

CHANGE ISSUE – RTCA/DO-242

MASPS for ADS-B

Rev B

Tracking Information (committee secretary only)	
Change Issue Number	61
Submission Date	2/14/02
Status (open/closed/deferred)	OPEN
Last Action Date	2/22/02

Short Title for Change Issue:	Need guidance on coping with duplicate A/V addresses
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MASPS Document Reference: WP-11-01		Originator Information:	
Entire document (y/n)		Name	Tom Mosher
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Table/Figure number(s)		Other	Bill Flathers (AOPA)

Proposed Rationale for Consideration (originator should check all that apply):	
<input type="checkbox"/>	Item needed to support of near-term MASPS/MOPS development
X	DO-260()/ED-102() 1090 MHz Link MOPS and SARPs (Doc 9871)
<input type="checkbox"/>	ASA MASPS
<input type="checkbox"/>	TIS-B MASPS
X	UAT MOPS (DO-282B) and SARPs (Doc 9861)
<input type="checkbox"/>	Item needed to support applications that have well defined concept of operation
<input type="checkbox"/>	Has complete application description
<input type="checkbox"/>	Has initial validation via operational test/evaluation
<input type="checkbox"/>	Has supporting analysis, if candidate stressing application
<input type="checkbox"/>	Item needed for harmonization with international requirements
<input type="checkbox"/>	Item identified during recent ADS-B development activities and operational evaluations
X	MASPS clarifications and correction item
<input type="checkbox"/>	Validation/modification of questioned MASPS requirement item
<input type="checkbox"/>	Military use provision item
<input type="checkbox"/>	New requirement item (must be associated with traffic surveillance to support ASAS)

Nature of Issue:	<input type="checkbox"/>	Editorial	X	Clarity	<input type="checkbox"/>	Performance	<input type="checkbox"/>	Functional
<u>Issue Description:</u>								
<p>Clarify whether an ADS-B receiver must be able to cope with targets that are transmitting duplicated A/V addresses. This situation could arise either through either self-assigned temporary addresses (anonymous), inadvertent anomalous reception of surface vehicles beyond the nominal range from an airport (see 242A-WP-11-01 Section 2.1.2.3 Note 1), or problems arising from equipment maintenance issues.</p> <p>Clearly two targets with the same address but with different SV reports can be identified as unique targets, if some additional portion of the SV is used for discrimination. The MASPS should be clear whether this is required, or if receiving units need only observe the A/V address.</p> <p>Clearly, the “unique address” requirement (R2.10) is not sufficient to guarantee that duplicate addresses never occur in practice.</p>								

Originator's proposed resolution:

Two proposed resolutions are provided:

Preferred resolution:

Delete Requirement R2.10, which contains the "uniqueness" provision, and add a note that specifically states that ADS-B receiving equipment should be capable of coping with reception of duplicated addresses.

Note that in the text below, the existing Note 2 has been deleted, in anticipation of approval of a separate Issue Paper. A new Note 2 has been provided.

In specific, revise the proposed text of 242A-WP-11-01A/B/C as follows:

Section 2.1.2.2.2 Participant Address and Address Qualifier

The ADS-B system design shall (R2.8) include a means (e.g., an address) to (a), correlate all ADS-B messages transmitted from the A/V and (b), differentiate it from other A/Vs in the operational domain.

Those aircraft requesting ATC services may be required in some jurisdictions to use the same address for all CNS systems. Aircraft with Mode-S transponders using an ICAO-assigned 24 bit address shall (R2.9) use the same 24 bit address for ADS-B.

The ADS-B system design shall (R2.10) accommodate a means to ensure anonymity whenever pilots elect to operate under flight rules permitting an anonymous mode.

Notes:

1. *Some flight operations do not require one to fully disclose either the A/V call sign or address. This feature is provided to encourage voluntary equipage and operation of ADS-B by ensuring that ADS-B messages will not be traceable to an aircraft if the operator requires anonymity.*
2. *ADS-B receiving equipment should anticipate that the Participant Address may not be unique in all cases, and provide a means to differentiate targets by considering other information fields, such as Flight ID, Address Mode Qualifier, or other State Vector Report elements.*

Comments: In essence, this deletes the stated requirement for uniqueness because (1) no one can guarantee it, (2) no one can prove that the condition will always be met, (3) there has to be some provision on the receive side for the occasional duplicate, (4) the intent of uniqueness is captured in part (b) of the opening sentence, and (5) by not requiring uniqueness in the address, it gives the receive side the freedom to consider other message elements to provide distinction if necessary. A note has been added to reinforce the need for ADS-B receiving equipment to cope with duplicated Participant Addresses.

See the next sheet for a second proposed solution.

Originator's proposed resolution (continued):

Less-preferred solution:

In this proposed solution, the requirement R2.10 is softened into a "should", and places the advice about handling duplicate addresses in the text body, rather than in a note. Again, the existing Note 2 has been assumed deleted.

In specific, revise the proposed text of 242A-WP-11-01A/B/C as follows:

2.1.2.2.2 Participant Address and Address Qualifier

The ADS-B system design shall (R2.8) include a means (e.g., an address to (a) correlate all ADS-B messages transmitted from the A/V and (b) differentiate it from other A/Vs in the operational domain.

A/V addresses should be unique within the applicable operational domain. In the extremely rare case where two A/Vs have the same address in the same operational domain, other message elements such as the address qualifier, call sign, or other parts of the state vector report can be used to distinguish messages from the respective A/Vs.

Those aircraft requesting ATC services may be required in some jurisdictions to use the same address for all CNS systems. Aircraft with Mode-S transponders using an ICAO-assigned 24 bit address shall (R2.9) use the same 24 bit address for ADS-B.

The ADS-B system design shall (R2.10) accommodate a means to ensure anonymity whenever pilots elect to operate under flight rules permitting an anonymous mode.

Note: Some flight operations do not require one to fully disclose either the A/V call sign or address. This feature is provided to encourage voluntary equipage and operation of ADS-B by ensuring that ADS-B messages will not be traceable to an aircraft if the operator requires anonymity.

Working Group 6 Deliberations:

February 22, 2002: This Issue Paper was reviewed by WG6 at their February 2002 meeting. Since this IP was received so close to the completion date for revision A, and the fact that there will need to be proper coordination with all ADS-B links on this issue – especially the Mode-S community – it was decided this Issue Paper will be deferred for a future revision of the MASPS.

Working Group 3/5 Follow-up:

November 18, 2009: The issue of how to handle duplicate addresses on both ADS-B Data Links surfaced during the development of the specification for the FAA SBS ADS-B Ground Stations. It was discussed at numerous RTCA SC-186 Plenary and ICAO Aeronautical Surveillance Panel (ASP) Technical Subgroup (TSG) sessions. A note was added in ICAO Doc 9871 §A.2.7.3, which allows manufacturers the option to detect, process and output a duplicate aircraft address flag.

Working Paper 1090-WP27-16R1 was presented by Dean Miller of Boeing with a proposal to add to the reasonableness test to encompass the Duplicate Address issue in the draft of DO-260B. Action Item 27-07 was accepted to review comments and further define requirements for the Paris Joint Meeting. Upon review of 1090-WP28-21 during the Paris meeting, it was decided that Tom Pagano would work with Dean Miller to further define the requirements for Duplicate Addresses. Working Paper 1090-WP29-08 was submitted by Tom Pagano for specific changes for DO-260B. 1090-WP29-08R1 was accepted for implementation into DO-260B with a new section §2.2.10.7 setting the requirements for processing potential Duplicate Addresses.

It was argued that UAT did not have the same issues regarding Duplicate Addresses as do 1090ES Messages. WG-5 agreed that a simple note would be included in the draft of DO-282B and Action Item 23-01 was accepted to craft the note. Working Paper UAT-WP24-05R1 contains a proposed note which was accepted and inserted into DO-282B in §2.2.9.1.

Bottom line is that there still needs to be a discussion on whether or not to make further changes in DO-242B to deal with potential Duplicate Addresses.