

# **Changes to the TIS-B Service beginning in late 2015**

(As of March 31, 2015)

This document announces the FAA's decision to make changes to the Traffic Information Service – Broadcast (TIS-B) design beginning in late 2015.

In 2013, the FAA, through its operational ADS-B avionics monitoring activities, learned that a significant number of aircraft operators were equipping with uncertified ADS-B Out devices, apparently to obtain TIS-B services. However, aircraft using uncertified ADS-B Out devices are “invisible” to other aircraft using TSO-compliant ADS-B-In systems, which creates a safety concern. Further, aircraft equipped with uncertified ADS-B Out devices are not making good use of aeronautical protected spectrum, since their ADS-B information cannot be used by TSO-compliant ADS-B-In systems or FAA air traffic control automation systems. FAA determined that the TIS-B service required modification to address these issues.

Therefore, FAA conducted a study to determine a low risk, cost-effective, technically beneficial strategy for modification of the FAA TIS-B service. During this study, FAA consulted with the current manufacturers of ADS-B systems (both certified and uncertified) designed to use TIS-B information, including Accord Technologies, Dynon Avionics, FreeFlight Systems, Garmin, Honeywell, NavWorx, Rockwell Collins, and Trig Avionics.

On September 18, 2014, the FAA provided a white paper entitled, “Proposal for Addressing Issues with Certain ADS-B Avionics and FAA's TIS-B Implementation” to the General Aviation Manufacturers Association for electronic transmission to the Joint-industry ADS-B Implementation Working Group (JAIWG), an industry-led group that is jointly sponsored by the Aerospace Industries Association (AIA), Airlines for America (A4A), the Aircraft Owners and Pilots Association (AOPA), the General Aviation Manufacturers Association (GAMA), Helicopter Association International (HAI), the National Air Traffic Controllers Association (NATCA), and the National Business Aviation Association (NBAA); the JAIWG includes all of the manufacturers listed above. This proposal for making changes to the TIS-B service was briefed by FAA at the September 29, 2014 JAIWG meeting.

FAA will implement the changes to the TIS-B service as described below. FAA will update the Surveillance & Broadcast Services Description document, posted on the FAA RGL website with TSO-C195b, to reflect these changes before they are implemented.

## Background Information on the FAA's TIS-B Service

Traffic Information Service- Broadcast (TIS-B) Client Status: In the FAA's Traffic Information Service – Broadcast (TIS-B) service, client status is given to any Version 2 (V2, either DO-260B or DO-282B) ADS-B emitter whose position has been validated (using the FAA ground system's independent validation) and who reports that it has ADS-B-In equipage, regardless of reported ADS-B quality parameters. Version 1 (V1, either DO-260A or DO-282A) ADS-B emitters are also given TIS-B client status using the same criteria as V2 ADS-B. However, the FAA TIS-B service can disable client status for V1 ADS-B aircraft, which is planned to occur before 01-Jan-2020, though no specific date has been set. Within the FAA TIS-B service, V0 ADS-B emitters (DO-260) cannot be TIS-B clients. In the FAA system, ADS-R client status is identical to TIS-B client status.

TIS-B Target Status: Currently, V1/V2 ADS-B emitters are not included as TIS-B targets for other aircraft, because the FAA TIS-B service was designed assuming that other ADS-B-In aircraft receive these ADS-B reports. V0 ADS-B emitters (which exist only on 1090ES) are provided as TIS-B targets to aircraft equipped with ADS-B-In systems that only receive UAT (978 MHz) information. V0 ADS-B emitters are not included as TIS-B targets for aircraft equipped with ADS-B-In systems that receive 1090ES information.

## Problem/Rationale for Changes

The aviation community has realized that uncertified ADS-B devices that broadcast ADS-B Out with  $NACp/NACv/SDA=0^1$  will receive the FAA TIS-B/ADS-R services (aka, "activate TIS-B/ADS-R client status"), and evidence exists that over 500 aircraft are doing so. However, broadcasting ADS-B with  $NACp/NACv/SDA=0$  has certain negative effects as described below. Note that aircraft broadcasting ADS-B Out with  $NACp/NACv/SDA=0$  will not comply with 14 CFR 91.225 and 14 CFR 91.227 (the ADS-B Out rule) and cannot receive ATC separation services using ADS-B as the surveillance source.

Safety Concern: Per DO-317A (TSO-C195a), any ADS-B emitter broadcasting  $SDA=0$ ,  $NACv=0$  or  $NACp<5$  will not be displayed on a TSO-compliant ADS-B-In system. In alignment with the requirements of FAA TSO-C199 and for the purpose of this document only, *an ADS-B emitter with  $SDA=0$ ,  $SIL^2=0$ ,  $NIC<5$ ,  $NACv=0$  or  $NACp<5$  is defined as a non-performing emitter (NPE)*. Based on FAA monitoring data, it appears that 15% to 40% of the aircraft equipped with ADS-B V2 are broadcasting as NPEs to activate TIS-B/ADS-R client status for themselves, but in doing so are not displayed on TSO-compliant ADS-B-In systems. This introduces a potential safety hazard into the NAS. Presumably these NPE aircraft have a transponder, so they are seen by ATC and surrounding aircraft equipped with TCAS/TAS, but they are "unseen" by surrounding TSO-compliant ADS-B-In aircraft that do not have TCAS/TAS equipage.

Spectrum Concern: NPE aircraft are not making the best use of aeronautical spectrum assigned for ADS-B<sup>3</sup>, since their ADS-B information cannot be used by any TSO-compliant ADS-B-In system, nor by any air traffic control automation system. Given the linkage between ADS-Rebroadcast (ADS-R) and TIS-B client status, these NPEs also generate ADS-R messages on the other link (from the one that the NPE is broadcasting on) that are not usable by TSO-compliant ADS-B-In systems, adding to the inefficient utilization of aeronautical spectrum.

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<sup>1</sup> NACp=Navigation Accuracy Category, Position; NACv= Navigation Accuracy Category, Velocity; SDA=System Design Assurance (see RTCA DO-260B/DO-282B for more details)

<sup>2</sup> SIL=Source Integrity Level; NIC=Navigation Integrity Category (see RTCA DO-260B/DO-282B for more details)

<sup>3</sup> for 1090ES, this spectrum is used by other surveillance systems, including Traffic Alert and Collision Avoidance System (TCAS)

## **FAA Changes to the TIS-B service in late 2015 and early 2016**

TIS-B Target Status logic will be modified to uplink TIS-B messages for ADS-B NPE aircraft as soon as possible; this is currently planned for operational rollout by the end of 2015. Though this may result in ghosting of some NPE targets for uncertified ADS-B-In systems, it will address the immediate safety concern. Manufacturers of uncertified ADS-B-In systems have over a year to modify their systems appropriately to avoid ghosting.

TIS-B/ADS-R Client Status logic will be modified to only provide TIS-B/ADS-R client status to aircraft broadcasting ADS-B with  $NACp > 4$ ,  $NACv > 0$ ,  $SDA > 0$ ,  $SIL > 0$ , and  $NIC > 4$ . These criteria are aligned with the requirements of TSO-C199 and should remove the incentives for NPE use. Establishing a consistent FAA performance “floor” for ADS-B systems will make more efficient and appropriate use of aeronautical protected spectrum. FAA will make this TIS-B/ADS-R Client Status change effective on or after 4-Jan-2016, allowing more than one year for industry to modify their uncertified products and notify customers appropriately.

The results of these changes will be:

- (1) All ADS-B-In systems will see other aircraft equipped with ADS-B Out and transponders in areas with FAA radar/WAM coverage (complete & accurate traffic picture)
- (2) Compared to the current state, aeronautical protected spectrum will be more efficiently used
- (3) FAA will eliminate the current incentive for operators to equip with ADS-B Out systems that are not compatible with certified ADS-B-In systems

## **Additional Potential Changes to TIS-B/ADS-R services**

In addition, FAA plans to conduct an internal study of additional ADS-B message parameters or criteria that might be used as a basis for denying TIS-B/ADS-R Client Status to significantly problematic ADS-B emitters. While the primary motivation for this study is airspace safety (preventing use of flawed information), an advantage of the approach is that an aircraft operator with an ADS-B-In system would get immediate and relatively direct feedback when their ADS-B Out installation was not working properly, as well as an incentive to promptly correct the condition. Any changes to the TIS-B/ADS-R Client Status qualification criteria beyond those previously described in this decision memo will be announced at least one year in advance of their effective date, to allow industry time to modify uncertified products as appropriate.