

Explanatory notes for Draft CAA Amendment Notice 91.258

Background

The Notice of Requirement NTC 91.258 (the Notice) relating to Automatic Dependent Surveillance – Broadcast (ADS-B) systems was first issued on 20 July 2018. The Notice brought into full effect the ADS-B civil aviation rules for flight level above 245 within transponder mandatory controlled airspace.

The purpose of the Notice is to specify the requirements determined by the Director referred to in rule 91.258, regarding equipage of aircraft with ADS-B systems, the performance standards of those systems, the minimum message set elements, and the testing and power output, amongst other matters.

The procedures and processes for amending the Notice are set out in rule 91.258A as follows:

Process for amending the Notice under rule 91.258A

Elements of rule 91.258A that the Director will need to be satisfied with before amending the Notice are set out in italics below, with the accompanying notes:

Before issuing or amending a notice to specify the requirements referred to in rule 91.258, the Director must -

- (1) conduct a review to assess the risk to aviation safety of the matter giving rise to particular safety concerns by taking into account –*
 - (i) the requirements of the ATC system:*
 - (ii) the compatibility of equipment, performance standards and procedures for an ADS-B system required under rule 91.257:*
 - (iii) how ICAO or other ICAO Contracting States are dealing with the risk:*
 - (iv) the practicability of the proposed requirements:*
 - (v) any other information that the Director considers may be relevant; and*

1. Non-TSO position sources:

An issue for assessment was raised in October 2019 as follows:

Rule 91.258 w/ associated Notice NTC 91.258, set requirements for ADS-B systems. In regards to the position source, these have to meet a TSO requirement or performance equivalent to that TSO. (section 2(g) of the notice). There are no other means of compliance.

Section 4 of the Notice states that ADS-B systems are automatically accepted by the director if 5 criteria are met. (one of them being the position source GPS). So even with the current notice if there was a position source of actual equivalent performance to the TSO this is still not automatically approved as section 4 does not offer the equal performance clause.

Within the Notice or the rules there is no means of the director manually approving ADS-B system that do not meet the criteria for automatic approval.

The Criteria in section 4 for automatic acceptance includes being published on the FAA equipment list. As the FAA only allows class 1 transponders for ADS-B there will be valid eligible transponders with TSO'd position sources that this still will not be automatically approved e.g. Trig TT21 (a popular glider transponder).

In summary, there are non-TSO position sources which do not meet the criteria in clause 2(g) of the notice which may be acceptable for use in New Zealand. However there is currently no means for the Director to approve an ADS-B system which does not meet the specific criteria specified in the notice. An amendment to the notice will be required to allow for the use of non-tso position sources.

In reviewing the proposed amendment, the Aircraft and Certification Unit (ACU) considered that non-TSO position sources are compatible for use in an ADS-B system prescribed under rule 91.257. For instance, the use of non-TSO position sources will not affect the performance standards of the prescribed ADS-B system. The proposed amendment is aligned with the FAA system which allows for the use of non-TSO position sources. The ACU advised that to their knowledge, there are no known issues arising from the use of non-TSO position sources in the United States.

Allowing for the use of non-TSO position sources is desirable from a practical point of view especially for those aircraft flying to New Zealand which are already equipped with such position sources, such as aircraft registered in the United States. These non-TSO position sources do not need to be replaced thus some saving costs for affected operators. ACU informed that there are some unapproved ADS-B systems which already use these position sources. If the proposed amendment goes ahead then these unapproved systems do not need to be replaced.

On the basis that acceptable technical data is used, these devices can also save on the cost of new installations as generally they are less expensive. For instance, using aircraft spruce comparing the TSO TN70 which approximately costs USD\$1925 versus the TN72 non-(GPS) TSO which cost USD\$385.

In assessing the proposed amendment, the ACU was mindful that the general aviation (GA) sector operates much less in controlled airspace than those operating under Parts 129 and 121. Therefore the GA sector would gain less from equipage of aircraft with ADS-B system. Allowing for the use of non-TSO position sources will provide for a wider selection of equipment at reasonable costs, than what the current rules and CAA Notice NTC 91.258 provide. This could potentially lead to an increased uptake with ADS-B equipment for the GA sector.

2. Power requirements:

The ACU took the opportunity to review the whole CAA Notice NTC 91.258 to see what other requirements need to be updated. In this regard, it was considered necessary to update the power requirements (clause 3 of the notice) to align with ICAO Annex 10 volume IV.

The ACU considered that the proposed amendment to align the power requirements with ICAO Annex 10 volume IV will not incur any additional costs to operators, nor pose any safety risks, as the alignment merely clarifies what the power requirements are.

3. Message set elements:

The ACU also took the opportunity to review the message set elements. It was found that some of the message set elements did not align, causing differences between the DO-260/A and DO-260B standards. The ACU proposed that these inconsistencies be corrected and considered that the proposed corrections will not put additional restrictions on the requirements, but align the message set elements to the actual standards.

(2) consult publicly by publishing the initial or amended notice on the CAA website;

Once the draft amendment notice is approved by the Director, it will then be published on the CAA website.

(3) consider the following:

- (i) ICAO's annexes to the Convention or legislation by ICAO Contracting States in relation to surveillance systems and ADS-B systems, including the equipage;*
- (ii) International standards of the ICAO or ICAO Contracting States and recommended practices and guidance as set out in any document, plan, strategy or manual relating to surveillance systems and ADS-B systems, including equipage; and*
- (iii) Any factors unique or relevant to New Zealand's operations; and*

In assessing the proposed amendment, the ACU reviewed the FAA system and its current practice of allowing the use of non-TSO position sources. The ACU considered the proposed use of non-TSO position sources in New Zealand to be compatible with the ADS-B system prescribed under rule 91.257. The ACU further considered that the proposed amendment will promote aviation safety as it is likely to result in an increased uptake of ADS-B equipage in the GA sector.

(4) determine, after conducting the review, whether or not it is necessary to impose requirements to eliminate or mitigate any risk to aviation safety.

The ACU considered that the proposed amendment to allow for the use of non-TSO position sources will mitigate against a reduced uptake of ADS-B, especially by the GA sector, by providing more options for position sources. This approach would also mitigate against potential non-compliance by installation of these devices which are approved on FAA STC (e.g Dyon GPS-2020). As acceptance of these devices will be on a case by case basis by the

CAA regarding their suitability, it is envisaged that there will be little or no negative safety impact.

In summary, the ACU considered it necessary for Notice to be amended to allow for the use of non-TSO position sources, clarify the power requirements to align with ICAO Annex 10 volume IV, and correct inconsistencies in certain message set elements.

Under the current delegation powers of the Acting Deputy Chief Executive for Aviation Safety, Mr Dean Winter considers that rule 91.258A has been met before amending the Notice and approves the publication of the draft amendment Notice on the CAA website for public consultation, for a period of 8 weeks.

Proposed amendments to CAA Notice 91.258

The proposed amendments to the Notice are for the following reasons -

- (1) to reflect that ADS-B will be mandated below flight level 245;
- (2) to clarify what the power requirements are; and
- (3) to allow position sources for ADS-B which are suitable for that purpose but did not meet (or were equivalent to) listed GPS TSO's.

In addition, some editorial corrections are also proposed to correct certain inconsistencies between section 2 and tables 1 and 2 of the Notice.

Below is a brief description of the changes:

Section 2:

Section 2 saw a change in section 2(g) where 2(g)(5) was added - this allows for position sources to be used that do not meet the TSO requirements from 2(g)(1) to (4) provided CAA approves the position source. As ADS-B is used for surveillance purposes there is a level of assurance desired from the system, that it works today, tomorrow and well beyond. This assurance is not given by the system passing the performance test alone. The TSO requirements also include design assurances. These are elements that CAA will look at when approving non-TSO position sources, so that they can be safely used in the surveillance system for the foreseeable future.

Section 3:

Power requirements: this section was improved to better describe what was already required. The notice used to include a power requirement for ADS-B above FL245. As ADS-B uses Mode-S transponders this power requirement was already covered in appendix A.22 of Part 91, but it referred to TSO requirements.

The power requirements in Section 3 now includes the words from that TSO making the requirements more easily accessible. Essentially nothing has changed in the requirements themselves.

A lot of the documentation also refers to Class 1 or Class 2 ADS-B transponders; a note in the notice clarifies that meaning and origins.

Section 4:

Section 4(a)(2) saw item (ii) added to reflect the changes in section 2.

An important addition to section 4 was the use of "AND" as 4(a)(3)(iii) includes items from the FAA approved combination list, and this list does include systems that have a non-TSO position source. However the AND between 4(a)(2) and 4(a)(3) still requires that position source to be approved by the Director for automatic approval of the ADS-B system.

Section 4(b) sees a clarification on the intent that has always been there, as in the testing is to be done by a Radio Group 3 license holder (the word *radio* is missing in the current Notice).

Section 5:

This section had an error in the original issue of the Notice (revision 1). An added line in a table which misaligned requirements - there has since been an editorial change to get requirements back in line, as well as reflecting the requirements of section 2 correctly with the table.