 200	ALL SERIES
FA50	FA50	FALCON 50, FALCON 50EX	ALL SERIES
GALX	GALX	1126 GALAXY	ALL SERIES
GLEX	GLEX	BD-700 GLOBAL EXPRESS	ALL SERIES
GLF2	GLF2	GULFSTREAM II (G-1159),	ALL SERIES
GLF2B	GLF2	GULFSTREAM IIB (G-1159B)	ALL SERIES
GLF3	GLF3	GULFSTREAM III (G-1159A)	ALL SERIES
GLF4	GLF4	GULFSTREAM IV (G-1159C)	ALL SERIES
GLF5	GLF5	GULFSTREAM V (G-1159D)	ALL SERIES
H25B-700	H25B	BAE 125 / HS125	700B
H25B-800	H25B	BAE 125 / HAWKER 800XP, BAE 125 / HAWKER 800, BAE 125 / HS125	ALL SERIES/A, B/800
H25C	H25C	BAE 125 / HAWKER 1000	A , B
IL86	IL86	IL-86	NO SERIES
IL96	IL96	IL-96	M , T, 300
J328	J328	328JET	ALL SERIES
L101	L101	L-1011 TRISTAR	1 (385-1), 40 (385-1), 50 (385-1), 100, 150 (385-1-14), 200, 250 (385-1-15), 500 (385-3)
L29B-2	L29B	L-1329 JETSTAR 2	ALL SERIES
L29B-731	L29B	L-1329 JETSTAR 731	ALL SERIES
LJ31	LJ31	LEARJET 31	NO SERIES, A
LJ35/6	LJ35 LJ36	LEARJET 35 LEARJET 36	NO SERIES, A
LJ40	LJ40	LEARJET 40	ALL SERIES
LJ45	LJ45	LEARJET 45	ALL SERIES
LJ55	LJ55	LEARJET 55	NO SERIES B, C
LJ60	LJ60	LEARJET 60	ALL SERIES
MD10	MD10	MD-10	ALL SERIES
MD11	MD11	MD-11	COMBI, ER, FREIGHTER, PASSENGER
MD80	MD81,	MD-80	81, 82, 83, 87, 88

Monitoring Group	A/C ICAO	A/C Type	A/C Series
	MD82, MD83, MD87, MD88		
MD90	MD90	MD-90	30, 30ER
P180	P180	P-180 AVANTI	ALL SERIES
PRM1	PRM1	PREMIER 1	ALL SERIES
T134	T134	TU-134	A, B
T154	T154	TU-154	A, B, M, S
T204	T204, T224, T234	TU-204, TU-224, TU-234	100, 100C, 120RR, 200, C
YK42	YK42	YAK-42	ALL SERIES

*Note.— This list is not considered exhaustive.*