



International Civil Aviation Organization

**FIFTEENTH MEETING OF THE ADS-B STUDY AND IMPLEMENTATION
TASK FORCE (ADS-B SITF/15)**

Bangkok, Thailand, 18 - 20 April 2016

**Agenda Item 4: Review States' activities and interregional issues on implementation of
ADS-B and multilateralism**

EQUIPAGE STATUS OF AIRCRAFT

(Presented by Singapore)

SUMMARY

This paper updates the Task Force on the equipage status of aircraft and monitoring of avionics performance.

1. Introduction

1.1 This paper shares with the Task Force the equipage status of aircraft, as observed by the ADS-B stations used by the Civil Aviation Authority of Singapore (CAAS) and the monitoring of avionics performance.

2. Distribution of Avionics Type

2.1 About 96% of the aircraft in the Singapore FIR is now equipped with ADS-B. The distribution of DO-260, DO-260A and DO-260B avionics equipage of the aircraft as observed by ground stations used by CAAS over a period of 24 hours are as shown in the following table. While the statistics is not an exact reflection of the actual equipage, it nevertheless gives an indication of the avionic mix. The respective percentages of aircraft equipped with DO-260, DO-260A and DO-260B are as follows:

	Late 2014	Early 2015	Late 2015	Early 2016
DO-260	90.07%	86.81%	83.9%	84.3%
DO-260A	6.27%	9.71%	10.3%	8.2%
DO-260B	3.66%	3.48%	5.7%	7.5%

Table 1: distribution of avionics type

2.2 There is a surge in the number of DO-260B equipped aircraft and a reduction of DO-260A equipped aircraft. This is partly due to the B787 applying the service bulletin issued by Boeing, which upgraded the avionics from DO-260A to DO-260B. Some of the new models such as A350 are also delivered with DO-260B. Models such as B777 and B737 are still being delivered with DO-260 (as in the case of Singapore Airlines and Silk Air), this probably explains why the percentage of DO-260 equipped aircraft did not go down.

2.3 A study was also conducted on the equipage status of the Singapore registered operators. The equipage status is as shown below.

Operator	Aircraft Type	Avionics Type	Number of aircraft	Remarks
SIA Cargo	B747-F	DO-260	10	
Singapore Airlines	B777	DO-260	59	
	A330	DO-260	32	
	A350	DO-260B	1	
	A380	DO-260B	19	ADIRU L4.3 was installed to address the lack of Geo Alt.
Scoot	B777	DO-260	2	
	B787	DO-260B	10	Nine were upgraded from DO-260A to DO-260B. The tenth was delivered with DO-260B.
Silk Air	B737	DO-260	13	
	A320	DO-260	12	
	A319	DO-260	5	
Tiger Air	A320	DO-260	23	
	A319	DO-260	2	
Jetstar Asia	A320	DO-260	18	

Table 2: Status of Singapore registered operators

3. Other Avionics Issues

Toggling between high and low NUC

3.1 Singapore monitors aircraft which sent NUC values toggling between high and low without apparent reasons. It is observed that these airframes have consistency in such behavior. Currently, there are eight aircraft (reduced from fifteen) observed with such behavior over the last six months.

3.2 When such aircraft are observed prior to entering the ADS-B mandated airspace, CAAS will descend the aircraft to below FL290 if the aircraft cannot perform any rectification to maintain a high NUC. CAAS will inform the airline concerned. If the problem persists over several flights, the aircraft may be blacklisted.

Consistent low NUC

3.3 Singapore is also monitoring aircraft which consistently transmit low or zero NUC. Currently, there are thirteen (reduced from sixty-nine) observed with such behavior over the last six months. Most of these aircraft are considered “unequipped”. Most of the time, such aircraft are not in the ADS-B mandated airspace. CAAS still inform the airlines concerned so that the airlines are aware of their avionics issues.

Reduction in numbers

3.4 The numbers of aircraft with avionics issues are reduced greatly probably due to the commencement of ADS-B operations in Indonesia in June 2015.

4. Conclusion

4.1 The meeting is invited to:

- a) note the above information;
- b) urge States to share observations, especially with a neighboring State who is likely to observe the same issue; and
- c) urge airlines to work with ANSPs to aid in the investigation.
