International Civil Aviation Organization

AUTOMATIC DEPENDENT SURVEILLANCE – BROADCAST SEMINAR AND ELEVENTH MEETING OF AUTOMATIC DEPENDENT SURVEILLANCE – BROADCAST (ADS-B) STUDY AND IMPLEMENTATION TASK FORCE (ADS-B SITF/11)

Jeju, Republic of Korea, 24-27 April 2012

Agenda Item 7: Development of Asia/Pacific Regional ADS-B implementation plan and sub-regional ADS-B implementation plan

STATUS OF ADS-B AVIONICS EQUIPAGE ALONG ATS ROUTES L642/M771 FOR HARMONIZED ADS-B IMPLEMENTATION

(Presented by Hong Kong, China)

SUMMARY

This paper highlights good progress in avionics equipage of ADS-B along two ATS routes L642 and M771 with major traffic flow, and recommends extending the framework formulated for harmonizing ADS-B implementation over South China Sea to other high density routes in the APAC Regions to reap the full benefits of ADS-B deployment. Moreover, concerned CAAs/ANSPs are encouraged to continue their liaison with IATA/aircraft operators to early equip their fleets and seek ADS-B operational approval from the State of Registry in a timely manner to cope with their published ADS-B mandates.

1. INTRODUCTION

1.1 During the 6th meeting of ADS-B SEA/WG in February 2011, Hong Kong, China initiated to strengthen collaboration among concerned States/Administrations for harmonized ADS-B implementation and seamless operations along two ATS routes L642 and M771 with major traffic flow (MTF). An ad-hoc workgroup comprising concerned CAAs/ANSPs from Hong Kong, China, Mainland China, Vietnam and Singapore was subsequently formed to elaborate and agree on a framework regarding implementation timelines, avionics standards, optimal flight levels, and ATC and engineering handling procedures. As a coherent effort, ADS-B implementation along MTF routes L642 and M771 has been harmonized while Hong Kong, China and Singapore have published respective Aeronautical Information Circulars and Airworthiness Notices on ADS-B mandates for these two routes with effect on 12 December 2013.

1.2 Hong Kong, China has established a high-level CNS/ATM Committee to steer all strategic plan for study, trials and implementation of satellite-based technologies. To ensure a well-coordinated ADS-B implementation with major stakeholders, Hong Kong, China approached IATA back in 2009 to seek their support on ADS-B mandate for the above routes by end 2013 and the whole Hong Kong FIR by end 2014.

1.3 Since publication of the ADS-B mandates in early 2011, concerned CAAs/ANSPs have been working closely with IATA and relevant aircraft operators to reap full operational benefits of ADS-B deployment along these routes by early equipping their fleets. In parallel, Hong Kong, China initiated a study to track aircraft movements and analyse the latest progress in ADS-B equipage for aircraft flying along these two MTF routes.

2. DISCUSSION

2.1 A study was conducted to capture and analyse useful ADS-B data broadcasted from aircraft flying along these two MTF routes for 2 days between 29 February 1600 UTC and 2 March 1559 UTC. ADS-B data were collected by an ADS-B ground station installed at the high ground of 1,000 mPD in Hong Kong, China.

2.2 ADS-B equipage statistics along MTF route L642

2.2.1 The ADS-B ground station detected 197 airborne targets with ADS-B data broadcast out of 240 airborne targets (82% equipped) flying along MTF route L642 within the surveyed timeframe. With these 197 ADS-B airborne targets, 190 (79%) were able to provide ADS-B message with good Navigation Uncertainty Category (NUC) value > 4 as defined by ICAO suitable for aircraft separation. Appendix 1 shows detailed ADS-B equipage statistics of airborne targets flying along L642 with respect to NUC value, major aircraft type and aircraft operators.

2.3 ADS-B equipage statistics along MTF route M771

2.3.1 The ADS-B ground station detected 158 airborne targets with ADS-B data broadcast out of 196 airborne targets (81% equipped) flying along MTF route M771 within the surveyed period. With these 158 ADS-B airborne targets, 154 (79%) were with good NUC value. Appendix 2 shows the details.

2.4 ADS-B equipage statistics within Hong Kong FIR

2.4.1 During the same period, a total of 2,163 ADS-B airborne targets were detected out of 3,041 airborne targets (71% equipped) flying within the Hong Kong FIR. After analysis, 66% (2,008) out of these 2,163 ADS-B airborne targets were with good NUC values. Appendix 3 gives similar details.

2.5 Under the leadership of the ICAO and with collaborative efforts from IATA and CANSO, the ADS-B implementation along MTF routes L642 and M771 has been well-harmonized among stakeholders concerned with strong drives to maximize operational benefits. To date, aircraft flying along L642 and M771 with suitably equipped ADS-B avionics and transmitting quality information already achieved an encouraging result of 79%. Tracking some records showing ADS-B equipped aircraft had been maintained at some 50% in some 2 years before, it is obvious that ADS-B mandates did bring a very clear message to and obtain recognition from aircraft operators to plan for retro-fitting and forward-fitting their fleets. To go one step further, concerned CAAs/ANSPs are encouraged to continue their liaison with IATA/aircraft operators flying along these MTF routes and within the Hong Kong FIR to expedite equipping fleets and obtain ADS-B operational approval from the State of Registry in a timely manner to cope with the published ADS-B mandates.

2.6 To foster experience sharing and fast-track ADS-B development in the APAC Regions, it is recommended that the framework for harmonizing ADS-B implementation along L642/M771 in South China Sea (see Appendix 4) could serve as a useful template for use in other high density routes in the Regions, including the Bay of Bengal.

3. ACTION TAKEN BY THE MEETING

3.1 The meeting is invited to:

a) note the latest statistics of ADS-B avionics equipage for aircraft flying along MTF routes L642 and M771, and within the Hong Kong FIR;

b) request concerned States/Administrations to make reference to the framework on harmonized ADS-B implementation and seamless operations along MTF routes L642 and M771, and extend the framework to other high density routes in the APAC Regions; and

c) encourage the concerned CAAs/ANSPs to join efforts with IATA/aircraft operators to expedite equipping fleets and obtain ADS-B operational approval from the State of Registry in a timely manner to cope with the published ADS-B mandates.

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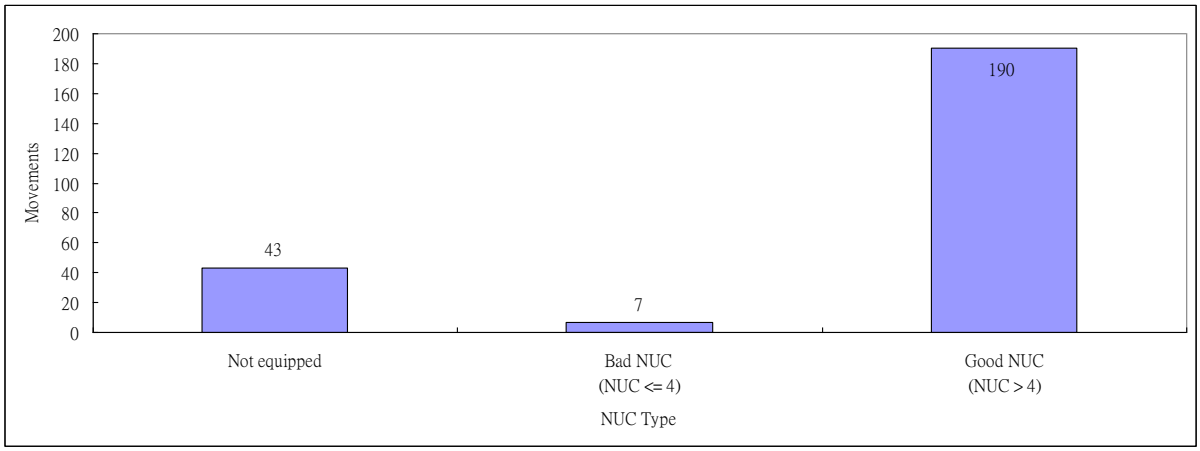

Figure 1 : ADS-B equipage along L642 with respect to NUC value

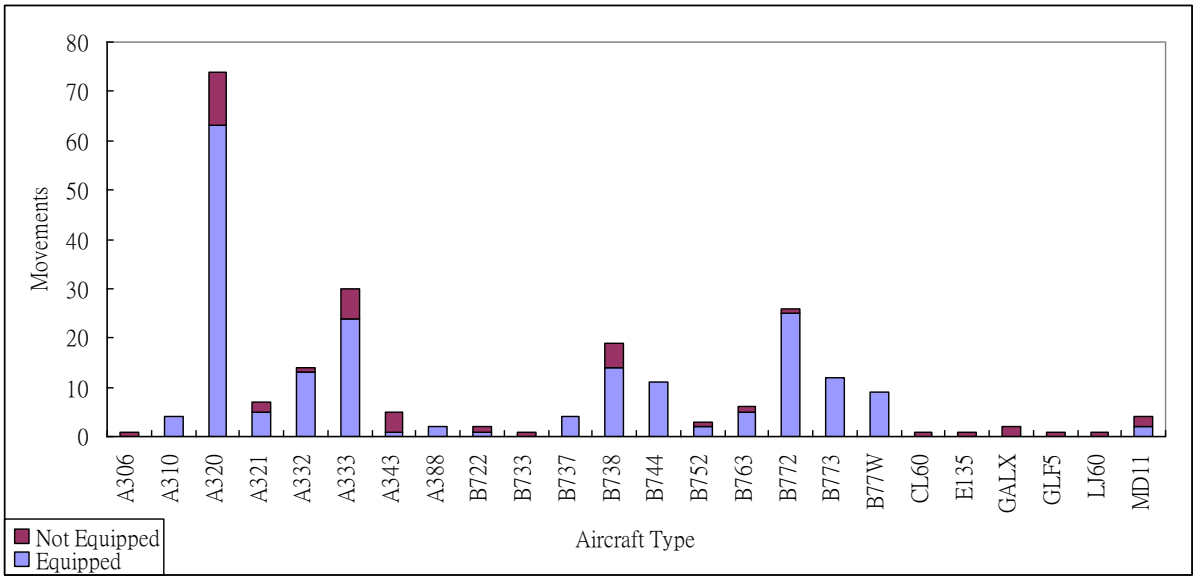

Figure 2 : ADS-B equipage along L642 with respect to aircraft type

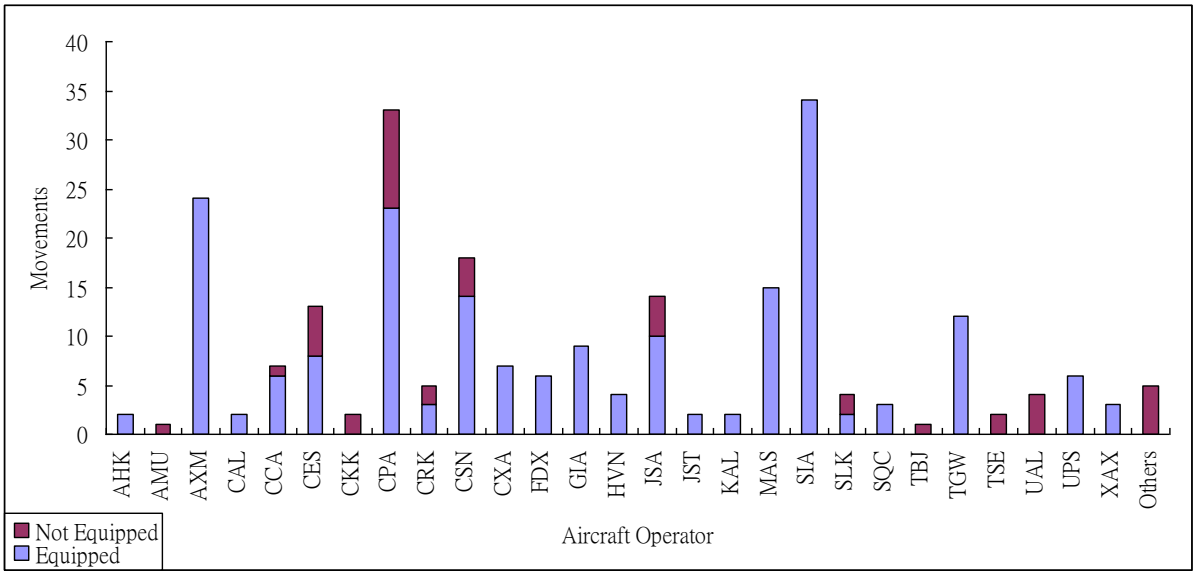

Figure 3 : ADS-B equipage along L642 with respect to aircraft operator

Appendix 2

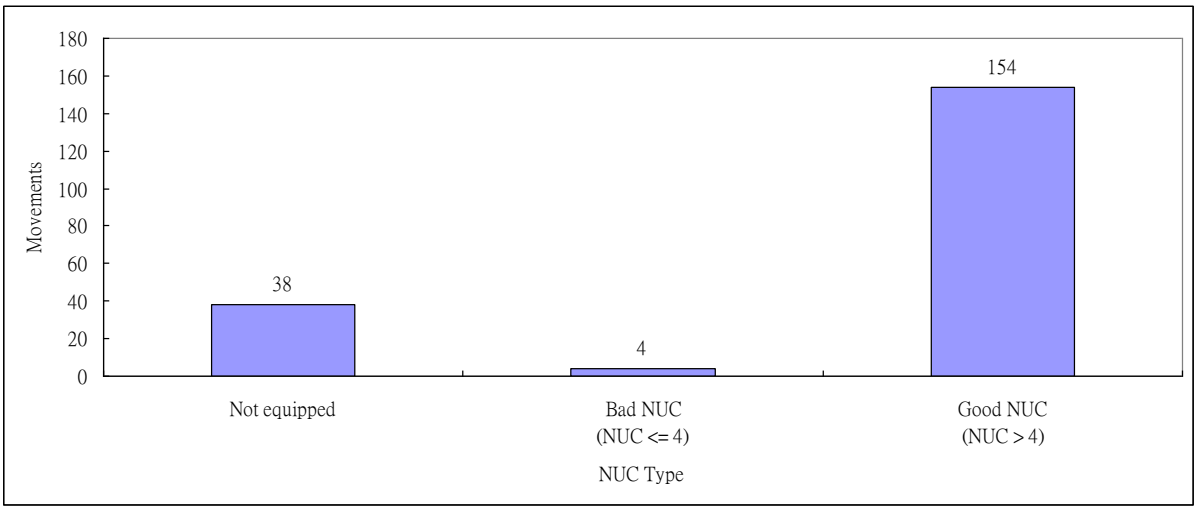

Figure 4 : ADS-B equipage along M771 with respect to NUC value

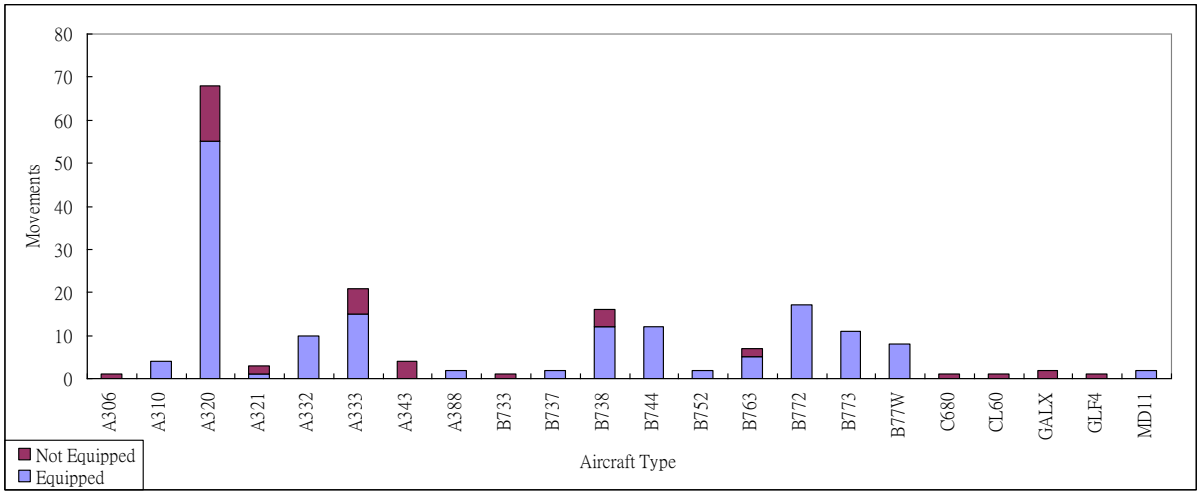

Figure 5 : ADS-B equipage along M771 with respect to aircraft type

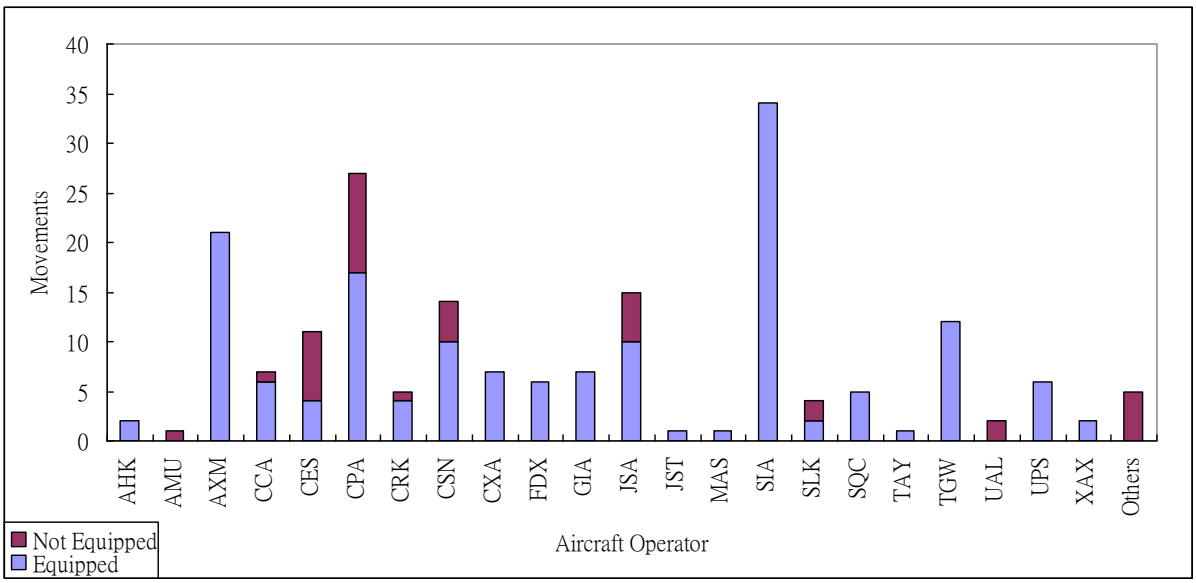

Figure 6 : ADS-B equipage along M771 with respect to aircraft operator

Appendix 3

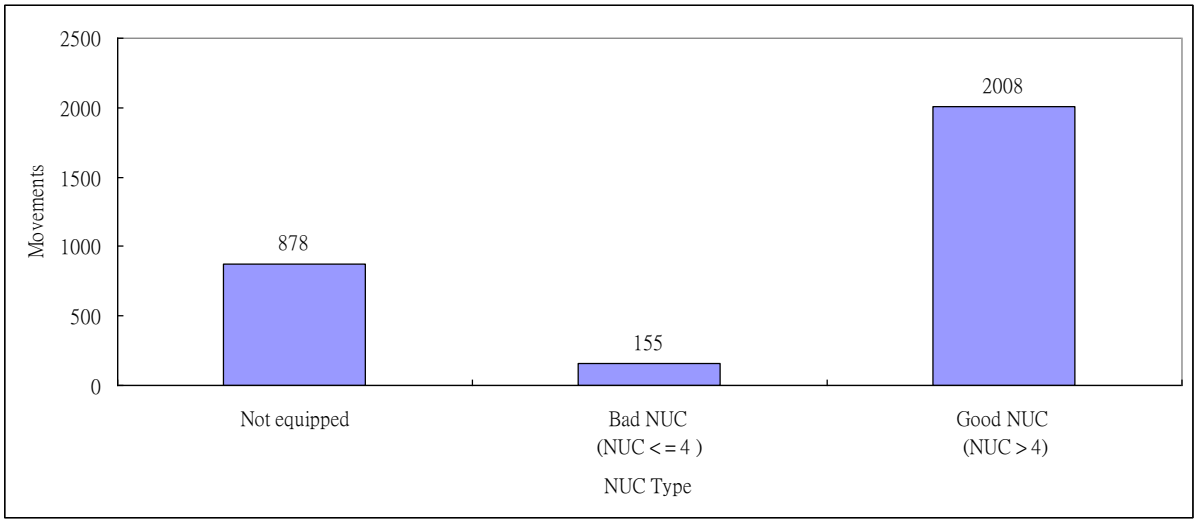

Figure 7 : ADS-B equipage inside Hong Kong FIR with respect to NUC value

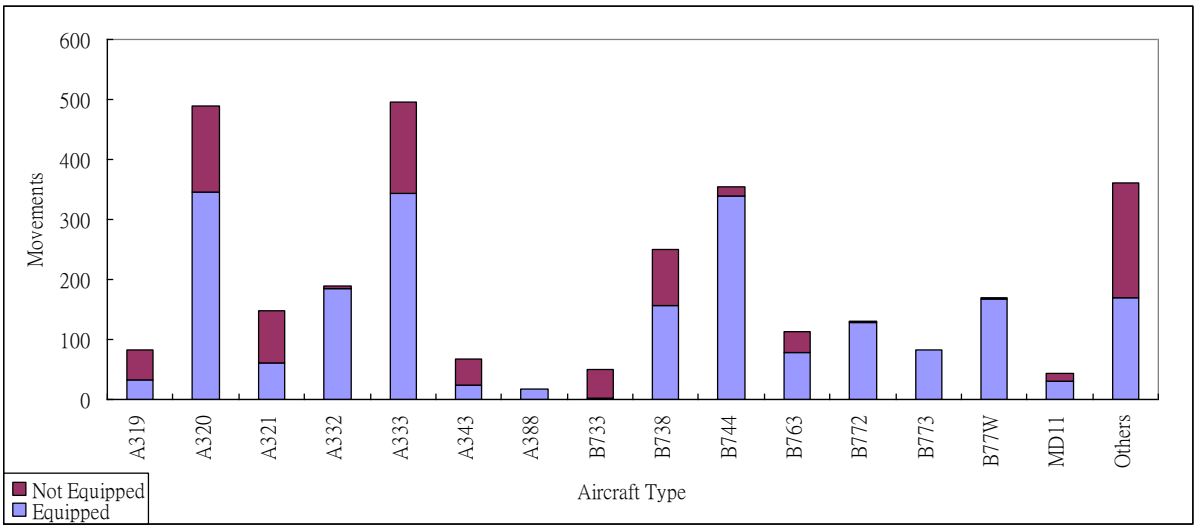

Figure 8 : ADS-B equipage inside Hong Kong FIR with respect to aircraft type

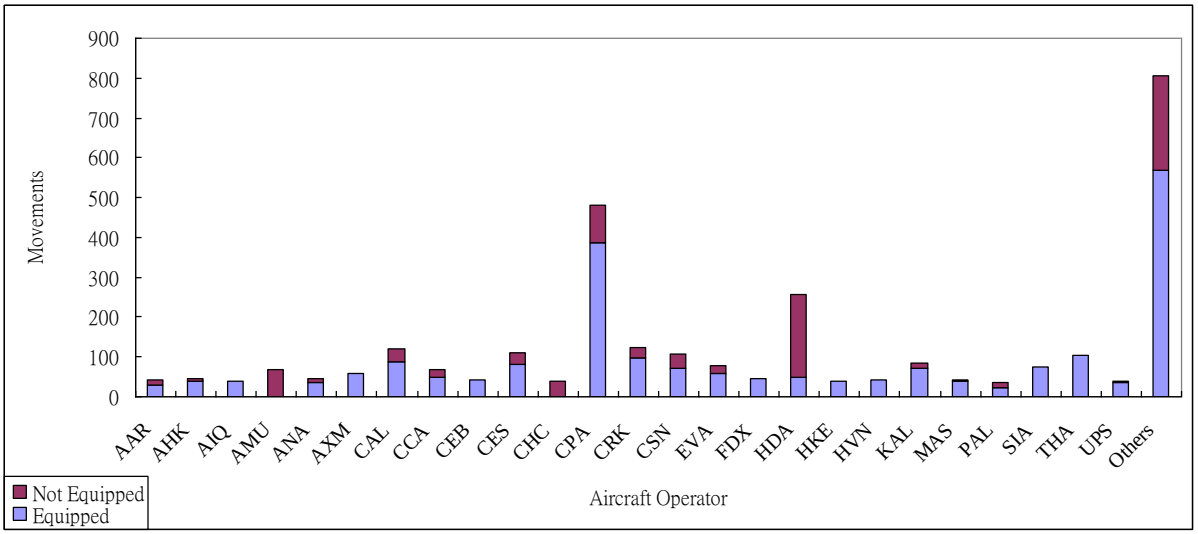

Figure 9 : ADS-B equipage inside Hong Kong FIR with respect to aircraft operator

Appendix 4

Harmonization Plan for L642 and M771 (Work in progress)			
No.	**What to harmonize**	**What was agreed**	**Issue / what needs to be further discussed**
1	Mandate Effective	SG - 12 Dec 2013 HK - 12 Dec 2013 VN - TBD (ADS-B SITF/11) CN - TBD (ADS-B SITF/11)	
2	ATC Operating Procedures	No need to harmonize	Refer to SEACG for consideration of the impact of expanding ADS-B surveillance on ATC Operating Procedures including Large Scale Weather procedures.
3	Mandate Publish Date	No need to harmonize	To publish equipment requirements as early as possible.
4	Date of Operational Approval	No need to harmonize	
5	Flight Level	SG - At or Above FL290 (ADS-B airspace) - Below FL290 (Non-ADS-B airspace) HK - At or Above FL290 (ADS-B airspace) - Below FL290 (Non-ADS-B airspace) VN - TBD (ADS-B SITF/11) CN - At or Above FL290 (ADS-B airspace) - Below FL290 (Non-ADS-B airspace) -	
6	Avionics Standard (CASA/AMC2024)	SG - CASA or AMC2024 HK - CASA or AMC2024 VN - CASA or AMC2024	ADS-B Task Force agreed that DO260B will be accepted as well.

Appendix 4

		CN - CASA or AMC2024 (subject to approval)	
7	Flight Planning	Before 15 Nov 2012, as per AIDG On or after 15 Nov 2012, as per new flight plan format	Same as Australia / Canada
8	Aircraft Approval		
8a)	Procedures if Aircraft Not approved	SG - FL280 and Below HK - FL280 and Below VN - FL280 and Below (subject to confirmation in ADS-B SITF/11) CN - FL280 and Below	
8b)	Aircraft Approved but Transmitting Bad Data	For known aircraft, treat as non ADS-B aircraft. If in-flight, provide other form of separation (subject to bilateral agreement). From radar/ADS-B environment to ADS-B only environment, system may be able to provide early notification of ADS-B failure.	Address the need of maintaining a black list / white list registry. Is this something that can be addressed by ICAO at the regional level?
9	Contingency Plan		
9a)	Systemic Failure such as Ground System / GPS Failure	Revert back to current procedure.	
9b)	Avionics Failure	Provide other form of separation, subject to bilateral agreement.	Address the procedure for aircraft transiting from radar to ADS-B airspace and from ADS-B to ADS-B airspace.
10	Letter of Operation Agreement	SEACG	Need for commonly agreed minimal in-trail spacing throughout.