



2017 NSS Roadshow Frequently Asked Questions

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Director NSS
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Introduction

Following on from the successful 2017 NSS Roadshow, the NSS Roadshow Frequently Asked Questions brings together the broad range of questions and feedback provided by aviation sector audiences from across New Zealand. The NSS team has attempted to record and highlight most of the questions put forward by participants at the Roadshows. If you would like to follow up with supplementary questions or comments please feel free to contact the team at nss@caa.govt.nz

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New Surveillance System

Serial	Question	Answer
1	Will primary radar still be available?	<p>The current primary radar becomes life-expired in 2021 and will subsequently be de-commissioned.</p> <p>Airways is actively looking at surveillance technologies that are non-cooperative. That means that like the current primary radar, they pick up a return bouncing off an aircraft or object. Non-cooperative surveillance technology does not rely on the aircraft being fitted with any specific equipment. It is not GPS-dependent.</p> <p>For that reason, it's useful for detection of aircraft without any transponder, including (but not limited to) airspace busts, or aircraft with an on-board equipment malfunction that means it's not transmitting any information that would be picked up by ADS-B or cooperative radar systems. A non-cooperative system would be part of the future surveillance network.</p> <p>Newer non-cooperative surveillance technologies may provide a means of detecting drones near controlled aerodromes.</p> <p>The current proposal is that a non-cooperative system (radar or similar) would be used around our busiest and most complex airspace, most likely Auckland, Wellington, and Christchurch.</p>
2	Will Auckland, Wellington and Christchurch have a secondary radar system (SSR)?	<p>Airways will retain a co-operative surveillance system along the main trunk: that is, the routes between Auckland, Wellington, and Christchurch, and international arrivals into those three airports.</p> <p>SSR is a co-operative surveillance system; however, Airways will make a decision on the exact type of co-operative system in the near future. It'll take into account the need for that system to be able to operate effectively with Mode A/C and Mode S transponder systems.</p>
3	What will the contingency SSR system cover?	<p>The contingency SSR system will provide limited coverage between Auckland, Wellington, and Christchurch. That's significantly less than the current system.</p>

Serial	Question	Answer
		<p>The purpose of the contingency system is to:</p> <ul style="list-style-type: none"> - Enable ATC to see an aircraft that has had a system malfunction that results in loss of its ADS-B functions; - Enable safe retrieval (i.e. landing) of all aircraft in the event that we experience a regional or national loss of GPS, as that would also affect ADS-B; and - To provide for limited ongoing use of the main trunk route in the event of a prolonged loss of GPS.
4	Can I use the contingency SSR system instead of ADS-B?	No. The contingency SSR system is proposed as a back-up to ADS-B, not an alternative. It will have limited coverage.
5	Why isn't Queenstown in the contingency SSR network?	<p>Radar can't be used at Queenstown because of its topography. The multi-lateration system that provides a surveillance picture for Queenstown depends on GPS for timing, so is not suitable as a back-up should the Queenstown area lose GPS service.</p> <p>Jet operators into Queenstown have advised CAA that in the event of GPS loss, for safety reasons they would not fly into Queenstown using either of the two alternatives: a VOR procedure or a visual approach. If an aircraft lost GPS due to an on-board failure, the crew would divert rather than land at Queenstown.</p> <p>While Queenstown is indisputably a very important part of New Zealand's economy and aviation network, it's not safe or feasible to include it in the contingency system.</p>
6	Will Airways contingency SSR system still be able to interrogate aircraft equipped with non-ADS-B transponders?	Yes. The contingency SSR will still be able to interrogate the Mode A/C and Mode S transponders. The ADS-B message set contains Mode A/C and Mode S as well as ADS-B, so ADS-B transponders will be compatible with the proposed contingency surveillance system.
7	How many ground stations are required to provide ADS-B coverage, nation-wide?	There will be 27 receiver sites, providing 45 per cent more surveillance coverage than the current radar network. There will be two antennae at each receiver site to

Serial	Question	Answer
		<p>minimise any disruption from problems with one receiver.</p>
8	<p>What about the loss of ADS-B?</p>	<p>Airways has designed its ADS-B system to be as resilient as possible. There is overlap of the coverage between ADS-B receivers, and the ground systems are specifically designed to provide redundancy in the event of problems with receivers or the ground system. ADS-B requires less maintenance than radar and the actual receivers themselves are much less complex pieces of equipment compared to a radar installation.</p> <p>ADS-B services could be lost due to GPS problems on board the aircraft or with the GPS signal; from problems with the ground stations; or with the processing of the data from the ground stations to the air traffic management system.</p> <p>For loss of ADS-B on a single aircraft—for example, equipment failure—Airways will use the contingency radar system and/or voice if the aircraft is in controlled airspace outside the contingency coverage area.</p> <p>Loss of ADS-B resulting from problems with the GPS signal would also be addressed using the contingency system and voice communications to get all aircraft on the ground as the first step. Longer term ADS-B outages would likely mean a reduced level of traffic to maintain safety.</p>
9	<p>What about the loss of contingency SSR?</p>	<p>Airways has contingency plans to cover the loss of surveillance systems, and the Aeronautical Information Publication (AIP) includes advice to pilots and crew on procedures to deal with such a situation.</p> <p>If the contingency system went down while ADS-B was functional, there would be minimal impact on normal operations, as the ADS-B system would continue to provide information into the air traffic management system.</p> <p>As well as ADS-B and contingency cooperative surveillance, Airways is considering potential non-cooperative surveillance systems for dense and complex airspace, such as Auckland, Wellington, and Christchurch. In normal operating conditions this system would focus on detecting aircraft without ADS-B that have entered controlled airspace: so called airspace busts. If we lost all other forms of surveillance, it would provide a very limited range of information for air traffic controllers.</p>

Serial	Question	Answer
		<p>Airways is investigating technologies that would be appropriate, but it is unlikely that a non-cooperative surveillance systems will provide nationwide coverage. Therefore, any simultaneous loss of ADS-B and SSR would likely result in a suspension of civil air operations until one or more of these systems could be restored.</p>
10	What happens if operators don't equip with ADS-B?	<p>CAA is proposing that ADS-B be required for all aircraft in controlled airspace – IFR and VFR – in two phases:</p> <ul style="list-style-type: none"> - Aircraft operating in all controlled airspace above flight level 245 by 31 December 2018; and - Aircraft operating in all controlled airspace by 31 December 2021. <p>If your aircraft is not equipped after these dates, you won't be able to operate in controlled airspace.</p> <p>If your aircraft does have an ADS-B system fitted but it's not transmitting the right data, you will not be able to enter controlled airspace until you fix the problem.</p> <p>If your aircraft isn't ADS-B equipped and you want to enter controlled airspace on a one-off or very infrequent basis, you can request permission from the controller, as is the case today.</p>
11	How much will ADS-B cost to fit on aircraft?	<p>There are options.</p> <p>The lowest cost and least complex are the all-in-one units that comprise an ADS-B transponder and a GPS chip. These units are TSO compliant and cost around \$3000 USD.</p> <p>If you already have a GPS unit that meets the requirements i.e. has fault detection and exclusion (FDE) or is TSO-C145 or 146, you can choose a Mode ES transponder that is compatible with your existing GPS.</p> <p><i>Please note that you must test to check that the transponder and GPS unit are compatible.</i></p>

Serial	Question	Answer
12	What do I do if my Mode A/C falls over tomorrow?	<p>We recommend that you consider the following options:</p> <p>If you already have a suitable GPS unit or are intending to install one before the end of 2021, purchase an extended squitter (Mode ES) transponder, or a Mode S that can be upgraded to a Mode ES with a software upgrade later on.</p> <p>If you do not have a suitable GPS unit and you are not intending to install a suitable GPS unit, consider an all-in-one ADS-B and GPS unit. If it complies with the TSOs above it will be suitable for use once the proposed mandate comes into force.</p> <p>Other issues to consider:</p> <p>If you choose to install another Mode A/C transponder, be aware that while we will be looking at ways to lower equipment costs, there is no guarantee that they will come down significantly before the end of 2021.</p> <p>Moreover, if you equip now, you are less likely to have problems finding a LAME with the capacity to install your ADS-B system closer to the mandate coming in to force.</p> <p>Check the Surveillance section of the NSS website for more information: here</p>
13	Is there going to be any assistance with the cost of ADS-B?	<p>For some people, we understand that the cost of ADS-B will mean investing in an aircraft that isn't worth a lot; is flown in controlled airspace infrequently, and will be a burden on business. The Future Surveillance Implementation Working Group (FSIWG) — a sub-group of the NSS Working Group that includes sector representatives — has worked to identify the issues that concern people the most, and cost of equipment and certification are high on the list.</p> <p>The CAA is actively looking at several options as part of the policy development process:</p> <ul style="list-style-type: none"> - Ways to streamline the certification process to minimise the time and cost of getting an ADS-B installation approved - Assessing if non-certified equipment can be used to offer lower cost options,

Serial	Question	Answer
		<p>and/or, lower power and/or lower weight options for aircraft with limited space and power.</p> <ul style="list-style-type: none"> - A bulk buy and loan or other similar schemes to reduce or spread the cost of equipping for ADS-B. <p>While CAA is looking at options, we cannot guarantee that the costs will come down between now and the end of 2021.</p> <p>The number of aircraft needing ADS-B installed won't decrease, the work will need to be done. If you want or need to replace their Mode A/C transponders, we encourage you to install ADS-B now.</p>
14	How many aircraft will need ADS-B installed?	<p>Our working estimate is around 4,000 aircraft operating below FL 245 will need ADS-B fitted.</p> <p>This excludes the estimated number that never fly in controlled airspace, and those that will likely be retired rather than fitted with ADS-B.</p> <p>We estimate that around five percent of aircraft below FL 245 are already equipped.</p>
15	Are there enough LAMEs to install ADS-B?	<p>LAME, Part 145 and Part 146 capacity are some of the issues that CAA is assessing with regard to ADS-B.</p> <p>We are aware that there are limited numbers of avionics engineers. CAA will take that into consideration when putting together options for the ADS-B rules. As part of the NSS programme, CAA has a project underway to assess LAME capacity and consider options for reducing the burden on LAMES.</p> <p>This is linked to options for encouraging people to equip with ADS-B as early as possible, such as cost minimising/cost spreading schemes. We want to avoid a bottleneck just before the mandate comes into effect.</p>
16	Will I need certified ADS-B on my homebuilt aircraft?	<p>Yes. The draft rule states that ADS-B equipment must have the relevant TSOs, or demonstrate performance equivalent to that standard.</p> <p>The key issue is that <i>all</i> ADS-B OUT equipment must transmit data that is accurate</p>

Serial	Question	Answer
		<p>and compatible with the ADS-B ground stations, so as not to compromise safety.</p> <p>If an ADS-B system transmits incomplete, inaccurate, or misleading data, it will cause problems for ATC. Any aircraft in the vicinity using ADS-B IN may also receive misleading information, compromising situational awareness.</p>
17	Why is ADS-B a major modification?	<p>The CAA has determined that ADS-B installations are considered a Major Design Change/Modification until such time as CAA has released the rules and requirements for ADS-B systems that are suitable for NZ. There is a risk that equipment being installed before the rules and requirements may not be suitable for use in NZ and/or airworthy. CAA has intervened on two occasion where equipment would not have met the proposed rules.</p>
18	Why isn't CAA mandating ADS-B in <i>all</i> airspace?	<p>The primary purpose of the ADS-B mandate is to make aircraft visible to air traffic control for separation of aircraft in controlled airspace. Making ADS-B OUT mandatory means that all aircraft in controlled airspace will be visible to ATC, and will be providing the same standard of information.</p> <p>Making ADS-B mandatory in all airspace would impose cost on those who would not receive a service from air traffic control, because they don't enter controlled airspace where the surveillance service is in operation.</p> <p>That said, there are benefits from having ADS-B installed, including visibility to ATC through greater coverage offered by the ADS-B system; however it is very important to be aware that <i>increased coverage does not mean increased service</i>. Aircraft outside controlled airspace may get assistance from ATC where that's possible, but it can't be guaranteed.</p> <p>The most benefit from ADS-B OUT in uncontrolled airspace is that it enables ADS-B IN, which is a situational awareness tool. We encourage people to consider the benefits of installing ADS-B for safety, to give them the option of entering controlled airspace (even if they don't now), and for resale considerations for their aircraft.</p>

Serial	Question	Answer
19	Why isn't CAA making ADS-B IN mandatory?	<p>ADS-B IN is a system that receives and displays information from other aircraft that are equipped with ADS-OUT.</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p>ADS-B IN is a situational awareness aid. It is NOT:</p> <ul style="list-style-type: none"> • A replacement for maintaining a lookout for 'see and avoid'. • A replacement for an Airborne Collision Avoidance System (ACAS). <p>It's important to be aware of the environment, and the risks that can come with being focused on a screen inside the cockpit.</p> <p><i>"We all still need to practice good airmanship and common sense."</i> (Roadshow participant)</p> </div> <p>CAA is not proposing to mandate ADS-B IN. The primary purpose of the ADS-B mandate is to make aircraft visible to ATC for separation of aircraft in controlled airspace. Making ADS-B OUT mandatory means that all aircraft in controlled airspace will be visible to ATC, and will be providing the same standard of information.</p> <p>ADS-B IN is a beneficial tool that's enabled by ADS-B OUT, but it's not critical for system safety. In addition, requiring ADS-B IN would increase the cost and installation issues for many operators. We encourage people to consider ADS-B IN, but are not intending to require it.</p> <p>ADS-B IN equipment is not certified, and can be found on many different apps and platforms. For that reason, you should not rely on it to show all aircraft in the area, nor for absolute accuracy.</p>
20	Will drones have to have ADS-B?	<p>Yes. The current proposal is that the mandates for ADS-B will apply to all aircraft in controlled airspace.</p>
21	Regarding ADS-B - what if I never fly in controlled airspace, or only go in for maintenance, for example?	<p>If you do not enter controlled space at all, the ADS-B mandate will not apply.</p> <p>However, if you come in once or twice a year for maintenance, the existing rules that allows ATC the discretion to allow you to enter will still apply. Controllers must be able</p>

Serial	Question	Answer
		<p>to manage unequipped aircraft and maintain a safe workload.</p> <p>Management of emergencies will not change: anyone can request assistance from ATC in an emergency situation.</p>
22	<p>Will transponder mandatory broadcast zones in uncontrolled airspace also require ADS-B?</p>	<p>No. That's because those zones require Mode A/C (at a minimum) for ACAS systems on aircraft operating into those areas, not for surveillance purposes.</p> <p>If you fly in TMZs and have to replace your A/C transponder, we recommend that you update with Mode S, which is a superior technology, and if you choose one that can be upgraded to ADS-B, or is an all-in-one unit that includes ADS-B and GPS, you'll have more options for a relatively low additional cost.</p>
23	<p>Why isn't New Zealand putting the UAT system in place as they have in the United States?</p>	<p>Universal Access Transceiver, or UAT, is an alternative ADS-B system used in the United States, in tandem with the 1090 MHz ES system. It operates on 978 MHz and requires a completely different ground system to the 1090 MHz ES system that is coming in to New Zealand.</p> <hr/> <p><i>UAT will not be rolled out in New Zealand. When you buy your ADS-B equipment, make certain that it operates on 1090 MHz, not 978 MHz.</i></p> <hr/> <p>UAT will NOT be usable in New Zealand. If you are buying ADS-B equipment, you should make sure that it operates on 1090 MHz and is ES, not UAT.</p> <p>The cost of UAT for New Zealand would be prohibitive.</p>

Serial	Question	Answer
24	Will we get weather and traffic into the cockpit with ADS-B?	<p>The UAT system in the US (see Q 23 also) provides a re-broadcast system that sends traffic and weather data from the ground stations to aircraft receivers.</p> <p>The 1090 MHz system being implemented in New Zealand will not include those functions. It is not a rebroadcast system.</p> <p>ADS-B IN is an option for traffic awareness, and we encourage people equipping with ADS-B to consider adding ADS-B IN to their aircraft.</p> <p>Metflight GA is now free. You can subscribe here: http://metflight.metra.co.nz/MetFlight.php</p> <p>In future, there may be other systems that will provide weather and traffic into the cockpit, but it will not be through the ADS-B system.</p> <p>The SWIM project will be looking at future digital upload information such as MET, so watch the NSS website for updates www.nss.govt.nz</p>
25	Don't most of the benefits from ADS-B go to Airways and the airlines?	<p>ADS-B is cheaper to buy and maintain, compared to replacing the current radar system.</p> <p>ADS-B is just one of the technologies that Airways is investing in and the lower replacement costs for ADS-B will reduce upward pressure on costs overall and allow investment elsewhere.</p> <p>The efficiency benefits of ADS-B, such as being able to reduce separation and safely manage more aircraft in controlled airspace, do fall mainly to the larger operators who have made significant investment in younger fleets of aircraft.</p> <p>We do acknowledge that the move to ADS-B does involve shifting some of the cost of the surveillance infrastructure on to all those who fly in controlled airspace, by way of requiring equipment on the aircraft.</p> <p>For GA VFR in particular, this may not translate into many direct benefits. That's why we are actively considering ways to reduce the costs and maximise the benefits of ADS-B for those operating below flight level 245.</p>

Serial	Question	Answer
26	How sure can you be that it won't be ADS-B today and then something else comes along tomorrow that will mean we have to update again?	<p>We can never be 100 percent certain of what's coming along next technology-wise. Airways investment cycle is normally 15 years or longer and any change in the future would be subject to extensive consultation with industry and consideration of costs and benefits. What we can say is that with the investment that's been made in the ADS-B ground infrastructure, Airways is planning for the ADS-B system to remain in place for its projected lifespan of around 25 years.</p> <hr/> <p><i>You can go for certainty and equip now, or you can wait and see if other options come available. That's up to you. The mandate date won't change, so do some research, ask us questions, and make the decision that's best for you.</i></p> <hr/> <p>There may well be technological advances that offer cheaper, higher performing and/or more accurate options for Airways and operators. However, we can't predict those.</p> <p>If you equip along the lines of the recommendations we're making now, we are as confident as we can possibly be that you will be set for the 2021 mandate and well beyond. We expect ADS-B transponders to be fit for purpose for the foreseeable future.</p>
27	Can MLAT be used as an approach aid?	<p>It can, but the coverage is limited to Auckland and the Queenstown area.</p> <p>ADS-B is a much more economical solution and will provide nationwide coverage</p>
28	Can you confirm that the decommissioning of the SSR that all ACAS systems will stop working?	<p>No, ACAS operates independently from radar and ADS-B.</p> <p>ADS-B transponders will trigger ACAS, because they include the Mode A/C and Mode S message sets.</p>
29	Regarding ADS-B - what about events like large airshows at Wanaka and Masterton? Not controlled airspace, but lots of aircraft going in.	<p>Good question! We will take that scenario and roll that into the policy development.</p> <p>If a temporary control zone was established, then control zone requirements like surveillance would apply. Airways can also provide mobile ADS-B receivers if needed. We will be working through a number of scenarios and keen to test the</p>

Serial	Question	Answer
		concept of the temporary control zone. The implications for warbird aircraft without transponders need to be fully considered.
30	What message can we communicate to the hang gliding community about ADS-B?	<p>Grab a CAA flyer on 'do you fly in controlled airspace?', as it contains the messages in a nutshell on ADS-B changes. That flyer is available from CAA in hard copy, or on our website: http://www.nss.govt.nz/workstreams/surveillance/</p> <p>If there's anything else that you'd like us to cover or consider, please get in touch with the NSS team at nss@caa.govt.nz</p>
31	ADS-B won't be used in control zones for separation, so why do we have to meet controlled airspace standards?	<p>You have to be receiving a surveillance service before ATC can apply a surveillance separation. However, aerodrome controllers will use ADS-B to help confirm the location of aircraft. Other forms of separation (e.g. geographical or visual separation) will be used, when needed.</p> <p>The greatest benefit of ADS-B OUT is found in the service improvements (i.e. the separation and advisory services from ATC).</p> <p>Extending the ADS-B coverage and the regional surveillance services means Airways can provide surveillance based approach services at controlled aerodromes nationwide and introduce digital towers at some locations. These changes will improve efficiency, reduce some delays and standardise the service nationwide.</p>
32	There are ADS-B transponders available in the US with lower power output that are FAA approved for use up to 15,000 feet – are those acceptable under current standards or will they be part of the trial?	<p>We will need to look into it.</p> <p>With equipment that comes out of the US, you need to confirm that it's not UAT, which is being used in USA and will be prohibited in NZ.</p> <p>Watch out for low cost low power ADS-B equipment which might be UAT. The key differences are:</p> <ul style="list-style-type: none"> - The frequency: ADS-B in New Zealand will operate on 1090 MHz. UAT operates on 978 MHz - The TSO: ADS-B in New Zealand will be certified against TSO-C166. The UAT standard is TSO-C154
33	On Flight Radar 24, anyone can see you if you have ADS-B OUT. e.g. private weddings, other commercial	The information will be available to anyone with a receiver and/or could include Flight Radar 24 network. For some people, being able to track their aircraft using ADS-B is

Serial	Question	Answer
	operations. Will that mean some people will turn off their transponders?	<p>a bonus. That may cause concerns for others.</p> <p>CAA isn't proposing a requirement to use ADS-B in uncontrolled airspace, but turning a transponder off means you won't be visible to others (including TCAS on equipped aircraft), or others with ADS-B IN. It also increases the risk that you'll enter controlled airspace without remembering to turn the transponder back on.</p> <p>People do turn their transponders off now – the FSIWG has raised that and we are aware that ADS-B could affect that sort of behaviour. However safety wise, it's in no-one's interest to have that going on.</p>
34	Any chance of incorporating ADS-B installations into AC43-14?	Ways of making certification easier and reducing the burden on avionics people is under consideration by the CAA. At the moment ADS-B is still a major modification.
35	The new ADS-B system relies on GPS: will there still be a requirement to have Mode 3A code?	Yes – all the Mode S information will continue to be available if GPS was offline. This includes the unique aircraft address (hex code), Flight ID (input by the aircrew) and Mode 3A code. Each of these sources of information can be used to identify the flight within the Air Traffic Management system.
36	What's the price difference between ADS-B OUT and ADS-B IN?	ADS-B IN will add about \$800 - \$1,000 USD to the cost of the lowest cost ADS-B OUT option. The cost for systems will vary depending on the equipment you have and the options you choose.
37	How are you going to encourage people to equip now, if the option of lower cost equipment and/or a loan scheme is still on the table? There's a real risk that people will wait for lower cost options and put it off until the last moment, and not get equipped in time.	<p>We're aiming to consult on policy options in early-mid 2018. That will include the possibility of:</p> <ul style="list-style-type: none"> - Lower power, lower cost equipment options - Policy options that <i>may</i> be available, for example bulk buy and loan, to reduce or spread the cost of equipping with ADS-B. <p>CAA can't guarantee that either of these options will offer lower cost ADS-B to all operators. What we do know is that LAMEs will get busy in the lead-up to the mandate so if you plan to equip early, you're likely to be well-placed come the mandate.</p> <p>Our main message is to do your research, weigh up the benefits of equipping now</p>

Serial	Question	Answer
		versus waiting, and make the decision that's best for you.
38	Who do we contact at the CAA to ask if ADS-B transponders and GPS receivers are compatible?	Contact airworthiness@caa.govt.nz
39	Will flexibility be given to allow installation of ADS-B equipment by the owner operator instead of a LAME?	No: the existing requirements will apply.
40	A lot of the cockpits don't have the space for ADS-B and are currently using handheld GPS. Will we have to remove other equipment to make space?	There are solutions on the market – blind transponders take up less space on the panel. You can also get the all-in-ones which means it's just one unit. We are also looking at uncertified equipment through the proposed trial to test the smaller units and see if they can be integrated into the surveillance system safely.
41	We have concerns about engineering capacity – how are you going to make sure we have enough engineers? Everyone leaves everything to last minute. We should be installing one a week, but we are currently only doing one ADS-B install every couple of months.	<p>As part of NSS, CAA is currently undertaking a project to look at what capacity we have now, including the right group licensing. We also need to consult to find out what people are likely to install and the complexities of the installation. We want to avoid a bottleneck at the end of the 2021.</p> <p>We'll also be encouraging people to equip early, by providing advice on what equipment to buy, and also by exploring options like the bulk buy and loan, and/or use of LPAT systems.</p> <p>We'd welcome your feedback on what might encourage people to fit ADS-B sooner rather than later.</p>
42	Is CAA aware that the FAA do not require an STC for fitting ADS-B? Recently in the last few days.	<p>The FAA has released an ADS-B installation memo. Under the memo, if an aircraft is not on an ADS-B transponder AML STC list (i.e. the list of aircraft that are approved to use the STC), an installer can use the memo to use that STC on any aircraft.</p> <p>So a STC is required, just not necessarily for the aircraft that it's going to be installed on. For example, the Appareo Stratus: the STC only covers a few aircraft, (it first started as only for the Cessna 172) but with the use of the memo it can be installed on any other aircraft.</p> <p>The memo isn't applicable in New Zealand, but is an example of the sort of measure that we will consider to help reduce the cost and time for certification.</p> <p>CAA staff are talking with the FAA to get more information on the memo, which will help us determine if we can consider a similar example in New Zealand.</p>

Digital Towers

Serial	Question	Answer
43	What are these 'Digital Towers' that you mentioned in your briefing? Are we going to see them in New Zealand anytime soon?	<p>The adoption of ATC Remote Towers technology was a project that was in Stage 1 of NSS. However, the technology at that stage was immature.</p> <p>Airways is looking at how what is now known as Digital Tower operations and technologies could help NZ to reduce costs, improve services and continue to meet the Target Level of Safety. As part of this evaluation, a Digital Tower technology demonstration has been operating at Auckland Airport.</p> <p>A Digital Tower project is currently being considered for NSS Stage 2. This will likely be labelled as a 'Virtual Services' project.</p> <p>London City airport is moving to a Digital Tower in 2018; when mature enough this technology could be considered for adoption by New Zealand.</p>

RPAS/UAVs/Drones

Serial	Question	Answer
44	How will ADS-B below FL245 and drones be considered?	Any aircraft, including RPAS/UAV/Drones, operating in controlled airspace below FL245 will require ADS-B under current proposals.
45	How high (altitude) do RPAS operate?	There is a wide set of users. RPAS are not restricted to below 400ft. Advanced Military RPAS operate to 60,000ft. Boeing is testing an unmanned B767 freighter. Expect various types of RPAS/UAVs to be introduced to NZ airspace over the next few years.

Ground Based Navigation Aids (GBNA)

Serial	Question	Answer
46	What is the GBNA MON?	<p>The MON stands for the ‘Minimum Operational Network’ and is defined in the GBNA Strategy paper here: http://www.nss.govt.nz/dmsdocument/27-ground-based-navigation-aid-strategy</p> <p>A Ministry of Transport led GBNA Review Panel has been working over the past year to make recommendations based on the Strategy. The Review Panel findings support the decommissioning of all NDBs (some will be retained on commercial terms temporarily to meet specific legacy needs e.g. the NZDF is paying for two NDBs - one to be retained on both Islands).</p> <p>The MON as recommended by the Panel would be made up of VORs/DME pairs located at all controlled aerodromes, and three other pairs to provide coverage to remote areas. The proposal is that the MON will be available to allow safe IFR recovery of all aircraft in the immediate event of a GNSS outage (outage may be individual aircraft, regional or national).</p>
47	What is the GBNA contingency network?	<p>The National Airspace and Air Navigation Plan identifies the need for a contingency network that enables air transport operations on the ‘main trunk’, as well as international operations into and out of these aerodromes. The main trunk is defined as flights between Auckland – Wellington – Christchurch. The purpose of this contingency network is to provide social connections and economic benefits between these aerodromes in the event of short or long term loss of GPS navigation capability. The contingency network will be provided by a GBNA infrastructure that supports conventional IFR navigation between these aerodromes.</p> <p>Note that the GBNA MON will cover the contingency requirements, so at this stage we do not see a need for two systems.</p>
48	What’s happening with the NDBs?	<p>Airways is in the process of decommissioning the remaining NDBs as they are outdated technology and in many cases, are at the end of their operational lives. The</p>

		<p>NDBs will not be replaced with a navigation aid unless a VOR/DME is recommended by the GBNA Review Panel.</p> <p>If the question is about whether a PBN approach procedure will be provided - Airways is looking at this for the regional areas at the moment, including Westport. There may be security and resilience issues to be considered.</p>
49	How many years until NDBs go?	NDBs will likely be phased out by 2021. This GBNA Review Panel recommendations will be released in early 2018.
50	What about the GBNA at Tauranga?	Tauranga is currently an NDB/DME site and the draft GBNA Review Panel recommendation is to change this to VOR/DME.

Trial of low power ADS-B transponders (LPAT) and/or uncertified ADS-B equipment

Serial	Question	Answer
51	<p>Comments:</p> <p>If you promise to do a trial to look at different equipment and a bulk buy and loan scheme, people will keep waiting and waiting.</p> <p>It might not happen and then we will get a bottleneck for engineers to install ADS-B equipment just before the 2021 mandate.</p> <p>The danger of looking at LPAT options etc. means people will wait until the last minute, which means you will get a bottleneck before the mandate.</p>	<p>Response – we are working with the FSIWG on this, but are keen to hear your views.</p> <p>There is no guarantee that the LPAT trial will output an acceptable solution.</p>
52	Is CAA working with CASA in Australia and with CAA UK on their LPAT trials?	Yes. CASA has recently released a discussion paper specifically looking at ADS-B solutions for their VFR community. It's worth noting that the Australian rule requires ADS-B for IFR aircraft, but not for VFR. CASA is promoting voluntary ADS-B uptake for VFR operators who fly in controlled airspace. You can access the CASA paper

		<p>here</p> <p>CAA UK has conducted trials on uncertified equipment, but only for improving situational awareness outside controlled airspace. They have no current plans to allow that equipment to be used for separation purposes.</p> <p>CASA Media Release: <i>‘CASA has released a discussion paper to gain the views of the visual flight rules (VFR) community on appropriate standards and equipment for lower cost ADS-B solutions suitable for visual flight rules aircraft.’</i></p>
53	What about gliders and other aircraft with low power issues?	That is a key driver for the LPAT trial, which will be looking at low power solutions for those type of aircraft.
54	Will the proposed LPAT trial approve equipment for aircraft type or transponder type?	Transponder type only.
55	Will non-certified approved equipment be applicable to certified aircraft?	That is still to be determined and will be an outcome of the trial.
56	Will LPAT be for ADS-B IN and OUT?	ADS-B OUT is the primary focus, but if there is an appetite from industry to explore ADS-B IN then we can add it – please let us know. The UK LPAT trial focused on situational awareness capability outside of controlled airspace so we can build on their experience to look at what might work here in New Zealand.
57	How is the LPAT trial going to work?	We will establish minimum criteria and test how it will interact with the ADS-B/ATM ground system, including the integrity of the data. We would like to start with bench testing via a test set and then go from there. The results of the trial may be that there is some non-TSO equipment that can be safely integrated into the system, or none at all.

58	I am building a second aircraft and would like to see the options for non-certified equipment (ASAP).	The CAA is looking at options, but this does require a 1090Mhz operating system and the functions required by ATM. Systems will need to deliver the required performance; this will be addressed by testing to determine solutions. It's on the policy schedule for next year and CAA will keep industry informed. If you have a system you would like to be tested, let us know. Need to consider Mode S capability, this requirement may vary depending on airspace operating in (i.e. complex or dense airspace).
59	Will ADS-B functions be available on the phones in future?	No, it's about integrity in an aviation system. Delivering a 'safety of life' capability is paramount.
60	Is it reasonable to go to the Insurance Council to have the safety benefits of PBN and SMS recognised? (Reduced cost)	This initiative should be an industry led activity.

Performance Based Navigation (PBN)

Serial	Question	Answer
61	What does PBN mean for Part 91 and Part 135 operators?	<p>We have heard a lot during the process of the Roadshow, and the feedback that we are getting is that we need to engage better with Part 91 and Part 135 operators on PBN changes. We will now be thinking about how we can do better in this space so that more operators are brought into the conversation on routes etc. and that they receive the information that they need.</p> <p>We have been focused on controlled aerodromes at this stage, and will turn our focus to uncontrolled aerodromes. NSS will be holding another PBN forum 21/22 March as Approach 18 – we encourage you to attend this free event. You can register here</p>
62	How would you summarise the benefits of PBN to Part 135?	In the short term, PBN creates an increased pilot workload because the system isn't simple yet. However, the benefits to operations are significant once the system becomes routine. See the whole story here: https://www.nss.govt.nz/content/pbn-in-new-zealand-advice-from-a-part-135-operator/
63	Best case, how far away is SBAS?	A joint Australia/NZ SBAS trial is underway. It is multi-sector; aviation is only part of the effort. Following the trial a cost benefit analysis will be conducted. As well as the challenge of getting a subsequent business case accepted, there is also the issue of getting suitable satellite payloads operating over Australia/NZ supported by the

		necessary infrastructure.
64	If flight manuals say 'approved for PBN' by a foreign state why can't we accept this?	New Zealand is following ICAO requirements and ensuring that operational, maintenance and airworthiness oversight are part of the picture. PBN is a 'whole of system' capability and not just something conferred by a piece of equipment.
65	How will CAA make sure all PBN rules are delivered on time, while still keeping up with the non-NSS rule changes that will keep coming in the meantime? Other parts of industry need rule changes too?	NSS provides for better coordinated rule making and planning in a strategic way (logical, efficient, providing certainty for sector). Informing and engaging people during the process are key elements. CAA doesn't have limitless resources; NSS helps by being disciplined in its approach to understanding the total impact of rule changes across the system. Together with the Ministry of Transport, we plan ahead for the policy and rule projects that are on the table and forecast, to make sure they progress as smoothly as possible.
66	PBN - will it reduce controlled airspace?	We are looking to see this as a benefit, and would expect to see changes to airspace. A 'triggers and methodology' study into why and how airspace changes occur is scheduled for NSS in 2018.
67	With the benefit of the use of GPS, surely Airways costs and charges can be reduced?	The use of GPS is only one of many factors affecting Airways' investment programme. Airways' pricing is set in consultation with its customers and accounts for the agreed capital expenditure plan and forecast levels of activity over each three year pricing period. Pricing is reviewed during this time frame if certain criteria are met. Airways reduced its published prices by 1.2% from 1 July 2017. This means that the average price increase for 2017/18 will reduce from 1.6% to 0.4%. The full terms and conditions are available at: http://www.airways.co.nz/assets/Documents/Standard-Terms-Conditions-July-2017.pdf
68	Comment – I am a Private IFR pilot and have had an ADS-B for 3 years and been flying PBN for 2 years, operating below 10,000 feet in IFR airspace, with experience in NZ and Australia. My observation is that there is no clear advice on how to integrate in the	Airways is doing what it can to provide PBN routes where they are needed but need to hear more from other pilots/operators to improve the process. What we have heard from the Roadshows and will pass on, is that part 91/Part 135 need better input and representation in the development of PBN routes and in

	system with higher performance, high altitude traffic. It's easy enough to find out from ATC, but recommend that these procedures are published for pilots flying at lower altitudes	providing feedback on how the system is working for them. In terms of flight training, the NSS Working Group is considering the concept of 'training sandpits' in uncontrolled airspace that provides a PBN enabled 'airfield' where these types of procedures can be practiced without reference to ATC, or interaction with other traffic at busy airports.
69	Comment – PBN implementation is very poor. CAA and Airways need to work closer together to stop PBN procedure issues, which are common. The approval process for PBN also takes too long – the long timeframe is unacceptable for straightforward applications.	NSS has noted concerns about Part 91/135 engagement in providing feedback on PBN. There is an NSS PBN Implementation Working Group (PBNIWG) that meets every two months and welcomes input from the sector. The CAA is addressing resourcing issues and streamlining PBN processes to make improvements to approval processes and timeframes. This work will result in a better process in 2018.
70	Could temporary PBN approvals be considered whilst waiting for a formal OK from CAA that PBN is approved long term?	We will take that suggestion on board but it is likely we will need a more mature PBN environment in New Zealand to allow such a flexible process.
71	How do RNP AR procedures work in Queenstown? What are the benefits?	The RNP AR procedures for Queenstown work very well. There are fewer diversions because approaches can be made down to 300 feet. RNP AR has allowed (with other significant changes to the airport) the introduction of night procedures. The NSS CBA which will be released in early 2018 will have the data to show the safety, environmental, economic and social benefits very clearly.
72	Are there any inputs for GPS taken from Land Information NZ? Why aren't we using other GNSS constellations?	LINZ is part of the NSS Working Group and has been from day one. Other constellations may come into play once aviation has equipment to use a multi-constellation capability. The first multi-constellation GNSS capability is likely to be GPS/GLONASS, but the manufacture, certification and installation of such equipment on aircraft is still some years away. There isn't yet a TSO for multi-constellation equipment, and even after that's available, it'll take some time to see that equipment installed on aircraft. We're keeping a watching brief on developments in this area.
73	Do software changes require additional testing?	It depends on what the software update is about. Get in touch with your supplier.
74	What are the key metrics to measure the benefits of PBN?	From an IFR point of view, we can provide straight in approaches, which are 25 times safer than a circling approach. If you are on an approach with vertical guidance, that's

		an additional eight times safer again. The safety benefits are significant. Access into airports with challenging terrain, such as Queenstown, has been improved, which has delivered significant economic benefits. Short approaches into Christchurch – saving miles and using low powered approaches to reduce noise. Apart from some noise issues for specific people under the flight path, these are all benefits. The NSS programme Cost Benefit Analysis (2017) which will be released in early 2018 will have the data to show the safety, environmental, economic and social benefits of PBN very clearly.
75	Why is there a DME equipment proposal for Part 91 as part of the PBN contingency planning? VOR/DME is huge expense for someone who needs it only as a back-up, adding \$12k for one unit.	It's a proposal driven by safety, and it's just an option at this stage. The reason for the proposal is the safety benefits, and this will be tested with the sector over the coming months.
76	What was the outcome of the November Airways customer meeting regarding PBN feedback from Nelson/Woodbourne?	No news around Woodbourne in particular; conversation was focused on New Plymouth at this stage. Airways tries to get the information from the sector and share information back, but if you do not feel included, please get in touch.
77	Shouldn't it get cheaper and easier to apply PBN procedures?	The initial set-up of PBN procedures involves considerable costs, and there are ongoing cost for the review and maintenance of those procedures. Costs may get lower over time.
78	What are the contingencies from a flight training perspective?	There is a Flight Training sub-group sitting below the NSS Working Group (led by Dave Harrison, supported by Ashok Poduval) looking at these exact issues and possible solutions to future proof IFR training. If you want to get involved, contact david.harrison@caa.govt.nz