RVSM HEIGHT MONITORING GUIDE FOR U.S. OPERATORS

Contents

Introduction 2
Who must participate in RVSM Monitoring 2
What is the minimum number of aircraft required to be monitored by each operator 3
Completion of Monitoring Requirement 3
How do I get my aircraft monitored 3
How can I verify if my aircraft was monitored in the last two years 4
What happens if I don't get monitored 4
References 5

Appendix A Short Guide to Monitoring
Appendix B RVSM Minimum Monitoring [Tables] Chart
Appendix C FAA approved GPS-based Unit (GMU) RVSM Monitoring Providers
Appendix D Ground-based monitoring using the North American AGHME System
Appendix E Ground-based monitoring outside North America
Appendix F Frequently asked RVSM Monitoring questions (FAQs)
Appendix G Points of Contact for RVSM Height Monitoring
Form 1 U.S. Operator Application for RVSM Monitoring

Introduction.

1. Reduced Vertical Separation Minimum (RVSM) System Performance Monitoring was implemented in conjunction with the establishment of RVSM Airspace to ensure that the implementation and continued operation of RVSM meets safety objectives.

2. Height-keeping performance of aircraft is a key element in ensuring safe operations in RVSM airspace. RVSM is a "performance based" operation requiring on-going independent monitoring to assure that the aircraft population adheres to stringent altimetry system requirements. What this means to operators is that not only are their aircraft in compliance, but also other aircraft that they will meet at the regularly used separation minimum are in compliance, assuring safe operation. An added benefit is that for operators with TCAS (ACAS II) onboard, this means that they will be assured of proper resolution maneuvers.

3. Height keeping performance of an aircraft is measured by equipment independent of the aircraft's altimetry system. The aircraft must be airborne and operating at an RVSM altitude for the performance to be measured. Currently, this requires operators to use external equipment brought on board and operated by trained technicians (GPS-based Monitoring Units (GMUs)) or have the height keeping performance of the aircraft measured by flying over ground-based measuring equipment, e.g., Aircraft Geometric Height Measuring Elements (AGHMEs) or ground-based Height Measuring Units (HMUs).

4. The guidance in this document is designed to explain how an operator holding a valid U.S. RVSM authorization can comply with the RVSM Monitoring Policy established by the Federal Aviation Administration (FAA).

NOTE: If you wish to skip the detailed information provided in this guidance document and prefer the short version on how to get your aircraft monitored, proceed directly to the short guide in Appendix A.

Who must participate in RVSM Monitoring?

1. All aircraft operators wishing to conduct operations in RVSM designated airspace are required to participate in RVSM Monitoring.

2. Existing rule 14 CFR § 91.180 requires operations within airspace designated as Reduced Vertical Separation Minimum (RVSM) to comply with the minimum standards of appendix G of this part. 14 CFR part 91 Appendix G, Section 2 (d), (e), and (f) stipulate the requirements for altimetry system error containment. 14 CFR Part 91 Appendix G, Section 4 (b) (2) advises that no person may show, on the flight plan filed with air traffic control, an operator or aircraft as approved for RVSM operations, or operate on a route or in an area where RVSM approval is required, unless, the aircraft has been approved and complies (an ongoing commitment) with the requirements of Section 2 of this appendix.

3. 14 CFR Part 91 Appendix G, Section 3(c)(1) and (2) stipulates how the operator, in a manner prescribed by the Administrator, must provide evidence that: 1) it is capable to operate and maintain each aircraft or aircraft group for which it applies for approval to operate in RVSM airspace. Height monitoring is the only method to verify ASE within performance limits and, further, it is the manner prescribed by the Administrator. 14 CFR Part 91 Appendix G, Section 7 states the Administrator revoke or restrict an RVSM letter of authorization, if the Administrator determines that the operator is not complying, or is unable to comply, with this appendix.

4. The effective date of the currently FAA prescribed requirements for RVSM Monitoring is 18 May 2011. Operators were given until 18 November 2012 to comply. See: *NOTICES TO AIRMEN Domestic/International, Part 4, Section 1* at http://www.faa.gov/air_traffic/publications/notices/.

5. To demonstrate the ability to maintain the Altimetry System Error (ASE) requirements of part 91, Appendix G, submit an RVSM height monitoring plan upon request for authorization. The elements of a monitoring plan include:

a) Number and identification of aircraft to be monitored in each RVSM monitoring group (see Appendix B for the definition of an RVSM monitoring group);

b) expected time frame for completion of monitoring requirements; and

c) expected method for monitoring.

What is the minimum number of aircraft required to be monitored by each operator?

1. U.S. Operators are required to conduct initial monitoring within six months of date of issue and must conduct monitoring every two years or within intervals of 1,000 flight hours per aircraft, whichever period is longer.

a) Operators are not required to complete monitoring prior to being granted operational approval.

b) Evidence of previous successful monitoring of an aircraft transfers to a new owner and may be used to meet the monitoring requirements.

c) When calculating the 1,000 hour provision of the minimum monitoring requirement the calculation of the flight time should be from the last valid monitoring date on record. Flight Log book data should be sufficient to meet this element. Operators who wish to invoke the less than 1000 flight hour provision should be prepared to provide this information to the applicable flight inspector, if requested.

2. If an operator has more than one aircraft in their fleet, they may not be required to demonstrate that every aircraft has been monitored since a statistical sampling of airframes of each type is used. To determine the minimum number of aircraft an operator must have monitored they must become familiar with the RVSM Minimum Monitoring Requirement Tables. (See Appendix B)

Completion of Monitoring requirement.

1. The following methods satisfy monitoring requirements:

a) Entry of successful AGHME or other approved ground based monitoring system result in the U.S. RVSM Approvals Data Base.

b) A report of a successful monitoring supplied by an FAA approved GPS-based provider.

c) Evidence provided through another ICAO sponsored Regional Monitoring Agency, such as EUROCONTROL.

NOTE: It is suggested that operators make a log book entry noting the date of successful height monitoring for later reference if needed.

NOTE: Most RVSM monitoring is accomplished through use of the aircraft's Mode S address that is then translated to a registration number and associated with the records contained in the operations approval. This is the primary means used by the FAA for developing lists of approved aircraft that can be obtained online and which are forwarded to other RMA officials.

How do I get my aircraft monitored?

1. There are essentially two ways to have the aircraft monitored:

a. An operator may choose to fly with a trained technician from an FAA approved RVSM monitoring support provider utilizing a Global Positioning System-based Monitoring Unit (GMU) onboard the aircraft; or

b. An operator equipped with a Mode S transponder may fly over an established ground-based height measuring system. Currently ground based systems exist in:

- North America, Aircraft Geometric Height Monitoring Elements (AGHME); or
- Ground-based height measuring system in Europe (HMUs); or
- the Strumble HMU in the United Kingdom; or

- the Setouchi HMU in the western part of Japan.

2. If an operator chooses to fly with an approved FAA RVSM monitoring support provider, see Appendix C for contact information.

3. If an operator wishes to fly over an AGHME constellation in North America:

   a. An operator, with a valid RVSM authorization and mode S transponder, flight plans a route through one of the seven AGHME coverage areas in North America at an RVSM altitude. The AGHMEs automatically collect height monitoring data on RVSM compliant aircraft. That data is shared with the NAARMO for entry into the RVSM Approvals Data Base.

   b. The aircraft must fly through the optimal coverage area, straight and level, at an RVSM altitude, with its Mode S transponder operational. The longer the duration of flight through the coverage area, the better the chance is of receiving a valid monitoring. (30 minutes is recommended)

   Note: RVSM aircraft equipped with **Mode C transponders** should utilize the procedures for flying with an FAA approved GMU RVSM monitoring support provider. AGHMEs **do not** have the capability to collect RVSM data from aircraft equipped with Mode C transponders.

   For specific guidance on AGHMEs, see Appendix D.

   For specific guidance on HMU monitoring outside North America see Appendix E.

How can I verify if my aircraft was monitored in the last two years?

1. An operator that has a valid RVSM authorization and has already established a monitoring program can check the RVSM Approvals Data Base to determine if their last valid monitoring occurred within the last two years. For North American operators the data base can be accessed from the FAA RVSM Website under RVSM Documentation. The files are located under the section heading of "**US RVSM Approvals".** The weblink for this site is:

http://www.faa.gov/air_traffic/separation_standards/rvsm/documentation/

What happens if I don't get monitored?

1. The FAA Technical Center Separation Standards Analysis Branch monitors RVSM airspace in North America and reviews the U.S. RVSM Approvals Data Base to determine which aircraft have not met the two year monitoring requirement and notifies the applicable Flight Standards District Office FSDO, Certificate Management Office (CMO), Certificate Holding District Office (CHDO) or International Field Office (IFO) to investigate. Operators found not in compliance will be required to show reason for not meeting the monitoring requirements, including flight hour data to justify the 1000 flight hour provision if last successful monitoring exceeds a two year period. If an operator does not complete the monitoring requirements within the allotted time:

   a. In a situation where an operator fails to meet the minimum operator requirements for monitoring within the prescribed time limits, it is the operator's responsibility to contact the FSDO, CMO, CHDO or IFO to discuss the situation and provide an updated plan for completing the monitoring requirements.

   b. If warranted, the FSDO, CMO, CHDO or IFO may provide a letter to the operator extending the period for monitoring, not to exceed three months, to allow the operator sufficient time to complete height monitoring. During this extension the operator may continue to operate in RVSM airspace. If an operator is unable to complete monitoring requirements within the extended time period, the Inspector should coordinate action with the FAA Flight Technologies and Procedures Division (AFS-400).

   c. Failure to complete monitoring requirements within the additional 3 months could result in termination of an operator's authorization to operate in RVSM airspace, unless the FAA determines that circumstances prevented the operator from completing the requirements.

References.

1. 14 CFR 91.180, Operations within airspace designated as Reduced Vertical Separation Minimum airspace
2. 14 CFR Appendix G to Part 91, Operations in Reduced Vertical Separation Minimum Airspace
3. 14 CFR 91.703, Operations of civil aircraft of U.S. registry outside the United States
4. 14 CFR 91.706, Operation within airspace designed as Reduced Vertical Separation (operations outside the U.S)
5. ICAO ANNEX 6, Parts I and II (7.2.7 and 2.5.2.7 respectively), Operation of Aircraft
6. ICAO ANNEX 11, 3.3.5.1 -3.3.5.2, Air Traffic Services
7. FAA Advisory Circular 91-85, Authorization of Aircraft and Operators for Flight in Reduced Vertical Separation Minimum Airspace
8. FAA Order 8900.1, Flight Standards Information Management System (FSIMS), Volume 4, Chapter 1, Section 5, Paragraph 4-109H, RVSM Monitoring Programs

APPENDIX A

Updated: 7/31/2015

SHORT GUIDE TO RVSM MONITORING

1. Determine the number of aircraft in a given fleet that need to be height monitored using the RVSM Minimum Monitoring Chart in Appendix B. Some aircraft of similar type constitute a monitoring group for fleet purposes.

2. Determine when the last successful height monitoring was recorded on the aircraft by accessing the U.S. RVSM Approvals Database by pasting the following link in your web browser: http://www.faa.gov/air_traffic/separation_standards/naarmo/rvsm_approvals

3. If the aircraft has been successfully height monitored within the last two years it meets the RVSM Minimum Monitoring Requirement.

4. If the aircraft has not been successfully height monitored in the last two years but has not flown more than 1000 flight hours since the last successful monitoring it meets the RVSM Minimum Monitoring Requirement.

5. If the aircraft has not been successfully height monitored in the last two years and has flown more than 1000 flight hours since the last successful monitoring the operator may not be in compliance with RVSM requirements and should contact the FSDO, CMO, CHDO or IFO as appropriate. To determine how to conduct an aircraft height monitoring:

a) If the aircraft is mode S transponder equipped there are two basic ways to have the aircraft height monitored:

   (1) Fly the approved RVSM configured and authorized aircraft straight and level at an RVSM altitude through the coverage area of a ground based monitoring system, such as the AGHME system in North America or HMU system in Europe. To read more about ground based monitoring systems or go to Appendix D for the U.S. AGHME system or Appendix E for ground-based systems outside North America.

   (2) Fly with an FAA approved RVSM monitoring support provider utilizing a Global Positioning System-based Monitoring Unit (GMU) onboard the aircraft. To read more about flying with an FAA approved RVSM monitoring support provider for onboard monitoring go to Appendix C.

b) AGHME Ground-based monitoring systems are not compatible with Mode C equipped aircraft. If the aircraft is mode C transponder equipped you should fly with an FAA approved GPS-based RVSM monitoring provider utilizing a GMU onboard the aircraft.

6. After flying a monitoring flight verify the height monitoring has been successfully added to the RVSM Approvals Database. Due to post processing time and quality assurance checks it can take 4-6 weeks for the Database to be updated.

APPENDIX B

Updated: 7/31/2015

RVSM MINIMUM MONITORING REQUIREMENTS TABLES

Table of Contents

Basic Instructions	Page B – 1
MMR Table Notes	Page B – 2
MMR Table 1 RVSM Monitoring Categories	Page B – 4
MMR Table 2 RVSM Monitoring Groups	Page B – 5

Basic Instructions

The RVSM Minimum Monitoring Requirement (MMR) Tables (or MMR chart for short) are maintained by the ICAO Regional Monitoring Agency Coordination Group (RMACG) and reflect the current aircraft group and category listings that RVSM capable aircraft types are assigned too. These tables can be used to determine the minimum number of aircraft that an operator must have monitored.

NOTE: These tables change from time to time reflecting current performance of the aircraft group and should be consulted prior to determining the number of aircraft necessary to be monitored.

1. The following instructions will assist operators on how to use the tables in this Appendix to determine the RVSM monitoring group and category for a given fleet of aircraft.

2. Aircraft groups. Aircraft of nominally identical design and build with respect to all details that could influence the accuracy of height-keeping performance are grouped together.

RVSM Group example from MMR Table 2: All Gulfstream 400 and 350 series aircraft are grouped into the "GLF4" group for monitoring purposes.

Monitoring Group	A/C ICAO	A/C Type	A/C Series
GLF4	GLF4	GULFSTREAM IV (G-1159C) G300 G350 G400 G450	ALL SERIES

3. Aircraft Categories. Aircraft groups are organized according to their compliance with the RVSM Minimum Aircraft System Performance Specifications (MASPS). Aircraft groups are further organized into three categories. (RVSM MMR Table 1):

a. Category 1: Group approved data indicates compliance with RVSM MASPS.

b. Category 2: Group approved aircraft that there is insufficient data to indicate compliance with RVSM MASPS.

c. Category 3: Non-group approved aircraft.

4. Each Category of aircraft has different minimum monitoring requirements.

a. Group aircraft that fall into Category 1 require a minimum of **two airframes** from each fleet of an operator to be monitored.

b. Group aircraft that fall into Category 2 require that **60% of airframes** (round up if fractional) from each fleet of an operator be monitored. If an operator only has two airframes of the same group both airframes must be monitored.

c. Category 3, Non-group aircraft, 100% of an aircraft shall be monitored.

RVSM Category example from <u>MMR Table 1</u>: A G350 is in monitoring group <u>GLF4</u>. GLF4 is a **<u>Category 1</u>** aircraft. The operator of this aircraft must have **<u>two airframes</u>** from the total number of their GLF4 fleet monitored.

CATEGORY	AIRCRAFT GROUP	MINIMUM OPERATOR MONITORING FOR EACH 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	**<u>Two airframes</u> from each fleet of an operator to be monitored**

5. <u>In summary to determine the number of aircraft an operator must have monitored</u>:

   a. Determine the aircraft "Group" that each of an operator's type and series of aircraft belongs from Table 2 of the RVSM MMR Tables; and

   b. Determine the "Category" for each aircraft group from Table 1 of the RVSM MMR Tables; and

   c. The number of airframes an operator has for each "Group" will provide the basis for the minimum number of airframes to be monitored from Categories in Table 1 of the RVSM MMR Chart. Using the "Category" multiply the minimum number required (from column 4 of Table 1) x the number of aircraft in each "Group" (round up if fractional).

   d. Example. An operator has five (5) G-550's. Since the G-550 belongs to the GLF5 monitoring group and that aircraft group is in Category 1, only two airframes from this operator's fleet need to be monitored.

   If the operator also has three (3) C-550s, since the Citations (C550 Group) is in Category 2, 60% of these airframes must be monitored, (3 x .60 = 1.8) rounding up the operator would also have to have two of these airframes monitored.

RVSM MINIMUM MONITORING REQUIREMENTS TABLES:

As of: 31 December 2014

1. <u>UPDATE OF MONITORING REQUIREMENTS TABLE AND WEBSITE.</u> As significant data is obtained, monitoring requirements for specific aircraft types may change. When Table 1 below, is updated, a letter will be distributed by the Regional Monitoring Agencies (RMAs) to the States concerned. The updated table will be posted on the RMA secure website being maintained by the International Civil Aviation Organization (ICAO) and replicated in each specific RMA website.

2. <u>MONITORING PROGRAM.</u> All operators that operate or intend to operate in airspace where RVSM is applied are required to participate in the regional RVSM monitoring program. 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 and thereafter as directed by the regional RVSM monitoring program.

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 programs from other regions can be used to meet regional monitoring requirements. The RMAs, which are responsible for administering the monitoring program, 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 the RMA 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 RMA 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 should complete monitoring in accordance with the attached table.

Table 1: MONITORING REQUIREMENTS TABLE (Civilian)

MONITORING IS REQUIRED IN ACCORDANCE WITH THIS TABLE

MONITORING PRIOR TO THE ISSUE OF RVSM APPROVAL IS **NOT** A REQUIREMENT

CATEGORY		MONITORING GROUP	MINIMUM OPERATOR MONITORING FOR EACH MONITORING GROUP
1	GROUP APPROVED: DATA INDICATES COMPLIANCE WITH THE RVSM MASPS	A124, A300, A306, A310-GE, A310-PW, A318, A320, A330, A340, A345, A346, A380, A3ST, AVRO, B712, B727, B737C, B737CL, B737NX, B747CL, B74S, B744-5, B744-10, B752, B753, B764, B767, B772, B773, BD100, BE40, C25A, C25B, C510, C525, C560, C56X, C650, C680, C750, CARJ, CL600, CL604, CL605, CRJ7, CRJ9, DC10, E135-145, E170-190, E50P, E55P, F100, F900, FA7X, GALX, GLEX, GLF4, GLF5, H25B-800, J328, 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, A350, AC90, AC95, AJ27, AN72, ASTR, ASTR-SPX, B701, B703, B731, B732, B744-LCF, B748, B787, BCS1, BD700, BE20, BE30, C25C, C441, C500, C550-B, C550-II, C550-SII, CRJ10, D328, DC85, DC86-87, DC91, DC93, DC94 DC95, E120, E45X, EA50, F2TH, F70, FA10, FA20, FA50, G150, G280, GLF2, GLF2B, GLF3, GLF6, H25B-700, H25B-750, H25C, HA4T, HDJT, IL62, IL76, IL86, IL96, L101, L29B-2, L29B-731, LJ23, LJ24, LJ25, LJ28, LJ31, LJ35-36, LJ55, MU30, P180, PAY4, PC12, SB20, SBR1, SBR2, SU95, 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: A225, AN12, AN26, B190, B462, B463, B720, B74S-SOFIA, BA11, BE9L, GSPN, H25A, L29A, PAY3, R721, R722, SJ30, STAR	100% of aircraft shall be monitored

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

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
A124	A124	AN-124 RUSLAN	
A148	A148	AN-148	
A158	A158	AN-158	
A225	A225	ANTONOV AN-225	Non-Group
A30B	A30B	A300	
A306	A306	A300	
A310-GE	A310	A310	Series: 200, 200F, 300, 300F
A310-PW	A310	A310	Series: 220, 220F, 320
A318	A318	A318	
A320	A319 A320 A321	A319 A320 A321	
A330	A332 A333	A330 A330	
A340	A342 A343	A340 A340	
A345	A345	A340	
A346	A346	A340	
A350	A359	AIRBUS 350-900	
A380	A388	A380	
A3ST	A3ST	A300	
AC90	AC90	COMMANDER 690 COMMANDER 840 COMMANDER 900	
AC95	AC95	AERO COMMANDER 695	
AJ27	AJ27	COMAC ARJ-21-700	
AN12	AN12	ANTONOV AN-12	Non-Group
AN26	AN26	ANTONOV AN-26	Non-Group
AN72	AN72	ANTONOV AN-72 ANTONOV AN-74	
ASTR	ASTR	1125 ASTRA	S/n 1-78, except 73
ASTR-SPX	ASTR	1125 ASTR SPX, G100	S/n 73, 79-145 S/n > 146
AVRO	RJ1H RJ70 RJ85	RJ100 Avroliner RJ70 Avroliner RJ85 Avroliner	
B190	B190	BEECH 1900	Non-Group

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
B462	B462	BAe-146-200	Non-Group
B463	B463	BAe-146-300	Non-Group
B701	B701	B707	
B703	B703	B707	Series 320, 320B, 320C
B712	B712	B717	
B720	B720	B720	Non-Group
B727	B721 B722	B727 B727	
B731	B731	B737	
B732	B732	B737	
B737CL	B733 B734 B735	B737-300 B737-400 B737-500	
B737NX	B736	B737-600	
	B737	B737-700	Series: 700, BBJ only
	B738 B739	B737-800 B737-900	
B737C	B737	B737-700	Series: 700C
B747CL	B741 B742 B743	B747-100 B747-200 B747-300	
B74S	B74S B74R	B747SP B747SR	
B74S-SOFIA	B74S	NASA B74SP with Sofia telescope	Non-Group: N747NA (s/n 21441)
B744-5	B744 B74D	B747-400	5 inch Probes up to SN 25350
B744-10	B744 B74D	B747-400	10 inch Probes from SN 25351
B744-LCF	BLCF	B747-400	
B748	B748	B747-800	
B752	B752	B757-200	
B753	B753	B757-300	
B767	B762 B763	B767-200 B767-300	
B764	B764	B767-400	
B772	B772 B77L	B777-200 B777-F	

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
	B77L	B777-200LR	
B773	B773 B77W	B777-300 B777-300ER	
B787	B788 B789	B787-8 B787-9	
BA11	BA11	BAC-111	Non-Group
BCS1	BCS1	BOMBARDIER 500 C SERIES CS100	
BD100	CL30	CHALLENGER 300	
BD700	GL5T	GLOBAL 5000	
BE9L			Non-Group
BE20	BE20	200 KINGAIR	
BE30	BE30 B350	B300 SUPER KINGAIR B300 SUPER KINGAIR 350	
BE40	BE40	BEECHJET 400 BEECHJET 400A BEECHJET 400XP HAWKER 400XP	
C441	C441	CONQUEST II	
C500	C500 C500 C501	500 CITATION 500 CITATION I 501 CITATION I SINGLE PILOT	
C510	C510	MUSTANG	
C525	C525	525 CITATIONJET 525 CITATIONJET 1 525 CITATIONJET PLUS	
C25A	C25A	525A CITATIONJET II	
C25B	C25B	CITATIONJET III 525B CITATIONJET III	
C25C	C25C	525C CITATIONJET IV	
C550-B	C550	550 CITATION BRAVO	
C550-II	C550	550 CITATION II 551 CITATION II SINGLE PILOT	
C550-SII	C550	S550 CITATION SUPER II	
C560	C560	560 CITATION V 560 CITATION V ULTRA 560 CITATION V ENCORE	
C56X	C56X	560 CITATION EXCEL 560 CITATION XLS	
C650	C650	650 CITATION III	

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
		650 CITATION VI 650 CITATION VII	
C680	C680	680 CITATION SOVEREIGN	
C750	C750	750 CITATION X	
CARJ	CRJ1 CRJ2 CRJ2 CRJ2	CRJ-100 CRJ-200 CHALLENGER 800 CHALLENGER 850	
CRJ7	CRJ7	CRJ-700	
CRJ9	CRJ9	CRJ-900	
CRJ10	CRJX	CRJ-1000	
CL600	CL60	CL-600 CL-601	S/n < 500
CL604	CL60	CL-604	5000 < S/n < 5700
CL605	CL60	CL-605	S/n > 5700
DC10	DC10	DC-10	
D328	D328	328 TURBOPROP	
DC85	DC85	DC-8	
DC86-87	DC86 DC87	DC-8 DC-8	
DC91	DC91	DC-9	
DC93	DC93	DC-9	
DC94	DC94	DC-9	
DC95	DC95	DC-9	
E120	E120	EMB-120 Brasilia	
E135-145	E135 E145	EMB-135 EMB-145	
E45X	E45X	EMB-145 XR	
E170-190	E170 E170 E190 E190	EMB-170 EMB-175 EMB-190 EMB-195	
E50P	E50P	PHENOM 100	
E55P	E55P	PHENOM 300	
EA50	EA50	ECLIPSE	
F100	F100	FOKKER 100	
F2TH	F2TH	FALCON 2000 FALCON 2000-EX FALSON 2000LX	

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
F70	F70	FOKKER 70	
F900	F900	FALCON 900 FALCON 900DX FALCON 900EX FALCON 900LX	
FA10	FA10	FALCON 10	
FA20	FA20	FALCON 20 FALCON 200	
FA50	FA50	FALCON 50 FALCON 50EX	
FA7X	FA7X	FALCON 7X	
G150	G150	G150	
G280	G250 G280	G250 G280	
GALX	GALX	1126 GALAXY G200	
GLEX	GLEX	BD-700 GLOBAL EXPRESS	
GLF2	GLF2	GULFSTREAM II (G-1159)	
GLF2B	GLF2	GULFSTREAM IIB (G-1159B)	
GLF3	GLF3	GULFSTREAM III (G-1159A)	
GLF4	GLF4	GULFSTREAM IV (G-1159C) G300 G350 G400 G450	
GLF5	GLF5	GULFSTREAM V (G-1159D) G500 G550	
GLF6	GLF6	G650	
GSPN	GSPN	GROB G-180 SPn Utility Jet	Non-Group
H25A	H25A	HS125-400, -600	Non-Group
H25B-700	H25B	BAE 125 / HS125	Series: 700A, 700B
H25B-750	H25B	HAWKER 750	
H25B-800	H25B	BAE 125 / HS125	Series: 800A, 800
		HAWKER 800XP HAWKER 800XPI HAWKER 800 HAWKER 850XP HAWKER 900XP	

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
		HAWKER 950XP	
H25C	H25C	HAWKER 1000	
HA4T	HA4T	HAWKER 4000	
HDJT	HDJT	HONDAJET HA-420	
IL62	IL62	ILYUSHIN-62	
IL76	IL76	ILYUSHU-76	
IL86	IL86	ILYUSHIN-86	
IL96	IL96	ILYUSHIN-96	
J328	J328	328JET	
L101	L101	L-1011 TRISTAR	
L29A	L29A	L-1329 JETSTAR 6/8	Non-Group
L29B-2	L29B	L-1329 JETSTAR II	
L29B-731	L29B	L-1329 JETSTAR 731	
LJ23	LJ23	LEARJET 23	
LJ24	LJ24	LEARJET 24	
LJ25	LJ25	LEARJET 25	
LJ28	LJ28	LEARJET 28 LEARJET 29	
LJ31	LJ31	LEARJET 31	
LJ35-36	LJ35	LEARJET 35 LEARJET 36	
LJ40	LJ40	LEARJET 40	
LJ45	LJ45	LEARJET 45	
LJ55	LJ55	LEARJET 55	
LJ60	LJ60	LEARJET 60	
MD10	MD10	MD-10	
MD11	MD11	MD-11	
MD80	MD81 MD82 MD83 MD87 MD88	MD-80 MD-80 MD-80 MD-80 MD-80	
MD90	MD90	MD-90	
MU30	MU30	MU-300 DIAMOND	
P180	P180	P-180 AVANTI	
PAY3	PAY3	PIPER Cheyenne 3	Non-Group
PAY4	PAY4	PA-42 Cheyenne 400	Series: 1000 CHEYENNE
PC12	PC12	PC-12	
PRM1	PRM1	PREMIER 1	

Monitoring Group	A/C ICAO	Manufacturer Type	Additional Defining Criteria
R721	R721	B-727-100: Re-engined	Non-Group
R722	R722	B-727-200: Re-engined	Non-Group
SB20	SB20	SAAB 2000	
SBR1	SBR1	SABRELINER 40 SABRELINER 60 SABRELINER 65	
SBR2	SBR2	SABRELINER 80	
SJ30	SJ30	SWEARINGEN SJ-30	Non-Group
STAR	STAR	BEECH 2000 STARSHIP	Non-Group
SU95	SU95	SUKHOI SUPERJET 100-95	
T134	T134	TU-134	
T154	T154	TU-154	
T204	T204	TU-204 TU-214 TU-224 TU-234	
T334	T334	TU-334	
TBM	TBM7 TBM8	TBM-700 TBM-850	
WW24	WW24	1124 WESTWIND	
YK42	YK42	YAK-42	

APPENDIX C

Updated: 7/31/2015

GPS-BASED MONITORING SYSTEM/UNIT (GMS/GMU) PROCEDURES

1. The NAARMO is responsible for all aircraft height monitoring activity for North American RVSM operations (Domestic U.S., Southern Canadian Domestic, and Mexico) and administers the GMS/GMU height-monitoring program. Both CSSI, Inc. and ARINC are approved GMS/GMU support contractors and assist the NAARMO with administering the monitoring program.

Global Positioning System-based Monitoring System (GMS) Description

2. The GMS is composed of the equipment and procedures to collect and process three required data elements: 1) GPS data; 2) pressure altitude or Mode C data; and 3) meteorological data. The GPS-based Monitoring Unit (GMU) is used to collect the GPS data during the monitoring flight. The NAARMO will use information to coordinate the collection of pressure altitude or Mode C data (or an approved substitute) from ATC facilities.

GMS/GMU Contacts:

U.S. GMS Coordinator at FAA Technical Center,

Phone:	+1 609-485-5102
Fax:	+1 609-485-5078
Email:	rvsm@faa.gov

CSSI Inc. FAA approved GMS RVSM Monitoring Support Provider:

Phone:	+1 866-468-8111 or +1 202-554-1050
Fax:	+1 202-863-2398
Email:	monitor@cssiinc.com

ARINC FAA approved GMU RVSM Support Provider:

Phone:	+1 410-266-4707
Fax:	+1 410-573-3007
Email:	rvsmops@arinc.com

GMS/GMU Monitoring Flights

3. Height monitoring can be conducted on scheduled flights, ferry flights, or monitoring-specific flights. To ensure collection of sufficient position data the aircraft must fly straight and level at any altitude from flight level (FL) 290 to 410 (inclusive) for at least thirty minutes in duration. Monitoring flights do not need to be conducted in North American airspace; however, monitoring should be conducted in areas where Mode-C radar data can be retrieved by the FAA Technical Center staff in a timely manner.

4. For more information on GMS/GMU monitoring visit the NAARMO web site at:

https://www.faa.gov/air_traffic/separation_standards/naarmo/monitoring_methods/

APPENDIX D

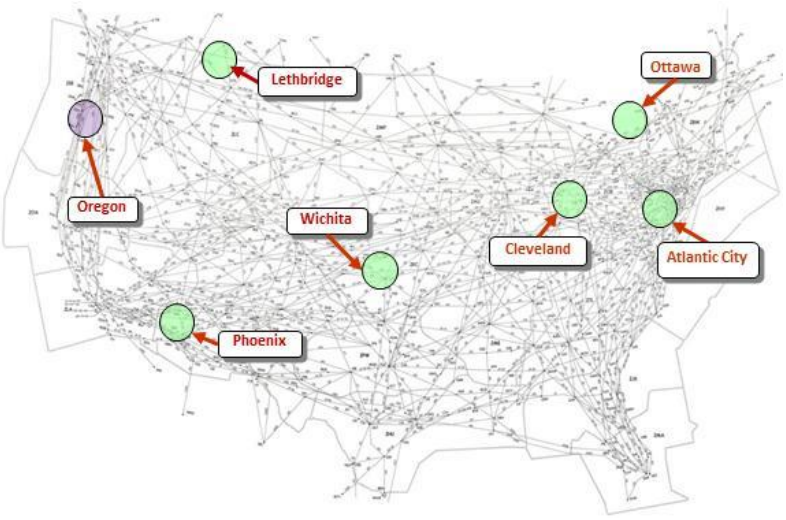
Updated: 7/31/2015

AIRCRAFT GEOMETRIC HEIGHT MEASUREMENT ELEMENT (AGHME) GROUND-BASED MONITORING SYSTEM

1. The North American Approvals Registry and Monitoring Organization (NAARMO) has developed the AGHME system to monitor all aircraft passing through its coverage volume, with the primary aim of supporting estimation of height-keeping performance parameters for the bulk of operations in North American RVSM airspace. The AGHME system does not require that any special monitoring devices be installed on an aircraft in order for it to be monitored. It is necessary, however, that the aircraft have an operational Mode S transponder.

2. All AGHME systems are functionally identical. Hence, an operator wishing to use an AGHME constellation to satisfy monitoring requirements should follow the guidance provided under the "AGHME Monitoring Procedures" link below. This will suffice at any AGHME constellation location.

3. AGHME constellations will be located at seven sites in the United States and Canada. The link in paragraph 4 provides information about these locations, and associated availability dates.



Basic AGHME Procedures

1. Ensure the aircraft is in RVSM approved configuration. Mode S transponder is operational.
2. Ensure the operator is authorized for RVSM operation from the relevant State RVSM approving official.
3. Choose an AGHME constellation for monitoring (see the "AGHME Locations" section for choices).
4. If your aircraft <u>is not currently listed</u> in the Approvals Data Base, complete the "US Operator Application for RVSM Monitoring". Email the form to "naarmo@faa.gov" with "AGHME Monitoring Application" and the aircraft registration number in the subject line or fax it to +1(609) 485-5078. (<u>See form-1 at the end of this document</u>)
5. Flight plan a route through the AGHME coverage area, at a flight level between 290 and 410, inclusive. The "Optimal Coverage Area" link shows a depiction of the coverage area superimposed on a route chart.
6. Ensure that the flight plan provides for <u>straight level-flight operation through</u> the AGHME coverage area.
7. Prior to departure, verify the operating status of appropriate AGHME monitoring constellation on the "AGHME Locations" link

4. For detailed information on AGHME locations and procedures, please access the AGHME Main Page at: http://www.faa.gov/air_traffic/separation_standards/aghme/

APPENDIX E

Updated: 7/31/2015

GROUND-BASED HEIGHT MONITORING OUTSIDE NORTH AMERICA

U.S. Operators requesting monitoring results from Regional Monitoring Agenices (RMAs) other than North American Approvals Registry and Monitoring Organization (NAARMO)

1. RVSM is a globally coordinated program. An operator that holds a valid RVSM authorization can fly in any region's RVSM airspace without additional RVSM approvals needed. Additionally, the RVSM Monitoring Program is globally coordinated. However, the implementation of monitoring requirements and collection of monitoring data is implemented on a regional basis.

2. Monitoring data obtained to fulfill the monitoring requirements for one region can be used to fulfill the monitoring requirements for another region. Regional Monitoring Agencies coordinate with each other to exchange database information on monitoring results.

3. A U.S. Operator that wants to access monitoring results from a RMA other than NAARMO should request the results by contacting NAARMO via email at: NAARMO@faa.gov.

Ground-based Height Monitoring Units (HMU) in Europe

1. The HMU is a passive ground based system that measures aircraft height keeping over an approximately circular area. Each system consists of a set of ground stations arranged as a central site with four additional receivers arranged in a square. Each site receives aircraft SSR replies (Modes A, C and S) from which the 3D position of the aircraft is derived. Using meteorological information and the Mode C/S height data the altimetry system error is calculated. HMUs are operating at the following locations:

a) Linz in Austria [centre 48°12'N, 014°18'E];

b) Nattenheim in Germany [centre 49°57'N, 006°28'E]; and

c) Geneva in Switzerland [centre 46°22'N, 005°56'E].

2. Air Traffic Service route segments within HMU coverage can be determined by considering a circle with 45 NM radius around the center coordinates given above. Up-to-date information can be obtained from the RMA.

3. For information on European HMU Monitoring see the European Regional Monitoring Agency (RMA) web site at: http://www.eurocontrol.int/eur-rma

Strumble Ground-based Height Monitoring Units (HMU) for the North Atlantic

1. In the North Atlantic Region, monitoring can be completed by overflying ground-based Height Monitoring Units (HMUs) or utilizing the portable, airborne GPS-based Monitoring System (GMS).

2. An HMU is located near the Strumble (STU) VOR below the centreline of UL9. The horizontal coverage areas for the Strumble HMU is a 13.8 nm radius circle centered on position N51° 56' 00'' W004° 40' 00''. In the vertical dimension, the coverage is from FL 290 to FL 410 inclusive. The site is unmanned and designed to operate continuously.

3. To obtain additional information or ascertain the result of the overflight operators may fax a request to the NAT Central Monitoring Agency (CMA) on +44 (*0) 1292 692754. (0 not required from U.S. locations) or via e-mail to natcma@nats.co.uk . Any request for information regarding the result of monitoring will be more speedily dealt with if the Mode S or Mode A codes and approximate time of overflight are included in the enquiry.

Ground-based Height Monitoring Units (HMU) in Japan

1. Japan has implemented the 3 HMUs, the Setouchi HMU, the Niigata HMU and the Sendai HMU. The HMU systems have one central and 4 outer receiving stations. The outer receiving stations are ideally installed to form a square of some 30 NM. The HMU measures geometric height of an aircraft using the multi-lateration principle. multi-lateration obtains three-dimensional positions calculated from the time difference of arrival (TDOA) of signals at each receiving stations from the transponder of an aircraft in flight. At least 4 receiving stations are required, and the fifth improves omni-directional coverage, accuracy and system redundancy.

2. The Setouchi HMU is located around the SHODO VOR/DME Site [center 34° 30'N, 134° 16'E]

The Nigata HMU is located [center 37° 58'N, 138° 52'E]

The Sendai HMU is located [center 38° 09'N, 140° 39'E]

Note: The Nigata and Sendai HMUs were not in service at the time of publishing this appendix, check for operational status prior to use at the website listed below.

3. Additional information about the HMUs in Japan can be found on the Japan Airspace Safety Monitoring Agency (JASMA) web site at: http://www.jasma.jp/height-monitoring.html

APPENDIX F

Updated: 7/31/2015

FREQUENTLY ASKED QUESTIONS (FAQ's) ON MONITORING

Note: these FAQ's are not in alphabetical order.

1. FAQ: Documents and Guidance. Where can documents explaining monitoring systems, operator requirements and procedures be found?

All of the documents referred to in this list of Monitoring FAQ's are posted on the RVSM Documentation Webpage in the "Monitoring Requirements and Procedures" section.

Requirements. Operators that have been issued an U.S. RVSM authorization will be required to conduct initial monitoring within six months of date of issue and must conduct monitoring every two years or within intervals of 1,000 flight hours per aircraft, whichever period is longer, in accordance with the aircraft categories as presented in the current version of the (North American) RVSM Minimum Monitoring Requirements chart. The RVSM Minimum Monitoring Chart is coordinated with the North American Approvals Registry and Monitoring Organization (NAARMO) and updated periodically to reflect changes in aircraft data. The RVSM Minimum Monitoring Requirements Chart will be posted to the FAA RVSM Webpage in documentation section "Monitoring Requirements/Procedures".

Note: Regarding the initial monitoring within 6 months see question 2. below.

2. FAQ: Previous monitoring results relating to transfer of ownership . If an aircraft has been successfully monitored previously and a new owner can demonstrate that the aircraft has been continuously maintained in standard airworthiness condition and the approved maintenance program is current, the previous monitoring can be used to meet the RVSM monitoring requirements. The time frames associated with the RVSM monitoring policy apply.

Example 1. If an operator purchases an aircraft and requires issuance of a new RVSM authorization and can demonstrate that the aircraft has a previous successful monitoring and meets the airworthiness and monitoring requirements above he has the remaining balance of the monitoring time to have the aircraft monitored (e.g., 2 years or 1000 flight hours, whichever is longer from the last successful monitoring.)

Example 2.: If an operator requires issuance of a new authorization and the aircraft has not been monitored (or can't be shown to have been monitored) within the previous 2 years or 1000 flight hours, whichever is longer, he has 6 months to get it monitored.

3. FAQ: Monitoring Objectives. What are the objectives of monitoring?

Monitoring objectives are to identify individual aircraft that are not performing to RVSM standards, identify any adverse altitude-keeping trends for individual aircraft types and provide data for use in safety analysis.

4. FAQ: Required Operator Participation. Are operators required to participate in the monitoring program? What are the regulatory requirements?

With reference to the assertion that there is no regulatory requirement for height monitoring, operators should review 14 CFR Part 91.180 and 14 CFR Part 91 Appendix G,

The following requirements in the regulations are met by height monitoring.

a) 14 CFR Part 91.180 - Operations within airspace designated as Reduced Vertical Separation Minimum airspace. (a) Except as provided in paragraph (b) of this section, no person may operate a civil aircraft in airspace designated as Reduced Vertical Separation Minimum (RVSM) airspace unless: (1) The operator and the operator's aircraft comply with the minimum standards of **appendix G of this part**; and (2) The operator is authorized by the Administrator or the country of registry to conduct such operations. (b) The Administrator may authorize a deviation from the requirements of this section

b) 14 CFR Part 91 Appendix G, Section 2 (d), (e) and (f) stipulates the requirements for altimetry system error containment and that , "...the Administrator must find that the altimetry system error (ASE) is contained as follows:..."
(Ed. comment: Height monitoring is the only method to detect aircraft with ASE that is not contained within requirements.)

c) 14 CFR Part 91 Appendix G, Section 4 (b) (2) advises that, "No person may show, on the flight plan filed with air traffic control, an operator or aircraft as approved for RVSM operations, or operate on a route or in an area where RVSM approval is required, unless, "...The aircraft has been approved and <u>complies</u> *(Ed. comment: Word is underlined to emphasize an <u>ongoing</u> commitment)* with the requirements of Section 2 of this appendix." *(Ed. comment: Compliance with the performance requirements in Section 2 can only be verified through height monitoring and is ongoing)*

d) 14 CFR Part 91 Appendix G, Section 3(c)(1) and (2) stipulates how the operator "In a manner prescribed by the Administrator, must provide evidence that: 1) it is capable to operate and <u>maintain</u> each aircraft or aircraft group for which it applies for approval to operate in RVSM airspace..." *(Ed. comment: Height monitoring is the only method to verify ASE within performance limits and, further, it is the manner prescribed by the Administrator.)*

e) 14 CFR Part 91 Appendix G, Section 6(b) advises that, "Each operator shall report to the Administrator each event in which the operator's aircraft has exhibited the following altitude-keeping performance: ...
(b) Altimetry system error of 245 feet or more;..."
(Ed. Comment: ASE containment can only be verified by height monitoring.)

f) 14 CFR Part 91 Appendix G, Section 7. Removal or Amendment of Authority provides for Administrator action if "...the operator is not complying, or is unable to comply with this appendix or subpart H..."

Height keeping is required by the Federal Aeronautical Regulations and implemented in accordance with FAA policy.

<u>5. FAQ: RVSM Letters of Authorization (LOA) or Operations Specification (OpSpec) and Monitoring.</u> Am I required to complete my monitoring requirements prior to obtaining RVSM authority (i.e., a Letter of Authorization or Operations Specifications, as appropriate)?

No. See the Minimum Monitoring Requirements charts. For DRVSM, you must complete your monitoring requirements not later than 6 months after you receive RVSM authority **<u>or</u>** 6 months after the start of DRVSM (Domestic U.S.RVSM) operations, whichever occurs later. In other areas of operation, you have up to 6 months after obtain RVSM authority to complete your monitoring requirements.

<u>6. FAQ: Number of Aircraft to be Monitored.</u> How many aircraft from an operator's fleet are required to be monitored?

In general, operators are only required to have a portion of their fleets monitored. Monitoring requirements are published in the North American Minimum Monitoring Requirements Charts posted under "Monitoring Requirements and Procedures".

7. FAQ: Monitoring Groups. What are monitoring groups and where are they listed?

Monitoring groups are listed on the Minimum Monitoring Requirements charts. For monitoring purposes, aircraft types can be placed in a single monitoring group. For example, the A319, A320 and A321 are categorized as a single monitoring group.

8. FAQ: GMU (GPS-based Monitoring Unit) FAQ's and Information. Where can I find FAQ's and information on scheduling GMU monitoring?

See monitoring procedures for U.S. Operators under the "Monitoring Requirements/Procedures" section of the FAA RVSM webpage.

9. FAQ: 1000-hour Requirement. If I fly my RVSM approved aircraft less than 1000 flight hours in 2 years. Am I required to have it monitored within a 2-year period.

No. The policy states that aircraft will be monitored every two years or 1000 flight hours, whichever is longer. However, if your aircraft has not had a valid monitoring in the last 2 years you may be contacted by your local Flight Standards District Office (FSDO) or Certificate Management Office (CMO) and asked to provide data that shows you have flown less than 1000 hours from the last successful monitoring.

The 1000 flight hour time limit clock starts on the date of the last successful monitoring.
NOTE: The 2-year time limit clock also starts on the date of the last successful monitoring.

10. FAQ: MMR Chart. If I purchase an aircraft of the same model and type series, for which I already hold a valid RVSM authorization, does it have to be monitored?

It depends. NOTE 9 of the RVSM MMR Chart states: 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 should complete monitoring in accordance with the attached table.

Example 1. You own a fleet of three Gulfstream 5's (GLF5) that have a valid monitoring in the last two years. You purchase of a fourth Gulfstream 5, it would not require monitoring because you already meet the minimum requirement of two airframes. A GLF5 is a group approved aircraft in category 1. This is specified in Table 1 of the Minimum Monitoring Chart.

Example 2.
You own a fleet of three Gulfstream 3's (GLF3) and 2 of the aircraft have a valid monitoring in the last two years. You purchase two more GLF3's, At least one would require monitoring to meet the 60% requirement (3-aircraft) within 6 months. A GLF3 is a group approved aircraft in category 2. This is specified in Table 1 of the Minimum Monitoring Chart.
Note: airframes must be RVSM compliant upon delivery

<u>11. FAQ: MMR Chart</u>. I just purchased a fleet of 4 Boeing 767's and applied for an U.S. RVSM operational authorization. How many must be monitored and when?

In accordance with FAA Policy and Note 2 of the RVSM MMR CHART, operators must show a plan for meeting applicable monitoring requirements. Initial monitoring of two airframes (for MMR chart category 1) should be completed as soon as possible but not later than 6 months after the issue of RVSM operational authority. A minimum of two airframes (MMR chart category 1) shall have a valid monitoring every two years or 1000 flight hours whichever period is longer.

<u>12. FAQ: Determination of Monitoring.</u> How will the FAA know if the aircraft has been monitored on time?

The FAA will periodically review its database of all RVSM aircraft monitoring to determine which aircraft have not met the two (2) year monitoring requirement and notify the applicable FSDO/CMO/CHDO, etc. to investigate.

<u>13. FAQ: RVSM Monitoring and Maintenance Programs.</u> Does the maintenance program have to be reissued to address the minimum monitoring requirements?

No, RVSM aircraft monitoring is a component of RVSM system quality control not continued airworthiness. As such, the monitoring requirements are operational in nature and do not need to be described in the maintenance program. The approved maintenance program is required to provide for continued airworthiness of the aircraft without periodic monitoring.

<u>14. FAQ: RVSM Monitoring Time Limits.</u> When does the 2 year or the 1000 hour time limit begin?

See Question #9

<u>15. FAQ: RVSM Proof of Monitoring.</u> What is an acceptable method to advise FSDO/CMO/CHDO that timely, successful monitoring has been completed.

Notification of a successful monitoring can be made in several ways:

- A report of successful monitoring supplied by an FAA approved GMS RVSM monitoring provider, e.g., CSSI Inc., ARINC
- The entry of successful Aircraft Geometric Height Measurement Element (AGHME) monitoring on the NAARMO AGHME webpage.
- Evidence of successful monitoring by another Regional Monitoring Agency, such as EUROCONTROL or the UK NATS Central Monitoring Agency in accordance with the directions available on the FAA RVSM Documentation webpage.

Note (1): If you conducted a monitoring flight and your aircraft is not listed in the RVSM Approvals database this is not necessarily an indication that the aircraft has not been successfully monitored. Please contact NAARMO if this occurs.

Note (2): Operators should be aware that the AGHME web page is only updated once a month, typically around the 15th. Also, it takes approximately 30 days for an AGHME measurement to be processed and posted to the approvals data base.

<u>16. FAQ: Application for Monitoring.</u> For the new two year requirement, do I have to fill out an "Application for Monitoring" if I already have an established RVSM monitoring program.

No, the application for monitoring is designed for an operator requesting an initial RVSM authorization. An operator that has a valid RVSM authorization and has already established a monitoring program can check the RVSM Approvals Data Base to determine when their last valid monitoring was recorded. For North American Operators the data base can be accessed from the FAA RVSM Website under RVSM Documentation. The files are located under the section heading of "**US RVSM Approvals".** The weblink for this site is:

http://www.faa.gov/air_traffic/separation_standards/rvsm/documentation/

17. FAQ: Previous monitoring results relating to transfer of ownership . If an aircraft has been successfully monitored previously and a new owner can demonstrate that the aircraft has been continuously maintained in standard airworthiness condition and the approved maintenance program is current, the previous monitoring can be used to meet the RVSM monitoring requirements. The time frames associated with the RVSM monitoring policy apply.

Example 1. If an operator purchases an aircraft and requires issuance of a new RVSM authorization and can demonstrate that the aircraft has a previous successful monitoring and meets the airworthiness and monitoring requirements above he has the remaining balance of the monitoring time to have the aircraft monitored (e.g., 2 years or 1000 flight hours, whichever is longer from the last successful monitoring.)

Example 2.: If an operator requires issuance of a new authorization and the aircraft has not been monitored (or can't be shown to have been monitored) within the previous 2 years or 1000 flight hours, whichever is longer, he has 6 months to get it monitored.

18. FAQ: Use of Electronic Media for RVSM Documentation. It is acceptable to maintain RVSM documentation carried onboard the aircraft via electronic media (e.g., IPAD, Electronic Flight Bag). However, copies of RVSM Authorizations may continue to be carried onboard at all times in paper format for backup purposes (note: any backup copies carried must reflect current electronic authorizations). For operators AC 120-76B provides an acceptable method of compliance for the certification, airworthiness, and the operational approval of both portable and installed Electronic Flight Bag (EFB) aircraft computing devices. Many of the RVSM documents, including the RVSM maintenance manual, are considered "Type A" documents and the use of an electronic device for these items requires Principal Inspector (PI) approval (see the AC for guidance). Note: For part 91 operators other than 91K, the use of an EFB in lieu of paper is the decision of the aircraft operator and/or the pilot in command. AC 91-78 and AC 120-76B contain guidance on replacing paper products with an EFB.

APPENDIX G

Updated: 7/31/2015

RVSM MONITORING POINTS OF CONTACT

Scheduling GPS-based Monitoring System/Unit Flights:

CSSI Inc., FAA RVSM GMS Monitoring Support Contractor:

Phone:	+1 866-468-8111 or +1 202-554-1050
Fax:	+1 202-863-2398
Email:	monitor@cssiinc.com

ARINC, FAA RVSM Monitoring GMU Support Contractor:

Phone:	+1 410-266-4707
Fax:	+1 410-573-3007
Email:	rvsmops@arinc.com

RVSM Monitoring Programs, Approvals Data Base and Support Questions:

Name	Title	Phone	Email
Steve Smoot	FAA RVSM Support, CSSI, Inc.	+1 (202) 267-8855	steve.ctr.smoot@faa.gov
Tracy Sivley	FAA RVSM Support, CSSI, Inc.	+1 (609) 485-7371	tracy.ctr.sivley@faa.gov

FAA RVSM Monitoring Program Leads:

Name	Title	Phone	Email
Madison Walton	FAA Headquarters (AFS-470)	+1 (202) 267-8850	madison.walton@faa.gov
Wayne Smoot	FAA Tech Center (ANG-E61)	+1 (609) 485-5475	wayne.smoot@faa.gov

U.S. OPERATOR APPLICATION FOR RVSM MONITORING

Updated: 7/31/2015

Instructions

1. If your aircraft **is not currently listed** in the Approvals Data Base, fax the completed form to +1(609) 485-5078 or email to naarmo@faa.gov

Operator Name: _____

Operator's 3-letter ICAO Identifier: _____

(For International General Aviation Operators (IGA), enter IGA. If no ICAO identifier assigned, enter "None")

Operator Primary Point of Contact

Name: _____ Title: _____

Telephone Number: _____ Fax Number: _____

Email Address: asdf

Operator Secondary Point of Contact

Name: _____ Title: _____

Telephone Number: _____ Fax Number: _____

Email Address: _____

Responsible Flight Standards Office (FSDO or CMO) Point of Contact

Name: _____ Title: _____

Address: _____

Telephone Number: _____ Fax Number: _____

Email Address: _____

REGION WHERE RVSM OPERATIONS WILL BE CONDUCTED:

(Check all that apply)

☐ North America ☐ Pacific ☐ North Atlantic ☐ Caribbean/ South American ☐ European ☐ Asia ☐ Other (Please Specify)

Form 1

U.S. OPERATOR APPLICATION FOR RVSM MONITORING

Updated: 7/31/2015

Date of flight:_____

HMU flight Location(s):_____

GMU flight Location(s):_____

AGHME flight Location(s):_____

AIRCRAFT INFORMATION

(Please be sure to include data for the ENTIRE fleet, Add additional forms as needed)

Aircraft to be Monitored	Aircraft Model	Registration Number	Serial Number	Mode S Address

Form 1