ENR 1.6 ATS SURVEILLANCE SERVICES AND PROCEDURES

1. PRIMARY RADAR

1.1 SUPPLEMENTARY SERVICES

A radar unit normally operates as an integral part of the parent ATS unit and provides radar service to aircraft, to the maximum extent practicable, to meet the operational requirement.

Radar derived information will be used in the provision of air traffic control service to the maximum extent practicable, depending on radar coverage, technical reliability of radar operation, radar data processing system, radar displays, radio communication, etc.

1.2 THE APPLICATION OF RADAR CONTROL SERVICE

Air traffic services are provided by use of the following five radar stations:

a. SSR - Mode S station at Butmir
Position: 434911.76N 0182023.47E;
Range: 256 NM.

b. SSR - Mode, S station at Jahorina
Position 434333.44N 0183306.14E;
Range 256 NM.

For additional three, SSR - Mode S stations: Kozjak, Psunj and Murtenica, data is to be found in relevant publications of Croatia and Serbia.

Radar derived information in the provision of air traffic control service will be used by:

- BHACC; and
- Sarajevo Approach Control

1.2.1 Radar separation

The radar separation minima shall be as follows:

a. Sarajevo Area Control - 5 NM;

b. Sarajevo Approach Control - 5 NM.

1.3 RADAR AND AIR-GROUND COMMUNICATIONS FAILURE PROCEDURES

If the aircraft's radio is completely unserviceable, the pilot should carry out the procedures for radio failure in accordance with provisions from Regulations on Rules of the Air and ATS. If radar identification has already been established, the radar controller will vector other identified aircraft clear of its track until such time as the aircraft leaves radar cover.

1.4 CONTROLLER-PILOT DATA LINK COMMUNICATIONS (VOICE AND CPDLC POSITION REPORTING REQUIREMENTS)

NIL

1.5 GRAPHIC PORTRAYAL OF AREA OF RADAR COVERAGE

NIL

2. SECONDARY SURVEILLANCE RADAR (SSR)

In Bosnia and Herzegovina use of Mode A & C or Mode S transponder is mandatory for:

- IFR / VFR GAT flights in Class C and Class D airspace;
- IFR / VFR GAT flights in Class E airspace only in SARAJEVO TMA;
- all cross-border and night IFR / VFR GAT flights

2.1 EMERGENCY PROCEDURES

In emergency situations, the pilot shall maintain the last assigned code, unless otherwise instructed.

In addition to ENR 1.6.2.1.1, the pilot may select Mode A, Code 7700, whenever he believes that would be the best course of action, in view of the nature of the situation.

A pilot experiencing the radio communication failure shall operate the SSR transponder to Mode A, Code 7600 and take actions prescribed for such a situation.

The pilot of an aircraft being subject to unlawful interference, shall endeavour to set Mode A, Code 7500, to give the indication of the situation, unless circumstances justify the use of Code 7700.

When SSR transponder operates incorrectly on Mode C, the pilot shall, unless otherwise instructed, immediately inform ATC unit concerned and switch off altitude reporting and transmit the framing pulses of the Mode C response. Alternately, he shall switch off completely Mode C if the design of the SSR transponder does not permit procedures stated above and maintain the Mode A transmission. If the design of the SSR transponder does not permit Modes A and C being switched off separately, the SSR transponder shall not be switched off without explicit instruction by ATC, to ensure continuous transmission of identification and position information via Mode A. When entering the area of responsibility of an ATC unit, the pilot shall maintain undertaken measures and inform the ATC accordingly.

Note: *Mode A/C, Codes 7500, 7600 and 7700 are permanently monitored in the Sarajevo FIR.*

2.2 AIR-GROUND FAILURE AND UNLAWFUL INTERFERENCE PROCEDURES

NIL

2.3 SYSTEM OF SSR CODE ASSIGNMENT

2.3.1 Transit and local codes allocated to Bosnia and Herzegovina

According to SSR Code Allocation List for the EUR Region, local codes in the series 00 are allocated to Sarajevo FIR for use by designated ATC units for local purposes. Transit codes are allocated to Sarajevo ACC for assignment to an aircraft engaged in transit flights within the Participating Area (PA) EUR-D. Aircraft will retain the assigned code within the geographical limits of the PA or, in the case of the agreement between States concerned, across PA boundaries.

2.3.2 SSR codes shall be used for ATS purposes only

Sarajevo FIR	Series	Codes	Remarks
Transit	41	4130 – 4137 4140 – 4147 7301 – 7307	Allocated to aircraft departing from any aerodrome within the Sarajevo FIR with destination to other countries
	73		
Local	00	0060 - 0077	Allocated for use by aircraft remaining within the boundary of the Sarajevo FIR
Local	42	4201 - 4277	Temporary allocated to EUFOR/NATO for use by helicopters operating not above 3000 FT AGL

2.3.3 Transponder operating procedures

The provisions of ICAO Doc 8168 – Secondary surveillance radar (SSR) transponder operating procedures are applied. The pilot-in command will:

a. if proceeding from an area where a specific code has been assigned to the aircraft by the competent ATC unit, maintain that code setting unless otherwise instructed;

b. select or reselect codes or switch off the equipment when airborne, only when instructed by the competent ATC unit;

c. acknowledge code setting instructions by reading back the code to be set by the competent ATC unit;

d. select mode C simultaneously with mode A unless otherwise instructed by the competent ATC unit; and

e. when reporting flight levels under routine procedures, or when requested by ATC, state the current altimeter reading to the nearest hundred FT.

2.3.4 Special purpose Mode A codes

Specific codes are reserved internationally for special purposes and should be selected as follows:

Code 0000: is available as a general purpose code for local use by any State.
Code 2000: shall be used by flight crew in the absence of any ATC instructions or regional agreements unless the conditions for the use of codes: 7000, 7500, 7600 and 7700 apply.
Code 7000: shall be used by flight crew not receiving ATC service in order to improve detection or suitably equipped aircraft, in areas specified by States, unless otherwise instructed by ATS.

Code 7500: is reserved for use in the event of unlawful interference.
Code 7600: is reserved for use in the event of radio communications failure.
Code 7700: is reserved for use in the event of emergencies and interception.
Code 7775 and Code 7777: are reserved for SSR ground transponder monitoring.

2.4 VOICE AND CPDLC POSITION REPORTING REQUIREMENTS

NIL

2.5 GRAPHIC PORTRAYAL OF AREA OF RADAR SSR COVERAGE

NIL

3. AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST (ADS-B)

NIL

4. OTHER RELEVANT INFORMATION AND PROCEDURES

4.1 INTRODUCTION

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.

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.

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.

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).

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.).

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:

1. adherence to the world-wide scheme for assignment of ICAO 24/bit Aircraft Addresses;

2. correct setting of Aircraft Identification by flight crew.

4.2 THE ICAO 24-BIT AIRCRAFT ADDRESS

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.

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

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.

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.

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.

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.

4.3 CORRECT SETTING OF AIRCRAFT IDENTIFICATION

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.

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.

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:

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

2. 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.

4.4 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.

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