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**Minimum Operational Performance Standards for  
1090 MHz Extended Squitter  
Automatic Dependent Surveillance – Broadcast (ADS-B)  
and  
Traffic Information Services – Broadcast (TIS-B)  
List of Corrigendum-1  
Revision 1.0**

RTCA DO-260B, List of Corrigendum-1  
Month Day, 20xx  
EUROCAE ED-102A, List of Corrigendum-1  
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## Foreword

This document was prepared jointly by RTCA Special Committee 186 (SC-186) and EUROCAE Working Group 51 (WG-51) Subgroup 1, and was approved by the RTCA Program Management Committee (PMC) on **Month Day, 20xx**.

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## Executive Summary

The corrigenda related to the *Minimum Operational Performance Standards (MOPS) for the 1090 MHz Automatic Dependent Surveillance – Broadcast (ADS-B) and Traffic Information Services – Broadcast (TIS-B)* systems, published by RTCA on December 2, 2009 as RTCA DO-260B, and published by EUROCAE in December 2009 as EUROCAE ED-102A, is contained herein as a **List of Corrigendum-1 for RTCA DO-260B and EUROCAE ED-102A**, and has been produced to reflect errata, corrections and clarifications to requirements and test procedures for 1090ES ADS-B and TIS-B transmitting and receiving systems, as a result of comments received from industry during their implementation of products conforming to the referenced standard since the publication of the standard in December 2009.

This **List of Corrigendum-1 for RTCA DO-260B and EUROCAE ED-102A** contains  
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With the publication of this document as “**List of Corrigendum-1 for RTCA DO-260B and EUROCAE ED-102A,**” errata are being reviewed for RTCA DO-260B and EUROCAE ED-102A that have been identified since the time of the publication of DO-260B/ED-102A. These errata include, but are not limited to:

1. Broad topic or category of errata 1, xxxxxxxxxxxx;
2. Broad topic or category of errata 2, xxxxxxxxxxxx;
3. Broad topic or category of errata 3, xxxxxxxxxxxx; and
4. Other errata related to correcting typographical and paragraph reference errors.

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## List of Corrigendum-1 for RTCA DO-260B and EUROCAE ED-102A

### Extended Squitter Automatic Dependent Surveillance - Broadcast (ADS-B) and Traffic Information Service - Broadcast (TIS-B) Equipment Operating on the Radio Frequency of 1090 Megahertz (MHz)

The applicable standards for the corrigenda described in this document is RTCA DO-260B and EUROCAE ED-102A, “*Minimum Operational Performance Standards for 1090 MHz Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) and Traffic Information Services – Broadcast (TIS-B)*,” issued December, 2009.

Corrigenda that are being specified in this **List of Corrigendum-1 for RTCA DO-260B and EUROCAE ED-102A** will use numbers such as (1.1) through (1.xx).

In the following list of corrigenda, for those items where existing text is identified to change, the new text is underlined and highlighted in blue, and deleted text is presented in ~~strikethrough and red text~~. In those changes where a totally new section or text is proposed to be inserted, all the text is presented in underline and highlighted in blue. In some cases, a yellow highlighting may be used to emphasize the specific issue.

- (1.1) In RTCA DO-260B and EUROCAE ED-102A, in section §2.2.3.2.6.1.14, the values in Table 2-30 need to account for the situation where the barometric and Geometric (GNSS or INS) altitude source data are exactly equal. Edit the “Meaning” in Table 2-30 for the value of ZERO (0) as follows:

**Table 2-30: “Difference From Barometric Altitude Sign Bit” Encoding**

Coding	Meaning
0	Geometric (GNSS or INS) Altitude Source data is greater than (above) <u>or equal to</u> Barometric
1	Geometric (GNSS or INS) Altitude Source data is less than (below) Barometric

- (1.2) In RTCA DO-260B and EUROCAE ED-102A, in section §2.2.3.2.7.1.3.11 references to the LNAV Mode Engaged were left out in the final edit. Add references to “ME” bit 54, and Message bit 86 into the proper places as follows for this section:

The “Status of MCP / FCU Mode Bits” subfield is a 1-bit (“ME” bit 47, Message bit 79) field that shall be used to indicate whether the mode bits (“ME” bits 48, 49, 50, ~~and 52;~~ and 54, Message bits 80, 81, 82, ~~and 84~~ and 86) are actively being populated (e.g., set) in the Target State and Status Message in accordance with Table 2-48.

**Table 2-48: “Status of MCP/FCU Mode Bits” Subfield Encoding**

Coding (“ME” Bit 47)	Meaning
0	No Mode Information is being provided in “ME” bits 48, 49, 50, <del>52</del> <u>or 54</u> (Message bits 80, 81, 82, <del>84</del> <u>or 86</u> )
1	Mode Information is deliberately being provided in “ME” bits 48, 49, 50, <del>52</del> <u>or 54</u> (Message bits 80, 81, 82, <del>84</del> <u>or 86</u> )

If information is provided to the ADS-B Transmitting Subsystem to set either “ME” bit 48, 49, 50, ~~52~~ or 54 (Message bit 80, 81, 82, ~~84~~ or 86) to either “0” or “1,” then bit 47 shall be set to ONE (1). Otherwise, bit 47 shall be set to ZERO (0).

- (1.3) In RTCA DO-260B and EUROCAE ED-102A, in section §2.2.3.2.7.1.3.18, inside Table 2-54, the definition of the LNAV Mode Engaged subfield was not totally defined. The “or Unknown” case must be added to the encoding of ZERO (0), as follows:

**Table 2-54: “LNAV” Mode Engaged” Subfield Encoding**

Coding (“ME” Bit 54)	Meaning
0	LNAV Mode is NOT Active <u>or Unknown</u>
1	LNAV Mode is Active

- (1.4) In RTCA DO-260B and EUROCAE ED-102A, in section §2.2.3.2.7.2.4.8, in order to correct a cut-and-paste error, make the following correction to this paragraph:

“Reserved” bits, (“ME” bits 33 – 40, Message bits 65 – 72) in the OM Code Subfield of ~~Surface~~ Airborne format Aircraft Operational Status Messages are reserved for future assignment. Until such future assignment, these bits shall be set to “ZERO” (0).

- (1.5) In RTCA DO-260B and EUROCAE ED-102A, in section §2.2.3.3.1.2, Table 2-79 summarizes the broadcast rates of the 1090ES ADS-B Messages. There was one case that was not included in the original summary of broadcast rates, wherein there would be no transmission of the Aircraft Status Message. Replace Table 2-79 with the following:

Transponder Register	Event-Driven Message Priority	1090ES ADS-B Message	Broadcast Rate		
			On-the-Ground, not moving	On-the-Ground and moving	Airborne
BDS 0,5	N/A	Airborne Position	N/A	N/A	2 / 1 second (0.4 – 0.6 sec)
BDS 0,6	N/A	Surface Position	LOW RATE 1 / 5 seconds (4.8 – 5.2 sec)	HIGH RATE 2 / 1 second (0.4 – 0.6 sec)	N/A
BDS 0,8	N/A	Aircraft Identification and Category	LOW RATE 1 / 10 seconds (9.8 – 10.2 sec)	HIGH RATE 1 / 5 seconds (4.8 – 5.2 sec)	HIGH RATE 1 / 5 seconds (4.8 – 5.2 sec)
BDS 0,9	N/A	Airborne Velocity	N/A	N/A	2 / 1 second (0.4 – 0.6 sec)
BDS 6,1	TCAS RA=1 Emergency=2	Aircraft Status Subtype=1: (Emergency/Priority Status) Subtype=2: (TCAS RA Broadcast)	TCAS RA or Mode A Code Change 0.7 – 0.9 seconds		
			No TCAS RA, No Mode A Change 4.8 – 5.2 seconds		
			<a href="#">No TCAS RA, No Mode A Change, No Emergency, Mode A Code set to 1000g No Transmission</a>		
BDS 6,2	N/A	Target State and Status (TSS)	N/A	N/A	1.2 – 1.3 seconds
BDS 6,5	N/A	Aircraft Operational Status	4.8 – 5.2 seconds	No change NIC <sub>SUPP</sub> /NAC/SIL 2.4 – 2.6 seconds	TSS being broadcast or not No change TCAS/NAC/SIL/NIC <sub>SUPP</sub> 2.4 – 2.6 seconds
				Change in NIC <sub>SUPP</sub> /NAC/SIL 0.7 – 0.9 seconds	TSS being broadcast Change in TCAS/NAC/SIL/NIC <sub>SUPP</sub> 2.4 – 2.6 seconds
					TSS not broadcast <sup>2</sup> Change in TCAS/NAC/SIL/NIC <sub>SUPP</sub> 0.7 – 0.9 seconds

- (1.6) In RTCA DO-260B and EUROCAE ED-102A, in section §2.2.3.3.1.4.2.b.(3) to correct a cut-and-paste error and to indicate that the high broadcast rate that occurs when an aircraft is on the surface and moving with a change in NIC<sub>SUPP</sub>/NAC/SIL, replace subparagraph §2.2.3.3.1.4.2.b.(3) with:

- (3). Aircraft/Vehicle Is Moving With Change in NIC<sub>SUPP</sub>/NAC/SIL Data:

If the Aircraft/Vehicle IS Moving and there has been a change in the NIC<sub>SUPP</sub>, NAC, or SIL data provided in the Surface Aircraft Operational Status Message (TYPE=31, Subtype=1), then the messages shall be broadcast at random intervals that are uniformly distributed over the range of 0.7 to 0.9 seconds relative to the previous Surface Aircraft Operational Status Message for [a period of 24 ±1 seconds as long as data is available to satisfy the requirements of subparagraph “b.” above.](#)

- (1.7) In RTCA DO-260B and EUROCAE ED-102A, in section §2.2.3.3.2.12.b, in the Note following the text of subparagraph “b” it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific *Note*, in order to correctly reference the data item, make the following edit:

**Note:** *For the Surface Position Message, the receipt of new Movement, or [Heading](#)/Ground Track data is not sufficient to maintain broadcast of the message once the message has been initiated.*

- (1.8) In RTCA DO-260B and EUROCAE ED-102A, in section §2.2.4.3.4.1.a, there is a typographical error in specifying the threshold were the value “A” should be -6 dB ±1 dB instead of “-6 dB + 1 dB.” Make the following correction in the last three lines of subparagraph “a.”

.....  
is received (§2.2.3.1.1), in which case the threshold shall be held at A -6 dB ±1 dB for a period of not less than 115 microseconds and shall be recovered in not more than 120 microseconds.

- (1.9) In RTCA DO-260B and EUROCAE ED-102A, in section §2.2.5.1.22, there is an incorrect reference to the UAT IN subfield. Make the following change:

The ADS-B Transmitting Subsystem **shall** be capable of accepting “UAT IN” information via an appropriate variable data input interface and use such data to establish subfields in transmitted ADS-B Aircraft Operational Status Messages as specified in ~~§2.2.3.2.7.2.3.2~~ [2.2.3.2.7.2.3.9](#).

- (1.10) In RTCA DO-260B and EUROCAE ED-102A, in section §2.2.5.2.2.c, in the text of subparagraph “c” it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific subparagraph, in order to correctly reference the data items, make the following edits:

- c. Any change in [Heading](#)/Ground Track identified in §2.2.3.2.4.3 and §2.2.3.2.4.4 **shall** be reflected in the appropriate [Heading](#)/Ground Track subfields of the next scheduled Surface Position Message transmission provided that the change occurs at least 100 milliseconds prior to the next scheduled Surface Position Message transmission.

- (1.11) In RTCA DO-260B and EUROCAE ED-102A, in section §2.2.8.1.4.3, in the text of the second paragraph it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific paragraph, in order to correctly reference the data items, make the following edit:

Each time that a Surface Position Message is received with valid Movement AND Heading/Ground Track data, the Report Assembly Function **shall** update the Velocity Time of Applicability data in the State Vector Report with either the GPS/GNSS UTC Measure Time data (see §2.2.8.5.1) or the Established Receiver Unit Time (see §2.2.8.5.2), whichever is applicable to the Receiving device Report Assembly Function installation requirements.

- (1.12) In RTCA DO-260B and EUROCAE ED-102A, in section §2.2.13.6.1, the reference to the paragraph previously holding the description of the Single Antenna Flag was moved in DO-260B/ED-102A and the reference in the last sentence was not correctly updated. Make the following change:

If transmission diversity is used, the bit described in §~~2.2.3.2.3.3~~ 2.2.3.2.7.2.4.5 **shall** be set valid.

- (1.13) In RTCA DO-260B and EUROCAE ED-102A, in section §2.2.17.3.5.1, add the following on to the end of the initial paragraph just prior to §2.2.17.3.5.2:

The format of the TIS-B Coarse Position Message is not specifically related to any other ADS-B format. The Surveillance Status and CPR Format (F) fields shall be decoded as specified for the ADS-B Airborne Position Message defined in §2.2.3.2.3. The formats for the other elements of the TIS-B Coarse Position Message are ~~is~~ specified in the following subparagraphs.

- (1.14) In RTCA DO-260B and EUROCAE ED-102A, in section §2.3.2.4.3, in order to correct a value in Step 3 of the test procedure, make the following change:

Step 3: Re-Trigger Capability – Part 3

Repeat Step 1 with **Input** level at ~~-24~~ 32 dBm for the first ADS-B Message and -16 dBm for the second ADS-B Message.

- (1.15) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.2.2.12, in order to correct a bad reference, make the following change:

Test procedures to validate the broadcast rate capability requirements for the ADS-B transmitted message are provided in §~~2.4.3.2.7.9~~ [2.4.3.3](#) through §2.4.3.3.2.12 of this document.

- (1.16) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.3.2.1.2.1, the test procedures do not verify CA=0, however, the description has been retained in §2.2.3.2.1.2, Table 2-8, and a review of ED-73C by EADS, as documented in [Working Paper SC209-WP11-10R1](#) on page 5 of 14, takes exception with using CA=0 in an Extended Squitter transponder. **→ As per agreement during discussions on this issue in Joint Meeting Sessions of RTCA SC-209 and EUROCAE WG-49, this will be discussed during any issuance of Corrigendum documents for RTCA DO-260B / EUROCAE ED-102A. ←**

(1.17) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.3.2.1.7, in order to correct several typographical errors, replace Table 2-136 with the following. The modified data are highlighted in yellow:

Column #		1	2	3	4	5	6
SET #	CASE #	Bit # Field Name	1 --- 5 "DF"	6 -- 8 "CA" ("CF")	9 ----- 32 "AA" [HEX]	33 ----- 88 "ME" [HEX]	89 ----- 112 "PI" [HEX]
#1	1		1 0001	000	AA AA AA	ALL ZEROs	46E012
	2		1 0001	000	55 55 55	ALL ZEROs	5B7924
	3		1 0001	000	77 77 77	ALL ZEROs	7DC67B
	4		1 0001	000	BB BB BB	ALL ZEROs	AA45B9
	5		1 0001	000	DD DD DD	ALL ZEROs	C18458
	6		1 0001	000	EE EE EE	ALL ZEROs	0B9EAC
	7		1 0001	000	FE DC BA	ALL ZEROs	7790F4
	8		1 0001	000	AB CD EF	ALL ZEROs	7EE5D2
#2	1		1 0001	100	AA AA AA	ALL ZEROs	D8D1FB
	2		1 0001	100	55 55 55	ALL ZEROs	C548CD
	3		1 0001	100	77 77 77	ALL ZEROs	E3F792
	4		1 0001	100	BB BB BB	ALL ZEROs	347450
	5		1 0001	100	DD DD DD	ALL ZEROs	5FB5B1
	6		1 0001	100	EE EE EE	ALL ZEROs	95AF45
	7		1 0001	100	FE DC BA	ALL ZEROs	E9A11D
	8		1 0001	100	AB CD EF	ALL ZEROs	E0D43B
#3	1		1 0001	101	AA AA AA	ALL ZEROs	80A083
	2		1 0001	101	55 55 55	ALL ZEROs	9D39B5
	3		1 0001	101	77 77 77	ALL ZEROs	BB86EA
	4		1 0001	101	BB BB BB	ALL ZEROs	6C0528
	5		1 0001	101	DD DD DD	ALL ZEROs	07C4C9
	6		1 0001	101	EE EE EE	ALL ZEROs	CDDE3D
	7		1 0001	101	FE DC BA	ALL ZEROs	B1D065
	8		1 0001	101	AB CD EF	ALL ZEROs	B8A543
#4	1		1 0001	110	AA AA AA	ALL ZEROs	68330B
	2		1 0001	110	55 55 55	ALL ZEROs	75AA3D
	3		1 0001	110	77 77 77	ALL ZEROs	531562
	4		1 0001	110	BB BB BB	ALL ZEROs	8496A0
	5		1 0001	110	DD DD DD	ALL ZEROs	EF5741
	6		1 0001	110	EE EE EE	ALL ZEROs	254DB5
	7		1 0001	110	FE DC BA	ALL ZEROs	5943ED
	8		1 0001	110	AB CD EF	ALL ZEROs	5036CB
#5	1		1 0001	111	AA AA AA	ALL ZEROs	304273
	2		1 0001	111	55 55 55	ALL ZEROs	2DDB45
	3		1 0001	111	77 77 77	ALL ZEROs	0B641A
	4		1 0001	111	BB BB BB	ALL ZEROs	DCE7D8
	5		1 0001	111	DD DD DD	ALL ZEROs	B72639
	6		1 0001	111	EE EE EE	ALL ZEROs	7D3CCD
	7		1 0001	111	FE DC BA	ALL ZEROs	013295
	8		1 0001	111	AB CD EF	ALL ZEROs	0847B3
#6	1		1 0010	000	AA AA AA	ALL ZEROs	FDAC76
	2		1 0010	000	55 55 55	ALL ZEROs	E03540
	3		1 0010	000	77 77 77	ALL ZEROs	C68A1F
	4		1 0010	000	BB BB BB	ALL ZEROs	1109DD
	5		1 0010	000	DD DD DD	ALL ZEROs	7AC83C
	6		1 0010	000	EE EE EE	ALL ZEROs	B0D2C8
	7		1 0010	000	FE DC BA	ALL ZEROs	CCDC90
	8		1 0010	000	AB CD EF	ALL ZEROs	C5A9B6
#7	1		1 0011	000	AA AA AA	ALL ZEROs	3E3BAD
	2		1 0011	000	55 55 55	ALL ZEROs	23A29B
	3		1 0011	000	77 77 77	ALL ZEROs	051DC4
	4		1 0011	000	BB BB BB	ALL ZEROs	D29E06
	5		1 0011	000	DD DD DD	ALL ZEROs	B95FE7
	6		1 0011	000	EE EE EE	ALL ZEROs	734513
	7		1 0011	000	FE DC BA	ALL ZEROs	0F4B4B
	8		1 0011	000	AB CD EF	ALL ZEROs	063E6D

- (1.18) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.3.2.5.3, in order to be consistent with changes that were made in RTCA DO-181E and EUROCAE ED-73E and ICAO Doc 9871, Edition 2 to clarify the zeroing and termination of Registers 08<sub>16</sub> and 20<sub>16</sub>, revise Step 4 of this test procedure as shown below:

Step 4      No Aircraft Identification or Aircraft Registration Data

~~Discontinue the input of Aircraft Identification or Aircraft Registration Marking Data.~~ Reinitialize the ADS-B Transmitting Subsystem and ensure that Aircraft Identification or Flight Number Data, and Aircraft Registration Data is not available to the ADS-B Transmitting Subsystem. Verify that each of the characters in the ADS-B Aircraft Identification and Category Message is transmitted properly with all bits of each character set to a binary ZERO (0). The encoding for each character should be ALL ZEROs (binary 000000).

~~**Note:**—The message will continue to be transmitted as long as Category data continues to be updated.~~

- (1.19) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.3.2.7.1.3.3, inside Table 2-151 there is an error in the specification of a Data Value for existing Item #3. There are also problems with the numbering in the “Item #” column in both Table 2-151 and 2-152. Therefore, replace (a) Table 2-151, (b) Step 2 of the Test Procedure, and (c) Table 2-152 with the following:

**Table 2-151: MCP/FCU Selected Altitude in Target State and Status Messages (ARINC Label ‘102’)**

Item #	Generic MCP / FCU Selected Altitude Input (BNR)			Target State and Status Encoding of MCP / FCU Selected Altitude		
	Type of Value	Status	Data Value (feet)	TYPE (bit 9)	Decimal Value (feet)	Binary Value (bit 10 ----- 20)
1	Basic	Valid	43648.00	0	43648.00	101 0101 0101
2	Basic	Valid	21792.00	0	21792.00	010 1010 1010
3	Basic	Valid	<del>28352.00</del> <u>28352.00</u>	0	<del>238352.00</del> <u>28352.00</u>	011 0111 0111
<del>5</del> <u>4</u>	Basic	Valid	65472.00	0	65472.00	111 1111 1111
<del>6</del> <u>5</u>	Basic	Rounded (1/4 LSB)	52392.00	0	52384.00	110 0110 0110
<del>7</del> <u>6</u>	Basic	Rounded (1/2 LSB)	52400.00	0	52416.00	110 0110 0111
<del>8</del> <u>7</u>	Invalid	Invalid	21792.00	0	0.00	000 0000 0000

Step 2:      Setup of FMS Selected Altitude Data

For each line Item # in Table 2-152, via the appropriate interface, provide the ADS-B Transmitting Subsystem with FMS Selected Altitude having a value as indicated in the “Data Value” (feet) Column in Table 2-152. Provide at least one data value from Table 2-152 while provided the data for Line Item #1 through ~~7~~ 6 in Table 2-151. Do not provide any data from Table 2-152 when providing data for Line Item ~~#8~~ 7 in Table 2-151.

**Table 2-152: FMS Selected Altitude in Target State and Status Messages (ARINC Label ‘102’)**

Item #	Generic FMS Selected Altitude Input (BNR)			Target State and Status Encoding of FMS Selected Altitude		
	Type of Value	Status	Data Value (feet)	TYPE (bit 9)	Decimal Value (feet)	Binary Value (bit 10 ----- 20)
1	Basic	Valid	37088.00	1	37088.00	100 1000 1000
2	Basic	Valid	13600.00	1	13600.00	001 1010 1010
3	Basic	Valid	22880.00	1	22880.00	010 1100 1100
<del>5</del> 4	Basic	Valid	60032.00	1	60032.00	111 0101 0101
<del>6</del> 5	Basic	Rounded (1/4 LSB)	25640.00	1	25632.00	011 0010 0010
<del>7</del> 6	Basic	Rounded (1/2 LSB)	25648.00	1	25664.00	011 0010 0011
<del>8</del> 7	Invalid	Invalid	13600.00	1	0.00	000 0000 0000

(1.20) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.3.2.7.1.3.4, inside Table 2-153 there is an error with the numbering in the “Item #” column, and several errors in the Binary Value column. Replace Table 2-153 with the following:

**Table 2-153: Barometric Pressure Setting in Target State and Status Messages (ARINC Label ‘234’)**

Item #	Barometric Pressure Setting Data Input			Target State and Status Encoding of Barometric Pressure Setting	
	Type of Value	Status	Data Value (millibars)	Decimal Value (millibars) (minus 800)	Binary Value (bits 21 --- 29)
1	Basic	Valid	942.7	142.4	0 1011 <del>000+</del> 0011
2	Basic	Valid	923.2	123.2	1 0101 <del>0+0+</del> 1011
3	Basic	Valid	1208.0	408.0	1 1111 1111
<del>5</del> 4	Basic	Valid	927.2	127.2	0 1010 <del>10+0</del> 0000
<del>6</del> 5	Basic	Rounded (1/4 LSB)	1099.4	299.2	1 0111 0111
<del>7</del> 6	Basic	Rounded (1/2 LSB)	1099.6	300.0	1 0111 1000
<del>8</del> 7	Invalid	Valid	1208.5	0.000	0 0000 0000
<del>9</del> 8	Invalid	Valid	799.6	0.000	0 0000 0000
<del>10</del> 9	Invalid	Invalid	927.2	0.000	0 0000 0000

(1.21) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.3.2.7.2.4.8, in order to correct a cut-and-paste error, make the following correction to the text in the Purpose/Introduction paragraph:

“Reserved” bits, (“ME” bits 33 – 40, Message bits 65 – 72) in the OM Code Subfield of ~~surface~~ airborne format Aircraft Operational Status Messages are reserved for future assignment. Until such future assignment, these bits will be set to “ZERO” (0).

- (1.22) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.3.3.1.4.2 to correctly test that the high broadcast rate that occurs when an aircraft is on the surface and moving with a change in NIC<sub>SUPP</sub>/NAC/SIL data, replace the second paragraph of test procedure Step 6 with:

Verify that the ADS-B Transmitting Subsystem is broadcasting ADS-B Surface Aircraft Operational Status Messages at a spacing uniformly distributed over the range of 0.7 to 0.9 seconds for a period of 24 ±1 seconds.

- (1.23) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.3.3.1.4.3.1, in test procedure Step 5, sub-bullet “b.(2)” revise the setting of the Emergency/Priority Status Subfield to ZERO (0), as follows:

- (2). Verify that the broadcast messages contain an Emergency/Priority Status Subfield (“ME” bits 9 – 11, Message bits 41 – 43) that is set to ~~“101” binary (“5” decimal)~~ “000” binary (“0” decimal).

- (1.24) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.4.3.1.2, in order to correct a value in Step 3 of the test procedure, make the following change:

Step 3: Re-Trigger Capability – Part 3

Repeat Step 1 with **Input** level at ~~-24~~ 32 dBm for the first ADS-B Message and -16 dBm for the second ADS-B Message.

- (1.25) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.5.2.2, in the text of Step 3 of the test procedure it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific test procedure Step, in order to correctly reference the data items, make the following edits:

Step 3: Surface Position Message – “~~Heading~~/Ground Track” Subfield (§2.2.3.2.4.3, §2.2.3.2.4.4 and §2.2.5.2.2.c)

Purpose/Introduction:

Any change in Heading/Ground Track identified in §2.2.3.2.4.3 and §2.2.3.2.4.4 **shall** be reflected in the appropriate Heading/Ground Track subfields of the next scheduled Surface Position Message transmission provided that the change occurs at least 100 milliseconds prior to the next scheduled Surface Position Message transmission.

Measurement Procedure:

Configure the ADS-B Transmitting Subsystem to transmit Surface Position Messages by providing position information at the nominal update rate. Provide the data externally at the interface to the ADS-B system. Set the ADS-B Transmitting Subsystem to Surface status. Continue transmitting Surface Position Messages at the nominal rate with all parameters unchanged. Verify that the [Heading](#)/Ground Track subfields in the Surface Position Message correctly matches the [Heading](#)/Ground Track subfield values from the Table 2-17 and Table 2-18 (§2.2.3.2.4.3 and §2.2.3.2.4.4).

Change input to the ADS-B System so as to affect the [Heading](#)/Ground Track subfield values so that the change occurs at least 100 milliseconds prior to the next scheduled Surface Position Message transmission. Verify that the [Heading](#)/Ground Track subfield values have changed in the next transmitted Surface Position Message and that they contain the correct values.

- (1.26) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.8.1.4.1, in the text of Step 4, first paragraph of the test procedure it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific test procedure Step, in order to correctly reference the data items, make the following edits:

Step 4: Verification of (TOA) for Estimated Velocity (resulting from received Surface Position Messages) Reporting

Repeat step 3 and verify that the Report Assembly Function outputs a State Vector Report with the Report Mode set to TWO (binary xxxx 0010). Generate a series of “even” and “odd” Surface Position Messages having a stable TYPE code, which include encoded data (“ME” bits 6 – 12) for a Ground Speed (Movement) of 2 knots (forces “High” rate of two Surface Position Messages per second), and a [Heading](#)/Ground Track Status (“ME” Bit 13) of “ONE,” and encoded data (“ME” bits 14 – 20) for any convenient [Heading](#)/Ground Track ~~heading~~.

- (1.27) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.8.1.4.3, in the text of the second paragraph of the test procedure Purpose/Introduction, it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific paragraph, in order to correctly reference the data items, make the following edit:

These test procedures also verify that each time a Surface Position Message is received with valid Movement AND [Heading](#)/Ground Track data, the Report Assembly Function updates the Velocity Time of Applicability data in the State Vector Report with either the GPS/GNSS UTC Measure Time data (see §2.2.8.5.1) or the Established Receiver Unit Time (see §2.2.8.5.2), whichever is applicable to the Receiving device Report Assembly Function installation requirements.

- (1.28) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.8.1.4.3, in the text of Step 2, first and second paragraphs of the test procedure it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific test procedure Step, in order to correctly reference the data items, make the following edits:

Repeat Step 2 of §2.2.8.1.4.2 and verify that the Report Assembly Function outputs a State Vector Report with the Report Mode set to TWO (binary xxxx 0010). Generate a series of “even” and “odd” Surface Position Messages having a stable TYPE code, which include encoded data (“ME” bits 6 - 12) for a Ground Speed (Movement) of 2 knots (forces “High” rate of two Surface Position Messages per second), which include a [Heading](#)/Ground Track Status (“ME” bit 13) of “ONE,” and which include encoded data (“ME” bits 14 - 20) for any convenient [Heading](#)/Ground Track **heading**.

Verify that the corresponding Velocity Time of Applicability presence bit (Report Byte #2, Bit 0), Ground Speed validity flag (Report Byte #4, Bit 0), and [Heading](#)/Ground Track validity flag (Report Byte #5, Bit 7), are set to “ONES.” Verify that the Velocity Time of Applicability presence bit, bit 1 of byte 2, is set to ONE (1).

- (1.29) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.8.1.19, in the text of Step 2, first paragraph of the test procedure it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific test procedure Step, in order to correctly reference the data items, make the following edits:

Generate a series of Surface Position Messages (Subtype 1 or 2), which include encoded data (“ME” Bits 6 - 12) for valid Ground Speed (Movement) values, which include a [Heading](#)/Ground Track Status (“ME” Bit 13) of “ONE,” and which include encoded data (“ME” Bits 14 - 20) for valid [Heading](#)/Ground Track **headings** having a significant North/South component, and verify that the ADS-B Receiver/Report Assembly outputs a State Vector Report of Type 0001.

- (1.30) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.8.1.19, in the text of Step 4, first paragraph, fourth line of the test procedure it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific test procedure Step, in order to correctly reference the data items, make the following edit:

Generate any valid Surface Position Message, which includes the encoded data (“ME” Bits 6 - 12) for a suitable Decimal Ground Speed (Movement) value, which includes the encoded data (“ME” Bits 14 - 20) for a suitable Decimal Heading/Ground Track value, representing a North/South movement .....

- (1.31) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.8.1.19, in the text of Step 4, second paragraph, third line of the test procedure it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific test procedure Step, in order to correctly reference the data items, make the following edit:

Three seconds after the first Surface Position Message, generate another valid Surface Position Message, which includes the same encoded data for Decimal Heading/Ground Speed (Movement), the same encoded data for Decimal Ground Track, and updated .....

- (1.32) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.8.1.20, in the text of Step 2, first paragraph of the test procedure it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific test procedure Step, in order to correctly reference the data items, make the following edits:

Generate a series of Surface Position Messages (Subtype 1 or 2), which include encoded data (“ME” Bits 6 - 12) for valid Ground Speed (Movement) values, which include a Heading/Ground Track Status (“ME” Bit 13) of “ONE,” and which include encoded data (“ME” Bits 14 - 20) for valid Heading/Ground Track **headings** having a significant East/West component, and verify that the ADS-B Receiver/Report Assembly outputs a State Vector Report of Type 0001.

- (1.33)** In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.8.1.20, in the text of Step 4, first paragraph, third line of the test procedure it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific test procedure Step, in order to correctly reference the data items, make the following edits:

Generate any valid Surface Position Message, which includes the encoded data (“ME” Bits 6 - 12) for a suitable Decimal Ground Speed (Movement) value, and the encoded data (“ME” Bits 14 - 20) for a suitable Decimal [Heading](#)/Ground Track value .....

- (1.34)** In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.8.1.20, in the text of Step 4, second paragraph, third line of the test procedure it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific test procedure Step, in order to correctly reference the data items, make the following edits:

Three seconds after the first Surface Position Message, generate another valid Surface Position Message, which includes the same encoded data for Decimal Ground Speed (Movement), the same encoded data for Decimal [Heading](#)/Ground Track, and updated .....

- (1.35)** In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.8.2.17, in the text of Step 5, first paragraph of the test procedure it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific test procedure Step, in order to correctly reference the data items, make the following edit:

Provide valid Version One (1) ADS-B Aircraft Operational Status Messages (Subtype=1) with “Track Angle/Heading Bit” set to ZERO (0) and Surface Position Messages with “[Heading](#)/Ground Track Status Bit” set to ZERO (0) to the ADS-B Receiving Subsystem. Verify that bits 0 and 1 of byte 32 of the True/Magnetic Heading field in the output Mode Status Report are set to ZERO (binary 00).

- (1.36)** In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.8.2.17, in the text of Step 6, first paragraph of the test procedure it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific test procedure Step, in order to correctly reference the data items, make the following edit:

Provide valid Version One (1) ADS-B Aircraft Operational Status Messages (Subtype=1) with “Track Angle/Heading Bit” set to ZERO (0) and Surface Position Messages with “[Heading](#)/Ground Track Status Bit” set to ONE (1) to the ADS-B Receiving Subsystem. Verify that bits 0 and 1 of byte 32 of the True/Magnetic Heading field in the output Mode Status Report are set to ONE (binary 01).

- (1.37) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.8.2.17, in the text of Step 9, first paragraph of the test procedure it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific test procedure Step, in order to correctly reference the data items, make the following edit:

Provide valid Version Two (2) ADS-B Aircraft Operational Status Messages (Subtype=1) with “Track Angle/Heading Bit” set to ZERO (0) and Surface Position Messages with “[Heading](#)/Ground Track Status Bit” set to ZERO (0) to the ADS-B Receiving Subsystem. Verify that bits 0 and 1 of byte 32 of the True/Magnetic Heading field in the output Mode Status Report are set to ZERO (binary 00).

- (1.38) In RTCA DO-260B and EUROCAE ED-102A, in section §2.4.8.2.17, in the text of Step 10, first paragraph of the test procedure it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific test procedure Step, in order to correctly reference the data items, make the following edit:

Provide valid Version Two (2) ADS-B Aircraft Operational Status Messages (Subtype=1) with “Track Angle/Heading Bit” set to ZERO (0) and Surface Position Messages with “[Heading](#)/Ground Track Status Bit” set to ONE (1) to the ADS-B Receiving Subsystem. Verify that bits 0 and 1 of byte 32 of the True/Magnetic Heading field in the output Mode Status Report are set to ONE (binary 01).

- (1.39) In RTCA DO-260B and EUROCAE ED-102A, in Appendix A, section §A.1.4.5.4, in the third paragraph, make the following deletion of the reference to “vertical velocity” to account for the change that was made during the creation of DO-260B/ED-102A when references to vertical velocity were removed from NAC<sub>V</sub>, NIC and SIL definitions and the Geometric Vertical Accuracy (GVA) parameter was created.

If the external data source provides 95% accuracy figures of merit for horizontal ~~and vertical~~ velocity, then the ADS-B Transmitting Subsystem will determine the value of the NAC<sub>V</sub> field in the Airborne Velocity Messages, Subtypes 1, 2, 3 and 4 according to Table A-5.

- (1.40) In RTCA DO-260B and EUROCAE ED-102A, in Appendix A, section §A.1.4.7, first paragraph:

**Replace** “Registers 61<sub>16</sub> to 6F<sub>16</sub>” **with** “Register 61<sub>16</sub>”

- (1.41) In RTCA DO-260B and EUROCAE ED-102A, in Appendix A, section §A.1.4.7.3.1, second paragraph:

**Change** “§A.1.4.8.1.1” to “§A.1.4.7.3.1.1”

**Change** “§A.1.4.8.1.2” to “§A.1.4.7.3.1.2”

- (1.42) In RTCA DO-260B and EUROCAE ED-102A, in Appendix A, section §A.1.4.7.3.1.1, first paragraph:

**Change** “§A.1.4.8.1” to “§A.1.4.7.3.1”

- (1.43) In RTCA DO-260B and EUROCAE ED-102A, in Appendix A, section §A.1.4.7.3.1.2, first paragraph:

**Change** “§A.1.4.8.1” to “§A.1.4.7.3.1”

- (1.44) In RTCA DO-260B and EUROCAE ED-102A, in Appendix A, section §A.1.4.10.8, replace Table A-29 and the *Note* following it in order to match the table with the correct encodings specified in Table 2-71.

<b>GVA Encoding</b> (decimal)	<b>Meaning</b> (meters)
0	Unknown or > 150 meters
1	≤ 150 meters
2	≤ 45 meters
3	Reserved

*Note:* For the purposes of these MOPS (RTCA DO-260B/EUROCAE ED-102A) values for 0, 1 and 2 are encoded. Decoding values for 3 should be treated as < 45 meters until future versions of these MOPS redefine the value.

- (1.45) In RTCA DO-260B and EUROCAE ED-102A, in Appendix A, section §A.1.5.2, in the *Note* under bullet “a:”

**Replace the reference** “§2.2.3.2.3.1.3.1” with “§2.2.3.2.3.1.3.2”

- (1.46) In RTCA DO-260B and EUROCAE ED-102A, in Appendix A, section §A.1.5.2, in *Note #1* under bullet “b:”

**Replace the reference** “§2.2.3.2.3.1.3.1” with “§2.2.3.2.3.1.3.2”

- (1.47) In RTCA DO-260B and EUROCAE ED-102A, in Appendix A, section §A.1.5.2.d, in order to be consistent with changes made in RTCA DO-181E, EUROCAE ED-73E and ICAO Doc 9871, Edition 2, regarding clarifications for the zeroing and termination of Registers 08<sub>16</sub> and 20<sub>16</sub>, replace the *Note* after subparagraph “d” with the following:

**Note:** The Aircraft Identification and Category Message is not cleared since it contains data that rarely changes in flight and is not frequently updated. With Extended Squitter installed, the Aircraft Identification and Category Message is not cleared or ZEROed once either Flight Identification or Aircraft Registration data has been loaded into Register 08<sub>16</sub> during the current ADS-B Transmitting Subsystem power-on cycle. The Aircraft Identification and Category Message is not cleared since it provides information that is fundamental to track file management in the ADS-B environment (see §2.2.5.1.11.c). Implementation of Register 08<sub>16</sub> should also consider the following:

- a. If valid Flight Identification data is available, then the data should be used to populate the character subfields in the Aircraft Identification and Category Message.
- b. After using Flight Identification data to populate the character subfields in the Aircraft Identification and Category Message in a given power-on cycle, if Flight Identification data becomes invalid or not available, then the last known valid Flight Identification data should be retained and used to continue population of the character subfields in the Aircraft Identification and Category Message for the duration of the power-on cycle.
- c. If valid Flight Identification data is not available, but valid Aircraft Registration data is available in a given power-on cycle, then the valid Aircraft Registration data should be used to populate the character subfields in the Aircraft Identification and Category Message for the duration of the power-on cycle.
- d. If the Aircraft Identification and Category Message has been populated using Aircraft Registration data in a given power-on cycle, and valid Flight Identification data becomes available, then the Flight Identification data should be used to populate the character subfields in the Aircraft Identification and Category Message for the remainder of the power-on cycle.
- e. Once valid Flight Identification data has been used to populate the Aircraft Identification and Category Message in a given power-on cycle, Aircraft Registration data should not be used to populate the character subfields of the Aircraft Identification and Category Message, even if Flight Identification data becomes invalid or not available during the power-on cycle.

(1.48) In RTCA DO-260B and EUROCAE ED-102A, in Appendix A, section §A.1.6.4.2, last paragraph before §A.1.6.4.3, fourth line:

**Replace the reference “§A.1.4.6.3” with “§A.1.6.4.3”**

(1.49) In RTCA DO-260B and EUROCAE ED-102A, in Appendix A, section §A.1.8, in Figure A-8a in order to conform to changes that have been made in the Transponder MOPS (RTCA DO-181E and EUROCAE ED-73E) and in Edition 2 of ICAO Doc 9871, in the *Notes* inside the Register format for the Aircraft Status Message for Subtype 1, the Emergency/Priority Status and Mode A Code, make the following changes:

(a) **Revise Note 1** as follows:

1) *Message delivery is accomplished ~~once per 0.8 seconds~~ using the Event-Driven Protocol as specified in §2.2.3.3.1.4.3.*

(b) **Add Note 7** as follows:

7) *The Mode A Code shall be coded as defined in ICAO Annex 10 Volume IV, §3.1.2.6.7.1.*

(1.50) In RTCA DO-260B and EUROCAE ED-102A, in Appendix A, section §A.1.8, in Figure A-2, in the text of the descriptions of Bits 13 and 16 it has been discovered that there are several places in DO-260B/ED-102A that reference the “Ground Track” or “Heading” field in the Surface Position Message without referencing both data items. In this specific Figure on these specific Bit definition lines, in order to correctly reference the data items, make the following edits:

13	STATUS for Heading/ <u>Ground Track</u> (1 = valid, 0 = not valid)
14	MSB
15	
16	HEADING/ <u>GROUND TRACK</u> (7 bits)

(1.51) In RTCA DO-260B and EUROCAE ED-102A, in Appendix A, section §A.1.8, in Figure A-10, correct a bad paragraph reference for the SIL Supplement in bit position #55 by making the following change:

55	SIL Supplement (§A.1.4.10. <del>14</del> 15)
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(1.52) In RTCA DO-260B and EUROCAE ED-102A, in Appendix A, section §A.3.4.6, in the Note:

**Replace the reference “§A.1.4.8” with “§A.1.4.9”**

- (1.53) In RTCA DO-260B and EUROCAE ED-102A, in Appendix J, section §J.3.1.2, add the following *Note* just after the section Title:

*Note: Since this Appendix was developed, the vertical rate accuracy requirement has been decoupled from the  $NAC_V$  parameter. The test for vertical rate is not necessary to establish the  $NAC_V = 1$  but remains here in the event that manufacturers want to additionally establish the vertical rate performance of their system at the 50ft/sec 95% level.*

Draft