



International Civil Aviation Organization

**The Sixth Meeting of the APANPIRG ATM Sub-Group
(ATM/SG/6)**

Hong Kong, China, 30 July – 03 August 2018

Agenda Item 4: ATM Systems (Modernisation, Seamless ATM, CNS, ATFM)

MODE S CONSPICUITY CODE – AMENDMENT TO eANP Vol II

(Prepared by Australia and Co-chairs of SURICG)

(Presented by Co-Chair of SURICG)

SUMMARY

This paper identifies future requirements for a regional Mode S conspicuity code, and proposes the use of Mode A Code A1000 for this purpose.

1. INTRODUCTION

1.1 The SSR Codes Allocation Plan of the Asia and Pacific Regions is based on the allocation of discrete Mode A codes for each flight, by each FIR. The availability of Mode A codes is limited, and an increasing number of flights in the region may result in capacity constraints as Mode A code allocations become fully used.

1.2 Mode S radar, and associated ATM systems, provides an opportunity to move away from using discrete Mode A codes for aircraft identification – instead using the transmitted Aircraft Identification and, to a lesser extent, ICAO Aircraft Address to support coupling of radar tracks to flight plans.

1.3 During SURICG/3 held in Fiji 25th to 27th April 2018, Australia presented WP/04 on this topic. The meeting report recorded “Although the rationale in the paper is justified, the meeting considered it more appropriate for ATM SG to review and take action on the proposal. Hence the meeting asked Australia and co-chair from Hong Kong China to prepare an enhanced working paper for consideration by the ATM SG/6 meeting scheduled for 30 July to 3 August 2018 in Hong Kong China.”

1.4 Within the Asia/Pacific Region, Mode A codes are used as the basis for aircraft identification, typically through the allocation of a discrete SSR code to a flight using a process such as the:

- first flight data processing system allocates an SSR code (derived from Table ATM II-APAC-2 SSR CODES ALLOCATION PLAN in Vol II of the APAC Air Navigation Plan (eANP));
- flight is assigned a discrete SSR code prior to departure, or on contact with Air Traffic Control; and
- assigned SSR Code is coordinated to downstream FIRs via DEP message and/or via AIDC. Ideally, the flight will retain its code for the duration of the flight, but in some cases may need to change code entering a new FIR.

1.5 Table ATM II-APAC-2 SSR CODES ALLOCATION PLAN in Vol II of the APAC eANP provides each FIR with a range of SSR codes for International (leaving the FIR) or Domestic (within the FIR) use. The numbers of codes allocated to each FIR is intended to account for traffic patterns within the region, and numbers of flights originating from each FIR. The objective being to minimise the possibility of 2 or more flights being assigned the same SSR code while in the same radar coverage area.

1.6 Where the same SSR code is used for 2 or more flights at the same time, in overlapping radar coverage volumes, and this is the primary means of associating a radar track to a flight plan, the possibility of incorrect identification is increased.

1.7 As traffic volumes increase, the finite number of discrete Mode A SSR codes will mean more likelihood of the same code being assigned to multiple aircraft in the airspace, increasing risk of mis-identification.

1.8 An alternative to using a discrete SSR code for identification and coupling to a flight plan is to use the Mode S Aircraft Identification and/or ICAO Aircraft Address. This requires states to use Mode S radar systems, and have suitable ATM system capabilities.

1.9 The Asia/Pacific Seamless ATM Plan V2.0 states:

7.40 All Category S upper controlled airspace, and Category T airspace supporting high density city pairs and wholly served by Mode S SSR and/or ADS-B surveillance should implement the use of a standard non-discrete Mode A code for Mode S transponder equipped aircraft to reduce the reliance on assignment of discrete Mode A SSR codes and hence reduce the incidences of code bin exhaustion and duplication of code assignment.

1.10 The Surveillance Strategy for the Asia/Pacific Region, adopted by APANPIRG/27 includes:

6. Make full use of aircraft Mode S capabilities where suitable surveillance systems are available to reduce reliance on 4-digit octal codes.....

1.11 No “standard non-discrete Mode A code” has yet been nominated for the Asia/Pacific region.

1.12 The European SSR Code Management Plan 2010 (EUR DOC 023) has identified the use of the Mode S Conspicuity Code A1000 for aircraft identified via the downlinked Aircraft Identification through Mode S Elementary Surveillance (ELS).

2. DISCUSSION

Heading

2.1 Mode S radars are being deployed across the Asia/Pacific region, however it is expected that many states will continue to rely on Mode A/C radars for a number of years to come.

2.2 Any use of a Mode S conspicuity code by a state, or coordinated across multiple states, requires a full Mode S radar environment, aircraft being Mode S ELS capable, and compatible ATM system capabilities. Use of a non-discrete conspicuity code for aircraft identification is not generally compatible with a Mode A/C surveillance environment. A Mode S equipage mandate for aircraft is not essential for the use of a Mode S conspicuity code, but may be preferred by some States as they move to implementation.

2.3 The proposal to nominate a Mode S conspicuity code for the Asia/Pacific region will not obligate states to implement the use of this code to replace discrete Mode A codes, but is to be encouraged as the use of Mode S radars, and compatible ATM system capabilities, increase.

2.4 The SAIOACG/6 & SEACG/23 meeting in March 2016 was informed of the India's trial implementation of a non-discrete Mode A SSR conspicuity code by Mode S SSR transponder equipped aircraft operating between specified city pairs. The conspicuity code used in the India's trial was A1000, which aligns with the practice in Europe, first introduced by EUROCONTROL under the Mode S Elementary Surveillance project in 2000.

2.5 Code A1000 is proposed for the Mode S Conspicuity code in the Asia Pacific region. This code has already been allocated for this purpose in Europe; selection of the same code in Asia Pacific will be a further step towards a seamless ATM environment for aircraft operating between Europe and Asia Pacific – noting it is likely to be many years before all states will be able to support this capability across EUR and APAC.

2.6 Volume II of the APAC eANP currently allocates code A1000 to the following FIRs:

- Bangkok (Domestic);
- Brisbane (International);
- Fukuoka (Domestic);
- Shanghai (Domestic);
- Shenyang (Domestic);
- Taipei (Domestic); and
- Urumqi (Domestic).

2.7 It is proposed that code A1000 be removed from these specific FIR allocations.

Recommendation

2.8 The following amendments to the Asia and Pacific Regions (APAC) Air Navigation Plan Volume II are recommended:

Part IV – AIR TRAFFIC MANAGEMENT (ATM)

Aircraft Identification-SSR Code Management

3.5 The SSR Codes Allocation Plan of the Asia and Pacific Regions is in **Table ATM II-APAC-2, SSR Codes Allocation Plan**.

3.6 Mode A Code A1000 is reserved for use as a conspicuity code for Mode S equipped aircraft, operating in airspace under Mode S radar surveillance, where Aircraft Identification (Flight ID) is used to enable coupling of ATS surveillance system information with the flight plan, and unambiguous ATC identification of aircraft.

TABLE ATM II-APAC-2 SSR CODES ALLOCATION PLAN OF THE ASIA AND PACIFIC REGIONS

Amend header of the table allocating SSR codes as follows:

Add	Amend
1000	10010- 1077

2.9 **Figure 1** is an excerpt of the eANP, indicating the proposed changes.

TABLE ATM II-APAC-2 SSR CODES ALLOCATION PLAN OF THE ASIA AND PACIFIC REGIONS

FIR	0001- 0077	0100- 0177	0200- 0277	0300- 0377	0400- 0477	0500- 0577	0600- 0677	0700- 0777	1000- 1077	1100- 1177	1200- 1277	1300- 1377	1400- 1477	1500- 1577	1600- 1677	1700- 1777
BANGKOK								I	D	D	D	D	D			
BEIJING	I						D									
BRISBANE				14	14				I	I	I					
CHENNAI			D				I									
COLOMBO																
DHAKA																
DELHI			D			I										
FUKUOKA					D				D	D	D	D	D	D		D
GUANGZHOU							D									
HANOI																I
HO CHI MINH																
HONG KONG, CHINA																
INCHEON			D	D											D	
JAKARTA																D
KABUL																

Figure 1: eANP Table ATM II Excerpt

Conclusion

2.10 The following Conclusion is proposed for the consideration of the meeting:

Draft Conclusion/Decision ATM/SG/6-X: Proposed Air Navigation Plan Volume II Amendment	
What: That, an amendment as proposed in WP/XX to the Asia and Pacific Regions (APAC) Air Navigation Plan Volume II to identify Mode A code A1000 as the Mode S conspicuity code for the APAC Regions.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: Reserve this SSR code for future use as the non-discrete Mode S conspicuity code.	Follow-up: ☐ Required from States
When: 3-Aug-18	Status: Draft to be adopted by Subgroup
Who: ☒ Sub groups ☒ APAC States ☒ ICAO APAC RO ☐ ICAO HQ ☐ Other:	

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) endorse the recommended amendments to Volume II of the APAC eANP; and
- c) discuss any relevant matters as appropriate.

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