

Regulatory Impact Statement

Remotely Piloted Aircraft Systems

Agency Disclosure Statement

1. This Regulatory Impact Statement has been prepared by the Ministry of Transport, based on information supplied by the Civil Aviation Authority (CAA). It provides an analysis of options to improve aviation safety through the regulation of Remotely Piloted Aircraft Systems (RPAS).
2. This regulatory proposal considers minor amendments to the current regulatory system in order to accommodate RPAS in the aviation system and address the immediate safety risks posed by the increasing use of these aircraft. Additional work, beyond the scope of this regulatory proposal, will be required to identify the long-term regulatory and non-regulatory interventions that would be necessary to fully integrate RPAS into New Zealand's aviation system.
3. The civilian use of RPAS for both commercial and recreational purposes is a burgeoning sector. Some of the activity in the RPAS sector falls outside the traditional oversight of the CAA, due to the definitions currently used for these aircraft in New Zealand regulations. As such, the CAA currently has an incomplete picture of the size and nature of activity in the sector, and the associated costs.
4. Data gathered on the size of the RPAS sector is based on recorded safety occurrences (as compiled by the CAA) and industry surveys conducted by the CAA and other organisations (for example Airways Corporation). This data does not present a comprehensive overview of the RPAS sector. It is expected that the CAA is unaware of a significant amount of RPAS activity.
5. As there is little information available about RPAS operations in New Zealand, the CAA adapted figures relating to CAA charges and training costs for conventional aircraft in determining the costs of the preferred regulatory option. It is assumed these costs will be relatively similar, or less, for RPAS, but they are intended as indicative costs only. As the RPAS industry grows and becomes more sophisticated, it is expected that the CAA will gain a more accurate understanding of the industry, and the CAA's fees and charges for authorising operators may be adjusted to reflect the unique requirements of RPAS operators.
6. The International Civil Aviation Organization (ICAO) is currently in the process of developing guidance material and Standards and Recommended Practices (SARPs) for RPAS. This is a long-term project currently in its infancy, and will have a significant impact on RPAS regulation in New Zealand. As the development of ICAO SARPs continues, they will have an impact on the nature of New Zealand's regulatory framework for RPAS and the costs identified in this analysis.

Daniel Barber, Adviser

Date

Signature

Terminology

1. The terminology used to refer to unmanned aircraft is not consistent between countries and even organisations. The terminology used throughout this Regulatory Impact Statement (described in Table 1 below) is broadly consistent with ICAO definitions, with some adjustments to reflect New Zealand’s aviation system. The terms used in the preferred approach are understood and used by the majority of unmanned aircraft operators in New Zealand.

Table 1 – Explanation of terminology used for unmanned aircraft

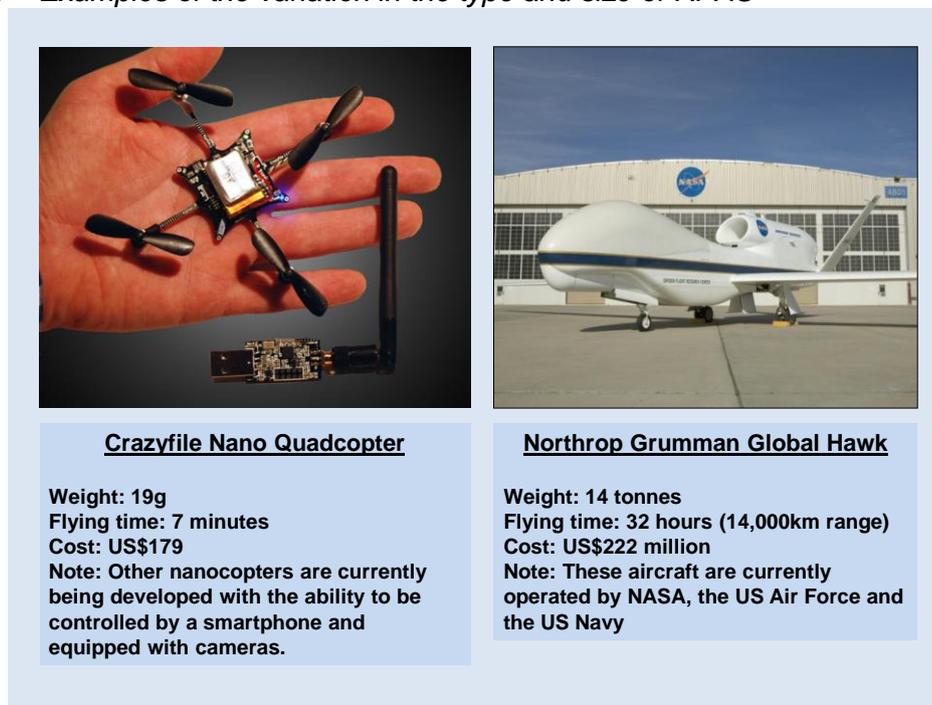
	Aircraft type	Definition
Definitions under the current system	Pilotless aircraft	An aircraft, other than a balloon or kite, designed to fly unmanned with a gross mass greater than 25 kg.
	Model aircraft	A pilotless aircraft with a gross mass of between 100g to 25 kg and includes: <ul style="list-style-type: none"> • control line model aircraft • free flight model aircraft • radio controlled model aircraft
Definitions under the preferred approach in RIS	Unmanned aircraft (UA)	An aircraft which is intended to operate with no pilot on board. This includes model aircraft, RPA and autonomous aircraft.
	Unmanned aircraft system (UAS)	An unmanned aircraft and its associated elements.
	Model aircraft	An unmanned aircraft that operates under Part 101 (model aircraft rules).
	Remotely piloted aircraft (RPA)	An unmanned aircraft which is piloted from a remote pilot station and is not operated under Part 101.
	Remotely piloted aircraft system (RPAS)	An RPA, its associated remote pilot station(s), the required command and control links and any other system elements as may be required, at any point during flight operation.
	Autonomous aircraft	An unmanned aircraft that does not allow pilot intervention in the management of the flight.

2. Under the preferred approach, the difference between a model aircraft and an RPA depends on whether it is to be operated in accordance with Civil Aviation Rule Part 101 (model aircraft rules). For this reason, a model aircraft and an RPA could be the exact same type of aircraft, but used in a different way.

Status quo

3. The RPAS sector is growing fast, particularly in the civilian applications of these aircraft. Operators in New Zealand are already employing these aircraft for commercial, research and other activities. Examples of operations currently underway in New Zealand include:
 - aerial photography
 - surveying and mapping
 - crop-spraying
 - search and rescue
 - conservation activities (Department of Conservation)
 - law enforcement (NZ Police)
 - power lines inspection
4. While some RPAS resemble traditional aircraft in design and flight capability, there is a significant variation in type and size. Figure 1 below highlights two examples of RPAS. Some RPAS have unconventional capability, with the ability to operate in ways traditional aircraft cannot, not least due to the different relationship they have to their human pilots. For example, RPAS are potentially capable of far greater maneuverability than manned aircraft, given they do not have to accommodate the physical constraints of an onboard pilot. These aircraft can also perform a wide variety of activities never envisioned for manned aircraft.¹

Figure 1 – Examples of the variation in the type and size of RPAS



¹ In December 2013, Amazon, the world's largest online retailer, announced that it is testing RPAS to deliver goods to customers.

5. Control and guidance systems are now available that enable RPAS to perform a variety of tasks that are unachievable, unreasonably expensive, or involve too much personal risk to be carried out in manned aircraft.² Consequently, the increasing applications for RPAS will see these aircraft have a greater presence in controlled and uncontrolled airspace.
6. The CAA is aware of the rapid growth of the RPAS sector in New Zealand with anecdotal evidence of increasing purchases of these aircraft and greater activity. The commercial RPAS sector in New Zealand includes researchers, manufacturers, operators and consulting services. Enquiries to the CAA from current and potential operators in this sector has been steadily increasing. As at March 2014, the CAA had identified more than 40 commercial RPAS operators and manufacturers, with further strong growth expected.
7. While the number of RPAS operations in New Zealand is relatively small compared to manned aircraft, there is expected to be considerable growth in the near future. The Federal Aviation Administration in the United States estimates there will be more than 7,500 small RPAS flying in its national airspace system by 2018.³

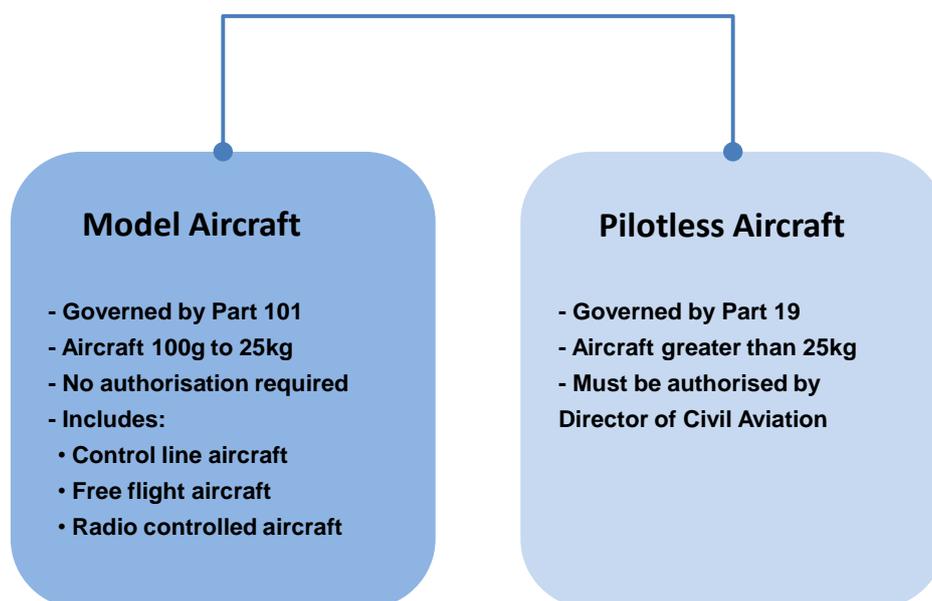
The New Zealand regulatory environment for RPAS

8. Civil aviation in New Zealand is regulated through the Civil Aviation Act 1990 and a suite of Civil Aviation Rules (CARs). The CAA, on behalf of the Minister of Transport, develops, maintains and enforces minimum aviation safety and security standards through the CARs.
9. Civilian RPAS activity in New Zealand is primarily regulated by CAR's Part 101 and Part 19. This framework is summarised in Figure 2 below. Part 101 sets out the operating rules for model aircraft, which are deemed to be 'pilotless aircraft' weighing less than 25kg. Under Part 101, a model aircraft operator must ensure that they remain clear of, and give way to, all manned aircraft on the ground or in flight. Some other restrictions under Part 101 including forbidding model aircraft from:
 - flying within 4km of an aerodrome without the explicit permission of the aerodrome operator
 - flying above 400 feet unless operating in specifically designated airspace or with the permission of the CAA
 - flying at night
 - flying out of the line-of-sight of the model aircraft operator
 - flying in a manner that 'creates a hazard to aircraft or to persons or property'
10. Rule Part 19 contains a number of transitional provisions related to various rules which do not fit neatly within other civil aviation rule parts. The section of Part 19 that relates to pilotless aircraft requires anyone wishing to operate one of these aircraft weighing more than 25kg to obtain the authorisation of the Director of Civil Aviation.

² RPAS were used to inspect and gather information at the Fukushima Dai-ichi nuclear reactor complex following the March 2011 earthquake and tsunami in Japan.

³ *FAA Aerospace Forecast: Fiscal Years 2013-2033*, Federal Aviation Administration, 2013.

Figure 2 – Current New Zealand regulation of model aircraft and pilotless aircraft



11. It is common practice internationally to define model aircraft as those that are flown for recreational purposes, and to define RPAS as those flown for non-recreational purposes. New Zealand regulations do not reflect this distinction, with the difference currently based on the weight of the aircraft.

International regulatory response to RPAS

12. Aviation regulators around the world are struggling to address the challenges posed by increasing RPAS activity. While some jurisdictions have introduced new rules to govern RPAS, a comprehensive framework that covers the full range of RPAS operations has not yet been developed.
13. ICAO promotes the safe and orderly development of international civil aviation regulations. In 2007 it formed the UAS Study Group to develop proposals and standards for the safe and efficient international use of UAS. ICAO has since released an advisory circular and amendments to ICAO Annex's⁴ concerning these aircraft. The guidance provided by ICAO so far has mainly focussed on identifying issues that will need to be considered in order to integrate RPAS into the civil aviation system. More detailed guidance from ICAO to assist states with the development of a regulatory framework for RPAS is expected by the end of 2014.
14. The United States FAA is currently in the process of developing regulations for the integration of commercial RPAS into the United States national airspace system. Public RPAS operations (such as border patrol and disaster relief) are already permitted, but the authorisation of commercial RPAS activity is still very limited. The FAA is preparing test sites for RPAS so data can be gathered that will feed into the development of policies and procedures.

⁴ The Convention on International Civil Aviation 1944, of which New Zealand is a signatory, is supported by 19 Annexes that contain the standards and recommended practices for member states.

15. The Australian Civil Aviation Safety Authority (CASA) already has regulations in place for RPAS. CASA issued its first RPAS Operators' Certificate in 2003; however, since then the growth in RPAS numbers has posed a challenge to these regulations. CASA is currently in the process of amending its regulations to ensure they are able to adequately regulate the growing RPAS sector.
16. In Europe, basic national safety rules apply to RPAS, but the rules differ across the European Union and a number of key safeguards are not addressed in a coherent way. In April 2014, the European Commission proposed to set new standards to regulate the operations of RPAS. The new standards will cover safety, security, privacy, data protection, insurance and liability. In 2014, the Commission will carry out an in-depth impact assessment to examine the issues related to RPAS and define the best options to address them. This may be followed by a legislative proposal, to be approved by Member States and the European Parliament.

Problem definition

Current rules are not fit-for-purpose

17. The power to require an RPAS operation to be authorised by the Director of Civil Aviation under Part 19 currently only relates to those RPAS weighing more than 25kg (referred to as a 'pilotless aircraft' under the current system). The CAA has received 70 enquiries for authorisations for RPAS, of these, 62 have been for aircraft that weigh less than 25kg. The current categorisation based on aircraft weight has created a gap in regulation that means that operators of RPAS under 25kg must either fly under the restrictions of Part 101, or go through the cumbersome and costly process of seeking exemptions from all relevant rule parts.⁵
18. The risk of a particular RPAS operation is not influenced by weight alone. Other factors, such as physical and technical characteristics of the aircraft, the skill and experience of the operators, and the intended operation area, also need to be taken into consideration. This gap in current regulations does not allow appropriate consideration of the full range of risks posed by an RPAS operation, and is acting as a barrier to operators.
19. Part 101 was originally designed for simple model aircraft operations. The advances in technology and the growth in commercial applications for unmanned aircraft that weigh less than 25kg has led to the current situation where it is inappropriate for many operators to be regulated under Part 101, but they have no simple alternative.

A growing RPAS sector challenges aviation safety

20. The increasing use of RPAS has the potential to disrupt the current aviation system. The most significant risk is a mid-air collision with a manned aircraft. There is also a risk of mid-air failure of an RPAS, posing a threat to people and property below.
21. The safety challenges associated with RPAS activity are driven by three key factors:

⁵ The exemption process takes an indeterminant amount of time as all relevant CAA teams (i.e. policy, legal, operations) need to consider the application, determine which rules are relevant to the application and be satisfied that the operation can be exempted from the rule requirements.

- **Operational risks inherent to RPAS** – RPAS present a unique challenge to an aviation regulatory system which is based on the principle that an aircraft is flown by an on-board pilot-in-command. Basic assumptions relating to the situational awareness of the pilot and their ability to respond to safety risks require reconsideration in the context of RPAS.

The New Zealand aviation system is designed to enable the safe and efficient operation of manned aircraft in all classes of airspace. If RPAS are to integrate into this airspace, their presence cannot increase the risks to manned aircraft. To achieve this, it is reasonable to expect RPAS to meet the same safety standards as manned aircraft.

While control and guidance systems for RPAS have improved, and have become widely available, RPAS do not yet meet the safety standards expected of manned aircraft. Specifically, most RPAS currently lack the ability to detect or communicate with other nearby aircraft, and instruct either the on-board autopilot or the ground-based remote operator of the necessary actions to avoid a collision.

There are currently no CAA-recognised operating qualifications or airworthiness standards for RPAS in New Zealand. While some organisations and manufacturers have developed operating guides, these have not been certified by the CAA as they have not produced the same level of data and assurance that is expected from conventional aircraft organisations.

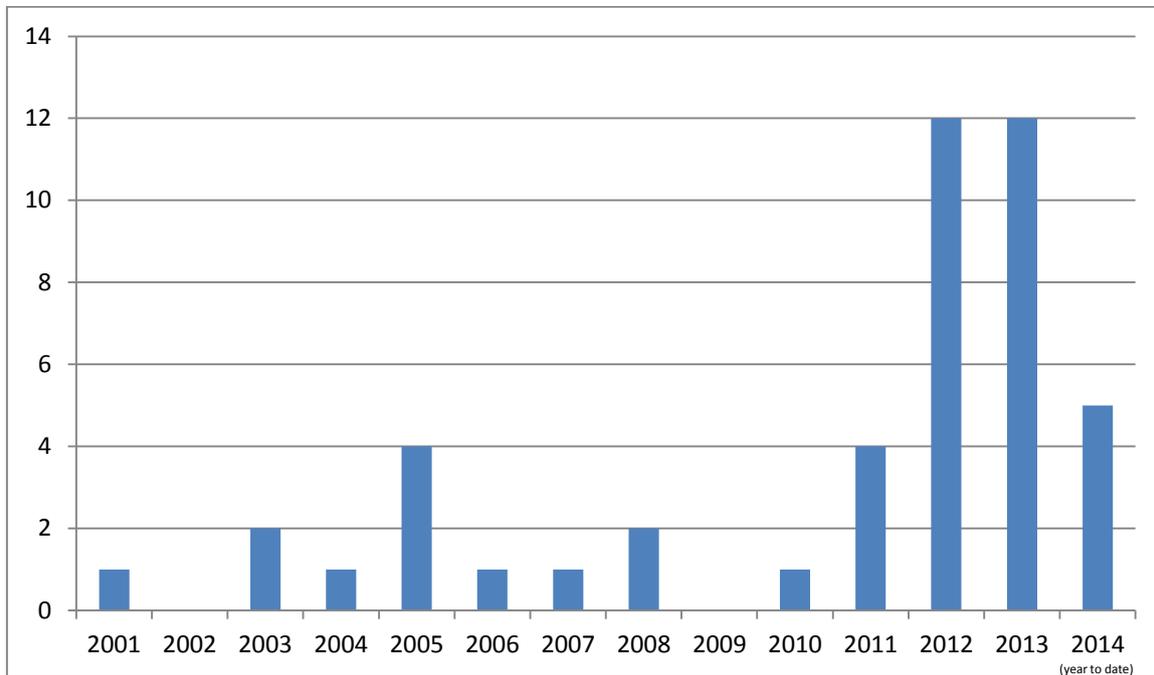
- **Broadening of the aviation participant profile to non-traditional operators** – RPAS are now widely available for purchase online, often at very low cost, and there are no restrictions on their importation. Many of the new operators and manufacturers of RPAS have had little experience with the aviation system, and no history of engagement with the CAA or aviation regulations. In many cases, operators will be unaware of their obligations under the CARs, or the safety risks that RPAS pose to other aircraft, and people and property on the ground.
- **A lack of information about RPAS activity in New Zealand** – The civilian use of RPAS in New Zealand is outside the traditional oversight of the CAA. Further, the RPAS industry is new and rapidly developing, with considerable uncertainty around its current and projected size and activity. The CAA has a lack of information on the RPAS sector. Without a reasonable understanding of the nature and extent of activity in the sector, the CAA is unable to appropriately address the safety risks associated with RPAS.

22. From 2001 to 2010, the CAA recorded 14 safety occurrences relating to model aircraft and RPAS.⁶ Since 2011, the CAA has recorded 33 safety occurrences relating to model aircraft and RPAS (Figure 3 below shows the annual recorded safety occurrences since 2001). This increase in safety occurrences likely reflects both an increase in activity, and an increase in the concern and attention regarding these aircraft within the aviation community and public. The CAA expects that many incidents are not reported, and so

⁶ An occurrence, as defined in the New Zealand Civil Aviation Rules, includes aviation accidents and incidents. The majority of incidents involving RPAS recorded in New Zealand have involved loss of control by the remote pilot and unauthorised entry into controlled airspace.

these figures are likely to reflect only a small part of model aircraft/RPAS activity in New Zealand.

Figure 3 – Annual recorded safety occurrences for model aircraft/RPAS in New Zealand



23. Several high-profile safety occurrences involving RPAS overseas have recently been reported in the media. In March 2014, the pilot of a 50-seat US Airways regional jet reported a near-miss with a “small remotely piloted aircraft” at an altitude of 2,300 feet as he was descending for landing. In April 2014, a multi-rotor RPAS being used to film a triathlon in Western Australia crashed, allegedly striking a competitor in the head, causing lacerations.

Current rules are not compliant with ICAO standards

24. New Zealand’s aviation regulatory environment is heavily influenced by the Convention on International Civil Aviation 1944 (the Convention).⁷ New Zealand is a signatory to the Convention which obliges New Zealand to secure, to the highest practicable degree, compliance with aviation global standards as established by ICAO.⁸ The strength and effectiveness of the international system relies on the setting of, and adherence to, these global standards.

⁷ The Convention is reflected in the Civil Aviation Act 1990, which governs the civil aviation system in New Zealand.

⁸ Section 14 of the Civil Aviation Act requires that the Minister “ensure that New Zealand’s obligations under international civil aviation agreements are implemented.” Section 33(1) requires that Rules made by the Minister of Transport are not inconsistent with ICAO standards.

Article 38 of the Convention obliges New Zealand to notify ICAO where New Zealand has different minimum standards for international operations from those set in the Standards and Recommended Practices. These differences are published by ICAO and made available to other member states

25. Since 2010, ICAO has released minor amendments to three Annexes that include implications for the regulation of international operations of RPAS.⁹ These amendments relate to defining RPAS, registration markings for RPAS and accommodating RPAS in accident investigation procedures.

26. New Zealand is yet to adopt these amendments or file a difference with ICAO.

Objectives

27. The desired outcomes of this proposal are to address the immediate safety risks associated with the use of RPAS, and to achieve compliance with international standards and recommended practices with regard to RPAS. The proposal also aims to facilitate CAA understanding of the New Zealand RPAS sector, informing future regulatory work to fully integrate RPAS into the aviation system.

Options and impact analysis

28. In determining the best approach for the regulation of RPAS, several options were considered:

- A. Continuation of the status quo** – no changes to the current Civil Aviation Rules relating to RPAS.
- B. Rule change to remove weight-based classification of unmanned aircraft and tighten Part 101 rules** – Amend the definitions of model aircraft and pilotless aircraft to remove the 25kg weight limit. Change Part 101 to require that RPAS intending to fly outside Part 101 rules must be authorised by the Director of Civil Aviation under a new Civil Aviation Rule Part 102 – *Remotely Piloted Aircraft Systems Operating Rules*.¹⁰
- C. All commercial RPAS operators to be authorised** – Part 101 operators would be limited to recreational operations only, while all commercial operations would have to be authorised under a new Civil Aviation Rule Part 102 – *Remotely Piloted Aircraft Systems Operating Rules*.
- D. Ban all RPAS from flying** – Use of unmanned aircraft would be limited to Part 101 operations. Operations beyond Part 101 would be banned from flying until the CAA has greater information on the sector and the safety risks, and/or RPAS can prove they can meet all the necessary safety requirements to fly in integrated airspace.
- E. Education programme** – Implement a comprehensive education programme on the risks of RPAS operation, including current regulatory requirements and penalties.
- F. Develop a suite of comprehensive rules to fully integrate RPAS into the aviation system** – the CAA would undertake a full review of the rules that cover RPAS activity, with the aim of the formal integration of RPAS into the New Zealand aviation system, including licencing, training, engineering, equipment and airspace requirements.

⁹ As an example of an 'international operation', there have been a number of occasions when Global Hawks (shown in Figure 1) operated by the United States military have traversed New Zealand's oceanic airspace transiting between Australia and the US.

¹⁰ The proposed new rule number is tentative at this stage, but is the preferred choice as it is consistent with the Australian RPAS rule number.

29. Each of the options above has been analysed against outcomes that are critical to meet the objectives of this work. The comparison of these options against the outcomes is included in Table 2 below.

Table 2 - Analysis of options for regulation of RPAS

Outcomes	Option A: Status quo – no changes to current Civil Aviation Rules relating to RPAS	Option B: Rule change to remove weight classification and tighten Part 101 rules (Preferred approach)	Option C: All commercial RPAS operators to be authorised	Option D: Ban all RPAS from flying	Option E: Education programme (Preferred approach)	Option F: Develop comprehensive rules to fully integrate RPAS into the aviation system
Improve the safe operation of RPAS in the short-term?	No. The risks posed by RPAS would remain unchanged. This risk would increase as the level of activity increases.	Yes. The CAA will have greater oversight of high-risk RPAS operations, while low-risk operations would be covered by an updated Part 101.	Partially. The CAA would have oversight of all commercial RPAS operations, but not recreational operations of comparable risk.	Partially. Some RPAS operations would cease completely, while others would likely still operate, without the safety oversight of the CAA.	Yes. A comprehensive education programme would provide clarity for operators on the regulatory requirements and safety risks for different operations.	No. The CAA currently does not have enough information to develop these rules. They may therefore be ineffective in addressing risk and would likely be inadequate and inconsistent with other states still developing regulations.
Facilitate CAA information-gathering and understanding of the RPAS sector?	No. CAA would only be able to gather information on RPAS above 25kg.	Yes. The CAA would have oversight of all high-risk RPAS operations, and those operators that 'opt-in' to an authorisation.	Partially. The CAA would have oversight of all commercial RPAS operations, regardless of weight, but not a complete oversight of all high-risk operations (including recreational).	No. Some RPAS operations would cease completely, while others would likely still operate. The CAA would have no engagement with these operations beyond enforcement.	No. The CAA would have no engagement with RPAS operations beyond enforcement of model aircraft rules (Part 101), an inadequate mechanism.	Partially. The RPAS sector would likely engage with this project, but without a solution to short-term safety issues, there would be on-going lack of oversight and understanding of current operations.
Complies with ICAO standards concerning RPAS?	No. The CAA does not have an appropriate RPAS regulatory framework according to ICAO standards.	Yes. The authorisation process would allow the CAA to mandate safety requirements that are consistent with ICAO standards.	Partially. The authorisation process would allow the CAA to mandate safety requirements that are consistent with ICAO standard, but only for non-recreational operations.	No. ICAO requires states to develop appropriate regulations for RPAS.	No. ICAO requires states to develop appropriate regulations for RPAS.	Yes. However, while a comprehensive ruleset would likely comply with current ICAO standards for RPAS, there is a good chance of a future conflict as ICAO is itself still developing a full ruleset.

30. Option B, a rule change to remove weight classifications, and a rule change to require unmanned aircraft operating outside Part 101 to be authorised by the Director of Civil Aviation, is the preferred option. It best meets the objectives outlined in paragraph 27.
31. Under this option, unmanned aircraft will essentially define their level of regulatory oversight by the nature of their activity (complying with Part 101 requirements or not). Low-risk activity will be covered by the Part 101 rules, which provide a narrow scope of permitted operations.
32. Activity outside of Part 101 will be subject to greater oversight provided through the authorisation process in the new Rule Part 102 – *Remotely Piloted Aircraft Systems Operating Rules*.
33. Under the preferred option an education programme, such as in option E, would also be implemented to provide clarity to operators on the regulatory requirements and safety risks associated with the use of RPAS.

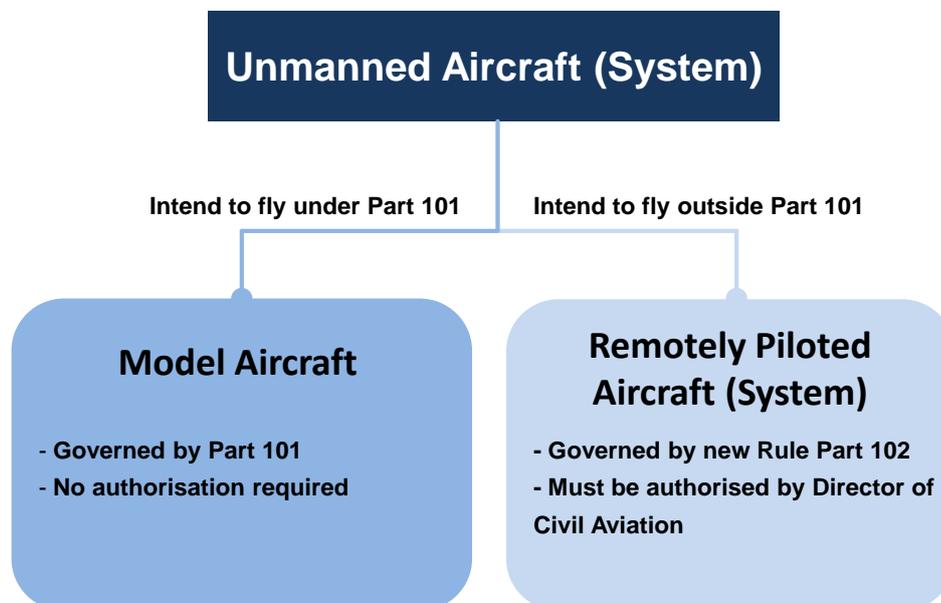
Features of the preferred option

34. Main features of the preferred option include:
 - a change to Part 19, removing Rule Part 19.105 and the ‘pilotless aircraft’ definition and putting them into a new Rule Part 102 – *Remotely Piloted Aircraft Systems Operating Rules*
 - the creation of a new Rule Part 102, which will remove and add to elements of the existing Rules suite that are to apply to RPAS. For example, Rule Part 21, which has airworthiness requirements for aircraft may be excluded entirely from Rule Part 102, reflecting the current lack of airworthiness standards for RPAS. The Rule Part could instead be substituted by more fit for purpose conditions attached to an authorisation
 - replacing the ‘pilotless aircraft’ definition with ‘unmanned aircraft’ and ‘unmanned aircraft system’ (of which RPAS are a subset)
 - maintaining the stipulation in rule 19.105 that all unmanned aircraft (updated for the new definition) must be authorised by the Director of Civil Aviation before they can operate, unless operating strictly in accordance with Part 101 rules. This rule will be renumbered to fit the new rule part
 - a change to Part 101, adjusting the definition of a model aircraft to ‘an unmanned aircraft that operates according to Part 101 rules’, removing the 100g to 25kg weight limits
 - a change to Part 101, noting that Part 101 outlines the minimum standards for operating RPAS, but that operators may choose to be authorised under the renumbered Rule 19.105 (i.e. ‘opt-in’ to Part 102) even if they comply with Part 101
 - an authorisation process, which involves the CAA evaluating the risks of proposed RPAS operations and mandating certain safety mitigation in line with these risks through inclusion of tailor-made conditions attached to an authorisation

- ensuring that the rules require RPAS operating outside Part 101 to be registered as part of the authorisation process to enable ongoing tracking of their use, and to enable targeting of safety information and educational material
- adoption into the CARs of the relevant ICAO amendments that relate to RPAS (for example amendment to the definition of an accident and the definition of an RPAS)
- a review of Part 101 to ensure that it is fit-for-purpose given developments in the RPAS sector, including providing greater clarity to rule 101.13 (Hazardous operations). This will include a review of the wider rule set to ensure there will be no significant contradictions with the measures proposed above.

35. Figure 4 below shows a basic outline of the proposed system under the preferred option.

Figure 4 – Proposed structure for regulating unmanned aircraft



36. In conjunction with rule-making, the CAA would implement an unmanned aircraft education programme. This would be aimed at educating operators as to the risks of their activity, and would utilise a variety of communication channels so as to better reach potential and current operators. This would include utilising CAA relationships with industry organisations (e.g. Aviation NZ, Model Flying NZ) as well as examining non-traditional communication channels such as Facebook, Twitter, and direct communication with retailers that sell unmanned aircraft.
37. The CAA would also develop comprehensive guidance material to outline expectations of operators under the new regulations, including advisory circulars.
38. Under the preferred option, further policy work would also be carried out in order to identify areas where additional regulatory and/or non-regulatory interventions may be required. The long-term objective of this work would be to fully integrate RPAS into New

Zealand's aviation system. The nature of further interventions would be dependent on developments within ICAO and other state aviation authorities.

Benefits of the preferred option

Addresses immediate safety issues while minimising compliance costs

39. Option B allows the CAA to achieve regulatory oversight of the RPAS sector to mitigate identified safety risks, while not over-extending oversight into areas that are currently deemed to be of lower risk (model aircraft).
40. The process will allow the CAA to target appropriate safety requirements according to the risk posed by the operation, providing sufficient discretion for the expected variance in RPAS activities.
41. Part 101 rules, once reviewed under this rule change process, provide a good basis for the regulation of low-risk RPAS activity. Requiring all RPAS that intend to operate outside Part 101 to be authorised by the Director of Civil Aviation allows the CAA to exercise its discretion in its risk assessment of these RPAS operations.
42. The creation of a new RPAS Rule Part 102 sets a foundation for the building of this more comprehensive framework. It provides clarity to industry with regard to RPAS requirements. It will be supported by Advisory Circulars that provide further guidance on the authorisation process.
43. The authorisation process is a more streamlined means of certification for RPAS operators, as opposed to requiring these operators to seek an exemption from all the relevant rule parts. The exemption process places an unreasonable cost on operators and does not contribute to the clear communication of regulatory expectations.
44. Some commercial operators, including those operating within the bounds of Part 101, may see a commercial benefit in obtaining an authorisation from the CAA. This may provide assurance to their customers, or insurers, that they are operating with the backing of the national aviation regulator. These operators will have the option of 'opting-in' to a higher level of regulatory oversight and obtaining a voluntary authorisation from the Director under Part 102.
45. This rule-change is a relatively minor change to the current rules governing these aircraft, while still providing the necessary oversight. Given this is only an interim step toward a more comprehensive regulatory framework for RPAS, it is appropriate that changes to the CARs are as 'light touch' as is possible while still addressing risk.

Complies with international obligations

46. Adoption into the CAR's of the relevant ICAO Annex amendments that relate to RPAS will bring New Zealand into compliance with ICAO standards. This will help maintain New Zealand's reputation as a best practice aviation regulator. While ICAO standards do not apply to domestic aviation, it would be impractical and undesirable to have a separate set of regulatory requirements for domestic and international operations. The application of RPAS rules to both international and domestic operations will ensure a consistent implementation of global best practice regulation for all New Zealand RPAS operators.

Improves understanding of the sector

47. Requiring RPAS to be registered and authorised by the Director of Civil Aviation would provide the CAA with the ability to gather information on the size and activities of the RPAS industry. This information, along with engagement with operators, would assist the CAA with on-going regulatory development for RPAS and would aid communication with RPAS operators.

Costs of the preferred option¹¹

48. Current model aircraft operators flying in accordance with Part 101 would not experience any change as a result of this proposal.
49. RPAS operators intending to fly outside Part 101 would be required to satisfy the CAA that their operation would operate safely, in order to receive an authorisation from the Director of Civil Aviation. As with manned flight, there is currently (and potentially) a wide range of different RPAS operations. The safety requirements for each operation will depend on the associated risk, thus the costs will vary.
50. As is the case under the current system, authorisation costs will reflect the time required by CAA staff to assess an operation, its risks, and the costs of meeting mandatory safety requirements (for example the cost of a pilot gaining the appropriate pilot qualifications).¹² The preferred approach does not introduce any new types of fees for RPAS operators.
51. Currently, all aircraft are required to be registered with the CAA and pay a participation fee (other than model aircraft). As information gathered through registration of RPAS will assist in the development of a comprehensive RPAS framework, it is appropriate for this cost to be borne by the regulator for now. This will encourage RPAS operators to register and engage with the CAA, which in turn will assist in the development of a better regulatory system for operators. As the RPAS framework develops in the future, this cost would be passed on to operators.¹³
52. Table 3 below outlines hypothetical case studies of the likely range of RPAS operations that will require the authorisation of the Director of Civil Aviation, and the associated costs. The table also includes a model aircraft operation as a comparison. These case studies are based on previous experience of CAA staff in assessing these operations, with time costs estimated on a 'business-as-usual' basis.

¹¹ These costs will apply for the interim period, and may be changed as part of future rule amendments. These rule amendments will involve stakeholder consultation and require approval by Cabinet.

¹² The current hourly rate for Civil Aviation Authority work is \$244.00 (incl. GST). This rate will increase to \$284.00 (incl. GST) on 1 July 2014, in accordance with the Civil Aviation Charges Regulations (No 2) 1991 Amendment Regulations 2012.

¹³ The current registration fee for conventional aircraft is \$296.00 per year (incl GST), with an annual maintenance fee of \$99.00. These charges would need to be reviewed for RPAS, prior to further amendments to the RPAS regulatory framework. Future agreement from Cabinet would be required before new charges are passed on to operators.

Table 3 - Case studies of costs for RPAS operations

Criteria	Operation One	Operation Two	Operation Three	Operation Four
Operation Size	Small-scale model aircraft operation: one aircraft weighing 2-5kg one pilot without formal training.	Small-scale RPAS operation: one RPAS weighing 2-5kg one pilot without formal training.	Moderate-scale RPAS operation: five RPAS weighing between 15-25kg, all pilots hold at least a Private Pilot Licence (PPL) each.	Large-scale RPAS operation: three large (150kg+) RPAS, all pilots hold a Commercial Pilot Licence (CPL) each.
Intended activity	Scenic photography of rural areas, flying within Part 101 rules.	Scenic photography of rural areas, flying within Part 101 rules. Operator intends to undertake this service for other farmers in the area and charge for the service. 'Opting-in' to Part 102 to gain CAA authorisation for insurance and customer assurance reasons.	Agricultural operations, primarily chemical spraying. Outside of Part 101 due to hazardous nature. There would also be additional requirements due to agricultural and chemical applications.	Inspection of power lines of nation-wide electricity grid, including in urban areas and near busy roads. Activity outside of Part 101 rules due to hazardous nature.
Applicable rule	Part 101 <i>Model Aircraft Operating Rules</i>	Part 102 <i>Remotely Piloted Aircraft Systems Operating Rules</i>	Part 102 <i>Remotely Piloted Aircraft Systems Operating Rules</i>	Part 102 <i>Remotely Piloted Aircraft Systems Operating Rules</i>
Direct CAA charges	No charges.	Two hour assessment: \$568.00 Registration: no charge during interim period.	Four hour assessment: \$1136.00 Registration: no charge during interim period.	65–85 hours assessment: \$18,460 – \$24,140.00 Registration: no charge during interim period.
Training costs borne by operator / pilot	No charges.	No charges.	Agricultural rating: Uncertain for RPAS ¹⁴ Pilot chemical rating: \$5700 + GST ¹⁵ Training specific to the RPAS: \$585 - \$1895.00. ¹⁶	Training specific to the RPAS: \$585 - \$1895.00.
Other operator requirements	Knowledge of, and compliance with, Part 101 rules. Understanding of airspace requirements (e.g. can read aviation charts).	Knowledge and compliance with Part 101 rules. Understanding of airspace requirements (e.g. can read aviation charts).	Formal exposition, outline of intended flight operating area, aircraft flight and maintenance manuals, Safety and Risk management plan.	Formal exposition, outline of intended flight operating area, aircraft flight and maintenance manuals, Safety and Risk management plan.

¹⁴ The current costing for a fixed-wing manned aircraft is \$46,000 (based on market price from agricultural rating provider), but is likely to be much less for an RPAS operator.

¹⁵ Figure based on market price from chemical rating provider.

¹⁶ Figure based on market price from RPAS manufacturer and trainer.

Consultation

53. The CAA conducted targeted consultation with key stakeholders on a draft *Interim Approach to the Regulation of Remotely Piloted Aircraft Systems* document (Interim Approach document), requesting comment on a proposed approach. The document outlined proposed short-term actions of the CAA for regulating RPAS, including rule changes that relate to Option C in Table 2 – requiring the authorisation of all non-recreational operations.
54. The key stakeholders consulted included:
- aviation representative groups such as the Aviation Community Advisory Group, Agricultural Aviation Association and Aviation NZ
 - government agencies, operators and other interested parties (including the Privacy Commissioner, Ministry of Business, Innovation and Employment, and others)
 - universities
 - commercial operators of RPAS or RPAS-related services
 - representative organisations of potential commercial operators, such as the Real Estate Institute of New Zealand
 - volunteer safety organisations such as Coastguard New Zealand and Land Search and Rescue.
55. The CAA received 28 submissions on the Interim Approach document. The majority of feedback supported an amendment to the rules to fill the perceived gap in regulation of unmanned aircraft, caused by the 25kg weight limit for pilotless aircraft. Submitters also supported a clearer distinction in the rules between model aircraft and RPAS.
56. Feedback from consultation also showed that operators agree that there is a need for the CAA to develop a comprehensive education campaign on the safety risks of RPAS, and creating an RPAS register (to be administered by the CAA). A majority of submitters expressed an interest in being involved in future policy and rule development work for RPAS.
57. Almost half of the submitters opposed the idea in Option C (see Table 2) of regulating aircraft based on whether they are used for recreational or commercial purposes. These submissions questioned whether this approach would adequately address the risks posed by RPAS operations. Submissions argued that a recreational model aircraft and a commercial RPAS both operating in the same way (in compliance with Part 101) pose the same level of risk. The level of risk is determined by how the aircraft is being used (complying with Part 101 rules or not), rather than why it is being used (for commercial or recreational purposes). Consideration of the submissions in this area led to the CAA decision to recommend Option B over Option C in this Regulatory Impact Statement.
58. Stakeholders were informed of this change in approach and were provided further opportunity for comment. The CAA will continue to engage with these stakeholders as it develops rules. In particular, stakeholders will have the opportunity to provide comment

on the rule-development process with the publication of a Notice of Proposed Rule Making.

Conclusion and recommendations

59. The preferred option of creating a new Rule Part, tightening the Part 101 (model aircraft) rules, and undertaking an education programme will best meet the objectives stated in paragraph 27. This option will result in improved safety outcomes for RPAS activity, as it will focus CAA resource on the areas of highest risk. It is a necessary first step to give the CAA appropriate oversight of the RPAS sector, while allowing flexibility in the development of a more comprehensive RPAS regulatory framework.
60. The preferred option can be accomplished without unreasonable burden to operators, while assuring a higher level of safety for traditional airspace users, the travelling public, and persons and property on the ground. It will provide certainty and clarity for RPAS and model aircraft operators of CAA expectations and will also align New Zealand with recent RPAS standards released by ICAO.
61. The development of comprehensive rules to fully integrate RPAS into the New Zealand aviation system (Option F) remains the long-term objective of regulatory work on RPAS, but is not feasible at present. In order to develop comprehensive rules, the CAA first requires a comprehensive understanding of the RPAS sector in New Zealand. The registration requirements in the preferred option will provide the CAA with an opportunity to gather information on the use of RPAS in New Zealand, while also allowing the CAA to target educational material and consultation opportunities to appropriate operators. The prudent approach for New Zealand is to address immediate safety risks and gather information on the New Zealand RPAS sector while monitoring international developments, as ICAO, or any state, is yet to develop a comprehensive and effective regulatory framework for RPAS.

Implementation plan

62. Several amendments will be made to Rule Parts 19 and 101 to accommodate the operation of RPAS. This includes the creation of a new Rule Part, currently titled Part 102 *Remotely Piloted Aircraft Systems Operating Rules*. Pending Cabinet approval, a Notice of Proposed Rule Making will be developed providing specific details on the proposed rule amendments. This will be published on the CAA's website, and affected parties will have an opportunity to submit their views.
63. Once signed, the amended Rule Parts will be published on the CAA website, and affected parties will be notified of what is required of them to comply with the rule changes through updated Advisory Circulars for Parts 101 and 102.
64. The CAA will continue to undertake work to address the growth of civilian RPAS operations. An internal RPAS working group will monitor the effectiveness of current and proposed regulations, and recommend changes where appropriate. The relevant CAA operational groups will be included in this work.

Monitoring, evaluation and review

65. Once the changes to Parts 19, 101 and 102 are completed (and any necessary consequential amendments), the relevant CAA operational group (Special Flight Operations & Recreational Aviation) will monitor adherence to these rules. The Special Flight Operations & Recreational Aviation group will also continue to proactively engage with RPAS operators and manufacturers, to build a greater understanding in the CAA of the New Zealand RPAS sector, and to provide clarity to RPAS operators of safety risks and mitigation through an education programme and published guidance material. Where necessary, enforcement action will be taken to ensure on-going compliance with the rules.
66. Information gathered from operators, through the authorisation process and proactive engagement, will help inform on-going policy development relating to RPAS. The CAA has a long-term goal of fully integrating RPAS activity into the New Zealand aviation system. This is a major project and will involve the reviewing of current rules and other interventions, to ensure they are still fit for purpose.
67. The expected growth of the RPAS sector may present a challenge to the allocation of CAA resource in this area in future. On-going monitoring of the sector may require a greater investment of resource into the Special Flight Operations and other relevant units within the CAA to ensure they can meet the increased workload. The CAA will monitor the growth of the sector following the implementation of the proposed rule changes, and resource requirements will be reviewed as necessary.