



International Civil Aviation Organization

Middle East Regional Monitoring Agency Board

Twelfth Meeting (MIDRMA Board/12)
(Kuwait, 17–19 December 2012)

Agenda Item 4: RVSM Monitoring and related Technical Issues

HEIGHT MONITORING ACTIVITIES

(Presented by MIDRMA)

SUMMARY

This working paper reflects the MIDRMA height monitoring activities for RVSM approved aircraft registered in the Middle East Region.

Action by the meeting is at paragraph 3.

REFERENCES

- MIDRMA Board/11 Report.
- MMR Table 2012.

1. INTRODUCTION

1.1 The MIDRMA has considered the new requirements for the long-term height monitoring and believe, along with the support of MIDANPIRG, that the RVSM Minimum Monitoring Requirements (MMRs) adopted for global application by all ICAO Regional Monitoring Agencies (RMAs) shall be the basis for implementation of the Annex 6.

1.2 The Minimum Monitoring Requirements (MMR) for each MIDRMA Member State was published in the MID RVSM Safety Mentoring Report 2012 and all monitoring requirements were addressed to each MIDRMA member states.

2. DISCUSSION

2.2 The MIDRMA consider height monitoring a high priority safety issue and failure to respond to the required height monitoring may jeopardise safety of aircraft as well as risk the implementation of RVSM. The MIDRMA continues to coordinate very closely with other RMAs to exchange all available height monitoring results, particularly with the Euro RMA who is providing a generous support to the MIDRMA for any MID RVSM Approved aircraft flying over their Height Monitoring Units (HMUs).

2.3 The new version of the Enhanced GMU is expected to be released by the CSSI very soon and the MIDRMA has officially requested to purchase 2 units, provided the recorded data will be officially analysed and validated by the CSSI.

2.4 The MIDRMA managed to conduct GMU monitoring for 82 aircraft since the last MIDRMA Board meeting which increased the percentage of the monitored aircraft registered in the MID Region from **54%** to **85%** with known height monitoring results.

2.5 The meeting should note that the MIDRMA only had access to one GMU machine and therefore required maximum personal contribution whilst encountering logistical challenges given the increase in demand for GMU monitoring over this 14 month period.

2.6 ICAO did not specify the minimum percentage required by each state/region in order to be considered compliant with Annex 6, therefore the MIDRMA would like to propose to the meeting that 98% of the MID Region RVSM Approved aircraft must be monitored and states must ensure their compliance with Annex 6 by coordinating with the MIDRMA to achieve all monitoring requirements reflected in the latest MMR.

2.7 The meeting is invited to agree with the following Draft Conclusion:

***DRAFT CONCLUSION 12/XX: THE MID REGION MINIMUM
PERCENTAGE OF AIRCRAFT WITH
KNOWN HEIGHT MONITORING RESULTS.***

That, 98% of the MID Region RVSM Approved aircraft must be monitored and States must ensure their compliance with Annex 6 by coordinating with the MIDRMA to achieve all monitoring requirements reflected in the MID region MMR.

2.8 The MIDRMA addressed a problem to the RMA Coordination Group (RMACG/7) meeting which was held in Beijing, China, 28 May – 1 June 2012 concerning new aircraft granted RVSM approval after the publication of the MID MMR. The new added RVSM approvals are continuously changing and amending the published table is keeping the MIDRMA extremely busy. Presently the Middle East CAA Airworthiness Inspectors and Airline Operators are required to know the height monitoring requirements in order to obtain 24 month RVSM approvals. This procedure is due to the belief that it is an ICAO requirement, however discussions with the European RMA have resulted in the consensus that no such rules exists concerning this issue.

2.9 Both ICAO documents 9574 and 9937 do not mention the height monitoring requirements for the new added RVSM approvals and, because the MIDRMA believes that this is a common problem facing all RMAs, the meeting was invited to discuss this issue and requested to agree on a procedure to be followed by all RMAs.

2.10 The RMACG/7 meeting agreed that, the RMA concerned shall address this issue to their PIRG and adopt the suitable procedure for their region concerning the monitoring of aircraft that are RVSM compliant on delivery. Thus the MIDRMA requests the meeting to adopt the MMR conditions attached to the MMR table (and found in **Appendix A** to this working paper) and invites the meeting to agree to the following Draft Conclusion:

***DRAFT CONCLUSION 12/XX: CONDITIONS APPLICABLE TO THE MID
REGION MINIMUM MONITORING
REQUIREMENT***

That, the conditions attached to the MMR table published by the MIDRMA is endorsed by the MIDRMA Board and considered to be part of height monitoring requirements for the MID Region.

3. ACTION BY THE MEETING:

- 3.1 The meeting is invited to discuss and endorse
- a) Draft Conclusion XX/12 in 2.7; and
 - b) Draft Conclusion XX/12 in 2.10

APPENDIX A

MID REGION RVSM MINIMUM MONITORING REQUIREMENTS - CONDITIONS

1. **UPDATE OF MONITORING REQUIREMENTS TABLE AND WEBSITE.** As significant data is obtained, monitoring requirements for specific aircraft types may change. When Table 1 below, is updated, The MIDRMA will advise all State members. The updated table will be posted on the MIDRMA website.

2. **MONITORING PROGRAM.** All operators that operate or intend to operate in the Middle East Region airspace where RVSM is applied are required to participate in the regional RVSM monitoring programme. Table 1 addresses requirements for monitoring the height-keeping performance of aircraft in order to meet regional safety objectives. In their application to the appropriate State authority for RVSM approval, operators must show a plan for meeting the applicable monitoring requirements. Initial monitoring should be completed as soon as possible but not later than 6 months after the issue of RVSM approval, the State of Registry that had issued an RVSM approval to an operator would be required to establish a requirement which ensures that a minimum of two aeroplanes of each aircraft type grouping of the operator have their height-keeping performance monitored, at least once every two years or within intervals of 1000 flight hours per aeroplane, whichever period is longer.

3. **AIRCRAFT STATUS FOR MONITORING.** Aircraft engineering work that is required for the aircraft to receive RVSM airworthiness approval must be completed prior to the aircraft being monitored. Any exception to this rule will be coordinated with the State authority.

4. **APPLICABILITY OF MONITORING FROM OTHER REGIONS.** Monitoring data obtained in conjunction with RVSM monitoring programmes from other Regions can be used to meet regional monitoring requirements. The RMAs, which are responsible for administering the monitoring programme, have access to monitoring data from other Regions and will coordinate with States and operators to inform them on the status of individual operator 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 and to the MIDRMA that show how they intend to meet the requirements specified in Table1. Monitoring will be carried out in accordance with this table.

6. **AIRCRAFT GROUPS NOT LISTED IN TABLE 1.** Contact the MIDRMA for clarification if an aircraft group is not listed in Table 1 or for clarification of other monitoring related issues. An aircraft group not listed in Table 1 will probably be subject to Category 2 or Category 3 monitoring requirements.

7. **TABLE OF MONITORING GROUPS.** Table 2 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 table, 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 must complete monitoring in accordance with the attached table.

Table 1: MONITORING REQUIREMENTS TABLE

MONITORING IS REQUIRED IN ACCORDANCE WITH THIS TABLE			
MONITORING PRIOR TO THE ISSUE OF RVSM APPROVAL IS <u>NOT</u> A REQUIREMENT			
CATEGORY		AIRCRAFT GROUP	MINIMUM OPERATOR MONITORING FOR EACH AIRCRAFT GROUP
1	GROUP APPROVED: DATA INDICATES COMPLIANCE WITH THE RVSM MASPS	A124, A300, A306, A310-GE, A310-PW, A318, A320, A330, A340, A345, A346, A3ST, AVRO, B712, B727, B737CL, B737C, B737NX, B747CL, B74S, B744-5, B744-10, B752, B753, B767, B764, B772, B773, BD100, CL600, CL604, CL605, C17, C525, C560, C56X, C650, C680, C750, CARJ, CRJ7, CRJ9, DC10, E135-145, E170-190, F100, F900, FA10, GALX, GLEX, GLF4, GLF5, H25B-800, J328, KC135, LJ40, LJ45, LJ60, MD10, MD11, MD80, MD90, PRM1, T154	Two airframes from each fleet* of an operator to be monitored
2	GROUP APPROVED: INSUFFICIENT DATA ON APPROVED AIRCRAFT	Other group aircraft other than those listed above including: A148, A158 , A380, A400 , AC90 , AC95, AN72, ASTR, ASTR-SPX, B701, B703, B703-E3, B731, B732, B787 , BD700, BE20, BE30, BE40, B744-LCF, B748, C130, C500, C25A, C25B, C25C, C441, C5, C510, C550-552, C550-B, C550-II, C550-SII, CRJ10 , D328, DC85, DC86-87, DC91 , DC93, DC94 DC95, E50P, E55P , EA50, F2TH, F70, FA20, FA50, FA7X, G150, G250 , GLF2, GLF2B, GLF3, GLF6 , H25B-700, H25B-750, H25C, HA4T, IL62, IL76, IL86, IL96, L101, LJ23 , LJ24 , LJ25 , LJ28 , L29B-2, L29B-731, LJ31, LJ35-36, LJ55, MU30, P180, PAY4 , PC12, SB20, SBR1, SBR2, T134, T204, T334, TBM, WW24, YK42	60% of airframes (round up if fractional) from each fleet of an operator or individual monitoring
3	Non-Group	Aircraft types for which no generic compliance method exists: BA11, R722, SJ30, STAR, B720, A225, GLEX-ASTOR, GLF5-AEW, VC-10, GSPN, B74S-SOFIA	100% of aircraft shall be monitored

Table 2: MONITORING GROUPS FOR AIRCRAFT CERTIFIED UNDER GROUP APPROVAL REQUIREMENTS

Monitoring Group	A/C ICAO	A/C Type	A/C Series
A124	A124	AN-124 RUSLAN	ALL SERIES
A148	A148	AN-148	100
A158	A158	AN-158	
A300	A30B	A300	B2-100, B2-200, B4-100, B4-100F, B4-120, B4-200, B4-200F, B4-220, B4-220F, C4-200
A306	A306	A300	600, 600F, 600R, 620, 620R, 620RF
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 A330	200, 220, 240 300, 320, 340
A340	A342 A343	A340 A340	210 310
A345	A345	A340	500, 540
A346	A346	A340	600, 640
A380	A388	A380	800, 840, 860
A3ST	A3ST	A300	600R ST BELUGA
A400	A400	A400M	
AC90	AC90	COMMANDER 690 COMMANDER 840 COMMANDER 900	
AC95	AC95	AERO COMMANDER 695	A
AN72	AN72	AN-72 AN-74	ALL SERIES
ASTR	ASTR	1125 ASTRA	ALL SERIES
ASTR-SPX	ASTR	1125 ASTR SPX, G100	ALL SERIES
AVRO	RJ1H RJ70 RJ85	AVRO AVRO AVRO	RJ100 RJ70 RJ85
B701	B701	B707	100, 120B
B703	B703	B707	320, 320B, 320C
B703-E3	E3TF	B707	E-3

Monitoring Group	A/C ICAO	A/C Type	A/C Series
B712	B712	B717	200
B727	B721 B722	B727 B727	100, 100C, 100F, 100QF 200, 200F
B731	B731	B737	100
B732	B732	B737	200, 200C
B737CL	B733 B734 B735	B737 B737 B737	300 400 500
B737NX	B736 B737 B738 B739	B737 B737 B737 B737	600 700, BBJ 800, BBJ2 900
B737C	B737	B737	700C
B747CL	B741 B742 B743	B747 B747 B747	100, 100B, 100F 200B, 200C, 200F, 200SF 300
B74S	B74S B74R	B747	SR, SP
B744-5	B744 B74D	B747	400, 400D, 400F (With 5 inch Probes up to SN 25350)
B744-10	B744 B74D	B747	400, 400D, 400F (With 10 inch Probes from SN 25351)
B744-LCF	B744	B747	LCF
B748	B748	B747	8F, 81
B752	B752	B757	200, 200PF, 200SF
B753	B753	B757	300
B767	B762 B763	B767 B767	200, 200EM, 200ER, 200ERM, 300, 300ER, 300ERF
B764	B764	B767	400ER
B772	B772 B77L	B777	200, 200ER, 200LR, 200LRF
B773	B773 B77W	B777	300, 300ER
B787	B788 B789	B787-8 B787-9	
BD100	CL30	CHALLENGER 300	ALL SERIES
BD700	GL5T	GLOBAL 5000	ALL SERIES
BE20	BE20	200 KINGAIR	ALL SERIES
BE30	BE30 B350	B300 SUPER KINGAIR B300 SUPER KINGAIR 350	ALL SERIES
BE40	BE40	BEECHJET 400 BEECHJET 400A BEECHJET 400XP HAWKER 400XP	ALL SERIES

Monitoring Group	A/C ICAO	A/C Type	A/C Series
C130	C130	HERCULES	H, J
C17	C17	C-17 GLOBEMASTER 3	ALL SERIES
C441	C441	CONQUEST II	ALL SERIES
C5	C5	C5	ALL SERIES
C500	C500	500 CITATION 500 CITATION I 501 CITATION I SINGLE PILOT	ALL SERIES
C510	C510	MUSTANG	ALL SERIES
C525	C525	525 CITATIONJET 525 CITATIONJET I 525 CITATIONJET PLUS	ALL SERIES
C25A	C25A	525A CITATIONJET II	ALL SERIES
C25B	C25B	CITATIONJET III 525B CITATIONJET III	ALL SERIES
C25C	C25C	525C CITATIONJET IV	ALL SERIES
C550-552	C550	552 CITATION II (USN)	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 ENCORE	ALL SERIES
C56X	C56X	560 CITATION EXCEL	ALL SERIES
C650	C650	650 CITATION III 650 CITATION VI 650 CITATION VII	ALL SERIES
C680	C680	680 CITATION SOVEREIGN	
C750	C750	750 CITATION X	ALL SERIES
CARJ	CRJ1 CRJ2 CRJ2 CRJ2	REGIONALJET REGIONALJET CHALLENGER 800 CHALLENGER 850	100, 100ER, 200, 200ER, 200LR ALL SERIES ALL SERIES
CRJ7	CRJ7	REGIONALJET	700, 700ER, 700LR
CRJ9	CRJ9	REGIONALJET	900, 900ER, 900LR
CRJ10	CRJ10	REGIONALJET	1000ER

Monitoring Group	A/C ICAO	A/C Type	A/C Series
CL600	CL60	CL-600 CL-601	CL-600-ALL SERIES CL-601- ALL SERIES,
CL604	CL60	CL-604	CL-604- ALL SERIES
CL605	CL60	CL-605	CL-605- ALL SERIES
DC10	DC10	DC-10	10, 10F, 15, 30, 30F, 40, 40F
D328	D328	328 TURBOPROP	100
DC85	DC85	DC-8	50, 50F
DC86-87	DC86 DC87	DC-8 DC-8	61, 62, 63 71, 72, 73
DC91	DC91	DC-9	10, 15
DC93	DC93	DC-9	30, 30F
DC94	DC94	DC-9	40
DC95	DC95	DC-9	51
E135-145	E135 E145	EMB-135 EMB-145	ALL SERIES
E170-190	E170 E170 E190 E190	EMB-170 EMB-175 EMB-190 EMB-195	ALL SERIES
E50P	E50P	PHENOM 100	ALL SERIES
E55P	E55P	PHENOM 300	E55P
EA50	EA50	ECLIPSE	ALL SERIES
F100	F100	FOKKER 100	ALL SERIES
F2TH	F2TH	FALCON 2000 FALCON 2000-EX FALSON 2000LX	ALL SERIES
F70	F70	FOKKER 70	ALL SERIES
F900	F900	FALCON 900 FALCON 900DX 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
FA7X	FA7X	FALCON 7X	ALL SERIES
G150	G150	G150	ALL SERIES
G250	G250	G250	
GALX	GALX	1126 GALAXY G200	ALL SERIES
GLEX	GLEX	BD-700 GLOBAL EXPRESS	ALL SERIES
GLF2	GLF2	GULFSTREAM II (G-1159)	ALL SERIES
GLF2B	GLF2	GULFSTREAM IIB (G-	ALL SERIES

Monitoring Group	A/C ICAO	A/C Type	A/C Series
		1159B)	
GLF3	GLF3	GULFSTREAM III (G-1159A)	ALL SERIES
GLF4	GLF4	GULFSTREAM IV (G-1159C) G300 G350 G400 G450	ALL SERIES
GLF5	GLF5	GULFSTREAM V (G-1159D) G500 G550	ALL SERIES
GLF6	GLF6	G650	
H25B-700	H25B	BAE 125 / HS125	700A, 700B
H25B-750	H25B	HAWKER 750	ALL SERIES
H25B-800	H25B	BAE 125 / HS125 HAWKER 800XP HAWKER 800XPI HAWKER 800 HAWKER 850XP HAWKER 900XP HAWKER 950XP	800A, 800B ALL SERIES
H25C	H25C	HAWKER 1000	ALL SERIES
HA4T	HA4T	HAWKER 4000	ALL SERIES
IL62	IL62	ILYUSHIN-62	ALL SERIES
IL76	IL76	ILYUSHU-76	ALL SERIES
IL86	IL86	ILYUSHIN-86	ALL SERIES
IL96	IL96	ILYUSHIN-96	ALL SERIES
J328	J328	328JET	ALL SERIES
KC135	B703	KC-135	ALL SERIES
L101	L101	L-1011 TRISTAR	ALL SERIES
L29B-2	L29B	L-1329 JETSTAR 2	ALL SERIES
L29B-731	L29B	L-1329 JETSTAR 731	ALL SERIES
LJ23	LJ23	LEARJET 23	
LJ24	LJ24	LEARJET 24	
LJ25	LJ25	LEARJET 25	
LJ28	LJ28	LEARJET 28 LEARJET 29	
LJ31	LJ31	LEARJET 31	ALL SERIES
LJ35-36	LJ35	LEARJET 35 LEARJET 36	ALL SERIES ALL SERIES
LJ40	LJ40	LEARJET 40	ALL SERIES
LJ45	LJ45	LEARJET 45	ALL SERIES

Monitoring Group	A/C ICAO	A/C Type	A/C Series
LJ55	LJ55	LEARJET 55	ALL SERIES
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 MD-80 MD-80 MD-80 MD-80	81 82 83 87 88
MD90	MD90	MD-90	30, 30ER
MU30	MU30	MU-300 DIAMOND	1A
P180	P180	P-180 AVANTI	ALL SERIES
PAY4	PAY4	PA-42	1000 CHEYENNE
PC12	PC12	PC-12	ALL SERIES
PRM1	PRM1	PREMIER 1	ALL SERIES
SB20	SB20	SAAB 2000	ALL SERIES
SBR1	SBR1	SABRELINER 40 SABRELINER 60 SABRELINER 65	ALL SERIES
SBR2	SBR2	SABRELINER 80	ALL SERIES
T134	T134	TU-134	A, B
T154	T154	TU-154	A, B, M, S
T204	T204	TU-204 TU-224 TU-234	100, 100C, 120RR 200, 214, C
T334	T334	TU-334	ALL SERIES
TBM	TBM7 TBM8	TBM-700 TBM-850	ALL SERIES
WW24	WW24	1124 WESTWIND	ALL SERIES
YK42	YK42	YAK-42	ALL SERIES

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