

### **Southern Sky Avionics Workshop Assessment**

New Southern Sky Programme - Civil Aviation Authority



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## **Executive Summary**

Automatic Dependent Surveillance-Broadcast (ADS-B) is a surveillance system that enables aircraft to receive data from navigation satellites. This is different from the existing surveillance system, in which information about an aircraft's position is obtained through radar signals. From 31 December 2021, the Civil Aviation Authority (CAA) is proposing to mandate ADS-B OUT in all controlled airspace. New Southern Sky (NSS) is the programme within CAA overseeing the change. Past the mandate, no aircraft will be permitted in NZ controlled airspace without ADS-B OUT equipment.

Abley were engaged to assess the capacity of NZ avionics shops to fit ADS-B upgrades by the mandate. We contacted all avionics workshops in New Zealand to gather quantitative and qualitative data through semi-structured interviews. Interviewees provided information on their workshop's capability to fit ADS-B upgrades as well as feedback on barriers that they and their customers are experiencing with regards to ADS-B.

Not all aircraft will need to have ADS-B by the mandate as for example some do not need to use controlled airspace. The target number of aircraft expected to need to equip by the mandate is 2,763 as per NSS numbers. Some of these have already equipped. Nationwide, the capacity is available in avionics workshops to fit all 2,763 aircraft by December 2021. Furthermore, capacity could be increased at five workshops if demand justified it.

NZ avionics workshops currently perform an estimated 31 ADS-B fitouts per month. This study has established that in order to meet the target number by the mandate a minimum of 88 ADS-B upgrades need to be fitted every month by NZ avionics workshops. This report identifies the current low numbers of fitouts to be due to slow customer adoption instead of workshop capacity.

Findings of this study suggest that the slow customer adoption is caused by uncertainty among customers about the mandate, technical standards, and a rumoured government grant. Workshops themselves are also pointing to regulatory barriers, some supply chain challenges, and staffing limitations. It appears that some of the brakes to customer adoption could be lifted by CAA or NSS clarifying the points of uncertainty relating to the mandate, technical standards, and the grant.

## 

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## 1. Background

The National Airspace and Air Navigation Plan (NAANP) provides clear direction on the safe, cohesive, efficient and collaborative management of New Zealand's airspace and air navigation systems over the next decade. The New Southern Sky (NSS) programme is the delivery vehicle for the NAANP, engaging stakeholders within New Zealand's aviation sector in a consistent and collaborative manner.

One of the major changes being introduced into the aviation system is the migration away from traditional radar technology as a primary means of surveillance; Automatic Dependent Surveillance Broadcast, or ADS-B, will replace this in New Zealand (and globally under the ICAO Global Air Navigation Plan).

#### What is ADS-B?

Automatic Dependent Surveillance-Broadcast (ADS-B) is a surveillance system that enables aircraft to receive data from navigation satellites via a global navigation satellite system (GNSS) receiver. The aircraft then broadcasts information, up to twice a second, on its identification, position, altitude, speed, and intention. The broadcast system is the ADS-B transponder which sends data to the ground receivers.

The data received by ground stations is then transmitted to the air traffic management (ATM) system for display to air traffic controllers who use it to maintain aircraft separation in controlled airspace. This is different from the existing surveillance system, in which information about an aircraft's position is obtained through radar signals.

ADS-B IN systems provide aircraft with the additional ability to receive information from other ADS-B OUT equipped aircraft in range. This can provide improved situational awareness to pilots equipped with ADS-B IN.

#### ADS-B timelines

The mandates for ADS-B OUT are in two stages:

- Since 31 December 2018, ADS-B OUT has been mandatory for aircraft operating in controlled airspace above flight level 245 (24,500 ft). (Airliners, business jets and jet cargo aircraft).
- From 31 December 2021 CAA is proposing to mandate ADS-B OUT in all controlled airspace.

The proposed 31 December 2021 mandate is aligned with the planned end of life of most of the current radar network. It is estimated that 80% of aircraft operating below FL245 will be subject to the mandate. Aircraft that are not equipped with ADS-B will not be permitted in controlled airspace.

## 2. Objectives and Methodology

#### Objectives

Abley were engaged to:

- Conduct planning and research into the capacity of NZ avionics shops to fit ADS-B upgrades by the mandate, and gathering data on this capacity.
- Conduct analysis and evaluation of this data.
- Prepare a draft report for feedback from NSS team.
- Prepare the final report for publishing and release.

#### Methodology and sample

A semi-structured qualitative telephone and face to face approach was used in order to meet the research objectives. This approach allowed for the exploration of certain areas of information to be conducted in-depth whilst at the same time allowing for the gathering of more structured avionics-capacity information.

A list of contact details was provided by NSS to Abley for all 17 workshops to be interviewed. Most were intended to be phone interviews but four were intended as in-person interviews.

Every effort was made to ensure all avionics workshops were contacted. Abley followed the below process in order to obtain interviews:

- 1) Initial email sent to the main contact for each workshop with an enclosed letter (see letter template in Appendix B).
- 2) If the workshops replied, Abley sought to arrange a time for an in-person or phone interview.
- 3) Where no response was received, Abley chased the workshops by email or phone.
- 4) Where no appointment could be made with interviewees, Abley proceeded to cold calling the interviewees.

Abley staff also attended an industry meeting between NSS, CAA, Airways, and four local avionics workshops at Ardmore Airport on 10 September 2019. This was an opportunity for informal chats with stakeholders including the workshops, and for an in-person interview with one of the workshops.

## 3. Workshops Interviewed

A total of 15 workshops and 1 independent contractor were interviewed nationwide, eleven in the North Island and five in the South Island, as summarised in Table 3.1. The duration of each interview varied from 10 minutes to one hour with the average duration being half an hour.

Table 3.1 Workshops included in this study

Workshops Included in this study	Region	Method
North Island		
Airwork NZ	Auckland	Telephone
Avcraft Engineering	Feilding	Telephone
Aviation Radio	Wellington	Telephone
Avionics Hawkes Bay	Napier	Telephone
Fieldair Engineering Ltd	Palmerston North	Telephone
Hamilton Aero Maintenance	Hamilton	Telephone
ICEA Ltd	Auckland	Face to face interview
Liviu Avionics and Instruments	Auckland	Face to face/ email (* see Table 3.2)
Oceania Aviation	Auckland	Telephone
Primary Avionics	Waikato/ Bay of Plenty	Telephone
South Pacific Avionics	Papakura Auckland	Telephone
South Island		
Allison Avionics	Christchurch	Self-Completion
Avionics Canterburywide	Rangiora	Face to face interview
SAB Avionics Ltd	Wanaka	Telephone
Performance Aviation	Wanaka	Telephone
(Independent Contractor)	Wanaka	Telephone

#### Issues encountered in gathering the data

Some workshops are very busy in September so a few interviewees could only spare limited time to answer questions. Two workshops could not be included, and one provided some information as explained in Table 3.2.

Table 3.2 Workshops not interviewed

Not Interviewed		Reason
PHI International	Nelson/ New Plymouth	This workshop indicated that they only service their own fleet and do not deal with customers. They have been excluded from this study.
Airbus Group NZ	Blenheim, Auckland, Ohakea, Whenuapai	Airbus service all aircraft for NZ Defence Force and being such a key operation of theirs they were reluctant to discuss any detail on what they fit to their aircraft for reasons of confidentiality. As such Airbus are excluded from this study.
*Liviu Avionics and Instruments	Auckland	Being too busy, they only provided limited information.

Our Ref: CAANZ-J001 Southern Sky Avionics Workshop Assessment Final Report v2.0

### 3.1 Customer Background

The survey sought to establish some background information about the customers serviced by the various avionics workshops across New Zealand. The workshops were asked what proportion of their customers use controlled airspace. Figure 3.1 shows that North Island workshops had a higher proportion of their customers flying in controlled airspace relative to workshops in the South Island. Many in the South Island were able to avoid controlled airspace, particularly customers south of Canterbury.



Figure 3.1 Flying in controlled airspace

Workshops were then asked what proportion of their customer base was commercial versus recreational. Figure 3.2 shows that North Island workshops reported a higher proportion of commercial customers than South Island workshops.

Note: proportions of commercial versus recreational aircraft owners assessed through workshops would underestimate the number of recreational aircraft among the total registered fleet in New Zealand. This is because some recreational owners may rarely or never visit a workshop so they would not be counted by the latter. Figures provided by NSS describe a nationwide split of all registered aircraft between 33% commercial and 67% recreational.



Our Ref: CAANZ-J001 Southern Sky Avionics Workshop Assessment Final Report v2.0

### 3.2 Types of Aircraft Serviced

One workshop specialised in helicopters and the other (independent contractor) mainly worked on helicopters, the remaining workshops serviced a broad range of aircraft with six servicing all types of aircraft.

Table 3.3 Types of aircraft serviced

Types of Aircraft	Number of Workshops
Small aircraft, helicopters, microlights, light sport aircraft	3
Medium and small aircraft, helicopters, microlights, light sport aircraft	4 (one of these did not do microlights)
All types of aircraft, helicopters, microlights, light sport aircraft	6
Only helicopters	2
Declined comment	1

## 4. Capacity of ADS-B Fitouts

Abley sought to estimate current and potential fitout rates at a national level based on feedback from each workshop. It is important to bear in mind that the figures gathered through workshop interviews are on-the-spot estimates provided by interviewees based on their knowledge of their workshop's activity and of the industry. The estimates presented here merely provide an indication of the capacity of the industry and are not to be treated as definitive. To gauge capacity workshops were asked:

- a) How many ADS-B upgrades do you currently fit per month and have planned for upcoming months? (Question 9 of survey questionnaire Appendix A)
- b) What is the sustainable number of ADS-B upgrades you are able to undertake per month comfortably along with your current workload? (Question 10)
- c) Do you have any plans to increase this capacity within the December 2021 timeframe? (Question 11)

### 4.1 Current Undertaking for ADS-B Fitouts

Nearly all but one of the workshops currently fit ADS-B equipment. One South Island based workshop didn't fit ADS-B: they had the capability to do so but not the testing equipment. They reported to not having invested in the testing equipment due to a lack of customer demand to install ADS-B as of yet. In total, about 31 ADS-B fitouts took place in the last month, with most taking place in the North Island. The fitting of ADS-B was so new to some workshops it was difficult for them to provide a monthly estimate. In this case three workshops reflected on the number of ADS-Bs they had installed to date (nine in total in recent months) which were not added to the monthly estimate.



Figure 4.1 Current ADS-B fitouts per month

Six workshops reported a higher proportion of ADS-B fitouts done by commercial customers (between 60% and 80%) and another three reported a higher proportion among recreational customers (66% to 95%). A further six workshops were unable to comment.

Our Ref: CAANZ-J001 Southern Sky Avionics Workshop Assessment Final Report v2.0

#### Current bookings for the months ahead

The number of ADS-B fitouts scheduled in for the months ahead varied greatly by workshop and was predominantly driven by customer requirement. In total five workshops were able to state definitely that they had ADS-B fitouts booked in for upcoming months with the remainder stating none were booked ahead. Three workshops had bookings for the immediate future (two months ahead) and two workshops had bookings for five to six months ahead. In total there were 41 ADS-Bs booked in for completion in the months ahead.

#### Table 4.1 Current bookings for the months ahead

Number of aircraft	Timescales
_ 8	Next 2 months
_ 33	3-6 months
TOTAL: 41	Within the next 6 months

Due to most workshops just getting started on their ADS-B fit outs, many could not report on a clear trend and found it difficult to plan ahead and anticipate demand. Some customers were reported to be proactive in fitting ADS-Bs while others would equip at the same time as they do scheduled maintenance:

"Some customers give a year's notice and others a day. Some [customers] are reactive, some [customers] are doing it when they're having to bring their aircraft to the workshop anyway"

The impression from some of the workshops is that even though customers knew they would have to do the upgrade they were not treating it as a priority or not anticipating bottlenecks.

#### Manufacturers

**Figure 4.2** shows the most common manufacturer used was Garmin, followed by Trig, Lynx L3 and Appareo. Other types used were Bendix King, Harris, Avidyne, and Rockwell Collins. In total four workshops were Garmin service centres and the fifth had moved beyond a service centre and were Garmin dealers. All workshops used at least two different manufacturers, but most used three or four. Many reported to stocking a number of ADS-Bs from different manufacturers on their shelves in order to respond to last minute requests from customers (see paragraph 5.2). Lynx L3 were reported as being easy to install. Some workshops referred to problems with the availability of equipment (see paragraph 5.2), but not the majority.



"We have the capability of booking [the ADS-B fitouts] with 1 weeks' notice, this comes down more to availability of equipment from manufacturers - sometimes the gear can take a month to come."

Our Ref: CAANZ-J001 Southern Sky Avionics Workshop Assessment Final Report v2.0

Figure 4.2 Proportion of the workshops using each of the main manufacturers



#### Time it takes to fit ADS-B transponders

Workshops were asked how many days it would take to install an ADS-B upgrade along with other maintenance work in the workshop. Responses varied greatly as there are differences in time according to the aircraft being fitted. In general fitting a new ADS-B took from two days to a week to install depending on the aircraft. Some workshops commented that customers failed to realise the time it takes and the complexity involved in fitting an ADS-B and this influenced their perceptions on how much time they had to act. Swapping out a mode C and adding GPS to a compliant ADS-B resulted in minor time saving but many reported on the amount of paperwork required for such activities resulting in little time saving.

#### Table 4.2 Number of days work to equip

Activity	# days
Complete new install from no transponder	2 – 5 days depending on the aircraft
Swap out a mode C/ Mode S transponder using the same installed location in the aircraft	1 – 4 days
Add GPS to a compliant ADS-B transponder	1 – 3 days

### 4.2 Anticipated Future Capability

#### Monthly throughput capacity

In addition to gathering data on current fitouts per month, Abley also asked the workshops about their:

1) Sustainable fitout numbers per month (along with current other workload);

2) Maximum fitout numbers per month if they were planning on increasing their capacity (e.g. by hiring staff, reprioritising their workload, expanding facilities or equipment, etc).

These are synonymous to 1) current capacity and 2) maximum future capacity.

1) Current Capacity

The assessment established that current fitout numbers per month are well below current capacity; there is unmet capacity in most workshops. Figure 4.3 shows that all the workshops' efforts combined are capable of more than doubling the number of upgrades each month, and such increase can easily fit within their current workload.

2) Maximum Capacity

Five workshops reported considering increasing capability to respond to demand. They each provided estimates of how many more upgrades they could perform per month if they did increase to their maximum. If all five workshops do complete their envisaged capability increase this would add another 21 ADS-B fitouts per month to current national capacity, basing on the estimated additional capacity they reported. This is the "Maximum Future Capacity". Figure 4.3 shows that North Island workshops have a far greater capacity to increase fitouts than South Island workshops and four out of five workshops prepared to make changes to accommodate excess demand are North Island based.



Figure 4.3 ADS-Bs fitted per month\*

#### Overview of the nationwide fleet

In order to clarify the context in which this study's findings are to be interpreted, it is important to summarise the segments of the nationwide fleet that are referred to. NSS has provided headline figures to Abley to ensure projections are based on sound data.

The number of aircraft that are likely to require avionics workshops to equip them with ADS-B by the mandate does not equate to all aircraft on the register in New Zealand. The main reasons are the following:

- Aircraft above Flight Level 245 are assumed to have already equipped.
- Some recreational customers may decide not to upgrade at all or to only upgrade after the mandate. This could be because they are not using controlled airspace for example.
- Microlights and amateur-built aircraft have different specifications and some of them can be upgraded by their owners, so they might not visit any avionics workshop.
- Some aircraft are already equipped.

Figure 4.4 provides an overview of the different segments, summarises progress to date, and clarifies the number of aircraft left to equip at the time of this study.

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Figure 4.4 Nationwide Fleet in Relation to ADS-B (NSS estimates)

Two "left to equip" numbers are proposed in the above figure. They take different factors into account:

- Left to equip (A) is a high-level estimate showing the contribution microlights and amateur built aircraft make to the challenge of fitting all aircraft expected to equip by the mandate. Some of them will be upgraded by their owners so they will not take up capacity in avionics workshops. How many of them will resort to avionics workshop is undetermined.
- Left to equip (B) does include microlights and amateur-built aircraft, treating them like other aircraft types. This number represents the key target to be met by the mandate as these aircraft are considered by NSS to be the ones that will most need to be upgraded by 31 December 2021. This assumes that all aircraft below FL245 that have already equipped are part of the target segment and not, for example, non-commercial aircraft that do not use controlled airspace regularly.

In summary, the figure to assess fitout projections against is the total number of aircraft expected to equip (2,763), of which 2,367 are assumed to be left to equip.

#### Projection of fitout completions



Figure 4.5 Projection of Fitout Completions to December 2021

#### Limitations of the above projections:

Please note the above projections are based on estimates provided by each workshop, thus numbers are not definitive.

Current level of fitouts (purple line): Eleven workshops reported on the number of fitouts they currently do per month (Q9a). Current capacity of workshops with seasonal fluctuations (yellow line): Thirteen workshops provided an estimate to how many upgrades they were able to do comfortably along with their current workload (Q10). This estimate was halved over the summer months (September to June) for nine workshops who reported lower rates of fitouts over the summer months. Current capacity of workshops without seasonal fluctuations (green line): This is based on thirteen workshops' estimate of Q10 without taking into consideration seasonal fluctuations. Maximum capacity of workshops (blue line): Five workshops said they would increase capacity to respond to demand (Q11a) this increased capacity was added to the response to Q10 from the other workshops. There is no seasonal difference estimated here.

The above **Figure 4.5** shows the projected numbers of completed fitouts over the next two years to the December 2021 mandate. These numbers account for the number of aircraft below FL245 that have already equipped (396) and the units that were fitted in September 2019 as reported by the workshops. For clarity, the corresponding colour coding from the graph is applied here:

- Based on current fitout levels, a total of 1,264 aircraft will be equipped in December 2021, which is under half of the total number of aircraft expected to equip (2,763).
- Considering the number of ADS-B fitouts workshops could comfortably perform, and taking into account other work and seasonal fluctuations, approximately 2,608 aircraft could be fitted which falls about 150 short of the 2,763 expected to equip.
- Disregarding seasonal fluctuations, 3,280 would be fitted comfortably within current workloads, which is 517 more aircraft than the 2,763 expected to equip.
- Five workshops said they would consider increasing capacity if demand justified it and if they could find the staff. If this was to happen, workshops would be able to equip 3,812 aircraft within the mandate. This is 1,049 more aircraft than the 2,763 expected to equip.

#### Impact on commercial customers

In line with trends identified by New Southern Sky in a recent survey of commercial aircraft owners, the current equipage rate across the country is well below what is needed for all commercial aircraft to equip by December 2021. There is, however, significant unused capacity to increase equipage rates.



In the target segment there are approximately 1,453 commercially operated aircraft and 1,310 recreational aircraft. As NSS specified that the priority is for commercial operators to be able to equip in time in order to avoid loss of business, the number of commercial customers that still need to equip is important. At the current level of fitouts, only 1264 aircraft will have equipped by the mandate. This is not enough to cover either the commercial or the recreational customers that are expected to equip, let alone all of them.

### • Key finding: The current level of fitouts is insufficient to ensure all commercially operated aircraft are equipped by December 2021.

Among the 396 aircraft below FL245 that have already equipped, it is not known how many are commercially operated and how many are recreational. However, the current capacity (without seasonality) of workshops is more than sufficient to fit all aircraft within the target segment, which includes all commercially operated aircraft under FL245. This projection sees all commercial aircraft equipped before the mandate. When seasonality is considered a projected 150 aircraft are expected to not be able to equip by the mandate, but these would be both recreational and commercial aircraft. This shortfall does not have to impact commercial operators if they all equip earlier than recreational aircraft owners so that the estimated 150 aircraft that did not equip in time are all recreational. So in this projection, earlier adoption by commercial customers can ensure all commercial aircraft are equipped before the mandate.

### • Key finding: Current workshop capacity is sufficient to ensure all commercially operated aircraft are equipped by December 2021 assuming fast adoption by commercial operators.

The maximum capacity projection suggests that all recreational and commercial aircraft within the target segment will easily be equipped by December 2021. This maximum capacity is unlikely to be realised because it is based on strong customer demand for ADS-B fitouts in workshops. The current demand for ADS-B fitouts from customers does not justify increases in equipage capacity at workshops as the demand is still well below current capacity. Additionally, the maximum capacity projection also relies on additional staff being able to be hired by the workshops who would decide to increase their capacity.

All projections lead to the same conclusion: customer adoption is the main challenge towards getting all aircraft of the target segment equipped. Workshop capacity is already sufficient and could even be increased if demand for ADS-B justified it. Workshop capacity will only co-determine how severe bottlenecks for ADS-B fitouts could be closer to the mandate if customers are to slow to book their upgrades.

#### • Key finding: Customer adoption, not workshop capacity, is the main cause for future bottlenecks.

Basing on the target number of 2,763, the number of upgrades already completed, and the number of months left (27) before the mandate, if customer adoption immediately increases to a minimum of 88 ADS-B upgrades per month nationwide, all aircraft of the target segment (including both recreational and commercial) will have equipped by the mandate. The longer it takes for monthly throughput to reach this level, the higher the monthly throughput will need to be in subsequent months.

### • Key finding: Commercial customers can still get ahead of the curve by booking in early to avoid disruption of their activity after the mandate.

The next section of this report is dedicated to understanding why customer adoption has been slow so far. This knowledge can inform strategies to prevent or reduce future bottlenecks.

## 

### 5. Identified Barriers to Higher Equipage Rates

### 5.1 Customer Adoption Barriers

#### Cost

Most workshops report their customers complaining about the cost of ADS-B upgrades but there are variations between workshops and segments (commercial/recreational).

In trend, while commercial customers were said to be "accepting of the necessity to do it but they just need to get on with it now", recreational customers seem less understanding of the need to pay for the units":

"Recreational customers are largely price driven, they want the cheapest system (which is still quite expensive) especially for small and cheaper aircraft like microlights. They feel the burden placed on them and are unhappy and grumpy and feel it has been forced on them."

"Mostly, what they see is the sheer cost of the upgrade, and they don't see the benefit to them compared to the transponder they already have. Five thousand NZ dollars is too much for owners of gliders for example. Many recreational customers are convinced that the Government should help, just the way Airways subsidised the installation of transponders decades ago. Some would still be waiting for the rebate, but some customers will probably just decide to stay below 2,000ft or to park their aircraft until they have enough money to do the upgrade. Some might just avoid controlled airspace."

However, there are also commercial operators for whom price is a barrier:

"[...} extreme frustration of them having to bear this cost for the benefit of NZ Airways. Commercial customers often go for the minimum (just ADS-B Out). Only about a third also have ADS-B In, probably because of cost."

And certain segments of the recreational market are less price sensitive, particularly when it comes to helicopters as they would be wealthier individuals.

As a result of cost being perceived as a major issue, many customers have been finding out about other types of units overseas and workshops report often having to explain that these units are not approved or cannot function in New Zealand (e.g. UAT or Universal Access Transponders). Some of them, both commercial and recreational, are also waiting to see if newer and cheaper units will come to market.

#### Downtime

Downtime was exclusively mentioned as an issue for commercial customers rather than recreational ones. It clearly appeared that most customers want maximum aircraft availability in Summer, which will have an impact on future ADS-B equipage rates. This is why one of the projections made in this report (see 4.2) takes seasonality into account.

"The customers want to have their downtime in winter, so we have just lost a whole winter of upgrades and now they are going to want to fly all summer rather than doing their upgrades."

Certain customers need to be flying all year round and have very limited opportunities to bring their aircraft to the workshop for an ADS-B upgrade. It is likely that they will try to tie the upgrade with their scheduled maintenance and other repairs as they do not want to ground an aircraft just for an ADS-B fit.

"Training organisations fly all year round except during the December-January holiday so that's when they could have some downtime."

"We deal with many medical rescue helicopters so when they get the aircraft in for maintenance they do a maximum at the same time."

One interviewee explained that their workload comes down to when the scheduled maintenance is booked in for and they do not experience seasonality. Another one also considered the workload to be *"steady and due to tourism down south it doesn't slow in winter"*.

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#### Uncertainty about Regulations and Subsidies

#### Grant

Workshops are sending a clear message that expectations of a "rebate" or government grant are currently causing delays to ADS-B fitouts.

"Lots are holding out for the subsidy and are unsure whether they will be paid retrospectively."

"The potential rebate from Government is a big uncertainty: many customers are waiting to see if the grant scheme happens or not so the Authorities need to clarify whether yes or no it is going to happen. This is equally affecting commercial and recreational customers."

Most workshops stated that many of their customers, both commercial and recreational, were delaying their ADS-B upgrade because of not wanting to miss out on the grant. One workshop did differentiate commercial customers in stating that the rumoured rebate is not really an issue for commercial customers as they anticipate the bottlenecks and don't want to lose business past the mandate.

#### Mandate

The rebate was not the only uncertainty stemming from the Authorities according to interviewees: the mandate itself is still being questioned because it has not been formally set:

"Private owners are still hoping the mandate won't apply to them, with for example a minimum flight level being introduced so that as long as they fly below this flight level, they don't need ADS-B."

"Nothing in CAA rules says that installing ADS-B by December 2021 is mandatory despite them and NSS talking about it."

"[Commercial customers] are also still waiting because it hasn't really been mandated. Although they know it's going to happen, they look for excuses not to do it."

#### Other feedback

#### ADS-B IN

Some customers, although a low proportion, have decided to include the IN component of ADS-B in their upgrades. These tend to be commercial operators who understand and appreciate the situational awareness:

"many commercial customers like the ADS-B [In and Out] because they see it as safer as they can see other aircraft. Particularly flying in Milford which although not controlled is very busy."

"They see it as a valuable tool - they like the idea of being able to see other aircraft on their screen."

"The customers who are leasing the few ADS-B equipped helicopters love having it. [...] It increases the cost of the lease but as long as the end product is what the customer was expecting they are ok with cost."

A contrasting view was expressed by one of the interviewees:

"From a customer point of view ADS-B OUT doesn't do anything for them, it doesn't improve aircraft performance, doesn't improve their situational awareness. Even ADS-B IN is only good when everyone has ADS-B OUT, until then it's a false sense of security."

#### **Campaign plans**

As part of this study, every workshop was asked whether they had campaign plans in place to inform customers about the ADS-B mandate and encourage them to book in early to avoid bottlenecks.

Six workshops said they have ongoing or upcoming ADS-B information campaigns ranging from posters and flyers to ads in specialised magazines and online communications (website, facebook, newsletter). Beyond basic information about the mandate there were different focusses: one interviewee said he is a huge advocate of ADS-B IN for the situational awareness it provides pilots with. He recommends it to customers as it adds that much safety to the aircraft. Another company has specifically sought to warn their customers of the funnel effect, i.e. the bottlenecks that will likely occur

Our Ref: CAANZ-J001 Southern Sky Avionics Workshop Assessment Final Report v2.0

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closer to the mandate date. They told their customers to book now in advance and to choose their equipment so that the workshop can have the unit on shelf in time. One workshop is holding open days where customers can see demo products fitted in actual aircraft. Finally a workshop said to advertise ADS-B in order to drive sales but they are trying to stay away from providing advice due to the uncertainty on the mandate and technical requirements. However, when asked about ADS-B by general aviation customers they recommend upgrading as soon as possible in order to avoid bottlenecks towards December 2021 (as despite uncertainty around the mandate they think General Aviation will definitely have to do it).

Two workshops mostly communicate about ADS-B whenever they are having conversations with their customers. One of them tries to push the safety argument of ADS-B to customers but also the fuel saving argument (more direct routes). The second mentioned that CAA and Airways need to conduct more informed talks on ADS-B and that "[New] Southern Sky talks left many owners coming away more confused".

Four workshops do not do anything in particular to promote ADS-B upgrades. Partly, this is because they know that all their customers are aware of the mandate or that they will come to the workshop when they are ready. Another workshop isn't sure what to promote because "the rules aren't clear". The last one differentiated between commercial and recreational customers in saying that "commercial customers are easy: they're starting to do it now". As for recreational customers he would tell them to wait and see which system they need fitted and whether the rebate will happen. He is not ready to take the responsibility of telling a recreational customer to equip if there is a risk of this customer coming back to complain that he had to fit a more expensive system than required, or that he was not eligible for the rebate because he equipped early.

### 5.2 Workshop Bottlenecks

While several workshops pointed to customer demand being the variable they respond to, Abley have identified key obstacles preventing the workshops themselves from performing more upgrades.

#### Units and equipment

A few workshops mentioned that lead time on certain ADS-B units has recently been longer than usual. Some attributed this to the US market being in a phase of high demand because of their earlier mandate while others pointed at business decisions made by Garmin that impacted their supply chain. Garmin were said to have reduced the number of workshops that can fit all of their products.

Some customers bring their aircraft into workshops for other maintenance and then decide to get ADS-B fitted at the same time but the lead time on the equipment may be too long to allow for this. Therefore, a number of workshops try to have an inventory of ADS-B units on the shelf. They cannot stock up too many units either by reason of their high cost.

Two interviewees explained not owning the necessary test equipment because of its cost (NZD25-30,000).

#### **Regulatory barriers**

"CAA has still not released the rule, requirement, or specification for aircraft flying below 2,000ft. Microlights are all waiting to know what level of system they'll have to fit. As it stands, no private owner will get a top box installed (at higher price) before knowing whether a cheaper system could be approved too and whether they will get financial help at all. The longer it takes for CAA to make announcements that clarify the situation, the worse the bottleneck will be in the end."

Several workshops indicated not knowing what to fit on certain types of aircraft (e.g. microlights and light sport aircraft) so they tell their owners to wait for clarification from CAA. As NSS and CAA are aware of this issue, this study did not go into more detail. It is however likely to have knock-on effects on the overall nationwide capacity to equip all required aircraft in time as owners who currently delay their upgrades because of uncertain technical standards will add to the bottlenecks closer to the mandate date.

Another regulatory barrier mentioned by some workshops was the amount of paperwork required for some upgrades which are treated as major modifications by CAA where they see these upgrades as not justifying the amount of paperwork. They also argued that approval procedures are driving the cost of ADS-B up for the customer.



#### Staffing

The availability of qualified engineers either inhouse or externally was mentioned by many interviewees when asked about increasing their capacity to fit ADS-B. Two workshops said they have enough staff to increase their capacity simply by reallocating their engineers from other tasks. Another workshop has just hired an apprentice engineer, but the interviewee said it wouldn't really make a difference to ADS-B fitouts as the bulk of their work consists of scheduled maintenance. One workshop explained they have no plan to recruit any more for ADS-B as it is just "an artificial spike" in demand. They are reluctant to hire more engineers just for ADS-B and then have to let them go after the ADS-B rush is over because there would not be enough work to keep them busy anymore.

Seven workshops said they are planning to or would need to recruit more qualified engineers if they were to step up their ADS-B equipage capacity (along with other tasks). Out of these, six workshops described challenges in finding suitably qualified staff in New Zealand. These are a few examples:

"There are a limited number of fully qualified engineers in NZ – it is very difficult to get qualified and takes a long time."

- "[...] avionics staff are very hard to come by."
- "[...] problem with recruiting overseas as they have no NZ licence"

"Staffing might be an issue as 6 avionics engineers will be hard to find. We could get school leavers to do most of the work after 6 months of training."

Attitudes were split between those who had given up on recruiting because of skills scarcity, and those who were still considering recruiting knowing that it would be difficult.

# **Alabley**

Appendix A Survey Questionnaire



Workshop Name	Workshop Address	
Date	Region	

A major change to the aviation system in NZ is the move away from traditional radar technology as a primary means of surveillance to ADS-B (Automatic Dependent Surveillance Broadcast). This has been mandatory since December 2018 for large aircraft flying above 24 000ft. Did you know that in December 2021 this will also be mandatory for all aircraft wanting to fly in all controlled airspace including smaller aircraft (medium and small aircraft, gliders, helicopters, microlights)? There are currently only 13% of the 3800 aircraft operating below FL245 fitted with ADS-B equipment,

We are a third party assisting in scoping this undertaking. All your information will be reported anonymously and in confidence, there will be no details of individual workshop activity released. We'd like to ask you a few questions about your capability of fitting of ADS-Bs.

#### 1) What sort of aircraft do you currently service at your workshop?

✓ all that apply
Large aircraft
Medium aircraft
Small aircraft
Helicopters
Microlights
Light sport aircraft
Other (specify

#### 2) Are you able to service other sorts of aircraft such as (read aircraft not ticked at Q1)?

✓ all that apply
Large aircraft
Medium aircraft
Small aircraft
Helicopters
Microlights
Light sport aircraft
Other (specify

3) Roughly what proportion of your customers use controlled airspace?

%



- 4) What proportion of your customers are commercial vs recreational (an estimate)?
- % commercial
- % recreational
- 5) Does your workshop have the engineering capability to fit ADS-B equipment?
- Yes (proceed to Q7)
- no (proceed to Q6)
- 6) What would you need to be able to fit this device? What could the NSS do to enable you to fit this device?

- 7) Does your workshop currently fit ADS-B equipment?
- Yes proceed to Q8
- no skip to Q13
- 8) Which manufacturers do you use to promote and sell the ADS-B? (List all)

9) How many ADS-B upgrades do you currently fit per month and have planned for upcoming months?

a) # currently fit per month	
<ul> <li>b) How many months ahead booked in or notified upgrades</li> </ul>	

- 10) What is the sustainable number of ADS-B upgrades are you able to undertake per month comfortably along with your current workload?
- # per month



11) Do you have any plans to increase this capacity within the December 2021 timeframe?

- yes answer a and b
- a) To how many per month

|--|

- no
- 12) Taking into account your current workload (such as general maintenance and PBN upgrades), on average how many days would it take to install an ADS-B upgrade:
  - a) As a complete new install from no transponder?

#### # days

b) Swap out a modeC/ mode transponder- using the same installed location in the aircraft

#### # days

c) Add GPS to a compliant ADS-B transponder

#### # days

13) So far approximately how many of your customers as an overall proportion have installed an ADS-B component?

% installed ADS-B

14) Thinking about your customers that have installed ADS-B, what proportion were commercial vs recreational customers?

% commercial with ADS-B\_\_\_\_

% recreational with ADS-B

Don't know

15) Thinking about your commercial customers, are there any barriers to installing an ADS-B that you can think of? PROBE, RECORD ALL



- 16) Have they expressed any thoughts or attitudes towards having to install this equipment? PROBE, RECORD ALL
- 17) Do you experience any seasonal fluctuations with regard to your commercial customers? If so how does the demand fluctuate?
- 18) What about your recreational customers? Are there any barriers to installing an ADS-B transponder that you can think of? PROBE, RECORD ALL
- 19) Have they expressed any thoughts or attitudes towards having to install this equipment? PROBE, RECORD ALL
- 20) Do you perceive any problems getting this device fitted to all the required aircraft within the timeframe (December 2021)? PROBE, RECORD ALL
- 21) Do you have any campaign plans to inform your customers of ADS-B requirement? If so are they related to a specific aircraft or any aircraft? Could you briefly describe your campaign plans?

# **Alabley**

### Appendix B Template Workshop Engagement Letter







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24 September 2019

Workshop Name Address Address Address

Attention: Name

TRANSMITTAL: EMAIL email address

Dear NAME

#### New Southern Sky Scoping Exercise for installation of ADS-B transponders

We are a transportation engineering company assisting the New Southern Sky programme by engaging with avionics workshops across New Zealand. As you will be aware, a major change to the aviation system in New Zealand is the move away from traditional radar technology as the primary means of air traffic surveillance to an ADS-B (GPS based) surveillance system. This has been mandatory since December 2018 for aircraft operating above 24.500 feet, but is proposed to be a requirement of all other aircraft (medium and small aircraft, gliders, helicopters, microlights) flying in controlled airspace below 24,500 feet from 31 December 2021.

We are conducting research with all avionics workshops across New Zealand to understand whether, from a national perspective, the industry has the capacity to deliver the ADS-B upgrades by the proposed December 2021 mandate. We would like to arrange a face to face interview to go through a few questions with you. All information gathered through the survey will be reported anonymously and in confidence; there will be no details of individual workshop activity released.

If you are agreeable, we expect that the interview will take about half an hour. We are available to see you (state dates) could you kindly confirm what time suits you?

If you have any further questions or concerns you are welcome to contact Scott Earley, Programme Coordinator New Southern Sky, +64 (0)4 830 2563, scott.earley@caa.govt.nz.

Thanks and regards,

fleetlos

Steve Carruthers

Associate Transportation Planner

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Appendix C Template Workshop Engagement Letter