# RTCA Special Committee 186, Working Group 3

# ADS-B 1090 MOPS, Revision A

# Meeting #14

## Considering Utility of TYPE Zero (0) Messages on the Airport Surface

**Prepared by Mark Hilson Schneider, Sensis Corp.**

Summary

The current DO-260A draft requires cessation of transmission of Surface Position messages within 60 seconds after the loss of position data in the ADS-B Surface Position message registers. However, multilateration ground surveillance systems can calculate an accurate position based on time difference of arrival with or without the availability of the target's self-reported position. Therefore, a modification to the **shall** text in section 2.2.3.2.3.1.3.2 of DO-260A is proposed in this Working Paper, which would remove the 60-second limitation on the transmission of Type code Zero (0) Surface Position Messages from Non-Transponder based devices on vehicles and aircraft.

## 1. Background

The following text is quoted from section 2.2.3.2.3.1.3.2 of the current draft of DO-260A.

> Type Code Equal to ZERO message may be required as a consequence of the following events:
>
> a. An ADS-B Airborne Position or Surface Position Message register has not been loaded with data in the last 2 seconds. In this case, the ADS-B Message register shall be cleared (i.e., all 56 bits set to ZERO) once it has timed out. Transmission of the ADS-B Message that broadcasts the contents of the register shall be terminated if the ADS-B Message register has not been loaded in 60 seconds. Broadcast of the ADS-B Airborne Position or Surface Position Message shall resume once data has been loaded into the ADS-B Message register.
>
> b. The data management function responsible for loading the ADS-B Message registers determines that all navigation sources that can be used for the airborne or surface position message are either missing or invalid. In this case the data management function shall clear (set all data fields to all ZEROs) the Type Code and all other fields of the airborne or surface position message and insert the ZEROed message into the appropriate ADS-B Message register. This should only be done once in support of the detection of the loss of data insertion and shall result in the suppression of the broadcast of the related ADS-B Message.
>
> c. Note that in all of the cases discussed above, a Type Code of ZERO infers a message of all ZEROs. The only exception is that the airborne position message format shall contain barometric altitude code as set by the transponder when so implemented. There is no analogous case for the other extended squitter message types, since a ZERO value in any of the fields indicates that no valid information is available.

The requirement to stop transmitting a TYPE Zero (0) Surface Position Message within 60 seconds of the last Surface Position Message register update can be justified in contexts containing dependent surveillance systems only. However, cooperative surveillance systems such as multilateration systems are not dependent on targets reporting their own positions. A multilateration system can track targets independent of the position information in the Surface Position message.

## 2. Proposal

The following text is proposed to be added at the end of the 3rd sentence in subparagraph (a) of Section 2.2.3.2.3.1.3.2 as quoted in Section 1 of this working paper:

> The Type Code Equal to ZERO message may be required as a consequence of the following events:
>
> a. An ADS-B Airborne Position or Surface Position Message register has not been loaded with data in the last 2 seconds. In this case, the ADS-B Message register shall be cleared (i.e., all 56 bits set to ZERO) once it has timed out. Transmission of the ADS-B Message that broadcasts the contents of the register shall be terminated if the ADS-B Message register has not been loaded in 60 seconds, except that transmission termination does not apply to Non-Transponder Devices on aircraft that are on the surface, or on surface vehicles. Broadcast of the ADS-B Airborne Position or Surface Position Message shall resume once data has been loaded into the ADS-B Message register.

## 3. Conclusions/Summary

The proposed modification would allow ADS-B Non-Transponder-based transmitters to broadcast TYPE Zero Surface Position Messages on airport surfaces where cooperative surveillance systems could track them. The proposed modification does not remove or alter other qualifying conditions that must be met in order to transmit surface position messages.