



ICAO

International Civil Aviation Organization

The Combined Tenth Meeting of the South Asia/Indian Ocean ATM Coordination Group (SAIOACG/10) and Twenty—Seventh Meeting of the South East Asia ATS Coordination Group (SEACG/27)

Bangkok, Thailand, 30 March – 03 April 2020

Agenda Item 3: Review of Current Operations and Problem Areas

MODE S CONSPICUITY CODES

(Prepared by the Secretariat)

SUMMARY

This paper reports the outcomes of discussions at the Sixth Meeting of the ATM Sub-Group of APANPIRG (ATM/SG/6, Hong Kong, China, 30 July – 03 August 2018), and subsequent developments relating to the Asia/Pacific Secondary Surveillance Radar (SSR) Codes Allocation Plan.

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 Australia and the Co-Chairs of the Surveillance Implementation Coordination Group (SURICG) provided information to ATM/SG/6 identifying future requirements for a regional Mode Select (Mode S) Secondary Surveillance Radar (SSR) conspicuity code. The information provided noted the typical allocation processes for discrete Mode A SSR codes, and the assignment of blocks of codes to Asia/Pacific Administrations in the APAC Air Navigation Plan (ANP).

2. DISCUSSION

2.1 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.

2.2 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 minimize the possibility of 2 or more flights being assigned the same SSR code while in the same radar coverage area.

2.3 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.

2.4 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.

2.5 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.

2.6 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.

2.7 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.....

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

2.9 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).

2.10 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.

2.11 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.

2.12 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.

2.13 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.

2.14 Code A1000 was 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.

2.15 Volume II of the APAC eANP previously allocated code A1000 to the following FIRs:

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

2.16 It was proposed that code A1000 be removed from these specific FIR allocations.

2.17 ATM/SG/6 noted the relevant sections of the *Asia/Pacific Seamless ATM Plan*, the *Surveillance Strategy for the Asia/Pacific Region*, the *European SSR Code Management Plan 2010* and India's trial non-discrete Mode A SSR conspicuity code implementation. The following Conclusion was agreed:

Conclusion ATM/SG/6-3: Proposed Air Navigation Plan Volume II Amendment

*That, a Proposal for Amendment (PfA) to the APAC Air Navigation Plan Volume II at **Appendix C to the Report** be submitted, withdrawing Mode A SSR Code A1000 from Table ATM II-APAC-2 and identifying it as the Mode S conspicuity code for the APAC Regions.*

2.18 PfA Serial No. APAC-II 18/05, proposing the withdrawal of Mode A SSR Code 1000 from the SSR code allocation table, and identifying it as the Mode S conspicuity code for the APAC Regions, was circulated under State Letter AP/065/19 (ATM) dated 12 July 2019. No objection to the proposal was received. One State, in their reply, requested allocation of two further bins of codes, which will be managed separately.

2.19 Consequently, State Letter AP080/20 (ATM) dated 25 March 2020 (**Attachment A**) notified APAC States that the PfA has reached Regional Air Navigation Agreement. The change to Regional ANP Vol. II will be finalized in due course, together with other changes to the SSR code allocation table agreed under separate PfAs.

3. ACTION BY THE MEETING

- 3.1 The meeting is invited to:
- a) note the information contained in this paper; and
 - b) discuss any relevant matters as appropriate.

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авиации

منظمة الطيران
المدني الدولي

国际民用
航空组织

Reference : T 3/2.6, T 3/10.1 – AP080/20 (ATM)

25 March 2020

Subject : **Approval of a Proposal for Amendment of the ICAO Asia and Pacific Air Navigation Plan, Volume II, APAC eANP – Volume II**
(Serial No.: APAC-II 18/05-ATM)

Sir/Madam,

1. I refer to the attached amendment of the Proposal for Amendment of the ICAO Asia and Pacific Air Navigation Plan, Volume II (APAC eANP Volume II), Serial No.: APAC-II 18/05-ATM, has been processed according to the procedure approved by the Council on 25 February 1998 and so is now approved.

2. The material concerned will be implemented as soon as practicable.

3. The amendment will be incorporated in the next consolidated amendment to be issued to the ICAO Asia and Pacific Air Navigation Plan, Volume II (APAC eANP Volume II).

Yours sincerely,

Arun Mishra
Regional Director

Enclosure:

Proposal for Amendment of the ICAO Asia and
Pacific Air Navigation Plan, Volume II
(APAC eANP Volume II)
(Serial No.: APAC-II 18/05-ATM)



PROPOSAL FOR AMENDMENT OF THE ICAO ASIA AND PACIFIC REGIONS AIR NAVIGATION PLAN, VOLUME II

(Serial No.: APAC-II 18/05 – ATM)

a) **Plan:** Air Navigation Plan (ANP) - Asia and Pacific Regions, Volume II

b) **Proposed amendment:** **Volume II, Part IV – AIR TRAFFIC MANAGEMENT**

Editorial Note: Amendments are arranged to show deleted text using strikeout (~~text to be deleted~~), and added text with grey shading (**text to be inserted**)

Add, Amend or Delete requirement as follows:

Add new paragraph as follows:

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 surveillance, where Aircraft Identification (Flight ID) is used for unambiguous ATC identification of aircraft and to enable coupling of the ATS surveillance system information with the flight plan.

Delete Mode A Code A1000 from **TABLE ATM II-APAC-2 SSR CODES ALLOCATION PLAN OF THE ASIA AND PACIFIC REGIONS**, as shown in the **Attachment** to this proposal.

c) **Originated by:** *Australia and Hong Kong, China.*

d) **Originator's reasons for amendment:** 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.

The Asia/Pacific Seamless ATM Plan 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.

The Surveillance Strategy for the Asia/Pacific Region states:

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

e) **Intended date of implementation:** As soon as possible following Regional agreement.

f) Proposal circulated to the following States and International Organizations:	Afghanistan	Maldives	CANSO
	Australia*	Marshall Islands	IATA
	Bangladesh	Micronesia	IBAC
	Bhutan	Mongolia	IFALPA
	Brunei Darussalam	Myanmar	IFATCA
	Cambodia	Nauru	
	China	Nepal	
	- Hong Kong,	New Zealand	
	China*	Pakistan	
	- Macao, China	Palau	
	Cook Islands	Papua New Guinea	
	Democratic People's Republic of Korea	Philippines	
	Fiji	Republic of Korea	
	France	Samoa	
	- French Polynesia	Singapore	
	- New Caledonia	Solomon Islands	
	India	Sri Lanka	
	Indonesia	Thailand	
	Japan	Timor-Leste	
	Kiribati	Tonga	
	Lao People's Democratic Republic	Tuvalu	
	Malaysia	United States of America	
		Vanuatu	
		Viet Nam	

** for information*

- g) **Secretariat Comments:** This proposal was presented to the Sixth Meeting of the Air Traffic Management Sub-Group (ATM/SG/6) of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG), and is supported by the following Conclusion:

Conclusion ATM/SG/6-3: Proposed Air Navigation Plan Volume II Amendment

That, a Proposal for Amendment (PFA) to the APAC Air Navigation Plan Volume II at Appendix C to the Report be submitted, withdrawing Mode A SSR Code A1000 from Table ATM II-APAC-2 and identifying it as the Mode S conspicuity code for the APAC Regions.

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ATTACHMENT TO PFA APAC-II 18/05 – ATM

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	1000-1001-1077	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																
KARACHI																
KATHMANDU		D														
KOLKATA			D		I											
KOTA KINABALU					I	D										
KUALA LUMPUR				D												
KUNMING																
LAHORE		D														
LANZHOU										D						
MALE			D													
MANILA				D			D									
MELBOURNE												I	I	I		
MUMBAI			D	I												
NADI						I										
NEW ZEALAND			I													
PHNOM PENH																I(1)
PORT MORESBY				D	D											
PYONGYANG						D										
SHANGHAI		I						D	D							
SHENYANG										D	I					
SINGAPORE	D	I														
TAHITI																
TAIBEI				D			D		D	D					D	
UJUNG PANDANG																D
ULAAN BATAAR				D	D											
URUMQI									D							
VIENTIANE			D													I(2)
WUHAN				D											D	
YANGON																
FIR	2001-2077	2100-2177	2200-2277	2300-2377	2400-2477	2500-2577	2600-2677	2700-2777	3000-3077	3100-3177	3200-3277	3300-3377	3400-3477	3500-3577	3600-3677	3700-3777
BANGKOK												D				
BEIJING				D					I				D			
BRISBANE																
CHENNAI								D				D				
COLOMBO																
DHAKA																
DELHI												D				
FUKUOKA	D	D	D	D	D	D				I(13)	I	D	D		I	I

GUANGZHOU					D					I			D			
HANOI																
HO CHI MINH																
HONG KONG, CHINA												I(15)			I	
INCHEON																
JAKARTA				I	I	D						D				
KABUL																
KARACHI											D			D		
KATHMANDU																
KOLKATA																
KOTA KINABALU	I										D					
KUALA LUMPUR		I														D
KUNMING			D	D												
LAHORE	D															D
LANZHOU		D														
MALE																
MANILA											I					
MELBOURNE																
MUMBAI													D			
NADI															D	
NEW ZEALAND																
PHNOM PENH																
PORT MORESBY																
PYONGYANG																
SHANGHAI											D					
SHENYANG																
SINGAPORE				I												
TAHITI																
TAIBEI	D	D														
UJUNG PANDANG																
ULAAN BATAAR																
URUMQI					D											
VIENTIANE																
WUHAN																
YANGON																
FIR	4000-4077	4100-4177	4200-4277	4300-4377	4400-4477	4500-4577	4600-4677	4700-4777	5000-5077	5100-5177	5200-5277	5300-5377	5400-5477	5500-5577	5600-5677	5700-5777
BANGKOK			D	D	D	D										
BEIJING																
BRISBANE																
CHENNAI																
COLOMBO	D															
DHAKA		D														
DELHI																
FUKUOKA								D	D			D(11)	D	D	D	D
GUANGZHOU						D										
HANOI		D					D									
HO CHI MINH															I	I
HONG KONG, CHINA																D
HONG KONG, CHINA																I(16)
INCHEON		I	D	I(12)	I(12)	D					D	D				
JAKARTA																
KABUL																
KARACHI					D											
KATHMANDU																
KOLKATA																
KOTA KINABALU													D			
KUALA LUMPUR	D														I	
KUNMING																
LAHORE						D	I									
LANZHOU																
MALE																
MANILA	D			D												

WUHAN			I(8)													
YANGON																

I = International, D = Domestic
1 = Codes/claves 1600-1637
2 = Codes/claves 1640-1677
3 = Codes/claves 5010-5077
4 = Codes/claves 5000 international/5001-5007 domestic
5 = Codes/claves 5200 international/5201-5207 domestic
6 = Codes/claves 6200-6217
7 = Codes/claves 6220-6237
8 = Codes/claves 6240-6277
9 = Codes/claves 6400-6447
10 = Codes/claves 6450-6477
11 = Not available for use in the western part of the Fukuoka FIR
12 = Not for southbound flights
13 = For eastbound/northeast bound flights
14 = Not available for use in Northeastern Australia
15 = For flights bound for China and for destinations within the Manila and Taipei FIRs
16 = Not for flights bound for destinations within and overflying the Fukuoka FIR
* All codes available for domestic use in Australia and New Zealand except where indicated
Note: codes have not been issued for the Auckland Oceanic FIR (NZ), Anchorage and Oakland Oceanic FIRs (USA), Honiara FIR, Nauru FIR and the Sanya FIR