

CHANGE ISSUE – RTCA/DO-242

# MASPS for ADS-B Rev. A

Tracking Information (committee secretary only)	
Change Issue Number	4
Submission Date	1/11/01
Status (open/closed/deferred)	Rev. A - CLOSED
Last Action Date	02/22/02

Short Title for Change Issue:	Request that ownship's aircraft size characteristic be broadcast.
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MASPS Document Reference:		Originator Information:	
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Section number(s)		Phone	(202) 267-7954
Paragraph number(s)		E-mail	Garret.Livack@faa.gov
Table/Figure number(s)		Other	

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 Rev A
<input type="checkbox"/>	ASA MASPS
<input type="checkbox"/>	TIS-B MASPS
X	UAT MOPS
<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
<input type="checkbox"/>	MASPS clarifications and correction item
<input type="checkbox"/>	Validation/modification of questioned MASPS requirement item
<input type="checkbox"/>	Military use provision item
X	New requirement item (must be associated with traffic surveillance to support ASAS)

Nature of Issue:	<input type="checkbox"/> Editorial	<input type="checkbox"/> Clarity	<input type="checkbox"/> Performance	X	Functional
<p><b>Issue Description:</b> The attached comment <b>requesting own aircraft's make and model be broadcast for use in future runway incursion systems and wake vortex modeling</b> was presented to the SC-186 plenary in reference to the ballot on the 1090 MHz ADS-B MOPS (DO-260). It was agreed that this issue would be deferred from consideration in DO-260 until it was first considered for inclusion in a future revision of the ADS-B MASPS. Included with the attached comment is the official response from working group 3, which was charted with development of DO-260.</p> <p><u>Note:</u> As a proposal to consolidate IPs 4, 6, 7, 13, 18, and 19 into a single Issue Paper discussing requested additional ADS-B message elements for various applications and users, Working Paper 242A-WP-5-02 was presented to the ad hoc group at their May 2001 meeting. It was the conclusion of the ad hoc group to not consolidate these Issue Papers so that they could each be addressed as separate issues. 242A-WP-5-02 is available for download from the May meeting materials on the WG6 page at &lt;<a href="http://adsb.tc.faa.gov/adsb/186-subf.htm">http://adsb.tc.faa.gov/adsb/186-subf.htm</a>&gt;</p> <p><b>Administrative Action:</b> Issue Papers temporarily named 4a, 4b, and 4c were renumbered on February 13, 2001. This IP (4a) was renumbered IP4. IPs 4b and 4c were renumbered IP18 and IP19, respectively.</p>					

Originator's proposed resolution: Proposed resolution is attached with comment from DO-260 ballot.

Working Group 6's Planned Solution: The ad hoc group was briefed at their May, 2001 meeting on this issue by Ken Staub. The group agreed that the final resolution to this Issue Paper will be based on the 4-bit aircraft size characteristic solution presented in 242A-WP-5-04.

Working Group 6 Deliberations:

January 24, 2001: Due to lack of completeness or maturity of current Operations Concept, it was agreed by the ad hoc group that IP4a should be deferred for consideration in a later version of DO-242.

May 24, 2001: This Issue Paper was discussed by the ad hoc group at their May 2001 meeting. While this Issue Paper was originally deferred, it was agreed to reopen this Issue Paper, re-title it as "Aircraft size Characteristic" and reference the work presented by Ken Staub in 242A-WP-5-04. This IP will be addressed in Revision A.

July 19, 2001: At the July WG6 meeting, it was agreed that the resolution for this Issue Paper needs to be done in concert with the resolution for IP14, "Certified Navigation Center". **AI 6-10:** Ken Staub will propose specific text to incorporate this into DO-242A.

August 30, 2001: This Issue Paper was again discussed at the August WG6 meeting. It was agreed that the 4-bit size characteristic originally proposed in 242A-WP-5-04 will be broadcast in on-condition messages whenever a plane is on the ground and that – if the size characteristic is large enough – the position data broadcast will need to be relative to the navigation reference point addressed in IP14. It was also agreed that 242A-WP-5-04 will be incorporated into DO-2342A as an appendix as justification for the 4-bit coding scheme. **AI 6-10:** Ken Staub will propose specific text to incorporate this into DO-242A. Also, for **AI 7-16**, Ken and Bill Flathers will propose language that will define when an aircraft is considered on the ground and when it is airborne and the transitions in-between these states and what needs to be broadcast dependant on these states.

February 1, 2002: This Issue Paper's final resolution was approved by WG6 as part of the review of 242A-WP-11-01a. The final resolution as it appears in 242A-WP-11-01a appears below. This Issue Paper is now considered CLOSED and addressed in DO-242A.

Working Group 6 Final Resolution:

Attachment B of this Issue Paper contains MASPS sections 2.1.2.3 and 3.4.4.6 which contain text for the new Aircraft Length and Width Codes from the draft DO-242A delivered to RTCA March 4, 2002. These codes will be contained within the Modes Status report. The reader is also referred to Appendix P of the March 4 draft DO-242A.

**ADS-B 1090 MHz Rev A Comments Related to MASPS Changes  
RTCA SC-186 WG-3/EUROCAE WG-51 SG-1**

#	Comment Author	DO-260 Section	Page	Comment / Rationale	Suggested Resolution
1	Livack (2)	1.3.5.2 Incursion Monitoring  1.3.6 Other Applica- tions	11  11	<p>Reference the various ADS-B surface movement applications. (See RTCA SC – 193, WG-3 airport mapping user requirements document, Appendix section, and Appendix E, DO-242). Suggest make aircraft "make / model" a REQUIRED information set to be transmitted in addition to other parameters already agreed upon. This information is needed to support various airport surface movement applications, noise monitoring, and to support the GA wake vortex modeling application. Intent would be to display an aircraft's silhouette while on the ground and in-flight and / or support a wake vortex alerting algorithm. Display of aircraft silhouette data on a CDTI with alerting is believed to help reduce display clutter.</p> <p><b>WG#3 Position:</b> <i>Can this information be reliably derived?? Will it cause a bandwidth problems??</i></p>	This is a safety critical item. The message set needs to be included in the MASPS and MOPS.

**2.1.2.3 A/V Length and Width Codes**

The A/V length and width codes describe the amount of space that an aircraft or ground vehicle occupies and are components of the Mode-Status report (§3.4.4, §3.4.4.6). The aircraft length and width codes are not required to be transmitted by all ADS-B participants all of the time. However, they *are* required to be transmitted by aircraft above a certain size, at least while those aircraft are in the airport surface movement area.

**3.4.4.6 A/V Length and Width Codes**

The “A/V Length and Width Codes” field in the MS field is a 4-bit field that describes the amount of space that an aircraft or ground vehicle occupies. The aircraft length and width codes **shall** (R3.99) be as described in Table 3.4.4.6 below. The aircraft size code is a four-bit code, in which the 3 most significant bits (the length code) classify the aircraft into one of eight length categories, and the least significant bit (the width code) classifies the aircraft into a “narrow” or “wide” subcategory.

Each aircraft **shall** (R3.100) be assigned the smallest length and width codes for which its overall length and wingspan qualify it.

*Note: For example, consider a powered glider with overall length of 25 m and wingspan of 50 m. Normally, an aircraft of that length would be in length category 0. But since the wingspan exceeds 33 m, it will not fit within even the “wide” subcategory of length category 0. Such an aircraft would be assigned length category 3 and width category 1, meaning “length less than 54 m and wingspan less than 52 m.”*

Each aircraft ADS-B participant for which the length code is 1 or more (length greater than or equal to 30 m or wingspan greater than 33 m) **shall** (R3.101) transmit its aircraft size code while it is known to be on the surface. For this purpose, the determination of when an aircraft is on the surface **shall** (R3.102) be as described in §3.4.3.1.1 above.

**Table 3.4.4.6: Aircraft Size (Length and Width) Codes**

Length Code (3 MSBs)			Width (Wingspan) Code (LSB)	
dec.	binary	Length Category	Narrow (LSB = 0)	Wide (LSB = 1)
0	0 0 0	L < 30 m	W < 16.5 m	16.5 m ≤ W < 33 m
1	0 0 1	L < 38 m	W < 30.5 m	30.5 m ≤ W < 38 m
2	0 1 0	L < 46 m	W < 38 m	38 m ≤ W < 48 m
3	0 1 1	L < 54 m	W < 42 m	42 m ≤ W < 52 m
4	1 0 0	L < 62 m	W < 51.5 m	51.5 m ≤ W < 65 m
5	1 0 1	L < 70 m	W < 66.5 m	66.5 m ≤ W < 74 m
6	1 1 0	L < 78 m	W < 69.5 m	69.5 m ≤ W < 80 m
7	1 1 1	L ≥ 78 m	W < 84 m	W ≥ 84 m