



Summary of Public Submissions Received on

NPRM 18-02 — NSS ADS-B Surveillance Above Flight Level 245

16 May 2018

Table of Contents

General.....	2
Summary of Submissions.....	2
Breakdown	2
Technical standards for ADS-B equipment.....	2
Performance standards of ADS-B equipment.....	4
Transition Provisions	6
Reporting of ADS-B errors and guidance on ADS-B incident investigation	8
New Zealand Defence Force (NZDF) Compliance	9
Inconsistency between current rule 91.541 and draft rule 91.541	9
Engineer Licensing	10
ADS-B Ground Infrastructure.....	11
Message set elements	11
Integrity of aircraft with ADS-B equipment for below flight level 245	13
Monitoring of GNSS and ADS-B Submission:.....	13
Mode C level.....	14
Exemptions.....	15
Universal Access Transceiver.....	16
Definitions	16
ATS surveillance system.....	16
NUC and other values	17
Compliance costs.....	17
Providing clear communication about the rule changes	18

General

Notice of Proposed Rule Making (NPRM) 18-02 NSS ADS-B Surveillance Above Flight Level 245 was issued for public consultation on 14 September 2017, and submissions closed on 27 October 2017.

The purpose of NPRM 18-02 was to update the Civil Aviation Rules to provide for the transition from secondary surveillance radar to Automatic Dependent Surveillance Broadcast (ADS-B) OUT as the primary source of data for surveillance in New Zealand. This proposal primarily relates to changes to Part 91 and includes proposed amendments to other parts to ensure they remain fit for purpose in an ADS-B surveillance environment.

The primary objectives of the proposal are to:

- provide an effective regulatory mechanism to facilitate the ADS-B transition;
- ensure the integrity of the surveillance system during the transition to ADS-B;
- set the required performance level of aircraft equipage compatible with the ADS-B surveillance system; and
- minimise costs and unnecessary regulatory impost on industry.

A copy of the NPRM was sent to:

- the Ministry of Transport
- the Aviation Community Advisory Group (ACAG)
- internal CAA stakeholders.

The NPRM was also published on the CAA website on 14 September 2017 and notified to the industry by automatic email alerts.

Summary of Submissions

Breakdown

There were five submitters who provided feedback on the NPRM - two from individuals and three from organisations. All five submitters indicated that the proposal is acceptable but would be improved if suggested changes were made.

Technical standards for ADS-B equipment

Submission

A submission was raised that a strict reading of draft rule 91.247(a)(3) and (b) would appear to only permit a transponder to be operated as ADS-B OUT. That is, no Mode A/C

or Mode S is permissible, and whether that is the intent of the rule. For instance, a DF18¹ transmission is ADS-B OUT but does not provide MODE A/C or S.

CAA Response

The CAA advises that the intent is that the message set would need to include Mode A/C and Mode S. Transponders that only transmit ADS-B would not be acceptable as they will not work with ACAS or the contingency surveillance system.

ADS-B Out message sets include MODE A/C and S.

Submission

A submission queried the technical standards for MODE A/C or MODE S transponders, as to whether the standards needed to be expressed in the rules, example TSO-C112F.

CAA response

The CAA advises that the TSO-C166b requires the backwards compatibility of the legacy modes. Transponders certified to TSO-C166b must also include the Mode A/C and Mode S messages. That means that to comply with the performance standards in the draft Notice 91.258, the transponder must transmit the requisite Mode A/C and Mode S information.

Submission

A submission noted that the paragraph regarding selective availability (SA) in clause 6.4 of the advisory circular excluded “SA On” position sources. A query was raised as to whether the standards notice should make mention of this and restrict SA Aware only. Restriction to SA Aware only may be implied in acceptable TSOs.

CAA Response

On the aspect of selective availability, the CAA agrees with the submission. However, the CAA notes that this is an early TSO -129 issue so may not present itself as early units certified to TSO-C129 may not have FDE.

The CAA advises that the use of TSO-C129 GPS will require CAA approval, specifically as to whether they are FDE capable. Therefore, it is unlikely that SA On position sources would be suitable for use in an ADS-B system.

Submission

Another submission pointed out that it might be more correct to refer to ‘ICAO Aircraft Address’, instead of ‘MODE S code’, which was raised at the last ICAO CNS subgroup meeting and ICAO SURICG meeting.

CAA response

¹This is a non-transponder based 1090ES message.

The CAA notes the proposed change in terminology but is mindful of the use of the term “Mode S code” in civil aviation rule 91.247. Given that the term has been used in this rule since 1997, and therefore has a settled meaning, the CAA advises that it prefers the term “Mode S code” instead of “ICAO Aircraft Address”. This matter can be reviewed in the work regarding the below FL245 proposal.

Submission

Another submission noted the reference to NACp of 5 or greater, being used which would equate to a NUC of 4. The concern is that the use of a NACp of 6 would eliminate some of the GA Jets using Garmin equipment which only provides a NACp5.

As a guide, the submission pointed to Table 2-200 of DO260B for equivalence between DO260, D0260A and DO260B. The table is used within ATM to simplify values between versions of DO260.

A further submission raised whether there is an intent to adopt the avionics template as discussed and amended during the 2017 SURICG meeting, or whether this would be covered off with references to TSOs.

CAA Response

The CAA advises that NACp of 5 or greater was agreed to with Airways. The CAA further advises that based on the submissions, Table 2-200 of 260B has been revised to better clarify the intent as to the circumstances in which the different standards are to apply. In this regard, draft Notice 91.258 is revised to provide for a separate table for the message set elements relevant for D0260B, and another table for message set elements relevant for D0260A and DO260 initial issue.

Performance standards of ADS-B equipment

Submission

A submission noted that the ADS-B transponder performance requirements specified in paragraphs 2(d) and (e) of the Notice 91.258 take a very strict interpretation of values as adopted by the FAA. This approach is not followed by the ICAO. The submitter noted that ADS-B performance is a function of the GPS constellation and evaluated and reported in real time. The ATM is used to filter out non-compliant ADS-B data. The submission considered that restricting the ATM by putting in such values will mean that some operators currently in New Zealand will not meet the required standard.

CAA response

The CAA advises that they consulted extensively with the Airways to arrive at these figures. The CAA confirms that these figures are not derived from the FAA but are based on the ICAO figures. Before knowing what non-compliant data is, it is imperative to know first what data is acceptable, and what data is not. The CAA is willing to revisit these figures if necessary. However the CAA is mindful that in doing so, it would delay the commencement of the rules.

Submission

Regarding the minimum performance requirement for an ADS-B transponder, a submission queried whether the 'SIL must be 3 or greater' is correct. The submission referred to table 2-200 which uses the standard SIL2 for TSO-C166A and SIL3 for TSO-C166B. The submission asserted that SIL2 is the minimum requirement.

CAA response

The CAA notes the submission. Upon further discussions with the Airways, the CAA considers it necessary to distinguish the SIL values for the TSOs as follows –

- the SIL for TSO-C166 and TSO-C166a must be 2 or greater:*
- the SIL for TSO-C166b must be 3 or greater.*

In this regard, the draft Notice 91.258 and associated advisory circular will be revised accordingly.

Submission

Another submission suggested that New Zealand should accept transponders defined as TSO-C166, -1660A or -1660B (consistent with the equivalent Australian standard). If TSO-C166B was required for all aircraft, this would add significant cost due to retrofitting requirements. The submitter understood that the proposed rules '*require (b) if the transponder is fitted after 31 December 2018, but permit () or (a) if the transponder is fitted before 31 December 2018*'.

CAA response

The CAA advises that we would accept transponders defined as TSO-C166 or TSO-C-166a that are already fitted before the commencement date of the rule. After commencement date, all new or replacement transponders must be TSO-C166b or met the equivalent performance.

The CAA also advises it will not require retrofitting of aircraft already fitted with earlier models of ADS-B transponders, unless the installed system does not meet the performance requirements set out in the draft Notice 91.258.

The submitter has highlighted the need to clarify the rule with regard to fitting new equipment relative to the commencement date of the new rule. It is as follows:

<p><i>Existing ADS-B transponders by the commencement date</i></p>	<p><i>Allowed under the proposed rule if:</i></p> <ul style="list-style-type: none"> - <i>certified to TSO-C166, -166A or -166B <u>and</u></i> - <i>is paired with a compatible GNSS position source with FDE functionality; <u>and</u></i> - <i>meets the performance standards</i>
<p><i>Any transponder installed after the commencement date</i></p>	<ul style="list-style-type: none"> - <i>Must be TSO-C166b; and</i> - <i>Coupled with a compatible GNSS position source with FDE functionality; <u>and</u></i> - <i>Meets the performance standards specified in the Rules</i>

The critical distinction is between the commencement date: that is, the date the rule comes into force (most likely by July 2018), and the mandate date of 31 December 2018, when all aircraft operating above flight level 245 must be operating an ADS-B system that complies with requirements under rule 91.257.

Submission

Another submission queried whether the rules need to mention 25ft resolution for MODE S or ADS-B? In the submitter's view, operationally, 25ft is more accurate and useful for the ATM.

CAA Response

The CAA advises that ADS-B does not define a 25 foot requirement, although it can do 25 foot increments with a capable altitude encoder.

Transition Provisions

Submission

A submission was raised that the transition provisions are not clear. The NPRM background, paragraph 2.1, indicates that for new installations in aircraft being operated in controlled airspace above flight level 245, ADS-B Out must be fitted from the date of commencement of the rules. However, the transition provision, rule 91.253, indicates that the requirement to equip an aircraft being operated above flight level 245 does not apply until 31 December 2018.

CAA response

It is envisaged that the ADS-B rules for operations in controlled airspace above flight level 245 will commence by July 2018 (commencement date). The policy intent is that any new installations or replacement of existing ADS-B systems fitted from the commencement date needs to include a TSO-C166B transponder and a compatible GPS receiver in order to

ensure that all aircraft that are to operate in controlled airspace above flight level 245, are suitably equipped before the transition period ends on 31 December 2018 (mandate date).

The CAA will work with affected operators on installation of suitable ADS-B systems in a timely fashion.

Submission

A submission noted that rule 91.541(c) requires that if an aircraft is equipped with an ADS-B system, regardless of where or when it is operating, the system must meet the requirements of rule 91.257. No transition provision is provided for this rule so an aircraft that is equipped with an ADS-B system that does not meet the requirements of rule 91.257 at the end of the commencement of the rule, must either remove the system or modify to meet the requirements.

CAA response

The CAA notes the submission. To clarify the intent of rule 91.541(c), the CAA proposes to have paragraph (c) revised as underlined below –

“(c) An ADS-B system installed in an aircraft must meet the minimum performance standards and requirements under rule 91.257.”.

The effect of the revised paragraph (c) would mean that the provision does not apply to an aircraft that already has an ADS-B system installed in it, before the commencement date. However, if that aircraft has an ADS-B system that does not meet the minimum performance standards prescribed by rule 91.257, the aircraft may operate the transponder in either Mode A and C, or Mode S, until 31 December 2018. In this regard, the CAA also proposes to have draft rule 91.253 (Transition) revised to clarify this intent.

An aircraft that has ADS-B system that does not meet the requirements of rule 91.257 may not be able to continue operating in controlled airspace above flight level 245, from the mandate date of 31 December 2018.

Operators whose ADS-B systems do not meet the requirements of the proposed rule should contact the CAA for specific advice.

Whilst an aircraft that has ADS-B equipment that meets the requirements of rule 91.257 will not be affected, and can continue to operate the transponder in ADS-B OUT in controlled airspace above or below flight level 245.

Submission

A submission also noted that there are no transition provisions for rules 101.107(1)(ii) and 101.107(1)(iii). ADS-B systems will be required for the operation of heavy free balloons in transponder mandatory airspace both above and below flight level 245 from the date of commencement of the rule. Whether this is intentional.

CAA Response

The CAA notes the transitional issue raised regarding rules 101.107. The CAA advises that it is not the intent for rules 101.107(1)(ii) and (iii) to come into force on commencement date of the rule. The CAA advises that Part 101 will come into force on 31 December 2018.

As the rules regarding operations below flight level 245 have yet to be made, the CAA considers it unnecessary to provide for a transition provision for heavy free balloons equipped with an ADS-B system that does not meet the proposed rule requirements under rule 91.257. As any transition period (if necessary) regarding the operation of aircraft in below flight level 245 will be specified in the associated rules.

Reporting of ADS-B errors and guidance on ADS-B incident investigation

Submission

A submission queried whether Part 12 needs requirements on reporting of ADS-B errors, and that guidance is needed regarding an ADS-B incident investigation.

CAA Response

The CAA is of the view that Part 12 in its current form adequately provides for the reporting of ADS-B errors, under one of the relevant categories of ‘incidents’ defined in Part 12². The CAA considers that an ADS-B error would primarily be covered by rule 12.55(a)(1)–(4)³.

For instance, the CAA considers that an ADS-B error resulting from a problem with the aircraft system would be a defect incident. An error resulting from a problem with the ground infrastructure would be considered a facility malfunction incident. Whilst an incident resulting from the loss of ADS-B surveillance would be considered an airspace incident. For the purposes of this query, Airways which is a certificate holder under Parts 171, 172 and 174, would be required to notify the Authority of an airspace incident, facility malfunction incident or defect incident.

Where a problem with ADS-B signals originates with the GPS system, CAA would work with Airways to investigate the underlying cause and provide guidance to operators.

The requirement to report incidents or accidents rests with a certificate holder, other person or the pilot-in-command⁴.

² Rule 12.3 provides definitions for incidents. Refer to the definitions of ‘airspace incident’, ‘defect incident’, and ‘facility malfunction incident’, which are particularly relevant to ADS-B errors.

³ Rule 12.55 requires a holder of a certificate to notify the Authority as soon as practicable of any incident specified in the rule if the certificate holder is involved in the incident and the incident is a serious incident or is an immediate hazard to the safety of an aircraft operation. Incidents to be reported as specified in paragraphs (1) to (4) of rule 12.55 are aircraft incident, airspace incident, facility malfunction incident and defect incident.

⁴ Refer to rules 12.57 and 12.55.

In terms of providing guidance, Advisory Circular 12-1 Revision 4 currently provides guidance material on the suite of incidents and accidents that need to be reported under Part 12. The CAA will update Advisory Circular 12-1 to clarify that Part 12 reporting requirements will apply to ADS-B incidents. Any revisions to the advisory circular will be published on the CAA website.

New Zealand Defence Force (NZDF) Compliance

Submission

A submission asserted that it would not be possible for the Director to approve equipment or performance standards of ADS-B equipment installed in the New Zealand Defence aircraft as the Director does not have access to the technical design data for military aircraft installations.

CAA Response

The CAA advises that it will not approve any kind of ADS-B equipment to be used by the NZDF. The NZDF will need to meet the ADS-B data requirements of not only New Zealand, but wherever they operate. In this regard, the NZDF will be required to have their aircraft equipped with the ADS-B equipment as specified in the rules. This is in line with PBN, according to rule 91.246 the Director gives the NZDF PBN approvals, whilst the NZDF approves their own PBN operations.

The CAA accepts that the draft rules do not clarify which provisions apply to NZDF aircraft, and which ones do not. Another examination of the draft rules and associated draft Notice 91.258 indicate that clause 4 of the draft Notice does not apply to NZDF. In this regard, the draft rules and Notice 91.258 will be revised accordingly.

The CAA is working actively with the NZDF on the process of transitioning their aircraft to the ADS-B environment.

Inconsistency between current rule 91.541 and draft rule 91.541

Submission

A submission was raised that the proposed rule 91.541 did not seem to match up with the current rule 91.541. The current rule 91.541 provides as follows –

91.541 SSR transponder and altitude reporting equipment

(a) Except as provided in 91.247(c) and (e), an aircraft operating in transponder mandatory airspace designated under Part 71 must be equipped with a SSR transponder having—

.....

Whilst the proposed rule 91.541 provides as follows –

91.541 Transponder and altitude reporting equipment

(a) Where an aircraft is equipped with ATCRBS transponder equipment, the transponder must have –

.....
The concern raised is that rule 91.247 (e) allows for operation under MEL subject to prior ATC approval and it would seem relevant to retain this as an exception to the requirement of rule 91.541.

CAA Response

The reason for the proposed change in draft rule 91.541 is because transponder mandatory airspace can exist inside and outside controlled airspace. Therefore aircraft that require a transponder in transponder mandatory airspace outside controlled airspace only requires a Mode A/C transponder. If ADS-B Out was required in transponder mandatory airspace outside controlled airspace, then this rule would have been removed.

Rule 91.541 details the requirements for the different types of transponder equipment. Rule 91.247 specifies which type of transponder must be used within a specific airspace designated as transponder mandatory airspace. Draft rules 91.247(e) and (g) still permit an aircraft to be operated within transponder mandatory airspace without an operable transponder, or transponder turned off in specific circumstances as is the case in this instance.

The CAA will update the relevant advisory circular to clarify that ADS-B is not required in transponder mandatory airspace outside controlled airspace.

Engineer Licensing

Submission

A submission noted the proposal to add ADS-B systems to the Radio – Group 3 rating, with no transition provisions. It further noted that no amendment is provided for the syllabus requirements in AC66-2.15. The submission pointed out that some of the Group 3 ratings were issued more than 50 years ago. Given that ADS-B systems are relatively new, the submission proposed that recurrent training should be required to ensure engineers are competent to maintain ADS-B systems. It seemed to be implied that anyone with a Radio – Group 3 rating would automatically be able to maintain ADS-B systems.

CAA Response

The CAA appreciates the view expressed and agrees to include knowledge requirements of ADS-B into AC 66-2.15, as a positive step moving forward. However, the knowledge requirements in themselves will not provide recurrence training or knowledge for those aircraft maintenance engineer licence holders that already have the Radio Category and a Group 3 rating. It will only be useful as a knowledge base for those aircraft maintenance licence holders, who are going to apply for the Radio – Group 3 rating.

The CAA advises that it does not have the capacity to provide recurrent training as proposed in the submission. Participants will need to get the required knowledge on ADS-B from the original equipment manufacturer that will be providing the supplemental type certificates for installation of this equipment. The aircraft maintenance engineer licence

holders maintain proof of this upgrade training and submit proof of upgrade training to the CAA, if the CAA requests it.

Although some of the group 3 ratings were issued many years ago without any formal requirement regarding recurrent training for the licence holders, the CAA considers that there is not much leap in technology that needs to be bridged with the introduction of ADS-B systems. This is due to the fact that holders of a group 3 rating would have had carried out some form of maintenance work on transponders such as Mode A/C or S, thus the required maintenance work would not be entirely new.

ADS-B Ground Infrastructure

Submission

A submission was raised that although Part 172 provides requirements for ATS equipment, it does not provide the requirements for the performance specifications or maintenance of the ADS-B infrastructure. Consideration should be given to providing similar requirements to those specified for aircraft in the Notice under rule 91.258. This would ensure the integrity of the entire ADS-B system.

CAA Response

The CAA advises that the requirements for aeronautical facilities, which includes surveillance equipment such as ADS-B, are covered in Part 171. Equipment in Part 171 have to meet the criteria of the ICAO Annex 10 and associated ICAO documents.

Message set elements

Submission

A submission noted that the table which sets out the message set elements (the table) appears to be specific to DO260B only. The submitter queried whether it is necessary to make this specific reference to DO260B and whether the reference to 'M' in respect of DO260A should be 'O' instead. This did not seem to read right. The submission added that a DO260 emergency would not alert ATC to the type of emergency only that there is some type of emergency. ATC will need to ask the pilot-in-command for the emergency state.

CAA response

The CAA notes the submission and has reviewed the message set elements (the table). To assist operators in using the correct message set elements, the CAA advises that the table has been revised into two tables, instead of one that was contained in the draft Notice 91.258 in the NPRM. Table 1 will provide the message set elements for DO-260B (TSO-C166b) in respect of new or replacement transponders and compatible GNSS (refer to clause 2(f)(3) of the Notice). Table 2 will provide for the message set elements for DO-260A or DO-260() (TSO-C166() or TSO-C166a) in respect of existing transponders (refer to

clauses 2(f)(1) and (2)). Also note that the numbering in Tables 1 and 2 have changed, beginning with '1.1', instead of 'A.2.1' as set out in the draft Notice 91.258 in the NPRM.

The CAA advises that the mandatory use 'M' is retained for the majority of the message set elements for DO-260A. Refer to Table 2 for details.

Submission

Regarding row A.2.18 of the table, a submission was of the view that only DO-260B was applicable and that the last column on the right should be 'O'.

CAA response

Regarding 'row A.2.18'⁵ referred to in the submission, the CAA advises that it is renumbered as row '2.10' in Tables 1 and 2. Table 1 which provides for TSO-C166 (or DO-260B), specifies 'M for surface' in the last column. Table 2 which provides for TSO-C166() or TSO-C166a (or DO-260) also specifies 'M for surface', in the last column.

Submission

A submission suggested to have removed the reference to DO282B which is UAT and is not permitted.

CAA response

The CAA agrees with the submission to have removed the reference to DO282B, as UAT is not permitted for use in New Zealand.

Submission

A submission highlighted the need to be consistent with section 5 in the Notice of requirement NTC 91.258, with specific references to DO260B, DO260 and DO260A. The submission also noted the use of 'MAY' whereas other document stated 'Optional' or 'Mandatory'.

CAA Response

The CAA advises that the list as set out in the draft advisory circular is based on DO260B; and that the list is not of requirements, but of most of the parameters that can be in an ADS-B message (hence 'may' being appropriate).

To assist operators in using the correct message set elements, the CAA has revised the list so that the message set elements for DO260B are placed in a separate table from the message set elements for DO260 and DO260A. Therefore the draft Notice 91.258 will be revised to have Table 1 which contains the message set elements for DO260B, and Table 2

⁵ Message set element regarding the length and width of aircraft.

which contains the message set elements for DO260 and DO260A. Also note that the numbering in Tables 1 and 2 have changed, beginning with '1.1', instead of 'A.2.1' as set out in draft Notice 91.258 in the NPRM. In instances where the use of a message set element is not referenced, this is indicated by '-' in the Tables.

The AC will be revised to reflect changes made regarding the message set elements.

Integrity of aircraft with ADS-B equipment for below flight level 245

Submission:

A submission queried whether there is a way of telling that an aircraft operating in transponder mandatory airspace below flight level 245 has been correctly tested. It was suggested that a placard placed adjacent to the transponder or its control head would be ideal to indicate this.

CAA Response

The CAA appreciates the desire for a quick easy reference to indicate that an aircraft operating in transponder mandatory controlled airspace below flight 245 is equipped for ADS-B Out. However, the CAA doubts that placing a placard as suggested is the best option.

The relevant advisory circular will be updated to provide guidance on what information should appear on CAA Form 2129. For instance, whether an aircraft has a transponder ADS-B Out.

Monitoring of GNSS and ADS-B

Submission

A submission queried as to whether the CAA was responsible for the monitoring of GNSS and ADS-B.

CAA Response

The CAA notes the multifaceted nature of GNSS and ADS-B systems that could give rise to several interpretations of what 'monitoring' entails, depending on which aspect of GNSS and ADS-B one looks at. For instance, if the query refers to the aircraft component, or the ground-based stations receiving the signals from aircraft ADS-B transponders to provide an ATS surveillance system, then the CAA is of the view that Airways is responsible for the monitoring of ADS-B. Airways currently has a similar responsibility for the SSR system – integrity monitoring of an aeronautical facility under rule 171.113(c).

If the ATS surveillance system receiving ADS-B signals is unserviceable, then Airways is required to issue a NOTAM under rule 171.19.

Under rules 172.151(4) and 172.57, depending on the facility, Airways is required to provide status monitoring of navigation, approach and landing aids, of which GNSS is one. Under rules 172.151(4) and 172.93, flight information service includes the provision of

information to pilots on changes in the serviceability of navigation aids. Following is more related to Part 171 requirements.

The requirement for informing ATS units of radio navigation aids is separate to Part 171 certification. It's co-incident that Airways holds a Part 171 certificate as well.

The CAA advises that it does not monitor the ATS surveillance system – whether it is using PSR, SSR, MLAT or ADS-B.

At the end of the day, ADS-B is Airways tool for surveillance as Airways relies on GNSS for the position accuracy of the aircraft in order to provide surveillance services. The CAA believes that Airways is in the best position to monitor GNSS to ensure the integrity of the position source. In addition, Airways would also be best placed to know of any issue that arises in the first instance, rather than waiting for evidence of untrustworthy data from aircraft.

Mode C level

Submission

Regarding draft rule 172.401, a submission asserted that MODE C level was not strictly correct for MODE S or ADS-B derived altitude.

Draft rule 172.401 provides as follows:

172.401 Verification of SSR transponder Mode C level information

- (a) Subject to paragraph (b), aerodrome control may verify the Mode C level information of a departing aircraft when the tower radar indicates a positive rate of climb from the aerodrome elevation.*
- (b) Mode C information must not be used when the displayed level varies by more than 300 feet from the aerodrome elevation during the take-off roll.*

CAA Response

The CAA agrees with the submission. The standards of any transponder used in ATS surveillance systems must meet the criteria of Annex 10, Document 4444, etc and are detailed in procedures to controllers as to what is acceptable on the situation display read out to use the level information for the purpose of providing an ATC service.

The rule package includes a proposed definition for 'ADS-B system' which includes 'a GNSS position source and a compatible Mode S Extended Squitter 1090Mhz ADS-B Out transponder'.

To clarify, the purpose of this rule is to refer to the information that is displayed to the controller, hence the reference to 'Mode C level information' in the first place. However, on further reflection, the CAA proposes to amend draft rule 172.401 to replace the reference 'SSR transponder Mode C level information' with 'transponder level information', as indicated below:

172.401 Verification of ~~SSR~~ transponder ~~Mode C~~ level information

(a) Subject to paragraph (b), aerodrome control may verify the ~~Mode C~~ transponder level information of a departing aircraft when the ~~tower radar~~ aerodrome control air situation display indicates a positive rate of climb from the aerodrome elevation.

(b) ~~Mode C~~ Transponder level information must not be used when the displayed level varies by more than 300 feet from the aerodrome elevation during the take-off roll.

Although there was no specific submission regarding the use of the term 'tower radar' in paragraph (a), the CAA takes this opportunity to replace that term with 'aerodrome control air situation display'. The proposed change from 'tower radar' to 'aerodrome control air situation display' is in line with the level information display to controllers being in altitude⁶.

Exemptions

Submission

A submission proposed that if an airline has an aircraft that did not have the necessary equipment installed, the CAA should provide an exemption to that aircraft for a reasonable period of time for an upgrade to be made. For instance, if an aircraft is due to be delivered to that airline a few months after December 2018, there should be no requirement to retrofit the existing aircraft.

CAA Response

The CAA advises that if an airline is placed in the situation described in the submission, the airline (or any other affected party) should contact the CAA to discuss the specific situation and to work through the options for addressing the problem(s). We would work with the operator and Airways to assess any safety risks.

The CAA generally advises against the grant of an exemption in respect of an aircraft that does not have the necessary equipment installed. The main reason is to prevent the transmission of non-compliant or misleading ADS-B data which the CAA considers as a major failure condition.

However, if the airline is unable to find a workable solution after discussions with the CAA and wishes to seek relief from the relevant rule requirements through an exemption, the airline is entitled to apply to the Director for an exemption under section 37 of the Act. Like any other exemption petition, each application seeking relief from the ADS-B rules will be treated on its own merit. This means that the Director will consider each application taking into account all the relevant circumstances surrounding that particular application, before deciding whether or not to grant an exemption.

⁶ Altitude is defined in Part 1 as the vertical distance of a level, a point or an object considered as a point, measured from sea level.

Given that the grant of an exemption is not automatic, the CAA strongly recommends that operators should plan ahead in order to get their aircraft equipped with the prescribed⁷ ADS-B equipment by the mandate date of 31 December 2018.

Universal Access Transceiver

Submission

Clause 6.11 of the AC describes the Universal Access Transceiver (UAT) as follows:

Universal Access Transceiver (UAT) is an alternative ADS-B solution used in the USA. It is not compatible with the ADS-B system used in New Zealand or anywhere else in the world.

A submission suggested a correction to clause 6.11 of the AC to state that the UAT is not compatible with NZ or ICAO. As the submitter believes that South Korea is now, or is planning to use UAT.

CAA response

The CAA agrees with the submission. In this regard, the second sentence of clause 6.11 of the AC will be revised to read '*It is not compatible with the ADS-B system used in New Zealand.*'

Definitions

ATS surveillance system

Submission

A submission queried whether the term 'ATS surveillance system' was already defined.

CAA Response

The CAA advises that the term 'ATS surveillance system' is not defined in the civil aviation rules. However, the CAA points out that the term is currently defined in Document 4444, which is incorporated by reference⁸ in rule 172.107(1)(i). The rule requires that all ATS surveillance services are provided in accordance with procedures published in Document 4444. Document 4444 provides a definition of 'ATS surveillance system' as follows:

⁷ Rule 91.257 specifies the requirements for ADS-B equipment.

⁸ Section 36(4) of the Act provides that any material incorporated in a rule by reference is to be treated for all purposes as forming part of the rule.

ATS surveillance system. A generic term meaning variously, ADS-B, PSR, SSR or any comparable ground-based system that enables the identification of aircraft.

Note.— A comparable ground-based system is one that has been demonstrated, by comparative assessment or other methodology, to have a level of safety and performance equal to or better than monopulse SSR.

The term 'ATS surveillance service' is also defined in Document 4444 as 'a term used to indicate a service provided directly by means of an ATS surveillance system'.

Given that Document 4444⁹ already provides for a definition of 'ATS surveillance system', the CAA considers it is unnecessary to provide a duplicate definition of 'ATS surveillance system' in the civil aviation rules.

NUC and other values

Submission

In the definition of 'NUC' in clause 4 of the Advisory Circular, a submission queried the specific reference to NUC being a 'codified parameter'. The query was based on the notion that all the other values¹⁰ are also codified parameters, therefore the definitions of these terms need to be consistent.

CAA Response

The CAA notes the submission and advises that the definition will be revised to remove the reference to NUC being a 'codified parameter'. The revised definition will read as follows—

"NUC – is used to report the maximum position error, which might not be detected with a predefined probability. NUC originates in a position-determining system and is transmitted by aircraft ADS-B systems complying with TSO-C166 initial."

Compliance costs

Submission

A submission noted that whilst the cost to Airways is provided in the NPRM, no data is provided on the cost to operators and the NZDF, other than a statement that the cost is 'highly variable'.

CAA Response

The CAA advises that the reason it did not provide detailed compliance costs for operators, is that the cost range would differ significantly from one operator to the next, depending

⁹ Document 4444 is part of the civil aviation rules (including definition of ATS surveillance system) as it is incorporated by reference, under section 36 of the Act.

¹⁰ Other values defined in the list of definitions in clause 4 of the AC are *NIC*, *NACp*, *NACv*, *SIL*, and *SDA*.

on several contributing factors, such as the age of the aircraft, the avionics systems of the aircraft, operators' preferences for the type of system they want to install, etc.

The CAA also advises that the reason it did not provide any detailed compliance costs for the NZDF is because the CAA does not have access to those details.

Although compliance costs associated with the equipage of ADS-B equipment and installation of ADS-B systems might not have been as detailed in the NPRM as anticipated, the CAA advises that it provided the necessary cost details in the Regulatory Impact Statement (RIS) on which approval for the proposal was based.

Submission

A submission pointed out that the wording in the explanatory notes of the NPRM (page 12) could be misconstrued to mean that Airways is responsible for the operator's costs, rather than the ground infrastructure costs, which was the intent.

The wording of the explanatory notes are provided as follows:

"Airways, as the owner and operator of the surveillance infrastructure, is responsible for the procurement, installation, and operational costs of the ADS-B Out system. There are costs to Airways for the installation of a network of ADS-B ground stations and contingency radar network. The costs of this solution will be borne by Airways as the owner of this infrastructure and by participants through Airways' fees and charges."

The submission suggested some correction to the wording which should have stated instead "...and the operational costs of the ADS-B ground infrastructure". This would have made the intent clearer.

CAA Response

The CAA regrets any inadvertent misinterpretation of facts arising from the statement in the NPRM. The CAA agrees with the correction submitted regarding the operational costs of ADS-B, that it is the cost of ground infrastructure only that is borne by Airways.

Providing clear communication about the rule changes

Submission

A submission expressed that the CAA (or Airways) should '*provide clear communications to all airlines about the Rule changes to ensure (a) that it is well understood and (b) that airlines have the necessary information to comply with the new rules. These communications should be made well in advance of 31 December 2018*'.

CAA Response

The CAA advises that it has already communicated, and continues to communicate to all airlines, and other interested parties, about the rule proposals including important milestone dates, such as 31 December 2018¹¹.

The CAA has done this by publishing information about the rule proposals on the CAA website. The CAA has also used other means of informing the airlines and other interested parties through a conference it hosted in 2016, and roadshows held in the main centres of New Zealand in 2016 and this year. Plans are underway for a conference to be held in Auckland in 2018. It is expected that a range of delegates from both the local and international aviation fields will participate at the conference.

The CAA invites representatives from the airlines and other interested parties to make use of this opportunity to learn more about the rule proposals and associated initiatives. More details about the conference will be made available on the CAA website in due course.

The CAA has recently contacted all Part 129 (Foreign Operator) certificate holders with information about the proposed rule change.

Related reading material

Clause 2 of the AC cites the FAA advisory circular:

AC 20-165B, Airworthiness Approval of Automatic Dependent Surveillance - Broadcast Out Systems as a related reading material.

Submission

A submission queried the reason for referring to the FAA AC 20-165B only, given that the 'FAA which is at odds with ICAO and rest of world'. It was suggested that AMC 20-24 and CS-ACNS should also be added to the list of related reading material.

CAA Response

The CAA agrees with the submission to add AMC 20-24 and CS-ACNS to the list of related reading material, in clause 2 of the AC. The CAA advises that the document ICAO Circular 326 will also be added to the list.

¹¹ Date when all aircraft must be equipped with the ADS-B equipment specified in rule 91.257 if operating in transponder mandatory controlled airspace above flight level 245.