

## Changes proposed to the 1090ES MOPS which will become part of RTCA/DO-260B

Section	DO-260A Page #	Date Accepted	Description
§2.1.12.2 Table 2-6	28	1/21/04 WG-3 Mtg 18	Table 2-6 has the wrong entries in the "Operation" column. This error is also in DO-260 and was not changed by DO-260A. These table entries appear to have been copied from the airborne receiver table and are not appropriate for a ground receiver that is used to support ground surveillance related applications. For now I would suggest the Operation column entries be replaced for C1 and C2 with something generic such as "support cooperative ATC surveillance services" and for C3 "Supports private user operations planning and flight following."
§2.2.3.2 Figure 2-2	37		As per originally suggested by the by the Technical Subgroup of the ICAO SCRSP WG-B, for inclusion in the revision of the 1090 SARPS, an entry must be made in Figure 2-2 defining a Message Structure for a DF=18 and CF=6 message for the rebroadcast of an ADS-B Message from an alternate data link using the same TYPE Codes and Message Formats as are defined for DF=17 ADS-B Messages, with the exception of bits modified for the transmission of the IMF.
§2.2.3.2	38		In support of adding the definition for a DF=18 and CF=6 ADS-B Rebroadcast Message in Figure 2-2, make changes to the last paragraph in 2.2.3.2 to reflect the revised CF range and add a sentence specifying the usage of a DF=18 and CF=6 rebroadcast message.
§2.2.3.2.1.2 Table 2-9 Table 2-10	39 thru 42	1/21/04 WG-3 Mtg 18	<p>As initiated by the review of the UAT SARPS Technical Manual, and as documented in DO-242A Issue Paper 71, the errors in the determination and validation of the Air/Ground State were originally defined in DO-260 and were carried forward to the ADS-B MASPS (DO-242A), the UAT MOPS (DO-282), and the revised 1090 MHz ES MOPS (DO-260A). The RTCA SC-186 Plenary on 9/18/03 established an ad hoc working group to resolve the errors and to recommend language for the draft ASA MASPS (DO-289). Working Paper <b>1090-WP-18-03</b> details the text agreed to by that ad hoc working group, and which was additionally reviewed as Working Paper WG-B06-03, and agreed to by the Technical Subgroup of the ICAO SCRSP WG-B for inclusion in the revision of the 1090 SARPS.</p> <p><u>Proposed Resolution:</u> It is recommended that the text of WG-B06-03, as agreed to in the ASA MASPS, be adopted to replace the text and table content of the Air/Ground Determination and Validation sections in both DO-260 and DO-260A.</p>

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§2.2.3.2.1.3 Table 2-11	43		In support of adding the definition for a DF=18 and CF=6 ADS-B Rebroadcast Message in Figure 2-2, replace the definition of CF=6 to indicate that it is for the rebroadcast of an ADS-B Message from an alternate data link using the same TYPE Codes and Message Formats as are defined for DF=17 ADS-B Messages, with the exception of bits modified for the transmission of the IMF. Additionally revise the paragraph below Table 2-11 to conform to the addition of the CF=6 case.
§2.2.3.2.1.5 Table 2-13	44		In support of adding the definition for a DF=18 and CF=6 ADS-B Rebroadcast Message in Figure 2-2, replace the definition of CF=6 to indicate that it is for the rebroadcast of an ADS-B Message from an alternate data link using the same TYPE Codes and Message Formats as are defined for DF=17 ADS-B Messages, with the exception of bits modified for the transmission of the IMF.
§2.2.3.2.2 Table 2-14	46		In support of adding the definition for a DF=18 and CF=6 ADS-B Rebroadcast Message in Figure 2-2, revise the text of the third paragraph in §2.2.3.2.2 (just prior to Table 2-14) to clarify the use of CF=6 to indicate that it is for the rebroadcast of an ADS-B Message from an alternate data link using the same TYPE Codes and Message Formats as are defined for DF=17 ADS-B Messages, with the exception of bits modified for the transmission of the IMF. Additionally modify the title of Table 2-14 to reflect the use of CF=6.
§2.2.3.2.2 Table 2-15	47		Correct an error in the title of Table 2-15 by changing “CF=2 to 4) to “CF=2 to 5.” Additionally, rename the previous “TIS-B Airborne Velocity Message” to only the “TIS-B Velocity Message” in order to reflect the fact that this message may also be transmitted for surface participants.
§2.2.3.2.7.1.3.5	107	1/21/04 WG-3 Mtg 18	<p>In the Target State and Status Message we need to add a “<b>shall</b>” statement to set the Vertical Mode Indicator to all zeros. We may also want to add a note to explain why this be being done.</p> <p><u>Proposed Resolution:</u> Add the following onto the end of the paragraph and prior to Table 2-50.</p> <p>In this version of these MOPS, the Vertical Mode Indicator <b>shall</b> be set to ZERO (binary 00). <i><b>Note:</b> Inconsistencies have been identified with how existing onboard data sources represent the data associated with the Vertical Mode Indicator parameter. Until these inconsistencies are resolved through a future update to these MOPS, this parameter must be encoded as all zeros, indicating Unknown Mode or Information Unavailable.</i></p>

Section	DO-260A Page #	Date Accepted	Description
§2.2.3.2.7.1.3.6 Table 2-51	108		<p>The Binary and decimal values displayed in Table 2-51 for Target Altitudes of zero (0) and +100 feet are incorrect.</p> <p><u>Proposed Resolution:</u> The “Target Altitude” of zero (0) feet should be a decimal 10 (binary 00 0000 1010) and the “Target Altitude” of +100 feet should be decimal 11 (binary 00 0000 1011)</p>
§2.2.3.2.7.1.3.10	109	1/21/04 WG-3 Mtg 18	<p>In the Target State and Status Message we need to add a “<b>shall</b>” statement to set the Horizontal Mode Indicator to all zeros. We may also want to add a note to explain why this be being done.</p> <p><u>Proposed Resolution:</u> Add the following onto the end of the paragraph and prior to Table 2-55.</p> <p>In this version of these MOPS, the Horizontal Mode Indicator <b>shall</b> be set to ZERO (binary 00). <i><b>Note:</b> Inconsistencies have been identified with how existing onboard data sources represent the data associated with the Horizontal Mode Indicator parameter. Until these inconsistencies are resolved through a future update to these MOPS, this parameter must be encoded as all zeros, indicating Unknown Mode or Information Unavailable.</i></p>
§2.2.3.2.7.2.3.1	115		<p>The reference to “ME” bits and “Message bits” is reversed in the first sentence of the paragraph.</p> <p><u>Proposed Resolution:</u> Replace the text of the first paragraph with the following:</p> <p>Within the CC Code subfield, a 4-bit (“ME” bits 9-10 and 13-14, Message bits 41-42, and 45-46) subfield <b>shall</b> be reserved for the “Service Level” of the ADS-B Transmitting Subsystem. ADS-B equipment conforming to this version (RTCA DO-260A) of these MOPS <b>shall</b> set the Service Level code to ALL ZEROS.</p>

Section	DO-260A Page #	Date Accepted	Description
§2.2.3.2.7.2.9	123		<p>During implementation by manufacturers, it was agreed that additional guidance was needed for the setting of the SIL value.</p> <p><u>Proposed Resolution:</u> After the existing <i>Note #2</i> under Table 2-72, add the following text as <i>Note #3</i>:  <i>Since the SIL is intended to reflect the integrity of the navigation source of the position information broadcast, the SIL value transmitted should be indicative of the true integrity of the ADS-B position data. A problem for installations that include currently available GNSS receivers and FMS systems is that SIL is not output by these systems. With the lack of SIL information being provided by the navigation source, implementers should not arbitrarily set a SIL value of zero indicating unknown integrity. It is suggested, unless there is a tightly coupled navigation source where SIL can be unambiguously determined, that the ADS-B Transmitting Subsystem provision for the static setting of SIL as part of the installation procedure. The value for SIL is determined by the integrity level of the navigation sources that would be used by the ADS-B Transmitting Subsystem.</i></p>
§2.2.3.2.7.2.11 Table 2-74	125	1/21/04 WG-3 Mtg 18	<p>As a result of International review of several ADS-B standards documents, it has been agreed that the largest “Length” encoding should be 85 meters. It has been further agreed that the largest “Width” encoding should be 90 meters. Therefore, these values should be updated in Table 2-74.</p> <p><u>Proposed Resolution:</u></p> <p>(a) Replace the last sentence in the first paragraph of this section with the following text: “Once the actual Length and Width of the A/V has been determined, each A/V <b>shall</b> be assigned the smallest A/V Length and Width Code from Table 2-74 for which the actual length is less than or equal to the upper bound length for that Length/Width Code, and for which the actual width is less than or equal to the upper bound width for that Length/Width Code.”</p> <p>(b) Replace Table 2-74 with Table 3-2 from the ASA MASPS.</p> <p>(c) Take the Note which follows Table 3-2 in the ASA MASPS and turn it into a requirements statement immediately following Table 2-74 with text as follows: “If the Aircraft or Vehicle is longer than 85 meters, or wider than 90 meters, then decimal Aircraft/Vehicle Length/Width Code 15 <b>shall</b> be used.”</p>

Section	DO-260A Page #	Date Accepted	Description
§2.2.8.4.1	220		<p>§2.2.8.4.1 of DO-260A requires the use of a GPS/GNSS precision time source (for generating the report time of applicability) for the case of extended squitter Types 5, 6, 9 and 10 messages (ie., NIC=10 or 11). However, it appears that this requirement should also apply to Type 20 and 21 messages where the NIC is the same as for the other message types already listed but GNSS geo height is reported instead of baro altitude, as with message Types 9 and 10. Type 20 and 21 messages are identified in paragraph 2.2.8.4.2 are requiring a non-precision time source. I can't think of any reason why Type 20 and 21 messages would not require a precision time source the same as applies to Type 9 and 10 messages.</p> <p><b>Proposed Resolution:</b> In the third line of the first paragraph, change “from TYPE 9 or 10” to “from TYPE 9, 10, 20 or 21.”</p>
§2.2.10.2	232		<p>A clarification would be useful here to note that if the participant is already in track, there is no need to go into the Initialization or Acquisition State again.</p> <p><b>Proposed Resolution:</b> Add a Note after subparagraph “f” as follows:  <i><b>Note:</b> Upon the first receptions of airborne-format messages from a target that is already in the Track State as a surface participant, it is not necessary to enter the Initialization State or the Acquisition State. The target remains in the Track State, now as a surface participant. Similarly, for the transition from airborne-format to surface-format messages, if the target is currently in the Track State, it remains in the Track State, now as a surface participant.</i></p>
§2.2.10.3.1	232	1/21/04 WG-3 Mtg 18	<p>A clarification would be useful here to note that if the participant is already in track, there is no need for a global decode.</p> <p><b>Proposed Resolution:</b> Add a Note under subparagraph “a” as follows:  <i><b>Note:</b> If the Airborne Participant has already been in the Track State as a Surface Participant, then it is not necessary to perform a Globally Unambiguous CPR Decode.</i></p>

Section	DO-260A Page #	Date Accepted	Description
§2.2.10.3.2	233	1/21/04 WG-3 Mtg 18	<p>(1) A clarification would be useful here to note that if the participant is already in track, there is no need for a global decode.</p> <p><b>Proposed Resolution:</b> Add a Note under subparagraph “a” as follows:  <b>Note:</b> <i>If the Surface Participant has already been in the Track State as an Airborne Participant, then it is not necessary to perform a Globally Unambiguous CPR Decode.</i></p> <p>(2) Because of the requirement to change the Local CPR Decode to a Global CPR Decode as documented in Working Paper 1090-WP-18-06, then several changes need to be made in §2.2.10.3.2 in order to change the requirement for a Local Decode to a Global Decode.</p> <p><b>Proposed Resolution:</b> (a) In subparagraph “a” replace “Local Unambiguous” with “Globally Unambiguous” and change the reference in Appendix A to §A.1.7.8. (b) In the text of subparagraph “f,” including the Note following, change “Local Unambiguous” to “Globally Unambiguous.”</p>
§2.2.17.2 Table 2-106	249		<p>In support of adding the definition for a DF=18 and CF=6 ADS-B Rebroadcast Message in Figure 2-2, in Table 2-106 replace the definition of CF=6 to indicate that it is for the rebroadcast of an ADS-B Message from an alternate data link using the same TYPE Codes and Message Formats as are defined for DF=17 ADS-B Messages, with the exception of bits modified for the transmission of the IMF.</p>
§2.2.17.2.2	250		<p>To add the use of DF=18 and CF=6 as a Rebroadcast by ground equipment for an ADS-B Message from an alternate data link using the same TYPE Codes and Message formats as are defined for DF=17 ADS-B Messages, with the exception of bits modified for the transmission of the IMF, revise §2.2.17.2.2 to include references to CF=6</p>
§2.2.17.3.4 Figure 2-28	253		<p>(1) Rename the titles of §2.2.17.3.4 and Figure 2-28 by removing the word “Airborne.”</p> <p>(2) In Figure 2-28, the definition of the Vertical Rate Type was incorrectly left in ME Bit #56. Remove the definition for this Bit and indicate that there are 4 Reserved Bits at the end of this Message when the GEO Flag=0.</p>
§2.2.17.3.4 Figure 2-29	254		<p>(1) Rename the title of Figure 2-29 by removing the word “Airborne.”</p> <p>(2) In Figure 2-29, the definition of the Vertical Rate Type was incorrectly left in ME Bit #56. Remove the definition for this Bit and indicate that this is a “Reserved” Bit.</p>

Section	DO-260A Page #	Date Accepted	Description
§2.2.17.3.4.1	255		Remove the word “Airborne” from the first line of the paragraph.
§2.2.17.4.6	260	1/21/04 WG-3 Mtg 18	<p>In the TIS-B report assembly description of the MOPS (DO-260A, §2.2.17.4.6) modify the 1st paragraph of text to read:            "As TIS-B Messages are received, the information is reported to applications. All received information elements, other than position, <b>shall</b> be reported directly, including all reserved fields for the TIS-B fine format messages (§2.2.17.3.1 to §2.2.17.3.4) and the entire message content of any received TIS-B management message (Table 2-106, CF Value =4). The reporting format is not specified in detail, except that the information content reported <b>shall</b> be the same as the information content received. The report <b>shall</b> be issued within 0.5 seconds of the message."</p>
§2.2.18 (new)	260		<p>In order to have the Receiving Subsystem deal with the correct interpretation of the ICAO/Mode A Flag in ADS-B Messages that are being Rebroadcast by a Ground Station on the 1090 MHz data link, having originally been received on an alternate (i.e., UAT) data link, there are ME bits which need to be redefined in all ADS-B Messages, except for the Aircraft ID and Category Message, which does not have any bits that can be redefined.</p> <p><u>Proposed Resolution:</u> Insert a new Section 2.2.18 entitled “ADS-B Rebroadcast Services – Formats and Codes”</p>
§2.4.3.2.1.2.1	319 through 321	1/21/04 WG-3 Mtg 18	<p>As initiated by the review of the UAT SARPS Technical Manual, and as documented in DO-242A Issue Paper 71, the errors in the determination and validation of the Air/Ground State were originally defined in DO-260 and were carried forward to the ADS-B MASPS (DO-242A), the UAT MOPS (DO-282), and the revised 1090 MHz ES MOPS (DO-260A). The RTCA SC-186 Plenary on 9/18/03 established an ad hoc working group to resolve the errors and to recommend language for the draft ASA MASPS (DO-289). Working Paper <b>1090-WP-18-03</b> details the text agreed to by that ad hoc working group, and which was additionally reviewed as Working Paper WG-B06-03, and agreed to by the Technical Subgroup of the ICAO ACP WG-B SCRSP for inclusion in the revision of the 1090 SARPS.</p> <p><u>Proposed Resolution:</u> With the adaptation of the text of WG-B06-03, as agreed to in the ASA MASPS, the test procedures for air/ground determination and validation in both DO-260 and DO-260A must be revised.</p>

Section	DO-260A Page #	Date Accepted	Description
§2.4.3.2.1.2.2 Table 2-124 Table 2-125	321 through 324	1/21/04 WG-3 Mtg 18	<p>As initiated by the review of the UAT SARPS Technical Manual, and as documented in DO-242A Issue Paper 71, the errors in the determination and validation of the Air/Ground State were originally defined in DO-260 and were carried forward to the ADS-B MASPS (DO-242A), the UAT MOPS (DO-282), and the revised 1090 MHz ES MOPS (DO-260A). The RTCA SC-186 Plenary on 9/18/03 established an ad hoc working group to resolve the errors and to recommend language for the draft ASA MASPS (DO-289). Working Paper <b>1090-WP-18-03</b> details the text agreed to by that ad hoc working group, and which was additionally reviewed as Working Paper WG-B06-03, and agreed to by the Technical Subgroup of the ICAO ACP WG-B SCRSP for inclusion in the revision of the 1090 SARPS.</p> <p><u>Proposed Resolution:</u> With the adaptation of the text of WG-B06-03, as agreed to in the ASA MASPS, the test procedures for air/ground determination and validation in both DO-260 and DO-260A must be revised.</p>
§2.4.3.2.3.1	328 through 329		<p>This test procedure for the TYPE Code Subfield in the Airborne Position Message was copied word-for-word from DO-260 as DO-260A was being drafted. As such, the paragraph was not changed at all during the review of the draft of DO-260A, and as published, DO-260A still contained references to deriving the TYPE Code using the Horizontal Position Error originally in Table 2-11 of DO-260. In the Appendix to TSO C166, in Section 1, change (1.2) required the replacement of DO-260 §2.2.3.2.3.1.2, indicating that “If HPL (or HIL) is not available from the sensor, then the 1090 MHz ES equipment may use other means to establish an appropriate HPL (e.g., HPL based upon known RAIM protection threshold).…”</p> <p><u>Proposed Resolution:</u> Remove references to “positional accuracy” from this Test Procedure and rewrite it to include references to Integrity and Radius of Containment.</p>

Section	DO-260A Page #	Date Accepted	Description
§2.4.3.2.4.1	363 through 364		<p>This test procedure for the TYPE Code Subfield in the Surface Position Message was copied word-for-word from DO-260 as DO-260A was being drafted. As such, the paragraph was not changed at all during the review of the draft of DO-260A, and as published, DO-260A still contained references to deriving the TYPE Code using the Horizontal Position Error originally in Table 2-11 of DO-260. In the Appendix to TSO C166, in Section 1, change (1.2) required the replacement of DO-260 §2.2.3.2.3.1.2, indicating that “If HPL (or HIL) is not available from the sensor, then the 1090 MHz ES equipment may use other means to establish an appropriate HPL (e.g., HPL based upon known RAIM protection threshold).…”</p> <p><u>Proposed Resolution:</u> Remove references to “positional accuracy” from this Test Procedure and rewrite it to include references to Integrity and Radius of Containment.</p>
§2.4.3.2.4.1.1	364 through 365		<p>Given the re-write of the Test Procedure in §2.4.3.2.4.1 to refer to Integrity and Radius of Containment, then delete this Test Procedure and point to the Test Procedure of §2.4.3.2.4.1 as appropriate for this requirement.</p>
§2.4.3.2.7.1.3.5	444 445	1/21/04 WG-3 Mtg 18	<p>In the Target State and Status Message we need to add a “<b>shall</b>” statement to set the Vertical Mode Indicator to all zeroes.</p> <p><u>Proposed Resolution:</u> With the implementation of the new requirement to set the Vertical Mode Indicator to ZERO, (1) Replace the sentence (requirement) after the Purpose/Introduction with the sentence: “In this version of these MOPS (RTCA/DO-260A), the Vertical Mode Indicator <b>shall</b> be set to ZERO (binary 00).”</p> <p>(2) Replace the last sentence of each of the two Test Procedure Steps 2 and 3 with the sentence: “Verify that ME Bits 14 and 15 are set to a value of ZERO (binary 00).”</p>

Section	DO-260A Page #	Date Accepted	Description
§2.4.3.2.7.1.3.10	449 450	1/21/04 WG-3 Mtg 18	<p>In the Target State and Status Message we need to add a “<b>shall</b>” statement to set the Horizontal Mode Indicator to all zeroes.</p> <p><u>Proposed Resolution:</u> With the implementation of the new requirement to set the Horizontal Mode Indicator to ZERO, (1) Replace the sentence (requirement) after the Purpose/Introduction with the sentence: “In this version of these MOPS (RTCA/DO-260A), the Horizontal Mode Indicator <b>shall</b> be set to ZERO (binary 00).”</p> <p>(2) Replace the last sentence of each of the two Test Procedure Steps 2 and 3 with the sentence: “Verify that ME Bits 38 and 39 are set to a value of ZERO (binary 00).”</p>
§2.4.3.2.7.2.3.1	455		<p>(1) The reference to “ME” bits and “Message bits” is reversed in the first sentence of the paragraph in the “<u>Purpose/Introduction.</u>”</p> <p><u>Proposed Resolution:</u> Replace the bit references text in the first sentence with the following: “(“ME” bits 9-10 and 13-14, Message bits 41-42, and 45-46)”</p> <p>(2) In the “<u>Measurement Procedure</u>” the references to “ME bits” and “Message bits” were exchanged.</p> <p><u>Proposed Resolution:</u> Replace the last sentence of the “<u>Measurement Procedure</u>” with the following: “Verify that the ME bits 9 and 10 and ME bits 13 and 14 are set to ALL ZEROS.”</p>

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§2.4.3.3.1.4.2	474 through 477		<p>During the certification process undertaken by Rockwell Collins to certify their DO-260A compliant 1090ES Transmit-only Transponder, a problem was uncovered with this Test Procedure. The tests as published in DO-260A require monitoring of the Target State and Status (TSS) Messages while monitoring the Aircraft Operational Status Messages for Subtype=1, which means that the Aircraft is in the “On-Ground” condition. First of all, there are no broadcasts of TSS Messages while on the ground. Next, there is no TCAS while on the ground, so changing the condition of the RA should have no effect. Essentially all that can be changed and have impact on the Subtype=1 Aircraft Operational Status Message is the NACp and SIL parameters.</p> <p><u>Proposed Resolution:</u> Rewrite this Test Procedure.</p>
§2.4.5.1.5.2	552		<p>In the second line of the paragraph, change the reference from §2.2.3.2.7.3.2 to §2.4.3.2.7.3.2.</p>
§2.4.8.1.16 Table 2-188	613		<p>It has been found that for NUC=2 there were several typos in that row, such that for NAC=1, the comment for HFOM should have shown it less than 10 NM, and the NIC=1. There are also a couple other typos: (a) in the row for NUC=9, add “m” after HFOM &lt;3, and (b) in the row for NUC=6, in the SIL column, add the comment “(No Integrity).”</p>
§2.4.8.4.1	667 668		<p>Paragraph 2.2.8.4.1 of DO-260A requires the use of a GPS/GNSS precision time source (for generating the report time of applicability) for the case of extended squitter Types 5, 6, 9 and 10 messages (ie., NIC=10 or 11). However, it appears that this requirement should also apply to Type 20 and 21 messages where the NIC is the same as for the other message types already listed but GNSS geo height is reported instead of baro altitude, as with message Types 9 and 10. Type 20 and 21 messages are identified in paragraph 2.2.8.4.2 are requiring a non-precision time source. I can't think of any reason why Type 20 and 21 messages would not require a precision time source the same as applies to Type 9 and 10 messages.</p> <p><u>Proposed Resolution:</u> In the third line of the first paragraph, and in the second line of the ‘Equipment’ paragraph, and finally in the first line of “Step 2” of the test procedure: change “TYPE 9 or 10” to “TYPE 9, 10, 20 or 21.”</p>

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§2.4.10.3.1	674	1/21/04 WG-3 Mtg 18	<p>A clarification would be useful here to note that if the participant is already in track, there is no need for a global decode.</p> <p><u>Proposed Resolution:</u> Add a Note under subparagraph “a” of the “Purpose/Introduction” as follows:  <i><b>Note:</b> If the Airborne Participant has already been in track as a Surface Participant, then it is not necessary to perform a Globally Unambiguous CPR Decode.</i></p>
§2.4.10.3.2	677	1/21/04 WG-3 Mtg 18	<p>(1) A clarification would be useful here to note that if the participant is already in track, there is no need for a global decode.</p> <p><u>Proposed Resolution:</u> Add a Note under subparagraph “a” of the “Purpose/Introduction” as follows:  <i><b>Note:</b> If the Surface Participant has already been in track as a Airborne Participant, then it is not necessary to perform a Globally Unambiguous CPR Decode.</i></p> <p>(2) Because of the requirement to change the Local CPR Decode to a Global CPR Decode as documented in Working Paper 1090-WP-18-06, then several changes need to be made in §2.2.10.3.2 and §2.4.10.3.2 in order to change the requirement for a Local Decode to a Global Decode.</p> <p><u>Proposed Resolution:</u> In the “Purpose/Introduction:” (a) In subparagraph “a” replace “Local Unambiguous” with “Globally Unambiguous” and change the reference in Appendix A to §A.1.7.8. (b) In the text of subparagraph “f,” including the Note following, change “Local Unambiguous” to “Globally Unambiguous.” In Step 1 of the test procedure (a) Change the title of Step 1 to “Globally Unambiguous CPR Decode, and in the last line of the second paragraph of Step 1, change “Locally Unambiguous” to “Globally Unambiguous” and change the reference in Appendix A to §A.1.7.8.</p>

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§2.4.17.4.6	737	1/21/04 WG-3 Mtg 18	<p>In the TIS-B report assembly description of the MOPS modify the 1st paragraph of text to read:</p> <p>"As TIS-B Messages are received, the information is reported to applications. All received information elements, other than position, <b>shall</b> be reported directly, including all reserved fields for the TIS-B fine format messages (§2.2.17.3.1 to §2.2.17.3.4) and the entire message content of any received TIS-B management message (Table 2-106, CF Value =4). The reporting format is not specified in detail, except that the information content reported <b>shall</b> be the same as the information content received. The report <b>shall</b> be issued within 0.5 seconds of the message."</p> <p><u>Proposed Resolution:</u> As a result of the above addition, review the test procedure for revision.</p>
§2.4.18	738		<p>In order to have the Receiving Subsystem deal with the correct interpretation of the ICAO/Mode A Flag in ADS-B Messages that are being Rebroadcast by a Ground Station on the 1090 MHz data link, having originally been received on an alternate (i.e., UAT) data link, there are ME bits which need to be redefined in all ADS-B Messages, except for the Aircraft ID and Category Message, which does not have any bits that can be redefined.</p> <p><u>Proposed Resolution:</u> Insert a new Section 2.4.18 entitled "Validation of ADS-B Rebroadcast Services – Formats and Codes"</p>
3.3.4.6.1	751	1/21/04 WG-3 Mtg 18	<p>There is an error in Equation 3 at the top of page 751 where the value (-1.574302725) is raised to the power of 10. This is backwards and should be reversed.</p> <p><u>Proposed Resolution:</u> Change the value to 10 raised to the power of (-1.574302725).</p>
A.1.4.1.2.3	A-11		<p>In subparagraph "a," second line, replace "Airborne" <b>with</b> "Surface."</p>
A.1.4.8	A-24		<p>The reference to Figure A-7 for the Emergency/Priority Status Message is incorrect.</p> <p><u>Proposed Resolution:</u> Replace "<b>Figure A-7</b>" with "<b>Figure A-8</b>."</p>

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A.1.4.9	A-24		The reference to Figure A-8 for the Emergency/Priority Status Message is incorrect.  <u>Proposed Resolution:</u> Replace “ <b>Figure A-8</b> ” with “ <b>Figure A-9</b> .”
A.1.4.9.6	A-25	1/21/04 WG-3 Mtg 18	To be consistent with the change proposed in §2.2.3.2.7.1.3.5 to add a requirement that the Vertical Mode Indicator be set to all zeros, a statement should be placed in A.1.4.9.6 reflecting that same requirement.
A.1.4.9.11	A-27	1/21/04 WG-3 Mtg 18	To be consistent with the change proposed in §2.2.3.2.7.1.3.10 to add a requirement that the Horizontal Mode Indicator be set to all zeros, a statement should be placed in A.1.4.9.11 reflecting that same requirement.
A.1.4.9.14	A-30		During implementation by manufacturers, it was agreed that additional guidance was needed for the setting of the SIL value.  <u>Proposed Resolution:</u> After the existing <i>Note #2</i> under Table A-17, add the following text as <i>Note #3</i> : <i>Since the SIL is intended to reflect the integrity of the navigation source of the position information broadcast, the SIL value transmitted should be indicative of the true integrity of the ADS-B position data. A problem for installations that include currently available GNSS receivers and FMS systems is that SIL is not output by these systems. With the lack of SIL information being provided by the navigation source, implementers should not arbitrarily set a SIL value of zero indicating unknown integrity. It is suggested, unless there is a tightly coupled navigation source where SIL can be unambiguously determined, that the ADS-B Transmitting Subsystem provision for the static setting of SIL as part of the installation procedure. The value for SIL is determined by the integrity level of the navigation sources that would be used by the ADS-B Transmitting Subsystem.</i>
A.1.4.10	A-31	1/21/04 WG-3 Mtg 18	In the first line of the first paragraph, the Register for the Aircraft Operational Status Message is incorrectly stated as 63 {HEX} and should be corrected to be “Register 65 {HEX}.”

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A.1.4.10.9	A-35		<p>In the fourth line of the SIL paragraph, there is an incorrect reference to Table A.4.9.14 which was left over from development of the document.</p> <p><u>Proposed Resolution:</u> In the fourth line of the SIL paragraph, change “<b>Table A.4.9.14</b>” to “<b>Table A-17.</b>”</p>
A.1.4.10.9	A-35		<p>During implementation by manufacturers, it was agreed that additional guidance was needed for the setting of the SIL value.</p> <p><u>Proposed Resolution:</u> After the existing text of A.1.4.10.9, add the following text as a <i>Note</i>: <i>Since the SIL is intended to reflect the integrity of the navigation source of the position information broadcast, the SIL value transmitted should be indicative of the true integrity of the ADS-B position data. A problem for installations that include currently available GNSS receivers and FMS systems is that SIL is not output by these systems. With the lack of SIL information being provided by the navigation source, implementers should not arbitrarily set a SIL value of zero indicating unknown integrity. It is suggested, unless there is a tightly coupled navigation source where SIL can be unambiguously determined, that the ADS-B Transmitting Subsystem provision for the static setting of SIL as part of the installation procedure. The value for SIL is determined by the integrity level of the navigation sources that would be used by the ADS-B Transmitting Subsystem.</i></p>
A.1.4.10.10	A-36		<p>In the fourth line of the NIC<sub>BARO</sub> paragraph, there is an incorrect reference to Table A.4.1.9.13 which was left over from development of the document.</p> <p><u>Proposed Resolution:</u> In the fourth line of the NIC<sub>BARO</sub> paragraph, change “<b>Table A.4.1.9.13</b>” to “<b>Table A-16.</b>”</p>
A.1.4.10.11 Table A-26	A-36	1/21/04 WG-3 Mtg 18	<p>As a result of International review of several ADS-B standards documents, it has been agreed that the largest “Length” encoding should be 85 meters. It has been further agreed that the largest “Width” encoding should be 90 meters. Therefore, these values should be updated in Table A-26.</p>

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A.1.5.4	A-39		<p>Australian TSO C1005, Appendix 1, paragraph 2.b indicates that paragraph §A.1.5.4 is not consistent with paragraph §2.2.3.3.2.1. The problem has been discussed in the ICAO SCRSP TSG Meetings and was agreed to change the 1090ES SARPs as suggested below.</p> <p><u>Proposed Resolution:</u> Replace the existing paragraph §A.1.5.4 with the following:  Non-transponder devices <b>shall</b> provide the same functionality for initialization; register timeout and broadcast termination as specified for the transponder case in §A.1.5.1 through §A.1.5.3, except that:</p> <ol style="list-style-type: none"> <li>1. A non-transponder device <b>shall not</b> broadcast acquisition squitters, and</li> <li>2. A non-transponder device operating on the surface <b>shall</b> continue to broadcast DF=18 messages with Type Code = 0 at a rate specified for the Surface Position Message even though it has lost its navigation input.</li> </ol> <p><i><u>Note:</u> Continued broadcast of the Surface Position Message is needed to support the operation of surface multi-lateration systems.</i></p>
A.1.7.2 Step #1	A-45	1/21/04 WG-3 Mtg 18	The term “TIS-B encoding” used in §A.1.7.2 step #1 and in §A.1.7.3 step #b is vague. It should be clarified that the “TIS-B encoding” in which $Nb = 12$ is to be used only for the TIS-B Coarse Airborne Position Message of <u>Figure A-17</u> and not for the TIS-B Fine Airborne Position Message ( <u>Figure A-12</u> ) or the TIS-B Fine Surface Position Message ( <u>Figure A-13</u> ).
A.1.7.3 Step #b	A-47	1/21/04 WG-3 Mtg 18	The term “TIS-B encoding” used in §A.1.7.2 step #1 and in §A.1.7.3 step #b is vague. It should be clarified that the “TIS-B encoding” in which $Nb = 12$ is to be used only for the TIS-B Coarse Airborne Position Message of <u>Figure A-17</u> and not for the TIS-B Fine Airborne Position Message ( <u>Figure A-12</u> ) or the TIS-B Fine Surface Position Message ( <u>Figure A-13</u> ).
A.1.7.3 Step #b	A-47	1/21/04 WG-3 Mtg 18	The factor $k$ used in §A.1.7.3 step #b to describe the “TIS-B encoding” is unnecessary, as this factor should always be unity.
A.1.7.6	A-50		Replace the title of §A.1.7.6 with: “Locally, Unambiguous CPR Decoding for Surface Position”

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A.1.7.8	A-53	1/21/04 WG-3 Mtg 18	Experimental data from Australia indicates that Global CPR Decoding of Extended Squitter Surface Position reports may be required in certain applications. DO-260A does not define Globally Unambiguous CPR Decoding for the surface format. It is proposed in Working Paper 1090-WP-18-06 to replace the existing paragraph §A.1.7.8 with a definition for “Globally Unambiguous CPR Decoding” and to renumber the existing paragraph to §A.1.7.9.  <u>Proposed Resolution:</u> Implement Working Paper 1090-WP-18-06.
A.1.8 Figure A-10	A-63	1/21/04 WG-3 Mtg 18	The Register for the Aircraft Operational Status Message is incorrectly stated as BDS 6,3 and should be corrected to be “BDS 6,5.”
A.2.3 Table A-29	A-65		In support of adding the definition for a DF=18 and CF=6 ADS-B Rebroadcast Message in Figure 2-2, in Table A-29 replace the definition of CF=6 to indicate that it is for the rebroadcast of an ADS-B Message from an alternate data link using the same TYPE Codes and Message Formats as are defined for DF=17 ADS-B Messages, with the exception of bits modified for the transmission of the IMF.
A.2.4.4	A-67		Delete the word “Airborne” from the title of §A.2.4.4 and from the first line of the paragraph.
A.2.4.4.1	A-67		Delete the word “Airborne” from the first line of the first paragraph.
A.2.6	A-69		A section heading was left out of the Appendix. After the existing section §A.2.5, insert a new section heading §A.2.6 entitled “Formats for 1090 MHz TIS-B Messages.”
Figure A-15	A-73		Remove the word “Airborne” from the title of the Figure and remove the definition of Bit #56 as the Vertical Rate Type and indicate that the last four bits of the message are “Reserved.”
Figure A-16	A-74		Remove the word “Airborne” from the title of the Figure and remove the definition of Bit #56 as the Vertical Rate Type and indicate that the last bit of the message is “Reserved.”
§A.3 (new)	A-76 (new)		In order to have the Receiving Subsystem deal with the correct interpretation of the ICAO/Mode A Flag in ADS-B Messages that are being Rebroadcast by a Ground Station on the 1090 MHz data link, having originally been received on an alternate (i.e., UAT) data link, there are ME bits which need to be redefined in all ADS-B Messages, except for the Aircraft ID and Category Message, which does not have any bits that can be redefined.  <u>Proposed Resolution:</u> Insert a new Section A.3 entitled “ADS-B Rebroadcast Services – Formats and Codes” to be consistent with the new section added at 2.2.18.

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Appendix N Table N-4	N-10		<p>In the Appendix to TSO C166, in Section 1, change (1.2) required the replacement of DO-260 §2.2.3.2.3.1.2, indicating that “If HPL (or HIL) is not available from the sensor, then the 1090 MHz ES equipment may use other means to establish an appropriate HPL (e.g., HPL based upon known RAIM protection threshold)...” Table N-4 was taken from Table 2-11 from DO-260 and therefore, references to the 95% Containment Radius on Horizontal and Vertical Position Error should be removed.</p> <p><u>Proposed Resolution:</u> Remove the “95% Containment Radius” column from Table N-4. Also remove Note #3 from below the table.</p>
Appendix O Table O-3	O-6	1/21/04 WG-3 Mtg 18	<p>In Appendix O, Table O-3:</p> <p>(1) The top level heading for the columns at the far right of the table should be "Trajectory Change Message SUBTYPES"</p> <p>(2) Under the column headed “How Conveyed by 1090 MHz ADS-B Messages,” the listings for “Target State and Status Message” are incorrect. As described in §2.2.3.2.7.7, we have reserved TYPE Code 27 Messages for Trajectory Change Message formats. Thus, the entries in that column should be changed to “TYPE 27 ADS-B Message”</p>