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SSR MODE S OPERATIONAL USE, ICAO 24-BIT AIRCRAFT ADDRESSES AND AIRCRAFT IDENTIFICATION

1. INTRODUCTION

1.1 Bosnia and Herzegovina Air Navigation Services Agency has commenced on December 05th 2019, with operational use of SSR Mode S Elementary Surveillance (ELS) and SSR Mode S Enhanced Surveillance (EHS) services in Sarajevo FIR.

1.2 For that purpose, it is imperative that flight crews and aircraft operations staff, accurately complete flight plans and operate the Mode S transponders in the approved manner.

1.3 The provision of Air Traffic Services (ATS) using SSR Mode S rely on a unique ICAO 24-bit aircraft address for selective interrogation of individual aircraft. The 24-bit aircraft address is also an essential element of the Airborne Collision and Avoidance System ACAS II.

1.4 The aircraft address shall be one of 16,777,214 twenty-four-bit aircraft addresses allocated by ICAO to the State of Registry or common mark registering authority and assigned as prescribed in ICAO Annex 10 (Appendix to Chapter 9, Part I, Volume III).

1.5 All Mode S equipped aircraft engaged in international civil aviation are required to have an aircraft identification feature as prescribed in ICAO Annex 10 (Volume IV, Chapter 2, item 2.1.5.2.).

1.6 This circular provides guidance to ensure consistency regarding 24 -bit aircraft addresses and the reporting of aircraft identification relevant to the operational introduction of Mode S Elementary and Enhanced Surveillance, in particular:

a. adherence to the world-wide scheme for assignment of ICAO 24-bit Aircraft Addresses;
b. correct setting of Aircraft Identification by flight crew.

2. THE ICAO 24-BIT AIRCRAFT ADDRESS

2.1 There are instances of incorrect 24-bit aircraft addresses being installed/hard-wired on individual aircraft. This has happened not only on first installation of a Mode S transponder but also when a major modification has been made to the Mode S equipment, and following a change of State of Registration. Incorrect installation, such as setting the address to all zeros, or inadvertent duplication of an address, can pose a severe risk to flight safety. In particular, the Airborne Collision Avoidance System ACAS II performs on the assumption that only a single, unique 24-bit aircraft address per airframe exists. The performance of ACAS II can be seriously degraded and in some instances disabled if an incorrect or duplicated address is installed on an aircraft.

2.2 Incorrect or duplicated 24- bit aircraft addresses will also undermine the effectiveness of surveillance services based on SSR Mode S

2.3 It is essential that aircraft operators comply with the aircraft address assignment procedures of the State Regulatory Authority to which blocks of addresses have been allocated by ICAO.

2.4 The world-wide addressing scheme has been designed so that at any time same address is not assigned to more than one aircraft. Only one address can be assigned to an aircraft and it cannot be changed except under exceptional circumstances authorized by the State Regulatory Authority concerned.

2.5 When an aircraft changes its State of Registry, the previously assigned address is to be relinquished and a new address assigned by the new registering authority.

2.6 It is essential that the aircraft address is periodically verified using ramp tests. Such checks must also be conducted when a major maintenance check has taken place and when the aircraft has changed registration, to ensure that a newly assigned address has been properly set.

3. CORRECT SETTING OF AIRCRAFT IDENTIFICATION

3.1 To comply with European airborne equipment requirements, Mode S transponder equipped aircraft must incorporate an Aircraft Identification Feature. Correct setting of aircraft identification is essential for the correlation of radar tracks with flight plan data in the ATM and Airport Operator ground systems. Initial operational trials using SSR Mode S have shown that many aircraft are transmitting incorrect aircraft identification, e.g. BC_ 1234 instead of ABC1234. Such erroneous settings of aircraft identification prohibit automatic flight plan correlation and if perpetuated, will severely limit the effectiveness of Mode S to relieve the shortage of SSR codes.

3.2 In accordance with ICAO Doc 8168 (PANS-OPS, Vol. I, Section III, Chapter 1, item 1.3), flight crew of aircraft equipped with Mode S having an aircraft identification feature shall set the aircraft identification in the transponder. This setting shall correspond to the aircraft identification specified in item 7 of the ICAO flight plan or if no flight plan has been filed, the aircraft registration.

3.3 Aircraft Identification, not exceeding 7 characters, is to be entered in item 7 of the flight plan and set in the aircraft as follows either:

a. the ICAO three-letter designator for the aircraft operating agency followed by the flight identification (e.g. DLH511, BAW213, ASL122), when in radiotelephony the call-sign used consists of the ICAO telephony designator for the operating agency followed by the flight identification, or

b. the registration marking of the aircraft (e.g. EIAKO, 4XBCD, OOTEK) when:
   - in radio-telephony the call-sign used consists of the registration marking alone, or is preceded by the ICAO telephony designator for the operating agency,
   - the aircraft is not equipped with radio.

Note 1: No zeros, dashes or spaces are to be added when the Aircraft Identification consists of less than 7 characters

Note 2: Appendix 2 to ICAO Doc 4444 (PANS-ATM) refers.ICAO designators and telephony designators for aircraft operating agencies are contained in ICAO Doc 8585.

4. DISPLAY OF DOWNLINKED AIRCRAFT PARAMETERS (DAP)

The following Mode S DAPs are used in Sarajevo FIR:

- DSFL - Downlinked Selected Flight Level;
- DIAS - Downlinked Indicated Air Speed;
- DMACH - Downlinked Mach Number;
- DHDG - Downlinked Magnetic Heading.

These aircraft parameters are downlinked from aircraft by the Mode S EHS (Enhanced Surveillance) compliant transponder. Aircraft that are equipped with Mode S ELS (Elementary Surveillance) transponder only, cannot downlink these values.

Having seen the current selected Flight Level, indicated air speed, Mach number and magnetic heading on controller's working position, the air traffic controller generally will use these displayed values of a Mode S EHS equipped aircraft, without verbally asking.

Note 1: in certain circumstances, it may be necessary to verbally verify any of these DAPs against reading from the flight deck.

Note 2: the DRC (Downlinked Rate of Climb/Descend) value is also provided by EHS compliant aircraft, but the air traffic controller shall not use it, due to the fluctuation of the DRC value. However the DRC value is also displayed on the screen to give information about the tendency and the order of magnitude of the vertical speed. The carriage of a Mode S transponder capable of downlinking EHS aircraft parameters is not compulsory in the Sarajevo FIR. However, where an aircraft is so equipped, the installation and wiring of the instruments and transponder shall guarantee the downlinking of correct values in accordance with certification guidance contained in EASA Document AMC 20-13, or other equivalent airworthiness specifications.

5. FURTHER INFORMATION

Further information or guidance may be obtained from:

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More general information on SSR Mode S in the context of the European Air traffic Management Programme (EATMP) is available at the EUROCONTROL website address: http://www.eurocontrol.int/mica

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