

Notice of Proposed Rule Making

NPRM 19-05

Part 91 Mandatory ADS-B Below Flight Level 245

Docket 20/CAR/1

Background to the Civil Aviation Rules

The Civil Aviation Rules (**the Rules**) establish the minimum regulatory safety boundary for participants to gain entry into, operate within, and exit the New Zealand civil aviation system. The Rules are structured in a manner similar to the Federal Aviation Regulations of the USA.

Rules are divided into Parts and each Part contains a series of individual rules which relate to a particular aviation activity. Some rules empower the use of a CAA Notice. Notices contain specific mandatory requirements including detail about the approvals, standards, conditions, procedures and technical specifications that have been approved or determined by the Director as being appropriate in accordance with the corresponding enabling rule.

Advisory Circulars accompany many rule Parts and contain information about standards, practices and procedures that the Director has established to be an acceptable means of compliance with the associated rule. An advisory circular may also contain guidance material to facilitate compliance with the rule requirements.

The objective of the Civil Aviation Rules system is to strike a balance of responsibility between, on the one hand, the Crown and regulatory authority (CAA) and, on the other hand, those who provide services and exercise privileges in the civil aviation system. This balance must enable the Crown and regulatory authority to set standards for, and monitor performance of, aviation participants whilst providing the maximum flexibility for the participants to develop their own means of compliance within the safety boundary.

Section 12 of the Civil Aviation Act 1990 prescribes general requirements for participants in the civil aviation system and requires, amongst other things, participants to carry out their activities safely and in accordance with the relevant prescribed safety standards and practices.

Section 28 of the Act allows the Minister to make ordinary rules for any of the following purposes:

- the implementation of New Zealand's obligations under the Convention
- to allow for the mutual recognition of safety certifications in accordance with the ANZA mutual recognition agreements
- the provision of aviation meteorological services, search and rescue services and civil aviation security programmes and services
- assisting aviation safety and security, including but not limited to personal security
- assisting economic development
- improving access and mobility
- protecting and promoting public health
- ensuring environmental sustainability
- any matter related or reasonably incidental to any of the following:
 - i. The Minister's objectives under section 14 of the Act;
 - ii. The Minister's functions under section 14A of the Act;
 - iii. The Authority's objectives under section 72AA of the Act;
 - iv. The Authority's functions and duties under section 72B of the Act; and
 - v. The Director's functions and powers under section 72I of the Act
- any other matter contemplated by any provision of the Act.

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1. Purpose of this NPRM

The purpose of this rule-making proposal is to further update the Civil Aviation Rules (the Rules) to complete the transition from secondary surveillance radar to Automatic Dependent Surveillance Broadcast (ADS-B) Out as the primary source of data for surveillance in New Zealand. This proposal relates primarily to Rule Part 91 and includes proposed consequential amendments to Rule Parts 172 and 1.

2. Background to the proposal

2.1 General Summary

Current situation:

New Zealand is currently served by a surveillance system of primary and secondary radars. This system of radars ensures that all aircraft flying in controlled airspace are visible to Air Traffic Control (ATC), which manages ‘separation’ between aircraft. The primary purpose of air traffic control worldwide is to prevent collisions between aircraft.

There are three primary surveillance radars¹ at Auckland, Wellington, and Christchurch Airports, which are principally used to detect aircraft without transponders that are operating in the most complex and dense airspace near the main airports. Six secondary surveillance radars (SSR)² provide the majority of coverage and information to ATC. Where terrain precludes radar use, a multi-lateration system provides the air traffic management (ATM) system with a ‘radar-like’ picture of the lower South Island, including Queenstown.

This surveillance infrastructure is owned and maintained by Airways, a state-owned enterprise that provides air navigation services in New Zealand. The maintenance of this infrastructure and services is funded from charges on the aviation sector (predominantly airlines).

The current primary and secondary surveillance radars are coming to end of life at the end of 2021 and will not be capable of providing a reliable surveillance service after that date. Without a reliable surveillance service, the safe functioning of the New Zealand aviation system will be compromised.

Moving to a new surveillance system under the NAANP

In June 2014, Cabinet approved the National Airspace and Air Navigation Plan (NAANP), which included a replacement plan for the current radar array by the end of 2021. This replacement plan required greater surveillance coverage than the existing SSR to meet the future needs of the aviation system.

Following Cabinet’s approval, the CAA-led New Southern Sky (NSS) Programme was initiated to implement the NAANP. NSS is a ten-year programme to modernise New Zealand’s aviation system and aims to align work by all the key stakeholders to maximise the benefits for the whole aviation sector, and to improve safety, capacity and efficiency.

To replace the current radar system, the NAANP proposed:

- implementation of ADS-B sites nationally, to replace the current secondary surveillance network
- a regulatory mandate from 31 December 2018 for all aircraft that operate above Flight Level 245 (approximately 24,500 feet above sea level) to be equipped with ADS-B OUT compatible equipment (already in place). This mandate affected all aircraft that fly *above* Flight Level 245 (airlines, NZDF aircraft, business jets and some cargo operators).
- a regulatory mandate from 31 December 2021 for all aircraft that fly in controlled airspace to be ADS-B OUT equipped.

The set of rule amendments to implement the first phase came into force on 20 July 2018. A transition period of six months (from 20 July to 31 December 2018) was given to allow time for aircraft operating in controlled airspace *above* flight level 245 to be equipped with suitable ADS-B systems.

¹ Primary surveillance radar measure only the range and bearing of targets by detecting reflected radio signals (uncooperative targets).

² Secondary surveillance radar relies on targets equipped with a radar transponder, that replies to each interrogation signal by transmitting a response containing encoded data. They are also referred to as Monopulse Secondary Surveillance Radar as they have Mode S functionality.

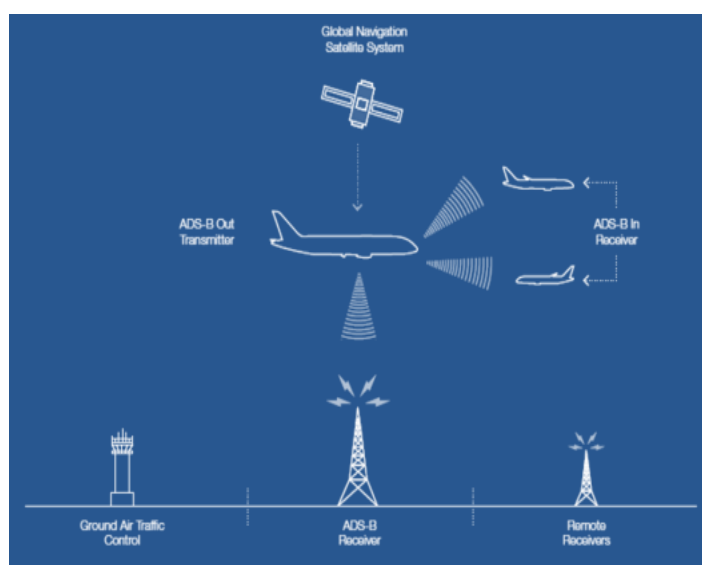
This NPRM deals with the proposed rule amendments required to implement the second phase - ADS-B Below FL 245 mandate.

What is ADS-B OUT?

ADS-B OUT is a Global Navigation Satellite System (GNSS) dependent surveillance system which most commonly uses the United States Global Positioning System (GPS) as its positioning source. An aircraft equipped with ADS-B OUT receives data from GPS navigation satellites via a GPS receiver, and then broadcasts information on its identification, position, altitude, speed, intention and other relevant data to ground stations every second. The broadcast system is the ADS-B OUT transponder fitted on the aircraft. The broadcast does not depend on the ground system interrogating the aircraft's system; it occurs continuously and automatically.

Data received by ground stations is then transmitted to the ATM system for display to ATC, who use it to separate aircraft in controlled airspace. ADS-B OUT equipped aircraft that are outside controlled airspace but within ADS-B OUT coverage areas will be visible to (but not controlled by) ATC.

Figure 1: *How ADS-B OUT works*



Source: Boeing Commercial, Aero Magazine

ADS-B OUT has the following benefits over the existing SSR system

Transitioning to ADS-B introduces significant safety benefits. It enables aircraft to see, and be seen, by other aircraft without relying on the pilot's vision. Where ADS-B IN is enabled, this improves crews' situational awareness of other ADS-B equipped aircraft in the area, regardless of whether they are in range of a ground receiver. This functionality will assist with integrating new aviation technology, for instance, unmanned aircraft ('drones'), into New Zealand's airspace alongside manned aircraft.

ADS-B also enables more efficient use of controlled airspace through providing more accurate positioning information. The transition to ADS-B will increase surveillance coverage by 45%, compared to the existing radar system. Greater accuracy will support more efficient flight routings and has the potential for faster location of aircraft in distress or following an incident.

ADS-B OUT aligns New Zealand's surveillance system with recommendations in the International civil aviation organisation global air navigation plan (GANP), and global and regional best practice in surveillance system modernisation.

In the future, it is expected that air traffic will no longer be dominated by manned aircraft with the ability to operate under visual flight rules in the traditional sense. In time, unmanned aircraft will need to be fully integrated into the aviation system and will need to have automated equipment that can indicate location and avoid interference with other aircraft.

Costs avoided to Airways

Replacing the existing radar system with ADS-B reduces capital and operating costs faced by Airways, the current air navigation service provider. Compared to replacing the existing radar system, the proposed ADS-B system will result in \$18.1 million of capital costs avoided. The ground system components of ADS-B are also less expensive to install and maintain, relative to the existing radar system.

The transition to ADS-B also reduces system maintenance costs, as these are avoided from 2021 until the end of life of the infrastructure – approximately 25 years.

Moving to ADS-B requires aircraft operating in controlled airspace to install new equipment

Moving to ADS-B will require equipment compatible with ADS-B surveillance infrastructure to be installed on existing aircraft, in order for these aircraft to continue operating in controlled airspace. This equipment comprises of either a transponder and compatible satellite-positioning receiver, or an all-in-one system with a built-in position source.

ADS-B relies on aircraft having an ADS-B OUT system fitted to ensure it is visible to air traffic control through information broadcast from the aircraft, received by the ADS-B ground antennae. This information must have sufficient integrity for it to be used to separate aircraft safely in controlled airspace. Aircraft that broadcast inaccurate or incomplete information may not be visible to air traffic controllers, or may be providing misleading information about their location and intentions.

Since December 2018, aircraft operating above flight level 245 have been required to be fitted with this equipment. This was the first phase of the transition to ADS-B and predominantly affected commercial aircraft. The proposed rule amendments in this paper, will extend this requirement to all aircraft operating in controlled airspace below 24,500 feet.

Of aircraft operating below this flight level (approximately 4500 aircraft), an estimated 80 percent of this fleet fly in controlled airspace and will be required to equip with ADS-B. These are primarily General Aviation (GA) aircraft.³

As this rule amendment only applies to aircraft operating in controlled airspace, aircraft operating outside this area are not required to equip with ADS-B OUT. However, if these aircraft did elect to equip, this would need to be consistent with the existing equipment and performance requirements.

Who flies in controlled airspace?

Controlled airspace is designated where there is a need for an ATC service to provide for the safety and efficiency of aircraft operations. Examples include Auckland, Wellington, Christchurch, Tauranga, Nelson, Napier, Dunedin and Invercargill.

Industry representatives have assumed that 80% of GA fly in controlled airspace and thus will need to equip with ADS-B OUT if they are to operate in the new surveillance system. This amounts to approximately 3,800 aircraft. Some aircraft do not fly in controlled airspace, such as operators that are based on the West Coast of the South Island, or that carry out agricultural operations away from controlled airspace; these operators will not require ADS-B OUT unless they need to access controlled airspace.

If a GA aircraft owner chooses not to equip with ADS-B OUT, they can continue to use uncontrolled aerodromes and fly routes that avoid transiting through controlled airspace. At the three main centres, uncontrolled aerodromes include Kapiti near Wellington, Ardmore near Auckland, and Rangiora near Christchurch. There may not be options for flying without ADS-B OUT in controlled airspace around regional centres such as Tauranga, Nelson, and New Plymouth, Napier, Dunedin, and Invercargill. The aeroclubs based at these aerodromes could consider ways to support their members to equip.

Approach to date:

³ General Aviation includes all civil aviation operations other than scheduled air services (such as regular Air New Zealand operations) and non-scheduled air transport operations for remuneration or hire. This includes aerial work, instructional flying and pleasure flying.

Aircraft with ADS-B systems already fitted

Many aircraft in New Zealand are fitted with ADS-B systems that include transponders certified against TSO-C166 initial issue and TSO-C166a. Provided they are operating properly, those systems meet the minimum performance standards prescribed in Part 91. The ADS-B rules which came into force on 20 July 2018 allowed operators a transition period of 6 months to continue to operate using that equipment, or equipment already fitted that can demonstrate the same level of performance up to 31 December 2018.

Aircraft being brought into New Zealand that are already equipped with an ADS-B system that meets the minimum performance standard prescribed in Part 91 do not need to be re-equipped.

New or replacement ADS-B systems

Despite the transition period of 6 months, operators were advised that any new or replacement ADS-B systems fitted from 20th July 2018 needed to demonstrate the same level of performance as, the most recent standard for Mode ES transponders: TSO-C166(b), and a compatible GNSS position source that meet the performance requirements set out in the Notice.

Since 31 December 2018, all aircraft operating above flight level 245 must be equipped with an ADS-B system that meets the prescribed performance standards in Part 91 and the Notice.

Aircraft with ADS-B system operating below flight level 245

An aircraft operating below flight level 245 in designated mandatory controlled airspace in the NZ FIR is not required to be equipped with an ADS-B system, until by the end of 2021. However, if the aircraft is already equipped with an ADS-B system, the ADS-B system must meet the prescribed performance standards in Part 91 and the Notice

Access to controlled airspace for non-equipped aircraft

Under the current rules, Airways are able to grant access to controlled airspace for non-transponder equipped aircraft through a dispensation, but non-ADS-B equipped aircraft above FL 245 require an exemption under rule 91.255.

If dispensations were to be allowed for ADS-B OUT equipment, this will reduce the incentive to equip with ADS-B. Therefore it is proposed that dispensations will not be issued for any aircraft not suitably equipped with ADS-B to enter controlled airspace. The only instance where a dispensation might be considered is when an aircraft experiences an emergency and it is necessary for the aircraft to enter into controlled airspace; being the most direct route to the nearest destination.

2.2 Problem definition

Without a clear regulatory framework to support ADS-B uptake, the safety and efficiency benefits of the airspace modernisation programme and related investments will be diminished. This will introduce safety risks into the system, create inefficiencies from developing alternative surveillance systems, and impact the relationship between ADS-B and other parts of the NSS programme such as performance-based navigation (PBN)⁴, the new ATM system and digital towers.

If any operators that fly in controlled airspace below FL 245 are not equipped with ADS-B OUT after the proposed mandate date of 31 December 2021, they will be a hazard for other aircraft. These aircraft will effectively be invisible to air traffic control once the current secondary surveillance radar system is decommissioned at the end of 2021 (excluding the cooperative contingency systems and non-cooperative systems around the three major centres). This will significantly impact on safety benefits of the NSS programme, introduce new risks to the system, and would require Airways to invest in alternative surveillance systems outside of those signalled in the NAANP (at considerable expense to either the Crown or the sector).

Except as required by rule 91.247(a)(3), the current rules mandate transponders to transmit ADS-B data in controlled airspace above flight level 245 only. There is no current requirement for aircraft that operate in controlled airspace below flight level 245 to use ADS-B systems. Being mindful of the current secondary surveillance radar system phasing out by the end of 2021, it is critical that there are Rules in place well before this end date to give full effect to the complete transition from secondary surveillance radar to ADS-B systems.

⁴ Performance-based navigation involves use of satellite location rather than ground-based navigation, which results in more accurate and shorter, more direct flights.

2.3 NPRM Development

Technical experts from the operational groups within the CAA and stakeholders of the New Southern Sky Programme contributed to the development of the policy and this NPRM. Airways contributed to the development of this proposal from a surveillance infrastructure perspective. The development of the NPRM reflects comments and feedback received from industry in response to targeted engagement that took place in early 2019.

In November 2019, Cabinet approved the Minister of Transport's proposal to mandate ADS-B in controlled airspace below flight level 245.

Consultation

There has been consistent engagement with the sector on the decision to introduce ADS-B following the approval of the NAANP in 2014. The NSS Programme has engaged with the aviation sector continuously for the past four years and signalled the planned move to ADS-B from the outset.

Recent consultation confirmed cost remains a barrier to aircraft equipping

The CAA recently consulted on the proposal to mandate ADS-B for all aircraft in controlled airspace. The primary reason for consulting on the potential rule amendments was to understand the barriers associated with moving to ADS-B, inform solutions to address these barriers, and provide Cabinet with sector-informed advice on the likely impacts of this rule change.

During the consultation period, the CAA held 18 roadshow events where they spoke to 325 people from Whangarei to Invercargill. 803 participants submitted on the proposal (including 651 pro-forma submissions and some organisation submissions). They also received 233 multi-choice questionnaires.

A consistent theme was that cost is a barrier to the affected aircraft equipping with ADS-B, particularly for private operators. This cost barrier has been mitigated by the Government's decision to introduce the grant scheme which will enable eligible aircraft owners to receive up to \$3000 in financial assistance. More details on costs are provided in clause 3.2 (Costs).

2.4 Key Stakeholders

The following are identified by the Civil Aviation Authority as key stakeholders in the proposed rule amendments contained in this NPRM:

- The Civil Aviation Authority;
- The Minister of Transport;
- The Associate Minister of Transport;
- The Ministry of Transport;
- Airways Corporation of New Zealand (Airways);
- The New Zealand Defence Force;
- General Aviation sector;
- Domestic and foreign air transport operators;
- Aircraft maintenance organisations;
- Aircraft design organisations;
- Licensed aviation maintenance engineers;
- Avionics suppliers.

3. Issues addressed during development

The matters considered in developing this proposal included the following:

3.1 Benefits

Transitioning to ADS-B introduces significant safety benefits. It enables aircraft to see if have ADS-B IN, and be seen, by other aircraft assisting pilots in early identification of aircraft in proximity. Where ADS-B IN is enabled, this improves crews' situational awareness of other ADS-B equipped aircraft in the area, regardless of whether they are in range of a ground receiver. This functionality will assist with integrating new aviation technology, for instance, unmanned aircraft ('drones'), into New Zealand's airspace alongside manned aircraft.

ADS-B also enables more efficient use of controlled airspace through providing more accurate positioning information. The transition to ADS-B will increase surveillance coverage by 45 percent, compared to the existing radar system. Greater accuracy results in shorter flight-times and the potential for faster location of aircraft in distress or following an incident.

It is expected that air traffic will no longer be dominated by manned aircraft with the ability to operate under visual flight rules in the traditional sense. Further in the future, unmanned aircraft will need to be fully integrated into the aviation system and will need to have automated equipment that can indicate location and avoid interference with other aircraft.

The aviation system is expected to change significantly over the coming decade. ADS-B will assist in accommodating future data-hungry, information-based technologies, such as those used by digital air traffic control towers.

For Airways, the capital and operating costs of the ADS-B system are lower than that of replacing the existing radar and much lower than implementing a radar system with equivalent levels of coverage. The current radar system comes to the end of its useful life in 2021, and the replacement or upgrade costs of that system are taken as a benefit, as are the operational costs avoided.

For aircraft owners, predominantly GA, current transponders will not need to be replaced when they arrive at the end of their useful life which vary between systems. These cost savings are partially offset by the cost of the new ADS-B system (see costs below).

3.2 Costs

Costs avoided to Airways

Replacing the existing radar system with ADS-B reduces capital and operating costs faced by Airways, the current air navigation service provider. Compared to replacing the existing radar system, the proposed ADS-B system will result in \$18.1 million of capital costs avoided. The ground system components of ADS-B are also less expensive to install and maintain, relative to the existing radar system.

The transition to ADS-B also reduces system maintenance costs, as these are avoided from 2021 until the end of life of the infrastructure – approximately 25 years.

The new ground infrastructure has been completed with an estimated cost to Airways of \$44m. This investment is expected to provide \$31m of new customer benefits and avoid \$21m of costs to maintain the radar current system.

There are costs associated with the introduction of ADS-B OUT, most notably the cost of equipping aircraft and certification of the modification. The CAA has worked to minimise the certification costs for the majority of standard category aircraft through amendments to AC43.14.

Operators that currently operate in controlled airspace below flight level 245 who have not yet equipped their aircraft with ADS-B OUT will incur costs for the equipment purchase, installation, certification and testing, and regular tests during the life of the equipment.

Grant scheme to mitigate costs

In the context of the transition of the airspace system to ADS-B, the Government considered the savings for Airways compared with the costs for GA. It was decided to provide a \$2,500 grant as financial assistance to GA aircraft operators affected by this proposal. Operators may receive an additional \$500 if they choose to equip with ADS-B IN. A basic ADS-B system costs \$5,500 plus installation and certification costs. In the policy consultation, the majority of GA agreed that the costs of installation and certification should be incurred by the aircraft owner.

The grant does not cover the full cost of the equipment. However, there also some benefits for GA in terms of the increased surveillance coverage, Air Traffic Management efficiencies, search and rescue benefits and the ability to have ADS-B IN equipment. Also, the current surveillance equipment for individual operators has a limited life, and would require replacement eventually regardless of the shift to ADS-B. The grant scheme takes account of the inconvenience and near-term costs of having to replace this equipment by the date of the proposed mandate (31 December 2021).

Military aircraft

Military aircraft are impacted by the decision to introduce ADS-B in controlled airspace. The New Zealand Defence Force has actively engaged in the NSS Programme and supports ADS-B as the future aviation surveillance system.

Cabinet recently approved funding to upgrade military aircraft with a range of new equipment, including ADS-B. Installing ADS-B is a key component of the joint Ministry of Defence and New Zealand Defence Force project to upgrade a number of communication, navigation and surveillance systems across military aircraft.⁵ Due to the unique complexities of military aircraft, the cost to government of equipping these aircraft is significantly higher than the cost to low-end civil sector systems.

The timeframe for equipping military aircraft with ADS-B is also significantly longer compared to civilian aircraft, meaning not all military fleets will be equipped ahead of the 31 December 2021 mandate. This is due to a range of factors, such as the complexity and duration of the process to certify new equipment.

Without any transitional arrangements in place, the timeframe for equipping presents a risk to the continuity of domestic tasks conducted by military aircraft. These tasks range from National Contingency operations, such as search and rescue, humanitarian and disaster relief, through to transport in support of State visits.

A transitional arrangement for military aircraft was anticipated when the NAANP was initially approved. The CAA are in the process of finalising this type of arrangement, to ensure these aircraft have ongoing access to controlled airspace.

There are also some challenges presented by the possibility of non-ADS-B equipped foreign State Aircraft intending to enter New Zealand airspace. These aircraft may not be equipped due to different State timeframes for equipping, or operational security concerns with the equipment. Separate arrangements are being finalised by the CAA, the New Zealand Defence Force and Airways to accommodate these aircraft.

Non-compliant data

Rule 91.257A currently only prohibits non-compliant ADS-B data in controlled airspace. Although Airways predominately use ADS-B data in controlled airspace, the data is also used in uncontrolled airspace for the purposes of a flight information services, as well as in emergency circumstances. Given the safety risks associated with non-compliant data, it was considered whether the mandate should be extended to prohibit non-compliant ADS-B data in all airspace.

However, it was ultimately decided not to extend the prohibition to all airspace. The CAA considers the transmission of non-compliant data outside of controlled airspace is low risk because it is not being used for traffic separation and that operators' having to re-equip with ADS-B that meets the prescribed performance standards would result in costs without significant benefit, unless those operators intend to operate in controlled airspace in the future.

Feasibility of installing ADS-B on special category aircraft - microlights and hot air balloons

Special category aircraft - microlights are not subject to Part 21 and therefore have different regulatory requirements for the installation of equipment and the required technical data. However they are not exempt from the requirements relating to ADS-B as prescribed under rule 91.257.

Hot air balloons have low electrical power consumption requirements, as they do not have a power-generating capability and have limitations regarding how the equipment can be installed on the equipment. There are currently three hot air balloons that have Mode S transponders, which are likely to require an upgrade to ADS-B OUT under the current proposal. These operators may also require some support from a Part 146 organisation to help them with their installation.

Aircraft operations without ADS-B for discreet operations

It is proposed that the rules should allow for aircraft to operate in controlled airspace without the use of ADS-B, for any of the following:

- 1) national defence or security purpose;
- 2) law enforcement or intelligence purpose; or

⁵ This refers to the Operational and Regulatory Aviation Compliance Sustainment (ORACS) project.

- 3) for any other suitable purpose approved by the Director where the transmitting of ADS-B data would compromise the security of the operation or pose a safety risk to the aircraft, crew or people and property in the air or on the ground.

It was considered whether discreet operations should only be allowed for purposes under paragraphs 1) and 2). For any other operation, the operator should seek an exemption. Conversely, it was considered whether paragraph 3) (for any other suitable purpose) should be limited to specific operations, such as those for conservation purposes such as 1080 operations and Tahr culling where threats are made against operators on social media.

It was clarified that Cabinet had agreed generally to the potential need for discreet operations, with examples being cited in the case of Police enforcement or Department of Conservation operations. The policy intent was that discreet operations would not be exclusive to these operations, as there may be other legitimate purposes in the future.

Being forward-thinking and mindful of the lengthy rulemaking process, it was decided that paragraph 3 should be included. As a caveat, a discreet operation must not be carried out unless certain requirements as set out in the rule are met. See more details about discreet operations in clause 4 (Summary of changes).

3.3 International Context

The NAANP proposes that New Zealand follows the ICAO Global Air Navigation Plan (GANP) and the ICAO Asia Pacific Surveillance Strategy and the Asia Pacific Seamless ATM Plan which includes surveillance system modernisation based on the 1090 MHz ES ADS-B system.

The GANP does not place requirements on ICAO States. It is a planning tool to be used by individual States where they determine a need for modernisation of their airspace and air navigation systems. The end of operational life of New Zealand's surveillance radar provides an opportunity to ensure that the replacement system improves aviation system safety and efficiency, and in consideration of the guidance in the GANP.

ADS-B is a modern aviation surveillance technology that is considered international best practice. The proposed transition towards a mandatory ADS-B OUT environment is consistent with developments in other jurisdictions including the United States. However other jurisdictions such as Europe and Australia have limited the mandate to aircraft above a certain size and/or depending on the type of operation. These States have exempted some smaller or recreational aircraft from the mandate because they have retained radar surveillance. In view of the secondary surveillance radar system in New Zealand being decommissioned by the end of 2021, it is not feasible for New Zealand to follow these States. From 31 December 2021, any aircraft operating in controlled airspace prescribed by the rules will be required to operate in ADS-B OUT.

3.4 Aim and objectives

The aim of the proposal is to provide a regulatory framework for the safe and effective introduction of ADS-B in controlled airspace below flight level 245 in the New Zealand Flight Information Region.

The primary objectives are to:

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

3.5 Options

In determining the approach to address the objectives, the CAA considered a number of regulatory options.

These options were:

- status quo;
- investment in a replacement SSR system;
- rule to require ADS-B OUT on all aircraft that fly in controlled airspace from 31 December 2021 (preferred option);
- rule to require ADS-B OUT for all aircraft which fly IFR only, and an education campaign encouraging voluntary equipage for VFR operators (the 'Australian' option);
- rule to require ADS-B OUT for aircraft which weigh more than 5700kg, or have a maximum cruise speed greater than 250 knots, and an education campaign encouraging voluntary equipage for those operators using aircraft below these limits (the 'European' option); and
- postpone the proposed mandate until 31 December 2022 to enable more time for GA to equip.

Option 1: Status Quo/Do nothing

Under the status quo, the current surveillance system will be coming to end of life by 31 December 2021. While airlines and other major operators are already utilising ADS-B OUT technology, without universal uptake of this technology, the surveillance system would be ‘blind’ to non-equipped aircraft operating in controlled airspace. This would introduce unacceptable safety risks to the aviation system.

ATC may be able to see unequipped aircraft around the three main centres (under the proposed contingency system). However, the contingency system will have significantly less visibility than the current surveillance network and will be insufficient for full system ATC purposes.

The Government would also have committed to providing financial assistance of \$2500 plus GST per aircraft in order to help aircraft owners equip with ADS-B OUT equipment. However, there would be no regulatory change to *require* that all aircraft operators that fly in controlled airspace below FL 245 are equipped with ADS-B OUT.

Given the safety risks, this is not a feasible option.

Option 2: Invest in a replacement SSR system

Airways would invest in a replacement SSR system that would maintain an acceptable surveillance system for aviation and would enable other projects within the NSS programme to be implemented (and thus their benefits realised).

This option would result in significant financial impacts for Airways who have already made financial decisions based on the indicative 2021 mandate outlined in the NAANP. They have also already invested in, and installed, the ADS-B system as proposed under the NAANP, which would now not be fully utilised.

Airways would need to find additional funding, potentially significant, to provide a suitable replacement SSR system. The costs of this system would likely either be funded from increased charges on the sector (airline and GA) or a Crown contribution. Any fees and charges to recover this amount from GA would be unpalatable due to the high infrastructure costs which would be shared across 4000 aircraft owners (or a portion of them). These costs would likely be significantly higher than the costs to these aircraft of equipping with ADS-B OUT.

The Government would also have committed to providing financial assistance of \$2500 plus GST per aircraft in order to help aircraft owners equip with ADS-B OUT equipment. However, there would be no regulatory change to *require* that all aircraft operators that fly in controlled airspace below FL 245 are equipped with ADS-B OUT.

Airways would still need to provide a safety case to the CAA for the replacement ATC system.

This option would have a significant impact on benefits realisation of the NSS programme and considerably erode confidence in the justification for the airspace modernisation. Strong resistance could be expected from the airline sector on which it is likely the majority of increased charges would fall, given the limited ability of the GA sector to pay.

Option 3: A rule requiring ADS-B equipage on aircraft operating in controlled airspace from 31 December 2021

This option would require an amendment to Rule Part 91 to require all operators that fly in controlled airspace below FL 245 after 31 December 2021 to have their aircraft equipped with ADS-B OUT equipment. If an operator doesn't equip by the mandate date, they will have limited access (via an exemption or discreet operations process) to controlled airspace and may not be able to fly to their planned destination. This is what was clearly signalled in the NAANP in 2014 (following two years of consultation with the sector), and continually following Cabinet agreement.

This option has the greatest safety benefits, as it provides an enforceable standard that ensures that only operators who have ADS-B equipment enter controlled airspace. This option is also consistent with international best practice as captured in the ICAO GANP.

This option also ensures the maximum wider benefits from the NSS programme. This includes economic benefits of \$128-904m for the New Zealand economy⁶. It also enables progress towards other related NSS projects, such as PBN, digital towers and the new ATM system. This option is also what Airways and airlines have been planning towards for

⁶ <https://www.nss.govt.nz/benefits/>

some years. Any change would have implications for them, as they have already invested substantially in ADS-B equipment.

This option would impose costs on GA operators who intend to continue operating in controlled airspace, if they do not already have ADS-B OUT equipment on their aircraft (the majority). This cost is mitigated by the Government decision to provide a grant to these aircraft operators, to assist with their equipage costs.

With limited numbers of avionics workshops across the country, there is a risk that these workshops will not be able to manage the influx of aircraft requiring new transponders in time for this mandate. To date, uptake of ADS-B equipment among this fleet is low. To mitigate this risk, there is a targeted communications plan to encourage early and phased equipage (and prevent backlog).

Option 4: Mandate ADS-B OUT for aircraft which fly IFR only, and an education campaign encouraging voluntary equipage for VFR operator (the ‘Australian Option’)

Under this option, a rule mandating ADS-B equipage would be applied to all Instrument Flight Rules (IFR) operators, as they have a greater need for continued surveillance given the inherent risks of their operations, complexity of operations, and areas to which they fly (busy airspace over urban centres). The CAA, Airways and Ministry of Transport would also work together to educate VFR operators of the benefits of ADS-B to encourage voluntary equipage of ADS-B OUT. This option means that those who receive the most benefit from moving from radar to ADS-B pay for and install the equipment on their aircraft.

This option would be similar to the proposal that was developed in Australia. However, it would not ensure the integrity of the surveillance system in New Zealand. This is because the Australian system cannot be compared directly with New Zealand’s proposed system, as they are retaining SSR coverage, whereas New Zealand is not.

Australia has acknowledged that their proposed system isn’t an ideal state. In a discussion document with the aviation sector in Australia on voluntary fitment of ADS-B, the Australian Civil Aviation Safety Authority (CASA) noted: ‘its ideal end state is having the maximum number of aircraft equipped with ADS-B OUT and ADS-B IN equipment’⁷.

Given that this option does not mandate ADS-B OUT for all operators in controlled airspace, it presents significant safety risks as not all aircraft that fly in that airspace will be equipped and thus visible to Airways (except in the limited coverage area of the proposed contingency system).

This option would mean that *most* GA operators who have the biggest concerns regarding the costs of ADS-B equipment would not be required to equip. 89.9% of submitters (who were predominately GA operators) during the policy consultation phase said that costs were a major concern for them. Furthermore, some of these submitters have said that costs could be 25% of the cost of their aircraft. However, given the decision by Government to announce a grant of \$2500 plus GST for ADS-B OUT, these concerns have been considered and the costs have been significantly reduced.

The benefits of ADS-B increase as more aircraft equip. However, under this option, not everyone will be required to equip. This option would therefore dilute the benefits of the NSS programme and the investment that the New Zealand Government has made through the ADS-B grant programme.

Option 5: Mandate ADS-B OUT for aircraft either weighing more than 5700kg, or with a max cruise speed greater than 250 knots, and an education campaign encouraging voluntary equipage for those operators using aircraft below these limits (the ‘European Option’)

Under this option, a rule mandating ADS-B equipage would be applied to all aircraft weighing more than 5700kg, or with a maximum cruise speed greater than 250 knots. The CAA, Airways and Ministry of Transport would also work together to educate VFR operators of the benefits of ADS-B to encourage voluntary equipage of ADS-B OUT. This option means that those who receive the most benefit from moving from radar to ADS-B pay for and install the equipment on their aircraft.

This option would be similar to the proposal that was developed by the European Union Aviation Safety Agency (EASA). However, it has similar issues as with following the Australian model, as it would not ensure the integrity of the surveillance system in New Zealand, as Europe is also retaining multi-layered and overlapping SSR systems, whereas

⁷ Civil Aviation Safety Agency of Australia, (December 2017) Discussion Paper: Voluntary fitment of ADS-B Technology in Visual Flight Rules aircraft, page 8.

New Zealand is not. There would be the same additional safety risks of Airways operating an ATC system where controllers could only see some of the aircraft.

Given that this option does not mandate ADS-B OUT for all operators in controlled airspace, it presents significant safety risks as not all aircraft that fly in that airspace will be equipped and thus visible to Airways (except in the limited coverage area of the proposed contingency system) and other aircraft.

This option would mean that *most* GA operators who have the biggest concerns regarding the costs of ADS-B equipment would not be required to equip. 89.9% of submitters (who were predominately GA operators) during the policy consultation phase said that costs were a major concern for them. Furthermore, some of these submitters have said that costs could be 25% of the cost of their aircraft. However, given the decision by Government to announce a grant of \$2500 plus GST for ADS-B OUT, these concerns have been considered and the costs have been significantly reduced.

The benefits of ADS-B increase as more aircraft equip. However, under this option, not everyone will be required to equip. This option would therefore dilute the benefits of the NSS programme and the investment that the New Zealand Government has made through the ADS-B grant programme.

Option 6: Postpone the proposed mandate until 31 December 2022

Under this option the proposed 31 December 2021 mandate would be delayed by 12 months to allow operators more time to equip their aircraft. Airways would be asked to and the existing radar array functional for another 12 months to enable operators to have more time to equip.

This would be a change of approach from what was signalled in the NAANP. Airways would be subject to additional financial and safety risks due to the current SSR would be used beyond design life and may be prone to failure. This would compromise ATC surveillance, safety benefits of ADS-B delayed, and cost expended by Airways and operators who have already equipped, without any benefit.

This option would provide more time for operators to equip their aircraft with ADS-B, which would have the benefit of allowing operators more time to bear the cost of upgrading; and reducing the risk of a 'bottleneck' as the mandate deadline approached.

Avionic shops which would carry out the installations have informed the CAA that the cost of certified ADS-B equipment has now plateaued. Therefore, delaying the mandate would likely not result reduction in costs for aircraft owners. Moreover, experience related by the US Federal Aviation Administration (FAA) is that despite a generous 10 year lead time for adoption of ADS-B OUT, uptake levels remained low until the FAA made it absolutely clear that the mandate would not be extended and compliance would be enforced. This was supported by a US\$500 rebate, limited to 20,000 aircraft, and for single engine piston aircraft only. The mandate will take effect on 1 January 2020.

The existing contract between Airways and the SSR vendor expires on 31 December 2021. After this date, there could be significant risks of an outage as Airways may have limited access to maintenance support from the vendor to supply parts for the equipment that would be at its end of life. There is currently a lack of clarity regarding the ability for Airways to extend the contract. However, it is the CAA's understanding that the current vendor may be reluctant to extend their contract given that the equipment is life expired. This option could therefore put significant risks on Airways' ability to safely manage aircraft using the existing radar array.

The postponed mandate could still result in a bottleneck. There has already been five years advanced notice of the proposal and any delay could just lead to a further delay by aircraft owners from equipping for longer. Given the FAA experience, it is likely that if an extension was granted in New Zealand, aircraft owners may assume that further extensions could also occur. This would reduce the incentive for aircraft owners to equip.

Which of these options is the proposed approach?

The preferred option is Option 3.

This option is consistent with the ICAO GANP and will provide an enforceable standard that requires ADS-B OUT on all aircraft operating in controlled airspace by 31 December 2021. An enforceable standard will ensure that the risk of unequipped aircraft entering controlled airspace will be minimised and safe separation of aircraft is maintained.

This option has also been clearly signalled since 2014 and the proposed mandate is an integral part of the NSS programme. This mandate will enable progress to be made on the other NSS projects that as a whole will have an expected benefit for the New Zealand economy of at least \$128m (potentially up to \$904m).

An education campaign is already underway and grant scheme will be implemented to help support uptake.

3.6 Compliance Costs

There are costs associated with the introduction of ADS-B Out most notably the cost of equipping aircraft and certification of the modification. Airways data indicates that approximately 11% of flights are undertaken by aircraft already equipped with operational ADS-B Out.

Operators who have not yet equipped will need to do by the end of 2021 mandate as signalled in the proposal. Operators bringing new aircraft into the country or fitting aircraft ahead of bringing them into the country, will need to install an ADS-B system that meets the prescribed requirements and performance standards in Part 91 before the new aircraft will be certified for flight in controlled airspace below flight level 245.

At present, ADS-B OUT requires two pieces of equipment to be fitted on an aircraft:

- A 1090 MHz Mode S extended squitter and
- A GNSS position source compatible with the transponder.

The cost of equipping general aviation aircraft with ADS-B Out is between \$5500 and \$13000. A basic ADS-B system is \$5000. Costs are variable depending in the aircraft-equipment combination, the level of integration required with existing avionics/systems, and the availability of approved data, modifications, and/or STCs. Some variation is also due to operator preferences.

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

Any uncertified ADS-B equipment will need to be certified to ensure that it meets the requirements of rule 91.257 and the performance standards specified in the notice NTC 91.258. The costs of getting uncertified ADS-B equipment are highly dependent on a number of factors such as the equipment itself, the aircraft type and whether the certification of the equipment requires technical data to be obtained from a suitable organisation.

3.7 Out of Scope Matters

The following matters are outside the scope of this proposal:

- Regulating the use of ADS-B IN equipment. If an operator chooses to install ADS-B IN equipment, the operator will need to comply with the certification requirements for the aircraft type. In uncontrolled airspace, pilots using ADS-B IN need assurance that the data they are receiving from other aircraft is accurate. Otherwise the safety benefits of improved situational awareness are lost. Although the regulating of ADS-B IN is outside the scope of this proposal, the grant scheme provides eligible operators a financial incentive to equip with ADS-B IN.
- Space based ADS-B.
- Regulating the use of uncertified ADS-B equipment. Any uncertified ADS-B equipment to be used in an aircraft operating in controlled transponder mandatory airspace will need to meet the requirements of rule 91.257 and the performance standards specified in the notice NTC 91.258. In order to meet the prescribed requirements and performance standards which will need the Director's approval, operators are encouraged to proactively engage with the CAA before proceeding with installing equipment which is not certified.
- Regulating the use of ADS-B in drones, as drones are generally exempt from Part 91⁸.
- Regulating the use of ADS-B outside controlled airspace.

⁸ See rule 91.1(c) which provides that Part 91 does not apply to — ... (2) persons operating aircraft to which Part 101 applies; and (2A) a person operating an aircraft under the authority of an unmanned aircraft operator certificate granted under the Act and in accordance with Part 102 unless compliance with any of the requirements in this Part is required as a condition of operation; Note that Part 101 prescribes rules governing the operation of remotely controlled aircraft (see rule 101.1(4)).

3.8 ICAO Standards and Recommended Practices (SARPS)

The proposed rule amendments are intended to align with International Civil Aviation Organization (ICAO) annexes and are written in consultation with the following annexes:

- Annex 1 – Personnel Licensing
- Annex 2 – Rules of the Air
- Annex 3 – Meteorological Services for International Air Navigation
- Annex 5 – Units of Measurement to be Used in Air and Ground Operations
- Annex 6 – Operation of Aircraft
- Annex 8 – Airworthiness of Aircraft
- Annex 10 – Aeronautical Telecommunications
- Annex 11 – Air Traffic Services
- Annex 14 – Aerodromes
- Annex 15 – Aeronautical Information Services

3.9 Level of Risk to NZ Aviation Safety

Without a rule to mandate ADS-B equipment on aircraft operating in transponder mandatory controlled airspace below FL 245, there would be significant safety risks for the NZ aviation system if the current SSR network is not extended beyond its current life. Both equipped and unequipped aircraft would be allowed to fly in the controlled airspace, as there would be no rule to exclude unequipped or ill-equipped aircraft.

Without a rule, ATC will not be able to see unequipped aircraft in the majority of controlled airspace and this would cause significant safety risks. ATC may be able to see unequipped aircraft around the three main centres (by the proposed contingency system). However, the contingency system is significantly less than the current surveillance network and not sufficient for air traffic control purposes. Therefore, to ensure the integrity of the aviation system all aircraft in controlled airspace must be equipped with ADS-B systems which meet the performance standards prescribed in Part 91. Otherwise the safety benefits of ADS-B would not be realised.

4. Summary of changes

4.1.1 Rule 91.247 is amended –

- in paragraph (a) by removing the reference to ‘*transponder mandatory controlled airspace below flight level 245*’, as this airspace is covered in paragraph (b). This leaves paragraph (a) applying to transponder mandatory special use airspace designated under Part 71 within the New Zealand FIR only. Paragraph (a) is further amended in subparagraph (3) by deleting the phrase ‘*if the aircraft is equipped with an ADS-B system that meets the requirements under rule 91.257*’. From 31 December 2021, every aircraft operating in transponder mandatory controlled airspace that is equipped with an ADS-B system must operate the transponder to transmit ADS-B data.
- Paragraph (b) is amended by deleting the reference ‘*above flight level 245*’, to remove the limitation that the provision applies to the designated controlled airspace above flight level 245 only. This means that a pilot-in-command operating in the designated transponder mandatory controlled airspace in either above or below flight level 245, must operate the transponder to transmit ADS-B data, unless otherwise authorised or instructed by ATC.
- Paragraph (e) is deleted as it is redundant. The provision is reflected in the new draft rule 91.255D.

4.1.2 Rule 91.253 is to be revoked as the transition period of 31 December 2018 has passed.

- 4.1.3 New draft rule 91.253 is inserted to provide for a new transition arrangement, from when the new rules come into force⁹ until the mandate date of 31 December 2021. The rule allows for an aircraft that is not equipped with an ADS-B system but a Mode A and C, or Mode S, to operate in transponder mandatory controlled airspace below FL 245. The transitional arrangement is to allow time for affected operators to get their aircraft equipped with ADS-B systems that meet the prescribed performance standards in rule 91.257.
- 4.1.4 Rule 91.255 is amended –
- in the heading by removing the phrase “above flight level 245”, as the mandatory use of ADS-B system in controlled airspace is to apply in both spheres – above and below FL 245;
 - in paragraph (a), by inserting ‘*and 91.255D*’, as the new rule 91.255D will also provide an exception to the requirement that a person must not operate an aircraft in the designated controlled airspace unless as specified in rule 91.255;
 - in paragraph (a), by inserting a new paragraph (2). The paragraph adds a new requirement that an aircraft must transmit ADS-B data at all times as soon as the aircraft begins to move under its own power, until it has come to a complete stop at the end of the flight.
- 4.1.5 New draft rule 91.255D is inserted to provide for discreet operations. A discreet operation is where a person may operate an aircraft without transmitting ADS-B data in the designated transponder mandatory controlled airspace, for one of the purposes specified in the rule. The purposes are namely for national defence or security, intelligence or law enforcement, or for any other suitable purpose approved by the Director where the transmitting of ADS-B data would compromise the security of the operation, or pose a safety risk to the aircraft, crew or people and property in the air or on the ground. For an IFR flight, information submitted in the flight plan must include that the proposed operation is a discreet operation and there is a detailed plan for alternative surveillance. In addition, the appropriate ATS unit will need to approve the operation before it is carried out.
- 4.1.6 A person who has carried out a discreet operation for the purpose of national defence or security, intelligence or law enforcement will be required to inform the Director of the details of the discreet operation, within 14 days after completing the operation. However, if an incident or accident occurred while carrying out the discreet operation, the person is not required to notify the Director under this rule but will be required to inform the Director of the incident or accident as required under Part 12.
- 4.1.7 Note that a person who carries out a discreet operation for ‘any other suitable purpose approved by the Director where the transmitting of ADS-B data would compromise the security of the operation or pose a safety risk to the aircraft, crew or people and property in the air or on the ground’ is not required to inform the Director of the details of the discreet operation after completing the operation. This is intentional, as the person would effectively need to present to the Director the details of the proposed discreet operation, before the Director approves it. If an incident or accident occurred in carrying out the operation, the person will be required to inform the Director of it as required under Part 12. The CAA considers that a report submitted under Part 12 would effectively provide sufficient details of a discreet operation, thus it is not necessary to provide two separate reports in respect of a discreet operation.
- 4.1.8 Rule 91.257 is to be amended in paragraph (a) by inserting “*or any other suitable transponder determined by the Director as specified in a notice referred to in rule 91.258*”. The rule currently requires that an ADS-B system must include a 1090 MHz Mode S Extended Squitter transponder. It is envisaged that as technology progresses over time, other types of suitable transponders will become available for use in the future. In view of the lengthy process involved in amending a rule, and to provide some flexibility, the proposed amendment would allow the Director to determine any other suitable transponder in a CAA Notice. In deciding whether or not a transponder is suitable, the Director would be expected to assess a new transponder’s suitability against the performance standards of the current 1090 MHz Mode S Extended Squitter transponder. Part of the Director’s assessment of a non – TSO equipment would include whether there is a compelling reason as to why an aircraft could not be fitted with certified equipment, such as weight or electrical power factors.
- 4.1.9 Rule 91.257A is to be amended by inserting a new paragraph (b) to provide for the definition of “*non-compliant ADS-B data*”. The term refers to any data that does not meet the ADS-B OUT message set requirements specified

⁹ Tentative scheduled date for the new rules coming into force date is April/May 2020.

in a notice referred to in rule 91.258. The proposed definition also clarifies that any data that arises from external factors such as a GNSS outage is not non-compliant ADS-B data.

- 4.1.10 Rule 172.3 (Definitions) is amended by correcting the definition of situation display consistent with the ICAO Doc 4444 definition, and inserting the definition of *Visual surveillance system* to give full effect to Part 172.
- 4.1.11 Rule 172.57 is amended in paragraph (c)(1) by inserting a new subparagraph (iii). The proposed amendment places an additional duty on the applicant to establish procedures for ensuring that an area control centre, a flight information centre, and an approach office is provided with equipment enabling situation display, where an ATS surveillance service is provided. The rule is further amended in paragraph (e) by deleting “*visual display unit*” and replacing with “*display system including the situation display and/or visual surveillance system display*”.
- 4.1.12 Rule 172.67 is amended by inserting a new paragraph (da). The paragraph requires an applicant to establish automated coordination procedures where the ATS surveillance provides for the automated exchange of coordination data relevant to aircraft being provided with an ATS surveillance service. This updates the rule consistent with technological improvements and consistent with ICAO Doc 4444 requirements. The rule is further amended in paragraph (f) by correcting a reference – delete “Part IX” and replace with “*Chapter 11*”.
- 4.1.13 Rule 172.107 is amended to include the requirement information to be made available for pilots and operators on “*all areas where PSR, SSR, ADS-B and MLAT systems are in use*”, consistent with international practice and DOC 4444, and requirements for the use of ADS-B in the provision of an ATS surveillance service.
- 4.1.14 Rule 172.115 is amended in paragraph (d)(2) by inserting a new subparagraph (iii) to “*replicate the visual surveillance system display*”. This is a consequential amendment due to the amendments to rule 172.3 (Definitions).
- 4.1.15 Rule 172.265 is amended by correcting the paragraph references - delete “8.7.4.1” and replace with “8.7.3.1”, delete “8.7.4.2” and replace with “8.7.3.2”.
- 4.1.16 Rule 72.267 is amended in paragraph (1)(i) by deleting “Part V”, deleting paragraph reference “7.3.7” and replacing with “8.7.2.8”.
- 4.1.17 An editorial amendment is made to rule 172.293 by amending the paragraph reference from “(a)(3)(iii)” to “(a)(4)”.
- 4.1.18 Rule 172.401 is amended by deleting “*air*” in the term “*air situation display*”.
- 4.1.19 The definition of Aeronautical telecommunication service in Part 1 is amended by inserting a new paragraph (1A) as follows:
- (1A) any telecommunication service which processes or displays air traffic control data, including aviation meteorological data, for use by an ATS provider under Part 172; or”.

5. Legislative analysis

5.1 Power to make rules

The Minister may make ordinary rules under sections 28, 29, 29A, 29B and 30 of the Civil Aviation Act 1990, for various purposes including implementing New Zealand’s obligations under the Convention, assisting aviation safety and security, and any matter contemplated under the Act.

These proposed rules are made pursuant to:

- (a) Section 30(a) which allows the Minister to make rules for the designation, classification, and certification of all or any of the following:
- i. aircraft:
 - ii. aircraft pilots:
 - iii. flight crew members:
 - iv. air traffic service personnel:

- v. air traffic services:
- vi. aerodrome and aerodrome operators:
- vii. navigation installation providers:
- viii. aeronautical procedures:
- ix. aviation communication services:
- x. any other person who provides services in the civil aviation system, and any aircraft, aeronautical products, aviation related services, facilities, and equipment operated in support of the civil aviation system, or classes of such persons, aircraft, aeronautical products, aviation related services, facilities, and equipment operated in support of the civil aviation system:

(b) Section 28(5) which allows the Minister to make rules that provide for matters to be determined or approved by the Authority, the Director, or any other person or empower the Authority, the Director or any other person to impose requirements, or conditions on the performance of any activity including but not limited to procedures to be followed.

(c) Section 30(b) which allows the Minister to make rules for the setting of standards, specifications, restrictions, and licensing requirements for all or any of those persons or things specified in paragraph 30(a) including the specifications of standards of design, construction, manufacture, processing, testing, supply, approval, and identification of aircraft and aeronautical products;

(d) Section 30(d) which allows the Minister to make rules for the definitions, abbreviations, and units of measurement to apply within the civil aviation system.

5.2 Matters to be taken into account

The development of this NPRM and the proposed rule changes take into account the matters under section 33 of the Act that the Minister must take into account when making ordinary rules including the following:

ICAO Standards and Recommended Practices

The proposed rule amendments comply with applicable sections of the following International Civil Aviation Organization (ICAO) Annexes:

- Annex 2 – Rules of the Air
- Annex 6 – Operation of Aircraft
- Annex 8 – Airworthiness of Aircraft
- Annex 10 – Aeronautical Telecommunications
- Annex 11 – Air Traffic Services

Assisting economic development

The proposed rule amendments will assist economic development by reducing the capital and operating costs of the surveillance system to Airways and the Government. It also supports the realisation of the New Southern Sky programme benefits which has been estimated to be in the range of \$128 million – \$928 million in benefits for the New Zealand economy.

Assisting safety and personal security

The proposed rule amendments will improve aviation safety by ensuring that the equipment on board aircraft aligns with the ground-based surveillance infrastructure. These changes, including the introduction of performance-based rules, promote safety by future-proofing the rules framework to allow integration of new, more advanced technology provided it meets the set minimum standards.

The amendments will align the rules with the appropriate ICAO standards and recommended practices.

Improving access and mobility

The proposed rule amendments will limit access to transponder mandatory controlled airspace for operators that do not have suitable ADS-B equipment installed in their aircraft. This is to ensure aviation safety by reducing the risk of non-compliant ADS-B data being transmitted from those aircraft.

Protecting and promoting public health

The proposed rule amendments will not have a detrimental impact on protecting and promoting public health.

Ensuring environmental sustainability

The proposed rule amendments will contribute to the overall benefits of system modernisation on environmental sustainability through reducing fuel burn and corresponding carbon emissions.

5.3 Incorporation by reference

The proposed rule amendments contain existing material incorporated by reference.

5.4 Civil Aviation (Offences) Regulations

Schedule 1 of the Civil Aviation (Offences) Regulations is made by the Governor General pursuant to section 100 of the Civil Aviation Act 1990 and contains a list of summary and infringement penalties associated with offences against various civil aviation rules.

A suite of draft amendments to the Civil Aviation (Offences) Regulations 2006 which include amendments relating to the ADS-B Above FL 245 mandate are currently being processed. It is envisaged that these amendments will come into force by February 2020. Any residual amendments resulting from this proposal will be considered in due course.

6. Submissions on the NPRM**6.1 Submissions are invited**

Interested persons are invited to participate in the making of the proposed rules by submitting written data, views, or comments. All submissions will be considered before final action on the proposed rulemaking is taken. If there is a need to make any significant change to the rule requirements in this proposal as a result of the submissions received, then interested persons may be invited to make further submissions.

6.2 Examination of submissions

All submissions will be available for examination by interested persons both before and after the closing date for submissions. A consultation summary will be published on the CAA web site and provided to each person who submits a written submission on this NPRM.

Submissions may be examined by appointment with the Docket Clerk at the Civil Aviation Authority Level 15, Asteron Centre, 55 Featherston Street, Wellington 6011 between 8:30 am and 4:30 pm on weekdays, except statutory holidays. Appointments to examine submissions are to be arranged by phone or email docket@caa.govt.nz.

6.3 Official Information Act

Submitters should note that subject to the Official Information Act 1982 any information attached to submissions will become part of the docket file and will be available to the public for examination.

Submitters should state clearly if there is any information in their submission that is commercially sensitive or for some other reason the submitter does not want the information to be released to other interested parties. The CAA will consider this in making a decision in respect of any Official Information Act requests. It should be noted that the CAA cannot guarantee confidentiality in respect of any specific submissions.

6.4 How to make a submission**6.4.1 Online response form**

Note: since this NPRM was prepared, we have a new website. Please use this address: <https://www.aviation.govt.nz/rules/rule-development-and-change/nprms-open-for-submission/>

An online response form is available on the CAA web site at <https://www.caa.govt.nz/rules/nprms/>. When submitted, this form will be sent directly to the Docket Inbox.

6.4.2 Submission response sheet

A submission response sheet may also be downloaded from our website and sent by the following methods:

e-mail: docket@caa.govt.nz and marked NPRM 19-05

by mail: Docket Clerk (NPRM 20/CAR/01)
Civil Aviation Authority
PO Box 3555
Wellington 6140
New Zealand

delivered: Docket Clerk (NPRM 19-05)
Civil Aviation Authority
Asteron House
Level 15
55 Featherston Street
Wellington 6011

6.5 Final date for submissions

Comments must be received by 21 February 2020.

6.6 Availability of the NPRM:

Any person may obtain a copy of this NPRM from–

CAA web site: www.caa.govt.nz;

or from:

Docket Clerk
Civil Aviation Authority
Asteron House
Level 15
55 Featherston Street
Wellington 6011
Phone: 64–4–560 9640 (quoting NPRM)

6.7 Further information

For further information, contact:

Salote Raiwalui
Rules Drafter

Email: Salote.Raiwalui@caa.govt.nz

Part 91 General and Operating Rules

[Proposed deleted text are ~~struck through~~ and shaded grey, new amendments are shaded grey]

91.247 Use of transponder and altitude reporting equipment

(a) Except as provided in paragraph (g), a pilot-in-command of an aircraft operating in transponder mandatory special use airspace ~~or transponder mandatory controlled airspace below flight level 245~~ designated under Part 71 within the New Zealand FIR must, ~~unless otherwise authorised or instructed by ATC,~~ operate the transponder —

- (1) in Mode A and Mode C; or
- (2) in Mode S if the aircraft is equipped with Mode S equipment and allocated a unique Mode S code referred to in paragraph (d); or
- (3) to transmit ADS-B data, ~~if the aircraft is equipped with an ADS-B system that meets the requirements under rule 91.257.~~

(b) Except as provided in paragraph (a) or (g), a pilot-in-command of an aircraft operating in transponder mandatory controlled airspace ~~above flight level 245~~ designated under Part 71 within the New Zealand FIR must, unless otherwise authorised or instructed by ATC, operate the transponder to transmit ADS-B data.

(c) Except if paragraph (3) applies or if operating Mode S equipment, the pilot-in-command must set the transponder SSR code—

- (1) to the code assigned by ATC for the flight; or
- (2) if not assigned a code by ATC, in accordance with Table 2; and
- (3) in the event of an in-flight emergency, loss of radio communications, or an act of unlawful interference, set the transponder to the appropriate code in accordance with Table 3.

(d) A pilot-in-command of an aircraft must not operate Mode S transponder equipment unless the aircraft is transmitting a unique Mode S code assigned by the State of registry.

~~(e) — A pilot in command intending to operate an aircraft without an operable transponder in transponder mandatory airspace that is within controlled airspace must obtain specific authorisation from the ATC unit having jurisdiction over the relevant airspace as part of the ATC clearance to enter that airspace. (Paragraph '(e)' reference to be reserved)~~

(f) A pilot-in-command of an aircraft operating in transponder mandatory airspace must immediately advise the ATC unit having jurisdiction over the relevant airspace of any failure or partial failure of the transponder equipment.

(g) Unless otherwise required by ATC, only one of the aircraft in a formation flight is required to operate a transponder in accordance with paragraph (a) or paragraph (b).

Table 2. Airspace SSR Codes

Flight rules	Type of aircraft operation	SSR Code
VFR	For aircraft involved in fire fighting and reconnaissance duties	0111
IFR	All	2000
VFR	All - in Auckland Oceanic FIR only	2000
VFR	All - when operating in the aerodrome traffic circuit at a controlled aerodrome	2200
VFR	Aeroplanes other than Defence aeroplanes	1200
VFR	Gliders or balloons	1300
VFR	Powered aircraft in designated general aviation areas	1400
VFR	Helicopters other than Defence helicopters	1500
VFR	Defence aeroplanes	6000
VFR	Defence helicopters	6500

Table 3. Emergency SSR Codes

Occurrence	SSR Code
Unlawful interference	7500
Loss of radio communication	7600
In flight emergency when no code has been allocated by ATC	7700

91.253 Transition Provision – transmission of ADS-B data prior to 31 December 2018

(a) This rule applies to an aircraft operating in controlled airspace above flight level 245 within transponder mandatory airspace designated under Part 71 within the New Zealand FIR.

(b) Despite rules 91.247(b) and 91.255(a), the aircraft is not required to transmit ADS-B data if it is equipped with a transponder that operates in –

(1) Mode A and C; or

(2) Mode S.

(c) This rule expires on 31 December 2018.

91.253 Transition provision – use of certain transponders before 31 December 2021

(a) This rule applies to an aircraft operating in controlled airspace within transponder mandatory airspace below FL 245 designated under Part 71 within the New Zealand FIR.

(b) Despite rules 91.247(b) and 91.255, the aircraft is not required to transmit ADS-B data if it is equipped with a transponder that operates in –

(1) Mode A and C; or

(2) Mode S.

(c) This rule expires on 31 December 2021.

91.255 Mandatory use of ADS-B system in controlled airspace above flight level 245

(a) Except as provided in rules 91.253(b) and 91.255D, a person must not operate an aircraft in controlled airspace within transponder mandatory airspace designated under Part 71 in the New Zealand FIR unless the aircraft –

- (1) is equipped with an ADS-B system which meets the minimum performance standards and requirements under rule 91.257; and
- (2) is transmitting ADS-B data at all times when the aircraft begins to move under its own power until it has come to a complete stop at the end of the flight.

(b) Paragraph (a) does not apply to an aircraft operating in any portion of the airspace within the Auckland Oceanic FIR.

91.255D Operation of aircraft without ADS-B for discreet operations

(a) Despite rule 91.255(a), a person may operate an aircraft without transmitting ADS-B data in the prescribed airspace referred to in that rule if the person is carrying out a discreet operation –

- (1) for national defence or security purposes; or
- (2) for intelligence or law enforcement purposes; or
- (3) for any other suitable purpose approved by the Director where the transmitting of ADS-B data would compromise the security of the operation or pose a safety risk to the aircraft, crew or people and property in the air or on the ground.

(b) An operator must ensure that a discreet operation is not carried out unless –

- (1) for a flight under IFR, information submitted in the flight plan as required by rule 91.407 includes that the proposed operation is a discreet operation; and
- (2) there is a detailed plan for alternative surveillance from the start to the end of the operation; and
- (3) the appropriate ATS unit is notified of the operation as soon as practicable before the operation is to occur; and
- (4) the appropriate ATS unit approves the carrying out of the operation.

(c) A person referred to in paragraph (a)(1) or (a)(2) must inform the Director of the details of the discreet operation in the prescribed form within 14 days of completing the operation unless the person is required to report an accident or incident involving the discreet operation as required under Part 12.

91.257 ADS-B system performance standards and requirements

An ADS-B system must meet the following minimum requirements –

- (1) include a 1090 MHz Mode S Extended Squitter transponder, or any other suitable transponder determined by the Director as specified in a notice referred to in rule 91.258;
- (2) include a GNSS position source that is compatible with the 1090 MHz Mode S Extended Squitter transponder, or any other suitable transponder referred to in paragraph (1);
- (3) include a barometric altitude pressure system and any related equipment;
- (4) transmit an ADS-B OUT message set determined by the Director as specified in a notice referred to in rule 91.258;
- (5) meet performance standards regarding ADS-B systems determined by the Director as specified in a notice referred to in rule 91.258;
- (6) meet the testing and power requirements determined by the Director as specified in a notice referred to in rule 91.258.

91.257A Prohibited transmission of non-compliant ADS-B or misleading data

(a) A person operating an aircraft in controlled airspace within transponder mandatory airspace designated under Part 71 within the New Zealand FIR must not ~~—~~

- (1) allow the transmission of non-compliant ADS-B data or misleading data; or
- (2) use a 978 MHz Universal Access Transceiver to transmit data.

(b) In this rule, **non-compliant ADS-B data** refers to any data that does not meet the requirements of the notice referred to in rule 91.258, unless the non-compliance is caused by factors beyond the control of the aircraft operator, such as but not limited to GNSS outage.

91.258 Director may determine certain requirements regarding ADS-B as specified in a notice

(a) After complying with rule 91.258A, the Director may determine the following as specified in a notice -

- (1) the requirements for an ADS-B OUT message set;
- (2) the performance standards for ADS-B system;
- (3) the testing and power requirements regarding an ADS-B system;
- (4) the requirements regarding the installation and approval of ADS-B system; ~~and~~
- (5) any conditions relating to ADS-B OUT system or design change requirements or combinations of position source and transponder; ~~and~~
- (6) any other suitable transponder that is compatible to the GNSS position source.

(b) A person must comply with any requirement specified in a notice referred to in paragraph (a) if the requirement applies to the person.

Consequential amendments:

Part 172 Air Traffic Service Organisations — Certification**172.3 Definitions**

In this Part—

Air-situation display means an electronic display depicting the position of and movement of aircraft and other information as required ~~includes any visual presentation of aircraft position.~~

Visual surveillance system includes an electro-optical system providing an electronic visual presentation of traffic and any other information necessary to maintain situational awareness at an aerodrome and its vicinity.

172.57 Facility requirements

(a) An applicant for the grant of an air traffic service certificate must establish the following facilities that are appropriate to the air traffic services listed in the applicant's exposition:

- (1) aerodrome control towers;
- (2) approach control offices;
- (3) area control centres;
- (4) aerodrome flight information offices;
- (5) flight information centres;
- (6) dedicated training and assessment facilities.

(b) Except as provided in paragraph (h), an applicant for an aerodrome control service, or an aerodrome flight information service, must establish procedures for ensuring that any aerodrome control tower or aerodrome flight information office, including any temporary tower or office, listed in the applicant's exposition, is—

- (1) constructed and situated to provide—
 - (i) the maximum practicable visibility of aerodrome traffic; and
 - (ii) protection from glare and reflection; and
 - (iii) protection from noise; and
- (2) safeguarded from any development that would affect the requirements of paragraph (b)(1); and
- (3) at solo watch locations, provided with—
 - (i) toilet facilities that ensure the minimum possible interruption to, or degradation of, air traffic services; and
 - (ii) storage and preparation facilities for food and drink in the visual control room; and
- (4) provided with equipment for two-way voice communication with—
 - (i) any aircraft, in or adjacent to airspace for which the applicant has responsibility; and
 - (ii) any aircraft, vehicle, and person, on, or adjacent to, the manoeuvring area; and
- (5) provided with the following minimum equipment:
 - (i) a display system or systems designed to show the disposition of current and pending aerodrome traffic together with ancillary information for individual aircraft:
 - (ii) a power supply:
 - (iii) appropriate and current maps and charts:
 - (iv) binoculars:
 - (v) clocks:
 - (vi) log keeping system:
 - (vii) outside temperature indicator:
 - (viii) QNH display:
 - (ix) signal lamp with green, red, and white functions:
 - (x) telephone communications:
 - (xi) status monitors for approach and landing aids and any road or rail signalling equipment affecting the use of a runway:
 - (xii) visibility and cloud height checkpoints:
 - (xiii) voice and, if applicable, data recording equipment:
 - (xiv) wind direction and wind speed display:
 - (xv) an audible emergency alerting system:
 - (xvi) an AFTN terminal or, if provided for in an ATS letter of agreement, an alternative means of reception and transmission of information normally conveyed by AFTN:
 - (xvii) if applicable, airfield lighting controls panel; and

- (6) provided with 2 independent sources of the current altimeter setting, at least 1 of which must be an aneroid barometer or barometric altimeter situated in the visual control room.
- (c) The applicant must establish procedures for ensuring that an area control centre, a flight information centre, and an approach control office is—
- (1) provided with equipment enabling—
 - (i) to the fullest extent practical, two-way voice communication; and
 - (ii) if applicable, data communication with any aircraft in, or adjacent to, airspace for which the applicant has responsibility; and
 - (iii) situation display, where an ATS surveillance service is provided; and
 - (2) provided with the following minimum equipment:
 - (i) a display system or systems designed to show the disposition of current and pending flights together with ancillary information for individual aircraft:
 - (ii) a power supply:
 - (iii) appropriate and current maps and charts:
 - (iv) clocks:
 - (v) log keeping system:
 - (vi) status monitors as appropriate for navigation, approach, and landing aids:
 - (vii) telephone communications:
 - (viii) voice recording equipment and, if applicable, data recording equipment:
 - (ix) an AFTN terminal:
 - (x) for an approach control operating position, an ILS/MLS status monitor at the approach control procedural or approach control surveillance operating position for the aerodrome concerned:
 - (xi) for an approach control operating position responsible for aircraft on final approach, or aircraft landing or taking-off, a wind direction and wind speed display fed from the same source as the corresponding equipment in the aerodrome control tower.
- (d) The applicant must establish procedures for ensuring that the aeronautical telecommunications equipment required by paragraphs (b) and (c) are operated as specified under Part 171.
- (e) The applicant must establish procedures for ensuring that any display system including the situation display ~~visual display unit~~ used by an air traffic service is positioned with due regard to the relative importance of the information displayed and ease of use by the staff concerned.
- (f) The equipment required by paragraphs (b)(4) and (5), and (c)(1) and (2), must have a level of reliability, availability, and redundancy, that minimises the possibility of failure, non-availability, or significant degradation of performance.
- (g) The applicant must establish procedures for ensuring that the status monitors required by paragraph (b)(5)(xi) and paragraphs (c)(2)(vi) and (x) are fitted with—
- (1) an aural signal to indicate a change of status; and
 - (2) a visual indication of the current status.
- (h) A temporary aerodrome control tower and a temporary aerodrome flight information office are not required to be provided with the equipment required under paragraphs (b)(5)(xi), (xvi) and (xvii) if it is impracticable to do so and other appropriate measures are taken, as the case may be, to—

- (1) provide the person providing the air traffic service from the temporary tower or office with the information that would be available from the equipment required under paragraphs (b)(5)(xi) and (xvi); and
- (2) control the airfield lighting if applicable.

172.67 Co-ordination requirements

- (a) An applicant for the grant of an air traffic service certificate must establish systems and procedures for ensuring, if applicable, co-ordination between each ATS unit listed in the applicant's exposition and the following agencies—
- (1) each holder of an aeronautical telecommunication service certificate issued in accordance with Part 171; and
 - (2) each holder of an instrument flight procedure service certificate issued in accordance with Part 173; and
 - (3) each holder of a meteorological service certificate issued in accordance with Part 174; and
 - (4) each holder of an aeronautical information service certificate issued in accordance with Part 175; and
 - (5) aircraft operators; and
 - (6) the New Zealand Defence Force; and
 - (7) search and rescue authorities; and
 - (8) if the listed ATS unit is an aerodrome control or aerodrome flight information unit—
 - (i) the aerodrome operator; and
 - (ii) the apron management service, if the service is not provided by the aerodrome control unit.
- (b) An applicant must establish procedures for ensuring that an ATS letter of agreement is in place between each ATS unit listed in the applicant's exposition and—
- (1) each ATS unit responsible for adjoining airspace, and
 - (2) any other ATS unit with which regular operational co-ordination is required.
- (c) An applicant must establish procedures for ensuring that each ATS letter of agreement—
- (1) details matters that are necessary for effective co-ordination between the units party to the agreement; and
 - (2) is kept current; and
 - (3) is signed by senior representatives of the participating units; and
 - (4) is part of the applicant's operations manual.
- (d) An applicant must provide systems and procedures for facilitating communications between those ATS units that have an operational requirement to communicate with each other.
- (da) An applicant must establish automated coordination procedures where the ATS surveillance system provides for the automated exchange of co-ordination data relevant to aircraft being provided with an ATS surveillance service.
- (db) An applicant must ensure that –
- (1) the failure of automated coordination is presented to the controller responsible for coordinating the flight at the transferring unit; and
 - (2) the controller facilitates the required coordination using the procedures referred to in paragraph (da).
- (e) An applicant must provide systems and procedures for ensuring that ATS units, aircraft operators, and aviation meteorological service providers, if they require the information, are provided, through the exchange of ATS messages, with details of —

- (1) the intended movement of each aircraft for which a flight plan has been filed, and any amendments to the flight plan; and
- (2) current information on the actual progress of the flight.

(f) An applicant must establish procedures for ensuring that ATS messages are prepared and transmitted in accordance with procedures detailed and cross-referenced in Document 4444 (~~Part IX Chapter 11~~ – Air Traffic Services Messages), except that the term *CAVOK* must not be used.

172.107 ATS Surveillance Service

An applicant for the grant of an air traffic service certificate must establish procedures ~~to ensure for ensuring~~ that, where an ATS surveillance system is used to support the provision of an air traffic service—

- (1) all ATS surveillance services are provided in accordance with procedures published in—
 - (i) Document 4444; or
 - (ii) Document 7030 (as applicable to the Middle East/Asia Region); or
 - (iii) Subpart G; and
- (2) SSR code allocation for international flights is in accordance with the code assignment system published in the applicable ICAO Air Navigation Plan; and
- (3) an SSR code management plan is in place for domestic flights that—
 - (i) conforms to the applicable principles contained in Document 4444; and
 - (ii) does not conflict with the SSR code allocation tables of ~~rule~~ 91.247(a); and
- (4) full information is made available to ~~inform~~ pilots and aircraft operators on—
 - (i) the nature and extent of the ATS surveillance services provided; and
 - (ii) any significant limitations regarding such ATS surveillance services; and
 - (iii) all areas where PSR, SSR, ADS-B and MLAT systems or other ATS surveillance systems are in use; and
- (5) the information displayed at individual ATS surveillance service operating positions is that required for the air traffic services to be provided; and
- (6) between aircraft equipped with ADS-B systems that meet the requirements of rule 91.257, and operating in transponder mandatory controlled airspace designated under Part 71 within the New Zealand FIR; and
- (7) ADS-B must only be used for the provision of an air traffic control service when the message set elements meet the requirements referred to in rule 91.257(4); and
- (8) ADS-B may only be solely relied on to provide for the separation between aircraft when –
 - (i) the aircraft to be separated is identified and its identity is maintained; and
 - (ii) the data integrity measure in the ADS-B message is adequate to support the separation minimum; and
- (9) for a discreet operation referred to in rule 91.255D -
 - (i) the procedures and separation requirements for aircraft are approved by the Director; and
 - (ii) the appropriate ATS unit approves the carrying out of the discreet operation only after being satisfied that there will be safe separation between aircraft.

172.115 Records

- (a) An applicant for the grant of an air traffic service certificate must establish systems and procedures for identifying, collecting, indexing, filing, storing, securing, maintaining, accessing, and disposing of, records necessary for—
- (1) the operational provision of air traffic services; and
 - (2) the purpose of assisting with any accident or incident investigation.
- (b) The records referred to in paragraph (a) must include—
- (1) telephone communications; and
 - (2) radio broadcasts and communications; and
 - (3) air-ground digital data exchanges; and
 - (4) ATS surveillance system data; and
 - (5) filed flight plans including standard and repetitive plans; and
 - (6) flight progress strips; and
 - (7) staff duty rosters; and
 - (8) appropriate meteorological and aeronautical information, except where the information is retained for an equivalent period by a meteorological or AIS organisation; and
 - (9) [revoked]
 - (10) a record for every person who is required to be trained under rule 172.165, including details of—
 - (i) each segment of training that is undertaken; and
 - (ii) knowledge testing or competency assessment as appropriate for the training conducted.
- (c) The applicant must establish systems and procedures for ensuring the electronic recording of—
- (1) all ATS radio and telephone communications; and
 - (2) all high-frequency air-ground communications; and
 - (3) all relevant data from ATS surveillance systems used in providing or supporting an ATC service; and
 - (4) for any equipment coming into service after the date this Part comes into force, any transfer and acceptance of control process not conducted by telephone.
- (d) The applicant must establish systems and procedures for ensuring that electronic records referred to in paragraph (c)—
- (1) include time recording, correct to within 5 seconds of UTC, as determined by reference to a standard time station or GPS time standard; and
 - (2) either—
 - (i) replicate the voice communications, and, if applicable, ~~an air~~ a situation display presentation applying at the particular operating position; or
 - (ii) ~~are accompanied by a statement fully describing the differences between the recording supplied and a recording under paragraph (i); or~~
 - (iii) replicate the visual surveillance system display.
- (e) The option provided by paragraph (d)(2)(ii) only applies to equipment that was in service on 1 January 1998.

(f) The applicant must establish systems and procedures for ensuring that all records, except where replication is required by paragraph (d)(2)(i), are sufficiently clear to convey the required information.

(g) The applicant must establish procedures for ensuring that the records referred to in paragraph (b) are retained for 31 days from the date of entry, except for—

- (1) staff duty rosters which must be retained for 2 years; and
- (2) written records associated with the requirements of rules 172.121(a)(2) and (3) which must be retained for 2 years; and
- (3) training records which must be retained for a period of 3 years from the date the affected person ceases to work or be associated with the air traffic service organisation.

172.265 Reduced separation when providing an ATS surveillance service

The Director may, in accordance with paragraph 8.7.4.2 of Document 4444, approve a reduction of the standard 5 NM minimum separation prescribed in paragraph ~~8.7.4.1~~ 8.7.3.1 of Document 4444.

172.267 Separation from an unidentified controlled flight by ATS surveillance service

- (1) A minimum separation of 5 NM may be applied in any of the following circumstances—
 - (i) between an identified aircraft and an unidentified controlled flight entering or about to enter ATS surveillance system coverage under Document 4444 ~~Part VI~~ paragraph ~~7.3.7~~ 8.7.2.8 a) and b); or
 - (ii) between a previously identified aircraft which has since passed out of ATS surveillance system cover, and a following identified aircraft, provided the following aircraft can achieve the appropriate vertical separation before the position at which the preceding aircraft passed out of ATS surveillance system cover; or
 - (iii) between aircraft on reciprocal tracks, when an identified aircraft is at least past the position at which previously identified aircraft passed out of ATS surveillance system cover; or
 - (iv) using an ATS surveillance system may be applied between an identified aircraft and the cleared route of an unidentified controlled VFR flight; or
 - (v) between aircraft equipped with ADS-B systems that meet the requirements of rule 91.257, and operating in transponder mandatory controlled airspace designated under Part 71 within the New Zealand FIR.

172.401 Verification of transponder level information

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

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

Part 1 Definitions and Abbreviations

ADS-B means a GNSS position source and a compatible Mode S Extended Squitter 1090Mhz ADS-B OUT transponder, or any other suitable transponder determined by the Director as specified in a notice referred to in rule 91.258(a)(6);

Aeronautical telecommunication service means—

(1) a telecommunication service provided to support the following services as they are defined in ICAO Annex 10, Volume II, Chapter 1—

- (i) an aeronautical broadcasting service:
- (ii) an aeronautical fixed service:
- (iii) an aeronautical mobile service:
- (iv) an aeronautical radio navigation service; ~~or~~

- (1A) any telecommunication service which processes or displays air traffic control data, including aviation meteorological data, for use by an ATS provider under Part 172; or
- (2) any other telecommunication service provided specifically to support the New Zealand air navigation system: