



INTERNATIONAL CIVIL AVIATION ORGANIZATION

Twenty Sixth Meeting of the Africa-Indian Ocean Planning and Implementation Regional Group (APIRG/26)

7 - 8 November 2023

Agenda Item 3: Implementation of air navigation goals, targets and indicators, including the priorities set in the regional air navigation plan

3.6. Other Air Navigation Initiatives

Assignment of 24-bit Addresses and Interrogator Identification Codes for Secondary Surveillance Radar Mode S

(Presented by the Secretariat)

SUMMARY	
<p>This working paper recalls and discusses the ICAO relevant provisions for the assignment of aircraft 24-bit addresses as well as the regional procedure set up for the assignment by the ICAO Regional Offices, of Interrogator Identification Codes (II Codes) for the operation of Secondary Surveillance Radar Mode S.</p> <p>Action by the Meeting is provided in paragraph 3</p>	
<p>REFERENCES</p> <ul style="list-style-type: none"> ▪ The Global Air Navigation Plan (GANP Doc. 9750) ▪ ICAO Annex 10, Volume III, Part I, Appendix to Chapter 9 (<i>Global Plan for the Allocation, Assignment and Application of Aircraft Addresses</i>) ▪ ICAO e-ANP Volume II Part III Communications, Navigation, Surveillance ▪ Aeronautical Surveillance Manual Doc. 9924 ▪ Technical provisions for Mode S Services and Extended Squitter Doc 9871 ▪ Outcome of the workshop on the operationalization of the Regional Workshop on SSR Mode S II Code and 24 Bits Addresses assignment. 	
<p><i>Strategic Objectives</i></p>	<p><i>A – Safety, B – Air Navigation Capacity and Efficiency, D – Economic Development of Air Transport, and E – Environmental Protection.</i></p>

1 INTRODUCTION

1.1. In the last past decades, the implementation of aeronautical Monopulse Secondary Surveillance Radars compatible Mode S has been increased by States/ANSPs in the Region offering the capability to overcome the natural limitations of conventional SSR Modes A& C Radars.

- 1.2. Although Mode S Radars operation is providing improvements in aviation safety, capacity and efficiency the ICAO Regional Offices are sometime requested by Administrations/Services operators for the assignment of temporary 24 bits addresses managed by ICAO in a global framework.
- 1.3. Uncoordinated allocation of SSR Mode S Interrogator Identification (II) Code by some Administrations/Organizations may result in threats on an efficient operation of neighboring stations.

2 DISCUSSIONS

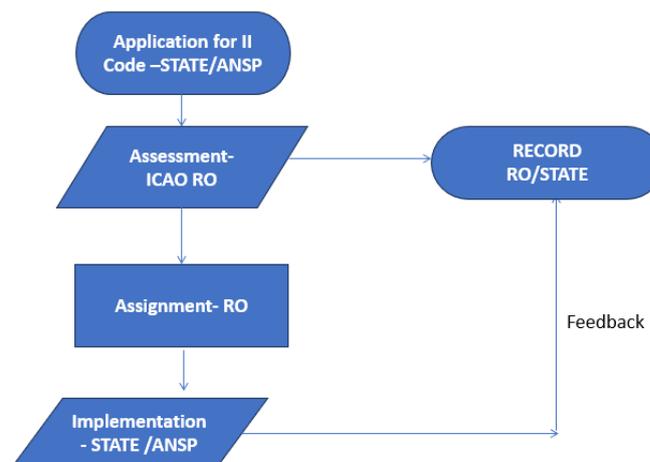
Assignment of aircraft 24-bits addresses for Secondary Surveillance Radars Mode S operation

- 2.1. The assignment of aircraft 24-bits addresses for Secondary Surveillance Radars Mode S operation is fully part of an aircraft registration process handled by States Aviation Authorities.
- 2.2. However, the assignment process should comply with the relevant provision of ICAO **Annex 10, Volume III, Part I, Appendix to Chapter 9** (*Global Plan for the Allocation, Assignment and Application of Aircraft Addresses*).
- 2.3. For a proper management, ICAO **allocated** consecutive address blocks of different sizes (*1 048 576, 262 144, 32 768, 4 096 and 1 024* consecutive addresses, respectively) to contracting states, the **assignment** of 24 bits addresses to aircraft being the responsibility of States. The Guidelines for ICAO 24 Bits Adresses Assignment with the blocks of addresses allocated to states is presented as Attachment to this Working Paper.
- 2.4. Each aircraft should be identified **unequivocally** through an **invariable 24-bits identifier assigned by the State** where an aircraft is registered in accordance with standards established by ICAO for Mode S transponders.
- 2.5. Address assignment may be **sequential within the corresponding range or based on the use of a particular criterion** by the State or authority responsible for aircraft registry, the important fact being that only one 24-bits address will be assigned to each aircraft with special care to be taken when an address is released for reassignment by States.
- 2.6. In this regard, ICAO organized recently, in Accra, Ghana, from 24 to 27 October 2023, at the kind invitation of the Ghana Civil Aviation Authority (GCAA), a regional workshop on the assignment of 24-bits addresses and Interrogator Identification (II) Codes for Secondary Surveillance Radar Mode S operation.
- 2.7. The main objective of the workshop was to provide States and the industry with best practices for the assignment of 24-bits addresses, in accordance with the relevant ICAO provisions with the final goal to have a **consistent and organized national plan for 24 bits addresses** assignment.
- 2.8. A hands-on exercise was conducted to enable participants develop this draft national plan for 24 bits addresses assignment consisting of a table with clear identification of aircraft in the States including commercial aircraft, Air Forces, State and general aviation aircrafts and, any other vehicles that can be subject to identification to ensure aviation safety and security.

Assignment of Interrogator Identification Codes for Secondary Surveillance Radar Mode S operation

- 2.9. The continuous effort of Administrations/Organizations in the implementation of modern surveillance systems results in heavy overlapping of Desirable Operation Coverages (DOC) of SSR with Mode S capability.
- 2.10. The lack of coordination amongst States/ANSPs in the implementation of SSR Mode S stations and the limited number of Interrogator Identifier (II) Codes (1 to 15) for SSR Mode S Stations may conduct to malfunctions in Mode S operation resulting from possible conflicting assignments of these Codes to Radars stations with overlapping Docs.
- 2.11. ICAO to assist States has developed a module in its software tool, Frequency Finder to address a proper coordinated assignment of II Codes that prevent conflicting operation in the Region.
- 2.12. During the Workshop held in Accra, the participants were reminded on the provision of **APIRG/20 Conclusion 20/27: Assignment of SSR Mode S interrogator identifier (II) Codes** as well as **APIRG/20 Decision 20/28: Adoption of the AFI II Code assignment criteria and the AFI II codes assignment manual-Planning Criteria for the assignment of SSR Mode S Interrogator Identifier (II) Codes in the AFI Region (Appendix 2.4.2A & Appendix 2.4.2B to APIRG20 Report).**
- 2.13. The participants were provided with the routine version of The ICAO software tool Frequency Finder developed to assist states for a **pre-evaluation** of VHF frequencies and SSR Mode S II Codes assignment.
- 2.14. It was agreed to encourage Administrations/Organizations, when implementing SSR Mode S stations to refrain to assign themselves II Codes but follow the regional procedure set forth by APIRG/20 as referred to in 2.12 and summarized below:

Procedure for the assignment of SSR Mode S Interrogator Identifier (II) Codes in the AFI Region



3. ACTION BY THE MEETING

3.1. The meeting is invited to:

- a) Take note of the information presented in this working paper, highlighting the importance of an consistent national plan for 24 bits addresses assignment and the criticality of SSR II Codes assignment; and
- b) Review and adopt the following draft conclusion.

APIRG/26 Draft Conclusion XXX- Assignment of aircraft 24-bits Addresses and Interrogator Identification Codes for Secondary Surveillance Radar Mode S stations

That;

In order to ensure a safe and efficient provision of aeronautical surveillance service through a full SSR Mode S operation:

- a) *States develop/update a National Plan for 24 bits addresses assignment consisting of a table with clear identification of aircraft in the States including commercial, Air Forces, State and general aviation aircraft and, any other vehicles that can be subject to identification to ensure aviation safety and security.*
- b) *Administrations/Organizations, when implementing SSR Mode S stations refrain to assign themselves II Codes but follow the regional procedure set forth by APIRG/20 Conclusion 20/27: Assignment of SSR Mode S interrogator identifier (II) Codes as well as APIRG/20 Decision 20/28: Adoption of the AFI II Code assignment criteria and the AFI II codes assignment manual.*

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