

**RTCA Special Committee 186, Working Group 5**

**ADS-B UAT MOPS (DO-282), Revision A**

**Meeting #17**

**Teleconference 11.06.03**

**Proposed Changes to the Determination and Validation  
of Vertical Status in DO-282**

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**SUMMARY**

**This Working Paper presents the proposed text for §3.1.2.4 of the ASA MASPS that was agreed to by an RTCA SC-186 ad hoc working group chaired by Tom Foster and tasked with coming up with language to solve the problem of having unclear or incorrect requirements for determining the Air/Ground State as is also defined in DO-282, §2.2.4.5.2.5.1 and §2.2.4.5.2.5.2, and also as defined in the ADS-B MASPS, the 1090 MHz ES MOPS, and the UAT SARPS Technical Manual.**

**It is proposed that WG-5 agree to adopt the specific text that follows to replace the text and Tables in the referenced paragraphs of DO-282 for the determination and validation of the vertical status.**

### 3.1.2.4 Air/Ground Assessment Processing

A transmitting participant's air/ground state **shall** (R3.73) have the following possible values:

- “Airborne” (or not known to be on the surface),
- “Known to be on surface”

A transmitting ADS-B participant **shall** (R3.74) apply the following tests to determine its air/ground state:

1. If a transmitting ADS-B participant is not equipped with a means, such as a weight-on-wheels switch, to determine whether it is airborne or on the surface, and that participant's Emitter Category (§3.1.5.13) is one of the following, then it **will** set its air/ground state to “Airborne” (or not known to be on the surface):
  - Glider or Sailplane
  - Lighter Than Air
  - Unmanned Aerial Vehicle
  - Ultralight, Hang Glider, or Paraglider
  - Parachutist or Skydiver
  - Point Obstacle
  - Cluster Obstacle
  - Line Obstacle
2. If a transmitting ADS-B participant's Emitter Category (§3.1.5.13) is one of the following, then that participant **will** set its air/ground state to “Known to be on surface”:
  - Surface Vehicle – Emergency
  - Surface Vehicle – Service
3. If a transmitting ADS-B participant is not equipped with a means, such as a weight-on-wheels switch, to determine whether it is airborne or on the surface, and that participant's Emitter Category (§3.1.5.13) is “Rotorcraft,” then that participant **will** set its air/ground state to “Airborne” (or not known to be on the surface).
4. If a transmitting ADS-B participant is not equipped with a means, such as weight-on-wheels switch, to determine whether it is airborne or on the surface, and that participant's Emitter Category (§3.1.5.13) is “Light Aircraft,” then that participant **will** set its air/ground state to “Airborne”, unless the participant can alternatively determine it is on the surface by the following test. If the participant's Ground Speed (GS) is available and is less than an aircraft type specific Threshold Level (TL) value the participant **may** set its air/ground state to “Known to be on surface”. The ground speed TL chosen for an aircraft type **will** reliably indicate on the surface conditions.

**Note:** *The appropriate ground speed threshold level is chosen to provide, except under unusual operating conditions, a reasonable assurance that the participant will not set the air/ground state to “Airborne” while taxiing on the airport surface and will not give false indications of being in the “Known to be on the surface” state while airborne.*

5. If a transmitting ADS-B participant is not equipped with a means, such as a weight-on-wheels switch, to determine whether it is airborne or on the surface, and its ADS-B Emitter Category is not one of those listed under tests 1, 2, or 3 above, then the following tests will be performed to determine the air/ground state:
  - a. If the participant's radio height (RH) parameter is available and  $RH < 50$  feet and at least ground speed (GS) or airspeed (AS) is available and the available  $GS < 100$  knots or the available  $AS < 100$  knots, then that participant **will** set its air/ground state to "Known to be on surface".
 

***Note:** If all three parameters are available, the air/ground state may be determined by the "and" of all three parameters.*
  - b. Otherwise, if radio height (RH) is not available and if the participant's ground speed (GS) and airspeed (AS) are available and  $GS < 50$  knots and  $AS < 50$  knots, then that participant **will** set its air/ground state to "Known to be on the surface".
  - c. Otherwise, the participant **will** set its air/ground state to "Airborne."
6. If a transmitting ADS-B participant is equipped with a means, such as a weight-on-wheels switch, to determine automatically whether it is airborne or on the surface, and that automatic means indicates that the participant is airborne, then that participant **will** set its air/ground state to "Airborne."
7. If a transmitting ADS-B participant is equipped with a means, such as a weight-on-wheels switch, to determine automatically whether it is airborne or on the surface, and that automatic means indicates that the participant is on the surface, then the following additional tests **will** be performed to validate the "on-the-surface" condition:
  - a. If one or more of the following parameters is available to the transmitting ADS-B system:
    - Ground Speed (GS) or
    - Airspeed (AS) or
    - Radio Height (RH) from radio altimeterand of the following parameters that are available:
    - $GS > 100$  knots or
    - $AS > 100$  knots or
    - $RH > 50$  ft,
 then the participant **will** set its air/ground state to "Airborne."
  - b. Otherwise, the participant **will** set its air/ground state to "Known to be on the surface."

### 3.1.2.5 (Reserved) Intent Data Processing

Future STP subsystems may need to support transmission of intent data or air reference vector for future applications. In future versions of this MASPS, the requirements for intent data processing will be defined.