REGISTRATION OF AIRCRAFT ADDRESSES WITH MODE S TRANSPONDERS

1   **Introduction**

1.1   With respect to the Mode S transponder capability of aircraft operating in the Region, States, Territories and International Organizations should apply the procedure established by ICAO for aircraft identification [Assignment of 24-bit aircraft addresses as stipulated in Annex 10, Volume III, Part I, Appendix to Chapter 9 (*Global Plan for the allocation, assignment and application of aircraft addresses)*], considering that it would be beneficial to implement national data bases containing standardized information on aircraft with assigned 24-bit addresses, which would give surveillance service providers updated aircraft identification information, especially for radar processing systems.

1.2   In this regard, these guidelines are drafted to help AFI States, Territories and International Organizations standardize 24-bit address assignment registration information for the identification of aircraft with Mode S transponders.

2   **Guidelines and considerations for standardized registration of aircraft with Mode S transponders**

Concept of the 24-bit address

2.1   ICAO 24-bit address: Each aircraft will be identified unequivocally through an invariable 24-bit identifier assigned by the State where an aircraft is registered in accordance with standards established by ICAO for Mode S transponders. Mode S transponders with their 24-bit addresses are oriented towards the application of ACAS, ELT, SSR Mode S, and ATN with VDL, AMSS, and other functions.

2.2   The aircraft address will be one of the 16,777,214 24-bit aircraft addresses allocated by ICAO to the State of Registry or the common mark registering authority and assigned as indicated in the procedure detailed in Annex 10, Volume III, Part I, Chapter 9. The 24-bit aircraft addresses should be assigned and applied in accordance with the guidelines contained in this procedure.

Procedure for assigning 24-bit aircraft addresses (Ref.: Annex 10, Volume III, Part I, Chapter 9)

2.3   Global plan for the allocation, assignment and application of aircraft addresses: The use of global communications, navigation and surveillance systems will be based on the assignment of exclusive 24-bit aircraft addresses. In no case will an aircraft address be assigned to more than one aircraft.

2.4   **Appendix A** to this paper lists the consecutive address blocks available to States for assignment to aircraft. Each block is defined based on a fixed pattern of the first 4, 6, 9, 12 or 14 bits of the 24-bit address. Accordingly, blocks can be of different sizes (1 048 576, 262 144, 32 768, 4 096 and 1 024 consecutive addresses, respectively).
ICAO will manage the plan to maintain appropriate international distribution of aircraft addresses.

2.5   As explained in detail in the procedure, the relevant State of Registry or common mark registering authority will assign aircraft unique addresses within each block when required for use by duly equipped aircraft registered in a national or international registry. That assigned address will be a part of the aircraft registry and should not represent another different registry, and for purposes of its use by surveillance service providers, this updated aircraft identification information should come from this registry or be directly associated with it to avoid duplication of information or use of information that is out of date.

2.6   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 the registry, the important fact being that only

one 24-bit address will be assigned to each aircraft. Special care must be taken when an address is released for reassignment.

2.7 At least the following fields should be associated with each address assigned within the aircraft registry:

> Aircraft data:
> 1) Nationality
> 2) Brand/manufacturer
> 3) Model
> 4) Registration
> 5) Aircraft serial number
>
> Address assignment:
> The 24-bit address assigned, expressed in binary/octal/hexadecimal format
>
> Control and follow-up data:
> 1) Date of registry (date on which the 24-bit address was assigned)
> 2) Date of de-registry (date on which the assigned address ceased to be used)

2.8 These data in the Aircraft Registry can be associated with other information like aircraft owner, contact data of the owner, Mode S transponder data (manufacturer, model, serial number, part number), type of authorized operations, control data (party applying, party assigning, date of application, etc.).

2.9 As an assignment control and verification measure, it would be advisable for these addresses to be verified periodically, either through field monitoring or by using ramp tests. These verifications should also be made following a major maintenance check or when an aircraft has changed its registry, to ensure that the new addresses assigned have been properly configured.

2.10 It should be noted that there are occasions when aircraft show an incorrect 24-bit address due to its installation or internal lay within the aircraft itself. This can occur not only during the first installation of a Mode S transponder, but also when a major modification is made to the Mode S equipment, followed by a change in registry. Incorrect installation, such as the setting of the address to all zeros or an inadvertent duplication of an address can represent a flight safety risk. The ACAS II system, in particular, operates on the assumption that each aircraft has a single unique 24-bit address. An incorrect or duplicated aircraft address can seriously degrade ACAS II performance and in some cases even disable it, as well as degrade the efficiency of Mode S radar-based surveillance services.

2.11 States and Territories should notify their users through appropriate publications about the criteria and considerations for the assignment, registry, and reporting of these addresses. **Appendix B** to this working paper offers a model of AIC in this regard.

2.12 This information on the assignment of 24-bit addresses should be available to users and contained in the aircraft registry database maintained by the State or the respective authority.

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APPENDIX A

Table 9-1. Allocation of aircraft addresses to States

Note.— The left-hand column of the 24-bit address patterns represents the most significant bit (MSB) of the address.

State	| Number of addresses in block					| Allocation of blocks of addresses (a dash represents a bit value equal to 0 or 1)
	1 024	*4 096*	*32 768*	*262 144*	*1 048 576*	
Afghanistan		*				0 1 1 1 0 0 0 0 0 0 0 0 – – – – – – – – – – –
Albania	*					0 1 0 1 0 0 0 0 0 0 0 1 0 0 – – – – – – – – –
Algeria			*			0 0 0 0 1 0 1 0 0 – – – – – – – – – – – – – –
Angola		*				0 0 0 0 1 0 0 1 0 0 0 0 – – – – – – – – – – –
Antigua and Barbuda	*					0 0 0 0 1 1 0 0 1 0 1 0 0 0 – – – – – – – – –
Argentina				*		1 1 1 0 0 0 – – – – – – – – – – – – – – – – –
Armenia	*					0 1 1 0 0 0 0 0 0 0 0 0 0 0 – – – – – – – – –
Australia				*		0 1 1 1 1 1 – – – – – – – – – – – – – – – – –
Austria			*			0 1 0 0 0 1 0 0 0 – – – – – – – – – – – – – –
Azerbaijan	*					0 1 1 0 0 0 0 0 0 0 0 0 1 0 – – – – – – – – –
Bahamas		*				0 0 0 0 1 0 1 0 1 0 0 0 – – – – – – – – – – –
Bahrain		*				1 0 0 0 1 0 0 1 0 1 0 0 – – – – – – – – – – –
Bangladesh		*				0 1 1 1 0 0 0 0 0 0 1 0 – – – – – – – – – – –
Barbados	*					0 0 0 0 1 0 1 0 1 0 1 0 0 0 – – – – – – – – –
Belarus	*					0 1 0 1 0 0 0 1 0 0 0 0 0 0 – – – – – – – – –
Belgium			*			0 1 0 0 0 1 0 0 1 – – – – – – – – – – – – – –
Belize	*					0 0 0 0 1 0 1 0 1 0 1 1 0 0 – – – – – – – – –
Benin	*					0 0 0 0 1 0 0 1 0 1 0 0 0 0 – – – – – – – – –
Bhutan	*					0 1 1 0 1 0 0 0 0 0 0 0 0 0 – – – – – – – – –
Bolivia		*				1 1 1 0 1 0 0 1 0 1 0 0 – – – – – – – – – – –
Bosnia and Herzegovina	*					0 1 0 1 0 0 0 1 0 0 1 1 0 0 – – – – – – – – –
Botswana	*					0 0 0 0 0 0 1 1 0 0 0 0 0 0 – – – – – – – – –
Brazil				*		1 1 1 0 0 1 – – – – – – – – – – – – – – – – –
Brunei Darussalam	*					1 0 0 0 1 0 0 1 0 1 0 1 0 0 – – – – – – – – –
Bulgaria			*			0 1 0 0 0 1 0 1 0 – – – – – – – – – – – – – –
Burkina Faso		*				0 0 0 0 1 0 0 1 1 1 0 0 – – – – – – – – – – –
Burundi		*				0 0 0 0 0 0 1 1 0 0 1 0 – – – – – – – – – – –
Cambodia		*				0 1 1 1 0 0 0 0 1 1 1 0 – – – – – – – – – – –
Cameroon		*				0 0 0 0 0 0 1 1 0 1 0 0 – – – – – – – – – – –
Canada				*		1 1 0 0 0 0 – – – – – – – – – – – – – – – – –

State	1 024	4 096	32 768	262 144	1 048 576	Allocation of blocks of addresses (a dash represents a bit value equal to 0 or 1)					
Cape Verde	*					0 0 0 0	1 0	0 1 0	1 1 0	0 0	– – – – – – – – –
Central African Republic		*				0 0 0 0	0 1	1 0 1	1 0 0	– –	– – – – – – – – –
Chad		*				0 0 0 0	1 0	0 0 0	1 0 0	– –	– – – – – – – – –
Chile		*				1 1 1 0	1 0	0 0 0	0 0 0	– –	– – – – – – – – –
China				*		0 1 1 1	1 0	– – –	– – –	– –	– – – – – – – – –
Colombia		*				0 0 0 0	1 0	1 0 1	1 0 0	– –	– – – – – – – – –
Comoros	*					0 0 0 0	0 0	1 1 0	1 0 1	0 0	– – – – – – – – –
Congo		*				0 0 0 0	0 0	1 1 0	1 1 0	– –	– – – – – – – – –
Cook Islands	*					1 0 0 1	0 0	0 0 0	0 0 1	0 0	– – – – – – – – –
Costa Rica		*				0 0 0 0	1 0	1 0 1	1 1 0	– –	– – – – – – – – –
Côte d'Ivoire		*				0 0 0 0	0 0	1 1 1	0 0 0	– –	– – – – – – – – –
Croatia	*					0 1 0 1	0 0	0 0 0	0 0 1	1 1	– – – – – – – – –
Cuba		*				0 0 0 0	1 0	1 1 0	0 0 0	– –	– – – – – – – – –
Cyprus	*					0 1 0 0	1 1	0 0 1	0 0 0	0 0	– – – – – – – – –
Czech Republic			*			0 1 0 0	1 0	0 1 1	– – –	– –	– – – – – – – – –

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Annex 10 — Aeronautical Communications Volume III

	Number of addresses in block											
State	*1 024*	*4 096*	*32 768*	*262 144*	*1 048 576*	*Allocation of blocks of addresses (a dash represents a bit value equal to 0 or 1)*						
Democratic People's Republic of Korea			*			0 1 1 1	0 0	1 0 0	– – –	– –	– – – – – – – – –
Democratic Republic of the Congo		*				0 0 0 0	1 0	0 0 1	1 0 0	– –	– – – – – – – – –
Denmark			*			0 1 0 0	0 1	0 1 1	– – –	– –	– – – – – – – – –
Djibouti	*					0 0 0 0	1 0	0 1 1	0 0 0	0 0	– – – – – – – – –
Dominican Republic		*				0 0 0 0	1 1	0 0 0	1 0 0	– –	– – – – – – – – –
Ecuador		*				1 1 1 0	1 0	0 0 0	1 0 0	– –	– – – – – – – – –
Egypt			*			0 0 0 0	0 0	0 1 0	– – –	– –	– – – – – – – – –
El Salvador		*				0 0 0 0	1 0	1 1 0	0 1 0	– –	– – – – – – – – –
Equatorial Guinea		*				0 0 0 0	0 1	0 0 0	0 1 0	– –	– – – – – – – – –
Eritrea	*					0 0 1 0	0 0	0 0 0	0 1 0	0 0	– – – – – – – – –
Estonia	*					0 1 0 1	0 0	0 1 0	0 0 1	0 0	– – – – – – – – –
Ethiopia		*				0 0 0 0	0 1	0 0 0	0 0 0	– –	– – – – – – – – –
Fiji		*				1 1 0 0	1 0	0 0 1	0 0 0	– –	– – – – – – – – –
Finland			*			0 1 0 0	0 1	1 0 0	– – –	– –	– – – – – – – – –
France				*		0 0 1 1	1 0	– – –	– – –	– –	– – – – – – – – –
Gabon		*				0 0 0 0	0 0	1 1 1	1 1 0	– –	– – – – – – – – –
Gambia		*				0 0 0 0	1 0	0 1 1	0 1 0	– –	– – – – – – – – –
Georgia	*					0 1 0 1	0 0	0 1 0	1 0 0	0 0	– – – – – – – – –
Germany				*		0 0 1 1	1 1	– – –	– – –	– –	– – – – – – – – –

State	1 024	4 096	32 768	262 144	1 048 576	Allocation of blocks of addresses
Ghana		*				0 0 0 0 0 1 0 0 0 1 0 0 – – – – – – – – – – –
Greece			*			0 1 0 0 0 1 1 0 1 – – – – – – – – – – – – – –
Grenada	*					0 0 0 0 1 1 0 0 1 1 0 0 0 0 – – – – – – – – –
Guatemala		*				0 0 0 0 1 0 1 1 0 1 0 0 – – – – – – – – – – –
Guinea		*				0 0 0 0 0 1 0 0 0 1 1 0 – – – – – – – – – – –
Guinea-Bissau	*					0 0 0 0 0 1 0 0 1 0 0 0 0 0 – – – – – – – – –
Guyana		*				0 0 0 0 1 0 1 1 0 1 1 0 – – – – – – – – – – –
Haiti		*				0 0 0 0 1 0 1 1 1 0 0 0 – – – – – – – – – – –
Honduras		*				0 0 0 0 1 0 1 1 1 0 1 0 – – – – – – – – – – –
Hungary			*			0 1 0 0 0 1 1 1 0 – – – – – – – – – – – – – –
Iceland		*				0 1 0 0 1 1 0 0 1 1 0 0 – – – – – – – – – – –
India				*		1 0 0 0 0 0 – – – – – – – – – – – – – – – – –
Indonesia			*			1 0 0 0 1 0 1 0 0 – – – – – – – – – – – – – –
Iran, Islamic Republic of			*			0 1 1 1 0 0 1 1 0 – – – – – – – – – – – – – –
Iraq			*			0 1 1 1 0 0 1 0 1 – – – – – – – – – – – – – –
Ireland		*				0 1 0 0 1 1 0 0 1 0 1 0 – – – – – – – – – – –
Israel			*			0 1 1 1 0 0 1 1 1 – – – – – – – – – – – – – –
Italy				*		0 0 1 1 0 0 – – – – – – – – – – – – – – – – –
Jamaica		*				0 0 0 0 1 0 1 1 1 1 1 0 – – – – – – – – – – –
Japan				*		1 0 0 0 0 1 – – – – – – – – – – – – – – – – –
Jordan			*			0 1 1 1 0 1 0 0 0 – – – – – – – – – – – – – –
Kazakhstan	*					0 1 1 0 1 0 0 0 0 0 1 1 0 0 – – – – – – – – –
Kenya		*				0 0 0 0 0 1 0 0 1 1 0 0 – – – – – – – – – – –
Kiribati	*					1 1 0 0 1 0 0 0 1 1 1 0 0 0 – – – – – – – – –
Kuwait		*				0 1 1 1 0 0 0 0 0 1 1 0 – – – – – – – – – – –
Kyrgyzstan	*					0 1 1 0 0 0 0 0 0 0 0 1 0 0 – – – – – – – – –
Lao People's Democratic Republic		*				0 1 1 1 0 0 0 0 1 0 0 0 – – – – – – – – – – –
Latvia	*					0 1 0 1 0 0 0 0 0 0 1 0 1 1 – – – – – – – – –

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	Number of addresses in block					
State	1 024	4 096	32 768	262 144	1 048 576	Allocation of blocks of addresses (a dash represents a bit value equal to 0 or 1)
Lebanon			*			0 1 1 1 0 1 0 0 1 – – – – – – – – – – – – – –
Lesotho	*					0 0 0 0 0 1 0 0 1 0 1 0 0 0 – – – – – – – – –
Liberia		*				0 0 0 0 0 1 0 1 0 0 0 0 – – – – – – – – – – –

Country						D1	D2	D3	D4	D5	D6
Libyan Arab Jamahiriya			*			0 0 0 0	0 0	0 1 1	– – –	– –	– – – – – – – – –
Lithuania	*					0 1 0 1	0 0	0 0 0	0 1 1	1 1	– – – – – – – – –
Luxembourg	*					0 1 0 0	1 1	0 1 0	0 0 0	0 0	– – – – – – – – –
Madagascar		*				0 0 0 0	0 1	0 1 0	1 0 0	– –	– – – – – – – – –
Malawi		*				0 0 0 0	0 1	0 1 1	0 0 0	– –	– – – – – – – – –
Malaysia			*			0 1 1 1	0 1	0 1 0	– – –	– –	– – – – – – – – –
Maldives	*					0 0 0 0	0 1	0 1 1	0 1 0	0 0	– – – – – – – – –
Mali		*				0 0 0 0	0 1	0 1 1	1 0 0	– –	– – – – – – – – –
Malta	*					0 1 0 0	1 1	0 1 0	0 1 0	0 0	– – – – – – – – –
Marshall Islands	*					1 0 0 1	0 0	0 0 0	0 0 0	0 0	– – – – – – – – –
Mauritania	*					0 0 0 0	0 1	0 1 1	1 1 0	0 0	– – – – – – – – –
Mauritius	*					0 0 0 0	0 1	1 0 0	0 0 0	0 0	– – – – – – – – –
Mexico			*			0 0 0 0	1 1	0 1 0	– – –	– –	– – – – – – – – –
Micronesia, Federated States of	*					0 1 1 0	1 0	0 0 0	0 0 1	0 0	– – – – – – – – –
Monaco	*					0 1 0 0	1 1	0 1 0	1 0 0	0 0	– – – – – – – – –
Mongolia	*					0 1 1 0	1 0	0 0 0	0 1 0	0 0	– – – – – – – – –
Morocco			*			0 0 0 0	0 0	1 0 0	– – –	– –	– – – – – – – – –
Mozambique		*				0 0 0 0	0 0	0 0 0	1 1 0	– –	– – – – – – – – –
Myanmar		*				0 1 1 1	0 0	0 0 0	1 0 0	– –	– – – – – – – – –
Namibia	*					0 0 1 0	0 0	0 0 0	0 0 1	0 0	– – – – – – – – –
Nauru	*					1 1 0 0	1 0	0 0 1	0 1 0	0 0	– – – – – – – – –
Nepal		*				0 1 1 1	0 0	0 0 1	0 1 0	– –	– – – – – – – – –
Netherlands, Kingdom of the			*			0 1 0 0	1 0	0 0 0	– – –	– –	– – – – – – – – –
New Zealand			*			1 1 0 0	1 0	0 0 0	– – –	– –	– – – – – – – – –
Nicaragua		*				0 0 0 0	1 1	0 0 0	0 0 0	– –	– – – – – – – – –
Niger		*				0 0 0 0	0 1	1 0 0	0 1 0	– –	– – – – – – – – –
Nigeria		*				0 0 0 0	0 1	1 0 0	1 0 0	– –	– – – – – – – – –
Norway			*			0 1 0 0	0 1	1 1 1	– – –	– –	– – – – – – – – –
Oman	*					0 1 1 1	0 0	0 0 1	1 0 0	0 0	– – – – – – – – –
Pakistan			*			0 1 1 1	0 1	1 0 0	– – –	– –	– – – – – – – – –
Palau	*					0 1 1 0	1 0	0 0 0	1 0 0	0 0	– – – – – – – – –
Panama		*				0 0 0 0	1 1	0 0 0	0 1 0	– –	– – – – – – – – –
Papua New Guinea		*				1 0 0 0	1 0	0 1 1	0 0 0	– –	– – – – – – – – –
Paraguay		*				1 1 1 0	1 0	0 0 1	0 0 0	– –	– – – – – – – – –
Peru		*				1 1 1 0	1 0	0 0 1	1 0 0	– –	– – – – – – – – –
Philippines			*			0 1 1 1	0 1	0 1 1	– – –	– –	– – – – – – – – –
Poland			*			0 1 0 0	1 0	0 0 1	– – –	– –	– – – – – – – – –
Portugal			*			0 1 0 0	1 0	0 1 0	– – –	– –	– – – – – – – – –
Qatar	*					0 0 0 0	0 1	1 0 1	0 1 0	0 0	– – – – – – – – –

State	1 024	4 096	32 768	262 144	1 048 576	Allocation of blocks of addresses
Republic of Korea			*			0 1 1 1 0 0 0 1 1 – – – – – – – – – – – – – –
Republic of Moldova	*					0 1 0 1 0 0 0 0 0 1 0 0 1 1 – – – – – – – – –
Romania			*			0 1 0 0 1 0 1 0 0 – – – – – – – – – – – – – –
Russian Federation				*		0 0 0 1 – – – – – – – – – – – – – – – – – – –
Rwanda		*				0 0 0 0 0 1 1 0 1 1 1 0 – – – – – – – – – – –
Saint Lucia	*					1 1 0 0 1 0 0 0 1 1 0 0 0 0 – – – – – – – – –

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Annex 10 — Aeronautical Communications Volume III

State	Number of addresses in block					Allocation of blocks of addresses (a dash represents a bit value equal to 0 or 1)
	1 024	4 096	32 768	262 144	1 048 576	
Saint Vincent and the Grenadines	*					0 0 0 0 1 0 1 1 1 1 0 0 0 0 – – – – – – – – –
Samoa	*					1 0 0 1 0 0 0 0 0 0 1 0 0 0 – – – – – – – – –
San Marino	*					0 1 0 1 0 0 0 0 0 0 0 0 0 0 – – – – – – – – –
Sao Tome and Principe	*					0 0 0 0 1 0 0 1 1 1 1 0 0 0 – – – – – – – – –
Saudi Arabia			*			0 1 1 1 0 0 0 1 0 – – – – – – – – – – – – – –
Senegal		*				0 0 0 0 0 1 1 1 0 0 0 0 – – – – – – – – – – –
Seychelles	*					0 0 0 0 0 1 1 1 0 1 0 0 0 0 – – – – – – – – –
Sierra Leone	*					0 0 0 0 0 1 1 1 0 1 1 0 0 0 – – – – – – – – –
Singapore			*			0 1 1 1 0 1 1 0 1 – – – – – – – – – – – – – –
Slovakia	*					0 1 0 1 0 0 0 0 0 1 0 1 1 1 – – – – – – – – –
Slovenia	*					0 1 0 1 0 0 0 0 0 1 1 0 1 1 – – – – – – – – –
Solomon Islands	*					1 0 0 0 1 0 0 1 0 1 1 1 0 0 – – – – – – – – –
Somalia		*				0 0 0 0 0 1 1 1 1 0 0 0 – – – – – – – – – – –
South Africa			*			0 0 0 0 0 0 0 0 1 – – – – – – – – – – – – – –
Spain				*		0 0 1 1 0 1 – – – – – – – – – – – – – – – – –
Sri Lanka			*			0 1 1 1 0 1 1 1 0 – – – – – – – – – – – – – –
Sudan		*				0 0 0 0 0 1 1 1 1 1 0 0 – – – – – – – – – – –
Suriname		*				0 0 0 0 1 1 0 0 1 0 0 0 – – – – – – – – – – –
Swaziland	*					0 0 0 0 0 1 1 1 1 0 1 0 0 0 – – – – – – – – –
Sweden			*			0 1 0 0 1 0 1 0 1 – – – – – – – – – – – – – –
Switzerland			*			0 1 0 0 1 0 1 1 0 – – – – – – – – – – – – – –
Syrian Arab Republic			*			0 1 1 1 0 1 1 1 1 – – – – – – – – – – – – – –
Tajikistan	*					0 1 0 1 0 0 0 1 0 1 0 1 0 0 – – – – – – – – –
Thailand			*			1 0 0 0 1 0 0 0 0 – – – – – – – – – – – – – –
The former Yugoslav Republic of Macedonia	*					0 1 0 1 0 0 0 1 0 0 1 0 0 0 – – – – – – – – –
Togo		*				0 0 0 0 1 0 0 0 1 0 0 0 – – – – – – – – – – –

State	1 024	4 096	32 768	262 144	1 048 576	Allocation of blocks of addresses (a dash represents a bit value equal to 0 or 1)				
Tonga	*					1 1 0 0	1 0	0 0 1	1 0 1	0 0	— — — — — — — — —
Trinidad and Tobago		*				0 0 0 0	1 1	0 0 0	1 1 0	— —	— — — — — — — — —
Tunisia			*			0 0 0 0	0 0	1 0 1	— — —	— —	— — — — — — — — —
Turkey			*			0 1 0 0	1 0	1 1 1	— — —	— —	— — — — — — — — —
Turkmenistan	*					0 1 1 0	0 0	0 0 0	0 0 1	1 0	— — — — — — — — —
Uganda		*				0 0 0 0	0 1	1 0 1	0 0 0	— —	— — — — — — — — —
Ukraine			*			0 1 0 1	0 0	0 0 1	— — —	— —	— — — — — — — — —
United Arab Emirates		*				1 0 0 0	1 0	0 1 0	1 1 0	— —	— — — — — — — — —
United Kingdom				*		0 1 0 0	0 0	— — —	— — —	— —	— — — — — — — — —
United Republic of Tanzania		*				0 0 0 0	1 0	0 0 0	0 0 0	— —	— — — — — — — — —
United States					*	1 0 1 0	— —	— — —	— — —	— —	— — — — — — — — —
Uruguay		*				1 1 1 0	1 0	0 1 0	0 0 0	— —	— — — — — — — — —
Uzbekistan	*					0 1 0 1	0 0	0 0 0	1 1 1	1 1	— — — — — — — — —
Vanuatu	*					1 1 0 0	1 0	0 1 0	0 0 0	0 0	— — — — — — — — —
Venezuela			*			0 0 0 0	1 1	0 1 1	— — —	— —	— — — — — — — — —
Viet Nam			*			1 0 0 0	1 0	0 0 1	— — —	— —	— — — — — — — — —
Yemen		*				1 0 0 0	1 0	0 1 0	0 0 0	— —	— — — — — — — — —
Yugoslavia			*			0 1 0 0	1 1	0 0 0	— — —	— —	— — — — — — — — —
Zambia		*				0 0 0 0	1 0	0 0 1	0 1 0	— —	— — — — — — — — —
Zimbabwe	*					0 0 0 0	0 0	0 0 0	1 0 0	0 0	— — — — — — — — —

- A5 -

| State | Number of addresses in block | | | | | Allocation of blocks of addresses (a dash represents a bit value equal to 0 or 1) | | | | |
	1 024	4 096	32 768	262 144	1 048 576					
Other allocations						0 0	0 0 0	— — —	— —	— — — — — — — — —
ICAO[1]			*			1 1 1 1				
ICAO[2]	*					1 0 0 0	1 0	0 1 1	0 0 1	0 0	— — — — — — — — —
ICAO[2]	*					1 1 1 1	0 0	0 0 1	0 0 1	0 0	— — — — — — — — —

[1]. ICAO administers this block for assigning temporary aircraft addresses as described in section 7.

[2]. Block allocated for special use in the interest of flight safety.

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APPENDIX B

SAMPLE AERONAUTICAL INFORMATION CIRCULAR (AIC)
RECOMMENDED TEXT OF STATE AIC

Notes		ICAO 24-Bit Aircraft Addresses and Aircraft Identification Reporting	
1. State to insert date and reference of last circular issued for Mode S Surveillance, if applicable.	**1**	**INTRODUCTION**	
	1.1	The provision of air traffic services (ATS) using SSR Mode S will 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. In addition, Mode S surveillance requires the reporting of aircraft identification as stated in previous circulars concerning Mode S airborne equipment requirements. (note 1).	
	1.2	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 the Appendix to Chapter 9, Part I, Volume III, ICAO Annex 10.	
	1.3	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, 2.1.5.2.	
	1.4	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	Instances occur 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, <u>disabled</u> if an incorrect or duplicate 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. Insert name of State and title of applicable organisation responsible for 24-bit aircraft address assignment	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 (note 2).	
	2.4	The world-wide addressing scheme has been designed so that, at any one time, no address is 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	

Notes		ICAO 24-Bit Aircraft Addresses and Aircraft Identification Reporting
		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, Part VIII, 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. KLM511, BAW213, JTR25), when:
		
		      in radiotelephony the callsign used consists of the ICAO telephony designator for the operating agency followed by the flight identification (e.g. KLM 511, SPEEDBIRD 213, HERBIE 25).
		
		Or,
		
		b) The registration marking of the aircraft (e.g. EIAKO, 4XBCD, OOTEK), when:
		
		      1) in radiotelephony the callsign used consists of the registration marking alone (e.g. EIAKO), or preceded by the ICAO telephony designator for the operating agency (e.g. SVENAIR EIAKO), 2) 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.

3. State to insert local points of contact	**4**	**FURTHER INFORMATION** Further information or guidance may be obtained from: DGCA contact information or Website

- END -