

RTCA Ad-Hoc MASPS Group
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Proposed Approach for an Anonymous ADS-B Mode

1. Background –

Certain general aviation user groups have expressed a desire to be able to utilize an anonymous aircraft address and flight ID as part of their ADS-B transmissions. The ADS-S MASPS allows for this capability for those aircraft that do not carry another CNS system that requires an aircraft address based on the ICAO 24-bit address. Currently the other airborne systems that require, based on existing ICAO SARPs and RTCA MOPS, the use of an ICAO 24-bit aircraft address are:

- Mode S transponders
- TCAS
- VDL Mode 2
- VDL Mode 3
- HFDL
- AMSS

The ADS-B MASPs does require the aircraft address to be unique and the general idea has been that only certain classes of general aviation users/airframes would be allowed to broadcast an anonymous address and flight ID. The following proposal is offered as an approach for accommodating the use of an anonymous ADS-B mode. However, the assurance of uniqueness of the aircraft addresses would not be assured for those aircraft using the anonymous ADS-B mode. However, this limitation may be addressed by placing operational constraints on the use of the anonymous service.

2. Proposal

2.1 Provisions for an Anonymous ADS-B Mode

This proposal describes the provisions for the installation and use of avionics supporting an Anonymous ADS-B Mode as well as places certain constraints on the configuration of the ADS-B avionics that supports this capability.

- a) All ADS-B aircraft installations would be required to support a standard (i.e., default) ADS-B mode using an ICAO conformant 24-bit aircraft address, as assigned by the

FAA in the U.S., and a flight ID that corresponds to the aircraft's radio call sign (i.e., tail number or flight number).

- b) Certain aircraft/installations, as defined below, would qualify to use ADS-B avionics that would also support an Anonymous ADS-B Mode. When operating in the Anonymous ADS-B Mode, the ADS-B avionics would broadcast a randomly selected 24-bit aircraft address and a flight ID (i.e., Call Sign) of the format VFRxxxx where the xxxx parameter is a randomly selected value between 0001 and 9999. The values for the aircraft address and flight ID would be automatically selected by the ADS-B avionics when entering the Anonymous ADS Mode and would not change for the duration of that operation (i.e., until the avionics is reset or until the pilot switches to Standard ADS Mode).
- c) Pilots operating aircraft equipped with avionics supporting the Anonymous ADS-B Mode and operating under certain authorized conditions, as described below, would be allowed to manually elect to override the (default) Standard ADS-B Mode (i.e., using an ICAO conformant aircraft address and standard flight ID) and instead broadcast in an Anonymous ADS-B Mode using a randomly selected 24-bit aircraft address and a flight ID of the format VFRxxxx (neither of which would be correlated to the specific airframe nor specific user). The ADS-B message formats must provide an unambiguous indication of which mode is being used (i.e., Standard or Anonymous ADS-B mode). When the ADS-B avionics is powered up or reset it would default to the Standard ADS-B Mode unless or until the pilot takes a specific action to instead activate the Anonymous ADS-B Mode.
- d) Any ADS-B avionics capable of the operating in an Anonymous ADS-B Mode would be required, as a minimum, to provide flight crew input and output functions for:
 - Input:
 - manual override of the Standard ADS-B Mode to activate the Anonymous ADS-B Mode.
 - manual reset to default Standard ADS-B Mode
 - Output:
 - Indicator showing when the ADS-B avionics is using the Anonymous ADS-B Mode
 - Display of the Flight ID that is being broadcast (e.g., tail number –or- VFRxxxx)

2.2 Airframe constraints on the use of anonymous aircraft address

ADS-B avionics capable of broadcasting in the Anonymous ADS-B Mode would only be authorized for use on the following aircraft classes:

- a) powered fixed wing aircraft with a maximum operating ceiling of less than 18,000 feet;

- b) unpowered aircraft/balloon;
- c) ultralight powered vehicle;
- d) rotorcraft.

2.3 Operational constraints on the use of the Anonymous ADS-B Mode

Only ADS-B equipped aircraft operating as uncontrolled VFR would be qualified to broadcast in the Anonymous ADS Mode. Any ADS-B equipped aircraft operating as IFR or controlled VFR would be required to broadcast in the Standard ADS-B Mode (i.e., ICAO conformant 24-bit aircraft address and a Flight ID containing the aircraft's radio call sign).

2.4 Use of Anonymous Flight ID

The provision of an anonymous Flight ID of the form VFRxxxx, and a pilot display showing the value being broadcast, would allow both the pilot of the broadcasting aircraft and all recipients of the ADS-B to display the target using the same flight ID value while also providing a reasonable degree of uniqueness. This would allow for any voice communications related to this target to be more readily correlated to the user's display (either controller's or other pilot's displays). However, the anonymity of the broadcasting aircraft is protected since the actual identify of the aircraft is known only to the pilot of the broadcasting aircraft.

3. Constraints on the use of ADS-B reports containing anonymous aircraft address and anonymous flight ID

Applications and operations will not be authorized to use ADS-B reports from target aircraft operating in an Anonymous ADS-B Mode for the purpose of providing aircraft separation services, de-confliction services, collision avoidance services, or any other safety critical service. However, situational awareness and See-and-Avoid services may be supported with targets using the Anonymous ADS-B Mode.

4. Recommendation

It is recommended that the RTCA MASPS, the 1090 MHz ADS-B MOPS and the UAT MOPS adopt the above proposed approach for support of an Anonymous ADS-B Mode. It is also proposed the RTCA coordinate with EUROCAE on this matter as it relates to the EUROCAE 1090 MHz ADS-B MOPS and the EUROCAE VDL Mode 4 MOPS.