



International Civil Aviation Organization  
Western and Central African Office

**Twelfth Meeting of the Air Traffic Management/Aeronautical  
Information Management/Search and Rescue Sub-Group  
(ATM/AIM/SAR SG/12)  
(Dakar, Senegal, 25 - 29 July 2011)**

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**Agenda Item 5: RVSM operations and monitoring activities**

**AFI RVSM HEIGHT MONITORING AND ASE**

*(Presented by ARMA)*

**SUMMARY**

This paper addresses the requirement for RVSM Height Monitoring and the urgency for all States to comply. Action required is contained in paragraph 3.

**1. INTRODUCTION**

1.1 RVSM requires that aircraft altimeters shall be accurate enough to ensure continued safe ICAO standard separation. In order to achieve these requirement altimetry systems must meet the global accuracy requirements for safe RVSM operations. ARMA therefore continuously monitors aircraft height keeping performance in AFI via the GMU method supplemented by monitoring results obtained from other RVSM regions. The main focus of Height Monitoring is to ensure that the Altimetry System Error, ASE, measured in this case for each target aircraft is within the permissible limits.

In short the ASE is the difference between the altitude that the Air Crew, Air Traffic Control and the aircraft's own systems (including TCAS) believe the aircraft to be at and the true altitude. Each airframe has a unique ASE characteristic and it must remain within specified limits for safe separation to be assured. The most important characteristic regarding ASE is that it is invisible except to the various Height Monitoring methods employed to measure ASE and in this particular case it is the GMU method in AFI. On board aircraft systems, Air Crew and Air Traffic Control are not aware that an individual aircraft's ASE may exceed the safety limits.

The initial assumption that ASE of an airframe is stable over time has now been demonstrated not to be true. This observation has been obtained through actual operations where ASE measurements have been gathered over a period of time and specifically in Europe. The aforementioned has inter alia implications for Aircraft Operators, Air Navigation Service Providers, Maintenance Organizations and Airworthiness Authorities.

## 2. DISCUSSION

2.1 The ARMA manages a height monitoring program to monitor ASE and thus contribute towards meeting the AFI RVSM Safety Policy. It is a requirement that all AFI Aircraft Operators participate in the Height Monitoring Program.

2.2 In AFI the ARMA utilizes the GMU method of RVSM height monitoring which is supplemented with results from other RVSM regions. To date the ASE results have in most cases met the tolerances required however a number of near non compliant and non compliant aircraft altimetry systems have been identified. In most of the instances, with the co-operation of the aircraft operator, the problems have been rectified.

2.3 Height monitoring in AFI has been endorsed by APIRG and is also now a standard in Annex 6 which shall be met by all Aircraft Operators for very good reasons.

2.4 Currently in AFI most of the AFI Long Haul fleets are meeting the monitoring requirements set however there are many Aircraft Operators operating solely within the confines of the AFI Region that are not meeting the requirements even after repeated intervention by ARMA.

2.5 At the time of compiling this paper the States recorded in Table 1 below complied with the height monitoring requirements. Nine out of thirty four States within the Height Monitoring Program equates to 26% which will need to improve. The table will be amended if required for presentation at the meeting.

Botswana	Cameroon	Madagascar	Namibia
Reunion	Seychelles	South Africa	Tchad
Zimbabwe			

**Table 1**

2.6 In order to resolve these deficiencies State Civil Aviation Authorities and Aircraft Operators are strongly urged to participate in the AFI Height Monitoring Program which is managed by ARMA. As previously mentioned a stable ASE holds big safety benefits for both the Aircraft Operator and Air Navigation Service Provider.

2.7 The height monitoring requirement status for AFI State Aircraft Operator fleets are available for viewing on the ARMA webpage which is updated at monthly intervals.

## 3. ACTION REQUIRED

3.1 The meeting is requested to:

- a) Take note of the working paper.
- b) Urge Civil Aviation Authorities to adhere to the height monitoring plan
- c) Support the distribution of a State Letter to Administrations outlining the requirements for height monitoring

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