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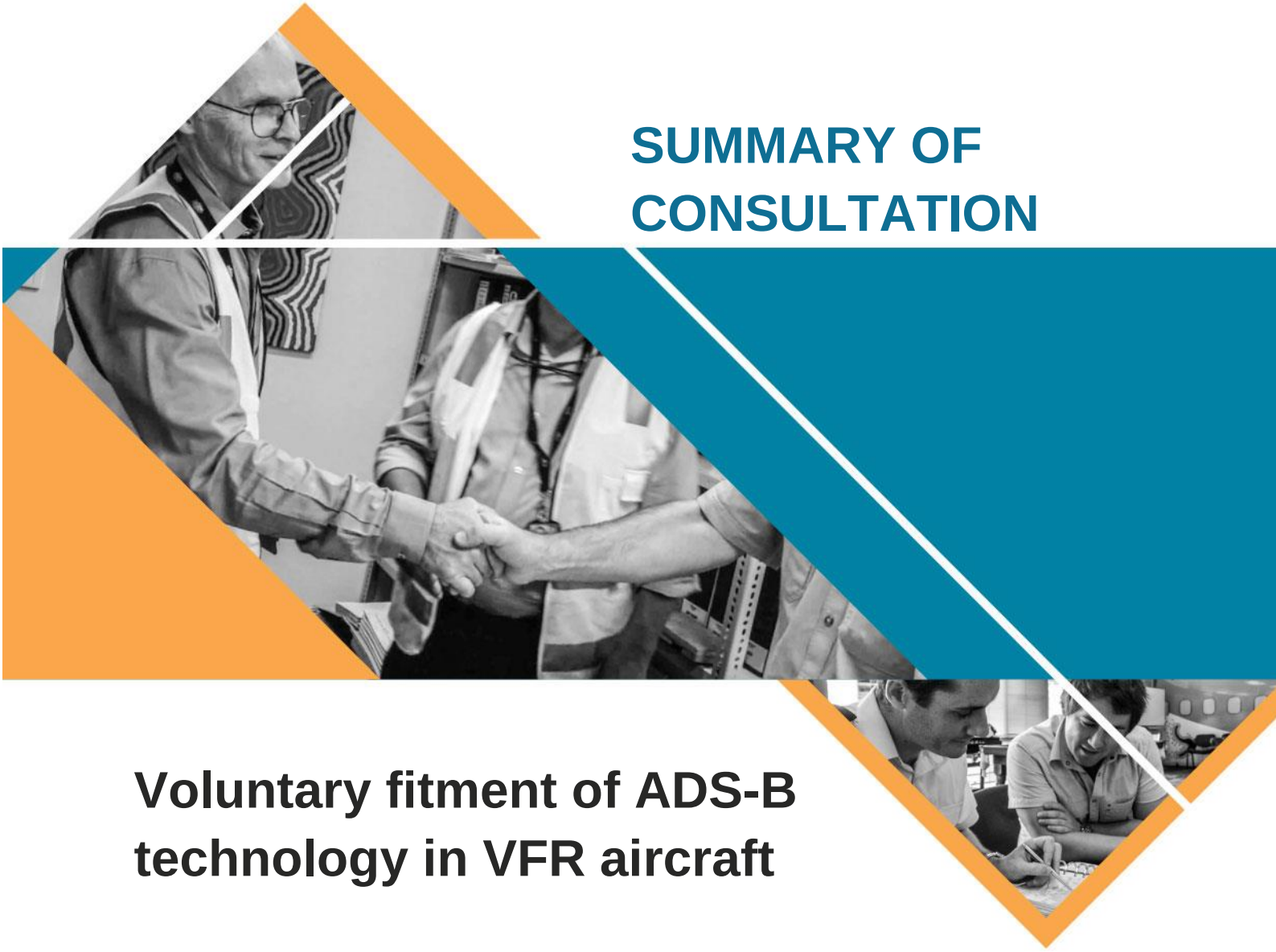
Civil Aviation Safety Authority



SUMMARY OF CONSULTATION

Voluntary fitment of ADS-B technology in VFR aircraft

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Introduction

CASA published a discussion paper (DP) 1701AS — Voluntary fitment of ADS-B technology in VFR aircraft — on the CASA website from 15 December 2017 to 23 February 2018.

About this consultation

The DP explored potential options for increasing the voluntary fitment rate of Automatic Dependent Surveillance - Broadcast (ADS-B) across Australia's fleet of aircraft that operate under the visual flight rules (VFR). These options included reducing the cost of installing equipment, allowing equipment that meets technical standards but without formal authorisation, allowing equipment meeting a lower cost Traffic Awareness Beacon System (TABS) technical standard, and developing Australian Technical Standards Orders for lower cost ADS-B equipment.

CASA also asked for feedback from the VFR community on its interest in, and the likely uptake of, the options and products, if they are made readily available.

Respondents

We received a total of 80 submissions. 61 respondents consented to have their comments published on the CASA website.

Summary of feedback

Installers and manufacturers: are the proposals an incentive to install?

The responses from those respondents identifying as installers or manufacturers was varied. Two out of six respondents said the proposals were a positive incentive to install ADS-B. The remaining respondents were either unsure or responded:

- ADS-B fitment should be mandated for VFR, similar to the USA
- There should be no relaxation of existing standards for installing avionics in aircraft
- The proposals were inappropriate and technology other than 1090MHZ ADS-B should instead be allowed.

Aircraft owners: are the proposals an incentive to install?

Nearly half the respondents (48%) said the proposals were a positive incentive to install ADS-B equipment in their aircraft. Several respondents said they had equipment ready to install as soon as CASA would give the go ahead. There were two clear messages:

- Installation of ADS-B in the VFR fleet must remain voluntary.
- Prices as mentioned in the Discussion Paper were still too high and, unless reduced, would not be an incentive for aircraft owners to install ADS-B technology.

Is 1090ES ADS-B the appropriate technology?

Seventy three percent of respondents agreed that 1090ES would be the appropriate technology for fitment of ADS-B OUT in VFR aircraft.

One respondent said Australia should also consider 978MHz - Universal Access Transceiver (UAT) technology (in conjunction with 1090ES) for use in specific circumstances, such as concentrated gliding operations at a particular place.

Those respondents disagreeing with the use of 1090ES technology recommended specific Electronic Flight Bag (EFB) solutions or situational awareness products using frequencies other than aviation-specific frequencies (for example via 3G/4G telecommunications or public bandwidth low power networks - 858/915 MHz etc).

Should ADS-B be compatible with ADS-B IN/OUT, ACAS and Mode S radar?

Seventy six percent of respondents agreed that an ADS-B solution should be compatible with ADS-B IN/OUT, ACAS and Mode S (SSR). However, there was qualification in this agreement. While most respondents simply agreed, several respondents said the priority should be ADS-B IN compatibility because, among other factors, ACAS and other compatibilities will increase complexity and cost.

Are the proposed installation requirements for type certificated aircraft likely to be an appropriate cost saving measure?

Seventy eight percent of respondents agreed that the proposal would be an appropriate cost saving measure. Specific feedback recommended:

- reduced cost installation should also apply to charter aircraft
- different methods for reducing installation costs - for example issuing an advisory circular with standard instructions for installing ADS-B and allowing maintainers to perform installations in accordance with the AC.

Other feedback indicated such detailed list of requirements would not result in significant savings and CASA should consider less complicated installation requirements.

Are the proposed installation requirements for other than type certificated aircraft likely to be an appropriate cost saving measure?

A lower proportion of respondents (62%) agreed that the proposal would be an appropriate cost-saving measure. On the one hand, some respondents enthusiastically endorsed the idea of experimental aircraft owners being able to install ADS-B without excessive regulatory oversight. On the other hand, some respondents said that aircraft sharing the same airspace should have equipment of the same standard.

Portable installation proposal

Sixty five percent of respondents agreed and 13% disagreed with the proposal on portable ADS-B devices. Despite the lower proportion of agreement, several respondents commented positively about the lower output power proposal. One respondent, while agreeing with the proposal, said the standard avionic peak transmit power requirement (70W) is not an unreasonable expectation and it is required to overcome the vagaries of installation, antenna design, and atmospheric conditions.

TSO-C199 appropriate for use in Class E or G airspace?

Sixty five percent of respondents also agreed with the proposal to allow ADS-B avionics conforming to TSO-C199 within Class E or G airspace; while 10% disagreed. A range of specific feedback was provided as summarised below:

- TSO-C199 provides a clearly defined standard ideal for VFR airborne traffic awareness and ATC situational awareness at costs far below those that apply to ADS-B installations certified to TSO C166B and in accordance with CAO 20.18.
- Requiring 'certification' to TSO-C199 will increase cost and reduce its attractiveness.
- Non-TSO ADS-B equipment should be allowable in Class E & G airspace.
- Equipment of this type should also be useable in Class D airspace.
- CASA should consider a cheaper, non-TSO unit - even if it is restricted to sole use in Class G airspace.
- From an avionics manufacturer:
  - Class A TABS devices (devices with transponder, altitude source, and ADS-B OUT functionality) are unlikely to gain significant market share.
    - This is because the small difference between TSO-C199 requirements and the requirements for full Mode S (e.g. DO-181E), together with limited useability of TABS in US airspace, does not provide a market large enough to invest in development and certification of such devices.
  - However, TABS Class B (position source only) devices may provide an opportunity to reduce costs, as they offer position source solutions at significantly lower cost than IFR-capable ADS-B position sources.

Australian Technical Standard Order (ATSO) for ADS-B OUT

Less than half the respondents (47%) agreed that Australia should develop ATSOs to support the implementation of ADS-B for VFR. Some respondents said Australia should not waste money or 'reinvent the wheel', and that Australia has too small a market to set a unique standard. Conversely, some respondents said that a suitable ATSO could reduce the cost and difficulties, including those associated with meeting FAA TSO requirements.

Technical standard for ADS-B equipment for non-type-certificated aircraft

More than three quarters (76%) of respondents agreed that equipment meeting (but not formally certified) the proposed technical standards should be useable in non-type-certificated aircraft. Specific comments included:

- Type certificated and aircraft heavier than 5,700kg should be able to use this equipment.
- There needs to be control over equipment standards.

Several respondents with expertise in ADS-B technical standards provided comment on the specific aspects of the technical proposal. For example, the DP proposed equipment meeting standards of the initial version of TSO-C166. However, equipment of this standard would not transmit the information needed to distinguish between VFR situational awareness-only equipment from IFR standard equipment.

Use of non-TSO-authorised equipment in controlled airspace

More than half the respondents (55%) agreed that non-TSO-authorised equipment of the proposed standard should be useable in controlled airspace. Some respondents said equipment suitability should be carefully controlled or that a TSO unit would be more appropriate, considering the current range of users and the possible higher concentration of traffic.

Table of proposed ADS-B criteria for use in different airspace classes

There was no clear preference for the options given in the table, with 46% agreeing with the proposed criteria, 31% disagreeing and 13% indicating they were unsure one way or the other. The table included prices for various types of equipment and this elicited several comments about the high prices. Some respondents said that TSO-C199 equipment should also be useable in Class C or D airspaces, and some said that type-certificated VFR aircraft should be able to use non-TSO-authorised (but standards compliant) ADS-B equipment in all airspace classes.

A respondent with expertise in ADS-B technical standards provided comment on the specific aspects of the technical requirements, particularly that equipment meeting DO-260 or DO-260A standards are not compliant with the FAA 14CFR 91.227 standards (the relevant standard being DO-260B) and that CASA should only accept the newer standard.

Use of ADS-B OUT in RPAS

There was no clear preference for CASA's proposal to restrict the use of ADS-B in RPAS, with 45% agreeing with the proposed criteria, 27% disagreeing and 20% indicating they were unsure one way or the other. The DP proposed the restriction over concerns with large numbers of RPAS saturating the system with ADS-B transmissions. Some respondents said that it would be better for every RPAS to broadcast its position rather than not. Other respondents agreed with the saturation argument and suggested ADS-B use should be limited by weight, size or type of operation (above a particular height, beyond visual line of sight, commercial operations, etc).

A manufacturer of ADS-B avionics said the issue of saturation had already been recognised and that a potential solution could be ultra-low power output ADS-B equipment (0.5W) with a maximum range of 10 miles.

Additional feedback

Additional feedback stressed that cost will be the critical factor influencing the uptake of ADS-B. Some respondents also raised concerns about privacy considering 1090ES ADS-B transmits on an open unencrypted frequency.

Despite these concerns, many respondents who provided additional feedback expressed support for the initiative and could see the value of ADS-B being widely adopted across the VFR community.

Next steps

We appreciate the time and effort taken by members of the aviation community to respond to DP 1701AS. We have carefully considered each response in determining the next steps for setting standards aimed at enhancing pilot situational awareness by electronic means.

Future direction

Type Certificated Aircraft

Considering the support given to the proposal for ADS-B installations to be classed as minor modifications and to eliminate Engineering Orders, CASA intends to proceed with rule changes to enable these provisions.

Non-type certificated aircraft

For non-type certificated aircraft including amateur home built and sports aviation aircraft, CASA intends to proceed with any necessary regulatory arrangements to facilitate owners and operators to install ADS-B avionics under self-administration arrangements. Refer to the proposal in relation to non-certified avionics.

ADS-B avionics for VFR aircraft

For type-certificated VFR aircraft intending to operate in Class C airspace (or Class A where specifically approved), CASA does not intend to change the standards and requirements for ADS-B OUT equipment as currently detailed in Civil Aviation Order 20.18.

For non-type certificated aircraft intending to operate in any airspace class (including Class C airspace), CASA intends to proceed with rule changes that will allow uncertified ADS-B OUT avionics that meets the performance standards specified in CAO 20.18, the USA's 14 CFR Part 91, or equivalent European standards.

Under this arrangement, the user would need to use equipment recognised or listed by CASA, the FAA or EASA as suitable for use in controlled airspace (such as '2020 compliant' or equivalent).

For operations by any VFR aircraft in Classes D, E and G airspace:

- CASA intends to proceed with rule changes that allow the use of avionics that meet the performance standards of TSO-C199 {standard for Traffic Awareness Beacon System (TABS)}.
  - This is to cover the possibility of more products entering the market in the future.
- Recognising the limited market for TABS, CASA also intends to allow devices that meet the UK's Electronic Conspicuity (EC) standards specified in CAP 1391.
  - In particular, CASA favours equipment designed to the CAP 1391 specification that allows transmission of accuracy and integrity indications greater than zero.
- In all cases, the user would need to use equipment recognised or listed by CASA, the FAA or EASA as meeting the relevant performance specification.

Note: The reference to Class D airspace does not imply that CASA intends to mandate the use of ADS-B avionics in VFR airspace in this class of airspace.

Portable avionics

CASA intends to proceed with rule changes that allow a portable ADS-B transmitter to be used by *any* VFR aircraft (*not just unpowered aircraft*) according to the following circumstances:

- The device meets the technical specifications of TSO-C199 or CAP 1391 (specifically equipment eligible to output accuracy and integrity values greater than zero)

- The device is recognised or listed by CASA, the FAA or EASA as meeting the relevant performance specification.
- In Classes D, E and G airspace, a portable device would be operable concurrently with an aircraft's existing Mode A/C transponder.
  - The combination would make the aircraft visible on TCAS, ADS-B IN and ATS surveillance.
- If it can be demonstrated there is no interference when an EC transmitting device is used concurrently with an aircraft's Mode S transponder, then CASA will consider allowing this combination as well.

Note 1: Trials are underway in the UK to test the Mode S transponder/EC configuration.

Note 2: It may be more practical to integrate a non-transmitting TABS position source with a Mode S transponder than to have separate transmitting devices.

ADS-B in RPAS

CASA wishes to carefully balance the safety benefits of RPAS being electronically visible with the potential for system saturation and problematic use of non-conforming devices. To this end, CASA intends to apply the same technical standards and operational procedures to the use of ADS-B in RPAS as are applicable to conventional VFR aircraft. In particular, ADS-B transmissions while operating within controlled airspace would be strictly subject to air traffic control approval or instructions.

ADS-B IN or ADS-B receiving equipment

CASA intends to encourage the adoption and use of ADS-B IN or receiving equipment in all forms of aircraft. In particular, the options for installing or using ADS-B equipment would apply equally to ADS-B receiving equipment.

Other aspects of the responses

CASA is aware of the trial underway in the UK to broadcast weather and aeronautical information via UAT. In line with our desire to electronically enhance pilot situational awareness, we are supportive of any suitable technology.

However, if implemented in Australia, UAT services would be entirely community-based (aerodrome, gliding/flying clubs etc). Accordingly, proponents would be entirely responsible to gain approvals to use the UAT frequency (978MHz) and to implement and operate the necessary equipment and interfaces.

It is important for UAT proponents to clearly understand CASA has no intention to implement the technology for air traffic service purposes, Traffic Information Service – Broadcast (TIS–B), or as a primary or alternative means of meeting ADS-B equipment requirements as currently specified in CAO 20.18.

CASA notes the suggestions for situational awareness products using frequencies other than aviation-specific frequencies. While each has merit, CASA's primary concerns are about compatibility and standardisation - the ability for information to be shared across different devices and for data output to meet a recognisable standard. Accordingly, our primary focus will be on internationally recognised open standards that do not require proprietary solutions.

In proposing ADS-B technology, CASA has no intention to diminish entitlement to privacy. We acknowledge that 1090ES ADS-B is easily detectable; but this system greatly facilitates

electronic situational awareness at reduced cost. As the proposals are voluntary, the community is free to balance privacy concerns with the benefits of enhanced situational awareness.

Timeline for change

CASA remains committed to implementing the changes as proposed at the earliest opportunity. However, it is not possible to accurately predict when the VFR ADS-B legislative changes will occur as there are many other legislative drafting activities presently underway.

All legislative changes will be publicly consulted, at the earliest opportunity, using the Notice of Proposed Rulemaking (NPRM) process.

Published Responses

View submitted responses where consent has been given to publish the response.