

CHANGE ISSUE – RTCA/DO-242

MASPS for ADS-B Rev. A

| Tracking Information (committee secretary only) | |
|---|----------------|
| Change Issue Number | 18 |
| Submission Date | 1/11/01 |
| Status (open/closed/deferred) | Rev A - CLOSED |
| Last Action Date | 02/22/02 |

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| Short Title for Change Issue: | Request to broadcast own aircraft's heading at Vstop. |
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| MASPS Document Reference: | | Originator Information: | |
|---------------------------|--|-------------------------|-----------------------|
| Entire document (y/n) | | Name | Gary Livack / FAA |
| 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) |

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|--|------------------------------------|----------------------------------|--------------------------------------|--|
| Nature of Issue: | <input type="checkbox"/> Editorial | <input type="checkbox"/> Clarity | <input type="checkbox"/> Performance | <input checked="" type="checkbox"/> Functional |
| <u>Issue Description:</u> | | | | |
| <p>The attached comment requesting own aircraft's heading at Vstop be broadcast for use in future runway incursion and other surface movement systems 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>Note: 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 http://adsb.tc.faa.gov/adsb/186-subf.htm</p> <p>Administrative Action: Issue Papers temporarily named 4a, 4b, and 4c were renumbered on February 13, 2001. This IP (4b) was renumbered IP18. IPs 4a and 4c were renumbered IP 4 and IP19, respectively.</p> | | | | |

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

Working Group 6 Deliberations:

January 24, 2001: This Issue paper (originally IP4b) was discussed by the ad hoc group at their January 2001 meeting. It was agreed that this issue should be considered for resolution in DO-242A. It was hypothesized that the resolution might be a clarification of the current MASPS. **AI 2-7:** Jim Maynard will propose a MASPS change to resolve this issue.

May 24, 2001: This Issue Paper was discussed by the ad hoc group at their May 2001 meeting. It was agreed that this IP will be addressed in Revision A. Previous action item on this IP [AI 2-7] was closed because it was agreed that it was now superceded by AI 5-6. **AI 5-6:** the team of Jim Maynard, Dan Castleberry, and Richard Barhydt will develop a straw-man proposal to reorganize the State Vector and Mode Status reports to resolve IP33.

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

February 22, 2002: As part of the review of 242A-WP-12-01, final MASPS text for this Issue Paper was agreed to by WG6.

(Issue Paper Resolution found on next page.)

Working Group 6 Final Resolution:

Below is sections 2.1.2.19, 3.4.3.12, and 3.4.3.13 which contain text for heading and the specification of the requirement to broadcast heading when an aircraft is considered on the airport surface. These sections are as they appear in the draft DO-242A delivered to RTCA March 4, 2002.

2.1.2.19 Heading

Heading indicates the orientation of an A/V, that is, the direction in which the nose of the aircraft is pointing. Heading is described as an angle measured clockwise from true north or magnetic north. The heading reference direction (true north or magnetic north) is conveyed in the Mode-Status report (§ 3.4.4).

Heading occurs not only in the SV report (§ 3.4.3) for participants on the airport surface, but also in the ARV report (§ 3.4.7) for airborne participants.

3.4.3.12 Heading While On the Surface Field

Heading (§ 2.1.2.9) indicates the orientation of an A/V, that is, the direction in which the nose of an aircraft is pointing. ADS-B Participants are not required to broadcast heading if their length code (part of the aircraft size code, § 2.1.2.3 above) is 0. However, each ADS-B participant that reports a length code of 1 or greater **shall** (R2.79) transmit messages to support the heading element of the SV report when that participant is on the surface and has a source of heading available to its ADS-B transmitting subsystem.

Heading **shall** (R3.80-A) be reported for the full range of possible headings (the full circle, from 0° to nearly 360°). The heading of surface participants **shall** (R3.80-B) be communicated and reported with a resolution of 6 degrees of arc or finer.

Notes:

1. *If heading is encoded as a binary fraction of a circle, a resolution of 6° of arc or finer would require at least 6 binary bits.*
2. *The reference direction for heading (true north or magnetic north) is communicated in the Mode-Status report (paragraph 3.4.4).*
3. *For operations at some airports, heading may be required to enable proper orientation and depiction of an A/V by applications supporting those surface operations.*

3.4.3.13 Heading Valid Field

The “heading valid” field in the SV report **shall** (R3.81-A) be ONE if a valid heading is provided in the “heading while on the surface” field of the SV report; otherwise, it **shall** (R3.81-B) be ZERO.

**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 |
|---|----------------|---------------------------------|------|---|---|
| 2 | Livack (3) | 1.3.5.2 Incursion Monitoring | 11 | <p>Reference various future surface movement applications. Suggest make aircraft "heading at Vstop" a REQUIRED information set to be transmitted while operating on the airport surface. Otherwise, there appears to be no means to correlate heading when not in motion.</p> <p>WG#3 Position: <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. |