



International Civil Aviation Organization
UNDP/ICAO Regional Project RLA/98/003
Transition to CNS/ATM Systems in the CAR and SAM Regions
Tenth Meeting/Workshop of ATM Authorities and Planners
of the CAR/SAM Regions (AP/ATM/10)

(Lima, Peru, 10 -14 May 2005)

Agenda Item 3: Review of RVSM issues in the CAR/SAM Regions

c) Safety and Airspace Monitoring Working Group (SAM/WG)

Update of the Minimum Monitoring Requirements (MMR) Chart

(Prepared by CARSAMMA/NAARMO/EUROCONTROL)

(Presented by CARSAMMA)

Summary

This working paper presents an update to the Minimum Monitoring Requirements (MMR) chart according to the last coordination meeting among CARSAMMA/NAARMO-PARMO and EUROCONTROL.

1. Introduction

1.1. The Minimum Monitoring Requirements (MMR) chart is a list that describes the pre-requisites in terms of the number of aircraft to be monitored for a specific aircraft/operator in connection with RVSM approval.

1.2. As a living document, the MMR chart shall be updated by the RMAs when changes in the status of some types of aircraft occur.

1.3. During the period 26-28 April 2005 CARSAMMA, PARMO/NAARMO and EUROCONTROL, the RMA established in the Caribbean and South American Regions, Pacific and North American Regions and Europe had an informal coordination meeting in the CARSAMMA facilities in Brazil.

1.4. One of the objectives of the meeting was to harmonize procedures according to the duties and responsibilities of the RMAs, as established in the RMA Manual.

1.5. The RMAs plan to continue to have meetings to keep all the common documents and procedures harmonized.

2. **Discussion**

2.1. In the **Appendix** to this paper there is a proposal to update the MMR chart, according to the results of the RMA informal meeting.

2.2. The idea is to keep the MMR chart updated according to the development of the transport industry and the amount of data available to verify the height keeping performance of the aircraft.

2.3. The main changes are the inclusion of new types of aircraft produced by the industries and the change in some groups of aircraft according to the industry information.

3. **Recommended actions**

3.1 States are requested to:

- a) Take note of the new MMR chart.
- b) Adopt the new MMR chart in their RVSM approval process.

Appendix A

CARIBBEAN AND SOUTH AMERICAN RVSM MINIMUM MONITORING REQUIREMENTS

EFFECTIVE APRIL 27, 2005

Changes from the April 21, 2003 edition: E170 and AVRO group [RJ70, RJ85, RJ1H] are added to Monitoring Category 2 on the chart. See yellow highlight.

1. UPDATE OF MONITORING REQUIREMENTS CHART AND WEBSITE. The Minimum Monitoring Requirements Chart is a living document. As significant performance data is obtained on specific aircraft groups or types, the CARSAMMA will update the minimum monitoring requirements for those types or groups. Experience has shown that performance data will normally justify reducing the requirements. Updates to the Minimum Monitoring Requirements chart, will be posted on the CARSAMMA RVSM Documentation webpage. The RVSM Documentation page can be accessed from the CARSAMMA RVSM Homepage:

<http://www.cgna.gov.br/carsamma>

2. INITIAL MONITORING. All operators that operate or intend to operate in airspace where RVSM is applied are required to participate in the RVSM monitoring program. The attached chart of monitoring requirements establishes requirements for initial monitoring associated with the RVSM approval process. In their application to the appropriate civil aviation authority for RVSM approval, operators must show a plan for meeting the applicable initial monitoring requirements.

3. AIRCRAFT STATUS FOR MONITORING. Aircraft engineering work that is required to bring aircraft into compliance with RVSM standards must be completed prior to the aircraft being monitored. Any exception to this rule will be coordinated with the responsible civil aviation authority.

4. APPLICABILITY OF MONITORING FROM OTHER REGIONS. Monitoring data obtained in conjunction with RVSM monitoring programs from other regions can be used to meet Caribbean and South American RVSM monitoring requirements. The Caribbean and South American Monitoring Agency (CARSAMMA), which is responsible for administering the Caribbean and South American RVSM monitoring program, has access to monitoring data from other regions and will inform other civil aviation authorities and operators concerning satisfaction of Caribbean and South American monitoring requirements.

5. MONITORING PRIOR TO THE ISSUE OF RVSM OPERATIONAL APPROVAL IS NOT A REQUIREMENT. Operators should submit monitoring plans to the responsible civil aviation authority that show how they intend to meet the requirements specified in the table below. Monitoring will be carried out in accordance with this table.

6. AIRCRAFT GROUPS NOT LISTED ON THE CHART. Contact the CARSAMMA for clarification if an aircraft group is not listed on the Minimum Monitoring Requirements chart or for clarification of other monitoring related issues. An aircraft group not listed in the table below will probably be subject to Category 2 monitoring requirements.

7. TABLE OF MONITORING GROUPS. A table of monitoring groups is provided in the pages following the Minimum Monitoring Requirements Chart. The table shows the aircraft types and series that are grouped together for operator monitoring purposes.

8. TRAILING CONE DATA. Altimetry System Error estimations developed using Trailing Cone data collected during RVSM certification flights can be used to fulfill monitoring requirements. It must be documented, however, that aircraft RVSM systems were in the approved RVSM configuration for the flight.

9. MONITORING OF AIRFRAMES THAT ARE RVSM COMPLIANT ON DELIVERY. If an operator adds new RVSM compliant airframes of a type for which it already has RVSM operational approval and has completed monitoring requirements for the type in accordance with the attached chart, the new airframes are not required to be monitored. If an operator adds new RVSM compliant airframes of an aircraft type for which it has NOT previously received RVSM operational approval, then the operator should complete monitoring in accordance with the attached chart.

10. FOLLOW-ON MONITORING. Monitoring is an on-going program that will continue after RVSM implementation. **The CARSAMMA will coordinate a follow-on monitoring program with industry after implementation.**

**CARIBBEAN AND SOUTH AMERICAN RVSM
 MINIMUM MONITORING REQUIREMENTS CHART**

EFFECTIVE APRIL 27, 2005

MONITORING IS REQUIRED IN ACCORDANCE WITH THIS CHART, HOWEVER, IT IS NOT REQUIRED TO BE COMPLETED PRIOR TO OPERATIONAL APPROVAL		
MONITORING CATEGORY	AIRCRAFT TYPE	MINIMUM OPERATOR MONITORING FOR EACH AIRCRAFT GROUP
<p>1</p> <p>Group approved <u>and</u> monitoring data indicates performance in accordance with RVSM standards.</p> <p>Group Definition: aircraft have been manufactured to a nominally identical design and build and for RVSM airworthiness approval fall into a group established in an RVSM certification document (e.g., Service Bulletin, Supplemental Type Certificate, Type Certificate Data Sheet).</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], [B733, B734, B735], B737 (Cargo) [B736, B737/BBJ, B738/BBJ, B739], [B741, B742, B743], B74S, 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, [E135, E145], F100, GLF4, GLF5, LJ60,</p> <p>L101, MD10, MD11, MD80 (All series), MD90</p>	<p>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 operational approval or not later than 6 months after the start of Caribbean and South American RVSM operations, whichever occurs later.</p> <p>* <i>Note. For the purposes of monitoring, aircraft within parenthesis [] may be considered as belonging to the same monitoring group. 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.</i></p>
<p>2</p> <p>Group approved but insufficient monitoring data collected to move aircraft to Monitoring Category 1. Group definition applies.</p>	<p>Other group aircraft other than those listed above including:</p> <p>A124, ASTR, B703, B731, B732, BE20, BE40, C500, [C25A, C25B], C525, C550**, C56X, C650, C750, CRJ9, D328, [DC86, DC87], DC93, DC94, DC95, E170, F2TH, [FA50 FA50EX], F70, [F900, F900EX], FA20, GLF2(II), GLF2(IIB), GLF3, GALX, GLEX, H25B(700), H25B(800), H25C, IL62, IL76, IL86, IL96, J328, L29B(2), L29B(731), LJ31, [LJ35, LJ36], LJ45, LJ55, [RJ70, RJ85, RJ1H], SBR1, T134, T154, T204, TBM7, P180, PRM1, WW24, YK42</p>	<p>60% of airframes from each fleet of an operator (round up if fractional), as soon as possible but not later than 6 months after the issue of RVSM operational approval or not later than 6 months after the start of Caribbean and South American RVSM operations, whichever occurs later.</p> <p>** Refer to aircraft group table for detail on C550 monitoring</p>
<p>3</p> <p>Non-Group</p> <p>Non-group Definition: aircraft that do not fall under the group definition <u>and</u> for RVSM airworthiness approval are presented as an individual airframe.</p>	<p>Non-group approved aircraft</p>	<p>100% of aircraft shall be monitored as soon as possible but not later than 6 months after the issue of RVSM operational approval or not later than 6 months after the start of Caribbean and South American RVSM operations, whichever occurs later.</p>

Monitoring Groups for Aircraft Certified under Group Approval Requirements

Monitoring Group	ICAO Designator	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	A3ST	A300	600R ST BELUGA
AN72	AN72	AN-74, AN-72	ALL SERIES
ASTR	ASTR	1125 ASTRA	ALL SERIES
ASTR-SPX	ASTR	ASTR SPX	ALL SERIES
AVRO	RJ70, RJ85, RJ1H	AVRO	RJ70, RJ85, RJ100
B712	B712	B717	200
B727	B721 B722	B727	100, 100C, 100F,100QF, 200, 200F
B732	B732	B737	200, 200C
B737 (Classic)	B733 B734 B735	B737	300, 400, 500
B737 New Generation (NG)	B736 B737 B738 B739	B737 B737 B737 B737	600 700, 700BBJ 800 900
B737 (Cargo)	B737	B737	700C
B747Classic (CL)	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)

Monitoring Group	ICAO Designator	A/C Type	A/C Series
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
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	S550 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

Monitoring Group	ICAO Designator	A/C Type	A/C 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
E170	E170	EMB-170	
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
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

Monitoring Group	ICAO Designator	A/C Type	A/C Series
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, MD82, MD83, MD87, MD88	MD-80	81, 82, 83, 87, 88
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