ICAO

Second Meeting of the Steering Group for the continued Improvement of Air traffic Services over the South Atlantic (SAT/SG2)

Dakar, Senegal, 9-12 December 2024

Agenda Item 5: SAT Members initiatives.

ADS B Height Monitoring over the high seas

(Presented by the ARMA)

SUMMARY	
ADS-B Height Monitoring System (AHMS) uses ADS-B receivers to obtain geometric height data from ADS-B equipped aircraft. The use of this method requires the aircraft to be ADS-B equipped and for the aircraft to fly in a region where ADS-B monitoring is performed. Action by the Meeting is in paragraph 3.	
Reference	Annex 6 Part I Chapter 7.2
Strategic Objectives	A Safety B Capacity and Efficiency

1 INTRODUCTION

1.1 With the endorsement of ADS-B Height Monitoring methodology by the ICAO Separation and Airspace Safety Panel (SASP), ADS-B data can be used for calculating the Altimetry System Error (ASE) which is a measure of the height-keeping performance of an aircraft. It is an ICAO requirement that aircraft operating in RVSM airspace must undergo periodic monitoring on height-keeping performance.

1.2 The ICAO Separation and Airspace Safety Panel (SASP) first considered the use of geometric height data from ADS-B systems in 2001. While further consideration was given to this issue by SASP in the intervening years, activity was started in earnest following work after significant progress was made with test flights conducted by the United States FAA in 2008 and early 2009 which demonstrated that aircraft geometric height data obtained from ADS-B is sufficient for estimating aircraft Altimetry System Error (ASE).

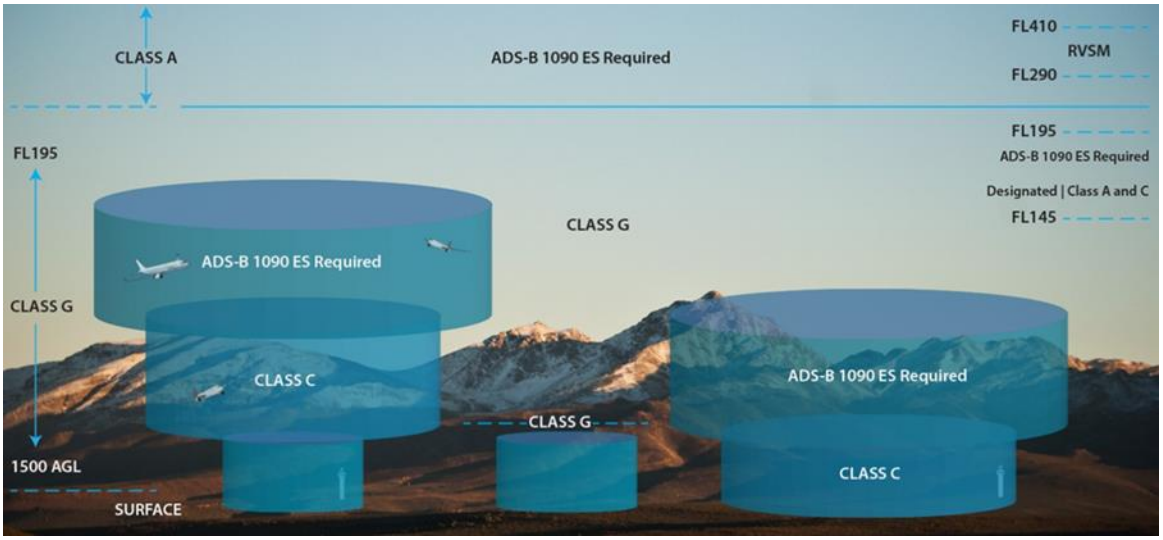
2. DISCUSSION

2.1 The ADS-B (OUT) and Mode S 1090mhz Extended Squitter aircraft transponder Mandate is as follows;

2.2 An aircraft operating in RVSM, Class A and any other airspace considered and approved through the appropriate structures shall use the RTCA DO-260B / EUROCAE ED-102A, as the adopted standard, unless a different standard has been specified by the Director General of Civil Aviation.

2.3 An aircraft with a MTOW 5700KG or less and capable of a speed of up to 250 KIAS, operating below RVSM airspace but intending to operate in Class A, and any other airspace considered and approved through the appropriate structures, shall use the RTCA DO-260A / EUROCAE ED-102 adopted standard, unless a different standard has been specified by the Director General of Civil Aviation".

2.4 Figure below provides a depiction of the ADS-B (OUT) and Mode S 1090MHz Extended Squitter aircraft transponder requirements



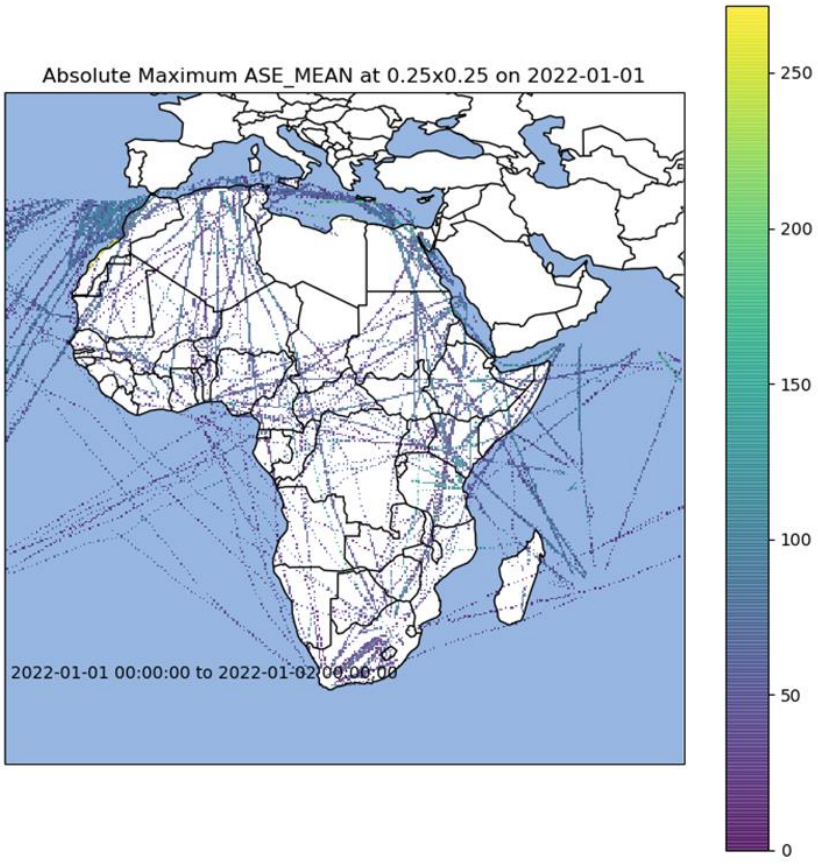
2.5 ARMA conducted a feasibility test with the help of the FAA using ADS-B Space Based data from Aireon and the test was successful. The test produced 5 minutes segments samples that could calculates Altimetry System Error. The program assessed all altitudes between FL170 and FL660. In this case we identified 44,494 5-minute samples from 1632 aircraft. The lowest flight level was FL180 and the highest was FL470 however we sampled using data from FL290-FL410 for height keeping checks.

2.6 The total number of samples within RVSM was 42,501. Here are just a few of the samples of the output file:

PINDEX	MODE_S	FLIGHT_ID	MSRMT_DATE	MSRMT_TIME	ASE_MEAN	SPEED	NIC	REL_HEADING
40752	AE5B68	BRNCO71	1/1/2022	12:19.2	19.81	309.29	9	-146.55
23551	04015B	ETH154	1/1/2022	31:04.3	70.27	336.36	8	5.56
28501	0A008B	DAH6472	1/1/2022	30:07.2	1.6	354.79	8	-16.82
30554	42463A	AFL422	1/1/2022	43:43.6	50	341.46	8	-158.84
40304	04003B	ETH811	1/1/2022	45:09.1	39.89	346.52	8	40.5
40723	0A0051	DTH1315	1/1/2022	54:32.7	119.37	334.53	8	104.53
41075	00A60D	ZSOKA	1/1/2022	10:00.5	54.61	277.29	8	36.21
4524	501D0A	NUA0533	1/1/2022	24:06.5	51.81	424.86	8	-84.46

2.7 NIC (Navigational Integrity Category) Subfield used to specify the containment radius integrity associated with horizontal position data. Altimetry System Error calculation require for the NIC >8.

2.8 The sampled area using ADS-B Spaced based Data provided by the State of South Africa from Aireon.



3 ACTION BY THE MEETING

3.1 The meeting is invited to.

a) take note of the information provided in this working paper;

b) encourage States to participate in the equipage survey to determine a go- or no-go decision; and

c)Support ARMA with implementation of ADS-B Height Monitoring as an additional method to the EGMU Method for the 6 SAT Area States in the AFI Region.