

RTCA Special Committee 186, Working Group 3
EUROCAE WG-51, SG-1

ADS-B 1090ES MOPS Maintenance

Meeting #25

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Response to Action Item 24-13
1090 ES MOPS Duplicate Aircraft Addresses

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Summary
This Working Paper addresses the question of whether the 1090ES MOPS needs to have requirements included in the receiver section for the detection of duplicate aircraft addresses.

1090ES MOPS Duplicate Address Tests

Currently there are no duplicate address requirements in the receiver sections of either the UAT link MOPS; DO-282A or in the 1090ES link MOPS, DO-260A. There are duplicate address requirements in the draft FRAC ASAS MOPS and the attached Table 1 provides the ASAS MOPS Section references on which combinations of ADS-B In reports are tested for duplicate address conditions.

Starting with the UAT combinations in the ASAS MOPS: (Upper left quadrant of the table)

1. Section 2.2.3.1.3.2 has requirements for testing if two UAT direct (air to air) reports with duplicate addresses are received.
2. Section 2.2.3.2.1 has requirements for testing UAT direct reports against either TIS-B or ADS-R reports with duplicate addresses.

The 1090ES test requirements in the lower right quadrant of the table are as follows:

1. Section 2.2.3.2.1 has requirements for testing 1090 direct reports against either TIS-B or ADS-R reports with duplicate addresses.
2. There are no requirements for testing multiple 1090 direct reports for duplicate addresses due to the multiple message format of the 1090 link. Assumption 1.5.1.4 cautions the user that misleading information is possible under these conditions.

The cross link duplicate address conditions are referenced in the ASAS MOPS Assumption Section 1.5.1.6. It states where dual link receivers are installed, if both a direct report on one link and an ADS-R report on the other link are received for the same airplane/address, the ADS-R report should be disregarded.

Considerations for DO-260A +++:

Because of the multiple message structure used for 1090 ES, only the position messages, whether surface or airborne format, contain position data which could be used via correlation testing to determine whether they originated from the same aircraft or two different aircraft. If an airborne receiver received two duplicate address messages of any other type (ID, velocity or event driven) it would not have any method to determine whether they came from the same aircraft or different aircraft.

It is recommended that if duplicate address tests for the receiver are included as part of the CPR Reasonableness Tests in DO-260X, Sections 2.2.10.4.1.2 (Airborne) and Section 2.2.10.4.2.2 (Surface) they should only apply to the Airborne Position message (BDS 0,5) or the Surface Position message (BDS 0,6).

Table 1 ADS-B Duplicate Address Tests

Report Types	UAT Direct (Air to Air)	UAT ADS-R	UAT TIS-B (Surface Targets)	1090 Direct (Air to Air)	1090 ADS-R	1090 TIS-B (Surface Targets)
UAT Direct (Air to Air)	ASAS MOPS Sect. 2.2.3.1.3.2	No reqmts	ASAS MOPS Sect. 2.2.3.2.1	No reqmts	ASAS MOPS Sect. 1.5.1.6	No reqmts
UAT ADS-R	No reqmts	No reqmts	ASAS MOPS Sect. 2.2.3.2.1	ASAS MOPS Sect. 1.5.1.6	No reqmts	No reqmts
UAT TIS-B (Surface Targets)	ASAS MOPS Sect. 2.2.3.2.1	ASAS MOPS Sect. 2.2.3.2.1	No reqmts	No reqmts	No reqmts	No reqmts
1090 Direct (Air to Air)	No reqmts	ASAS MOPS Sect. 1.5.1.6	No reqmts	ASAS MOPS Sect. 1.5.1.4	No reqmts	ASAS MOPS Sect. 2.2.3.2.1
1090 ADS-R	ASAS MOPS Sect. 1.5.1.6	No reqmts	No reqmts	No reqmts	No reqmts	ASAS MOPS Sect. 2.2.3.2.1
1090 TIS-B (Surface Targets)	No reqmts	No reqmts	No reqmts	ASAS MOPS Sect. 2.2.3.2.1	ASAS MOPS Sect. 2.2.3.2.1	No reqmts

- Notes:**
- 1. Section 1.5 in the ASAS MOPS contains assumptions, not requirements.**
 - 2. In the FAA system, TIS-B Airborne Messages will not have ICAO 24 bit address.**