

COMMERCIAL IN CONFIDENCE

Office of the Minister of Transport
Chair
Cabinet Economic Development Committee

TAKING FLIGHT: AN AVIATION SYSTEM FOR THE AUTOMATED AGE

Proposal

1. This paper seeks the Cabinet Economic Development Committee's agreement to release *Taking Flight: an aviation system for the automated age* (the integration paper), which sets out the Government's vision for integrating drones into the New Zealand aviation system. The integration paper is attached for your consideration.

Executive summary

2. Drones are aircraft of all sizes that operate without an on-board pilot, and can be flown remotely or autonomously.
3. Recent technological advancements have propelled drones from simple recreational gadgets to advanced and adaptable tools with the potential to bring innovation to a number of sectors. Drones now represent an opportunity for New Zealand to make transformative changes to the transport and aviation systems, benefiting the economy as a whole.
4. Drones can be used to improve efficiency and reduce costs across the economy. Increased access to drone platforms means that a growing number of industries could use aerial operations that have previously been too expensive, risky, or difficult to conduct with manned aircraft.
5. Research commissioned by the Ministry of Transport (the Ministry) and the Ministry of Business, Innovation and Employment (MBIE) indicates that the potential benefit to New Zealand from utilising drones across various sectors of the economy could be as high as \$7.9 billion over 25 years.¹ Urban Air Mobility (UAM) technology, or advanced passenger carrying drones, also have the potential to introduce transformative changes to regional transport and connectivity, if the safety and reliability of the technology can be demonstrated.
6. New Zealand has been highly regarded for its progressive regulations on drones. Our regulations provide a framework for safe consumer use of drones, and have encouraged numerous innovative drone companies to establish testing and development operations in New Zealand.
7. New Zealand stands to benefit from the opportunities offered by being among leaders in the drone sector. However, maintaining a position at the forefront of drone development requires a long-term strategy to facilitate safe and effective integration of drones into the wider transport system.
8. Integration will require innovative decision making and a willingness to make new investments to unlock the potential benefits of drones. Effective drone integration necessitates a willingness to address the safety and privacy issues arising from increased drone use and the dangers posed by negligent operators.

¹ The study was finalised in May 2019 by Market Economics Limited. The results of the study are based on economic modelling and interviews with stakeholders in the aviation sector and primary industries. The value represents an unconstrained and high estimate of the value of a developed drone sector for the New Zealand economy.

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9. The Ministry prepared the integration paper with input and consultation with other government agencies², stakeholders from the aviation sector, and academia³.
10. The integration paper lays the groundwork for how New Zealand will deal with the complex technological, regulatory, and social issues which need to be answered in order to facilitate drone integration. It identifies the building blocks which will be used to guide future initiatives on drones, and the factors that will be used to determine whether our work towards drone integration is successful.

Background

The use and development of drones has the potential to generate significant economic and social benefits for New Zealand.

11. In the last decade, small short-range drones have become increasingly common for commercial and recreational activities. According to new research commissioned by the Ministry, in 2017 there were an estimated 77,600 drones in New Zealand.⁴ Overseas research suggests that recreational and commercial drone use will continue to steadily rise in coming years.⁵
12. Drone technology, such as batteries, software, sensors, and materials, are advancing considerably. These advancements are making drones cheaper and more accessible, while also forming a basis for the development of increasingly advanced drones with the potential to safely carry cargo or passengers.
13. Drones are expected to be increasingly used as an easier, cheaper, quicker, and more efficient alternative to manned aircraft. Drones are already being used in New Zealand for animal mustering, small-scale agricultural chemical application, surveying of difficult environments, and hauling seedlings, equipment, and cabling in forestry. Internationally drones are also used to deliver medical supplies, provide emergency relief, and to conduct tests and security patrols in dangerous environments.
14. Increasingly, investments are being made into the development of UAM solutions, with at least 70 companies worldwide developing and testing UAM components and systems.⁶
15. Among these innovative companies is Zephyr Airworks⁷, which has launched operations and testing in the South Island to develop UAM.

Drones also represent significant challenges

16. Drones present their own set of safety and security risks, especially when used by careless or negligent operators in the vicinity of airports or other aircraft, or by those deliberately seeking to cause harm using drones. These risks will need to be addressed as part of the ongoing drone integration work. However, drones also have potential to

² The integration paper was created with input from the Ministry of Business, Innovation, and Employment, Civil Aviation Authority, and Airways.

³ Stakeholder input came via an extended public engagement period. During the engagement 23 responses were received from external stakeholders from government, the manned aviation sector, the drone sector, specialist interest groups, and academic representatives.

⁴ Based on calculations in the Drone Benefit Study commissioned by the Ministry in November 2018 and completed by Market Economics Limited.

⁵ The US Federal Aviation Authority estimates that model UAS numbers could increase from 1.1 million in 2017 to as much as 3.17 million in 2022, while non-model UAS numbers rise from 110,604 to as high as 717,895 in 2022.

⁶ According to the NASA Urban Air Mobility (UAM) Market Study, October 5, 2018. The study estimates that the unconstrained and optimistic value of the global UAM market is as high as USD 500 billion.

⁷ Zephyr Airworks began operations in New Zealand in October 2017, following ongoing collaborative efforts by MBIE, the Ministry, the Civil Aviation Authority, and Airways, to attract the company to New Zealand.

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improve safety, as they can be used in place of people in some of New Zealand's most dangerous jobs, such as forestry or manned flights in dangerous conditions.

17. Attention to safety and security is not a hindrance to the development of the drone sector. Addressing the safety and security risks associated with drones will be a key to building public acceptance and unlocking the potential economic benefits of drone use.
18. To foster innovative and safe drone use, it is important for the government to set a clear direction and vision for the future of drones. This vision needs to present a common understanding of where we are going, how we will get there, and what success will look like.

The New Zealand context

19. New Zealand has been considered a world leader in the drone sector, due, in part, to our welcoming business environment, but primarily due to our enabling risk-based regulations for innovative drone use.
20. New Zealand's drone regulations were developed by the Ministry and the Civil Aviation Authority (CAA) and are broken down into two categories: Rule Part 101 for drones weighing less than 25kg and carrying out low risk operations, and Rule Part 102 for drones weighing in excess of 25kg or carrying out higher risk operations. Civil Aviation Rule Part 102 provides an enabling risk-based approach that allows the regulator and operator to work together to identify the best approval pathway on a case-by-case basis. So far, our regulatory regime and approach has proven flexible and effective enough to enable initial testing of more advanced forms of drones.
21. In early May the CAA listed 111 Part 102 Unmanned Aircraft Operator Certificate Holders, who are certified to carry out flights which do not meet the risk criteria set out in Part 101, such as flying above people, flying out of sight of the pilot, or using drones weighing more than 25 kilograms.
22. New Zealand's risk-based and enabling regulations have already attracted several innovative developers to establish local operations. Among these is Zephyr Airworks, which has chosen New Zealand to develop its UAM system. Zephyr has taken a partnership approach in their development process, and readily works with the government, iwi and local communities to develop a broader ecosystem to support the implementation of UAM technology.

Withheld
under
9(2)(b)(ii)

23. [REDACTED]
[REDACTED]
[REDACTED] Advanced aviation technologies are a key component of MBIE's innovative partnership programme, and the broader aerospace sector is one of seven sectors included in the New Zealand industry policy.

Withheld
under
9(2)(b)(ii)

24. [REDACTED]
[REDACTED]
[REDACTED]
Officials at MBIE also have held preliminary discussions with a number of other companies to test drone technologies in New Zealand. The potential benefits from being at the forefront of UAM development are high, but there is significant competition from other countries to host and partner with these companies.

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25. Despite our progress, other countries are beginning to develop regulations to match or exceed our own, and are already testing innovative flight parameters, such as flights beyond the visual line of sight of the pilot, autonomous flights, and delivery flights.
26. Some countries⁸ are also making initial progress towards establishing simple Unmanned Traffic Management (UTM) systems. A UTM provides a platform to manage drone traffic and minimise aviation risks by dynamically allocating airspace, granting flight permissions, and facilitating effective and innovative use of airspace. Airways New Zealand (Airways) has already begun limited rollout of an early UTM platform, and my transport officials have begun preliminary work to investigate policy and regulatory issues associated with UTM.
27. As some overseas advancements are matching or exceeding those being made in New Zealand, we are not the only country at the forefront of drone development. If New Zealand does not take steps to advance our position we could lose out on the advantages of being among first-movers and capitalising on new developments.
28. New Zealand is currently in a position to match or exceed the regulatory developments being made overseas. However, any efforts to advance New Zealand's standing as a destination for drone development cannot compromise the high level of aviation safety that currently exists.
29. Recent research⁹ conducted on behalf of the Ministry indicates that the potential benefit of drones to the New Zealand economy could be as high as \$7.9 billion over 25 years:

Net Present Value of the benefits of drones to New Zealand over 25 years, \$billions		
	Low	High
Baseline	1.2	4.9
Unconstrained¹⁰	4.6	7.9

30. The benefits are derived from economic models based on feedback from stakeholders on how they currently use drones and how they can foresee their use of drones expanding. It is possible that more enabling work by the government, or additional advances in technology could further raise the benefits derived from drone use in New Zealand.
31. In addition to the above, the potential value to New Zealand over 25 years of a domestic air network using UAM to provide access to smaller regional airports could be as high as \$1.4 billion.
32. Further, along with the direct benefits derived from drone use, the drone sector itself could provide additional benefit. Based on information currently available, a conservative estimate of the benefits of the sector itself to New Zealand is up to \$216 million over 10 years.
33. Drones can also have wider benefits beyond their immediate uses, including building New Zealand's profile for fostering innovation, contributing to positive environmental outcomes, and benefiting wider research projects which are not drone related (e.g. monitoring river flows or the impact of urban streetlights on surrounding ecology).

⁸ These include: Singapore, Switzerland, China, Japan, and the UK.

⁹ The research is the Drone Benefit Study commissioned by the Ministry to quantify the benefits and value of a developed drone sector in New Zealand.

¹⁰ Within the context of the Drone Benefit Study, Baseline and Unconstrained refers to the rate of uptake of drone technology for commercial uses. Baseline is a conservative estimate based on feedback received from stakeholders on their current uptake of drones. Unconstrained refers to a more optimistic scenario where the uptake increases as the operators gain a better understanding of the technology.

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Current Work Underway

34. The Ministry has already established several streams of work to support drone integration. To illustrate the interplay of the work needed for ongoing drone integration, a diagram of upcoming work and indicative timeframes is attached in Appendix 1.
35. The Ministry, working closely with CAA, is exploring a package of regulatory options to simultaneously address several current issues and concerns:
 - 35.1. Continuing to enable innovation, and ensuring that our regulations and rules are flexible enough to work with emerging drone technology.
 - 35.2. Ensuring that privacy, safety and security concerns are met.
 - 35.3. Creating a framework which considers the interests of the drone sector alongside other participants in the aviation sector.
 - 35.4. Bringing drones and drone users within the regulatory framework and ensuring ongoing compliance.
 - 35.5. Creating a system which allows New Zealand to keep pace with technological and operational developments overseas.
36. Appendix 2 provides further detail on the Ministry and CAA work programme as well as potential interventions to address current and emerging issues from drones.
37. Through its Innovative Partnerships programme MBIE is working with international and domestic businesses, research organisations, infrastructure providers and regulators to co-create an enabling platform that brings together all the elements that influence innovators and investors' decisions to conduct R&D, innovate, invest and build a sustained New Zealand presence.
38. MBIE is engaging with a number of companies developing highly innovative drone systems. In October 2018, MBIE and Airbus signed a Letter of Intent to seek opportunities for Airbus to collaborate on the development of unmanned aircraft technologies in New Zealand.
39. MBIE is also working with relevant agencies to establish a programme of airspace integration trials intended to enable the safe development, testing and market validation of advanced drone applications within the existing regulatory framework.

Drone integration paper

40. *Taking Flight: An Aviation System for the Automated Age* sets out a vision and direction for a multi-year programme of work to integrate drones into the aviation and wider transport system.
41. In order for the Government to foster efficient and effective integration, all stakeholders, including the drone sector and wider transport sector, must have a clear understanding of the direction, intentions and strategy behind integration. This will help to ensure that the benefits of drones are realised for New Zealand and the sector as quickly and safely as possible.
42. The integration paper illustrates some of the potential future uses for drones which are currently under development, including rural and urban delivery drones, search and

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rescue drones, and UAM. The paper also lists a number of other drone use-cases identified by stakeholders during the engagement process for the paper.

43. By identifying the benefits of integration, along with the associated risks, the paper is meant to help alleviate the potential ongoing concerns of airspace users, drone users, and the drone industry.
44. The integration paper outlines two distinct phases for drone development.
 - 44.1. Phase 1 deals with navigating the issues arising from increased airspace utilisation by drones, airspace management, the impact of drones on other airspace users, and the potential impact of drones on people on the ground. This phase also covers the implementation of technology to manage airspace usage and for drones to autonomously detect and avoid hazards.
 - 44.2. Phase 2 considers issues associated with integrating drones into the wider transport system. For example, determining what ground infrastructure is required to support different types of drone operations.
45. The integration paper defines success as a time when the drone sector is thriving, innovative, and safe.
46. The paper identifies that creating an environment which facilitates integration will require a set of complementary building blocks. The building blocks are:
 - 46.1. Regulation – integration will rely on a regulatory system which supports building acceptance by the public and the aviation sector, and maintains safety and security, while being flexible, proportionate, equitable, and consistent with relevant international standards.
 - 46.2. Funding and investment – integration may alter the funding requirements and the sources of funding for the aviation system, and it will be necessary to consider what funding will be needed to support integration.
 - 46.3. Infrastructure and technology – integration may require investment into new infrastructure or technologies. Decisions on these investments will need to be evaluated through robust engagement and analysis.
 - 46.4. Research and development – to facilitate integration and to maximise benefits from investments, it is necessary encourage testing and early market validation and to develop domestic R&D capabilities.

What happens next?

47. If the vision for integration is agreed and adopted, further work will be required to ensure that New Zealand is positioned at the forefront of international drone development. At times the government may be required to respond rapidly and consider interventions and regulatory changes that have not been tested in other jurisdictions.
48. A joint budget initiative to support drone integration was considered as part of Budget 19, but this initiative was not successful. However, the Ministry is working with MBIE to explore other possible funding sources. In order to maintain our position at the forefront of drone technologies, it is likely that further investments into new technologies or capabilities will be required in the future.

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Engagement on the integration paper

49. The Ministry received feedback on the initial draft of the integration paper from representatives of the general aviation sector, the drones sector, academics, commercial entities, special interest groups, and government agencies.
50. The respondents provided a mix of optimistic and cautious feedback., The main points were:
 - 50.1. Stakeholders wanted more clarity on what constitutes “being at the forefront of drone development”.
 - 50.2. Stakeholders wanted more clarity on the nature and timing of the work programmes for drone integration.
 - 50.3. Stakeholders expressed concern that rapid advancements on drone integration could result in reduced safety standards for the aviation sector.
 - 50.4. Stakeholders suggested that drone integration will be slowed by technological limitations, especially in regards to the hardware needed to help drones detect and avoid hazards.
51. All of the suggestions were considered, and, where appropriate, changes were made to ensure that the integration paper strikes an appropriate balance between the intentions of the Government and the concerns and aspirations of the sector. The final paper clarifies safety will continue to be the primary objective of drone integration. Any new technologies, systems or procedures will be assessed against the benchmark of the overall safety of the system being at least maintained, and ideally, improved.

Governance

52. As part of its ongoing work on drones, the Ministry has established the Unmanned Aircraft Leadership Group. This group provides oversight over the cross-government work programme to deliver the vision of an integrated drone sector.
53. The membership of the UA Leadership Group consists of senior officials from the Ministry (Chair), CAA, Airways and MBIE.

Continued Engagement with the Sector

54. Work is currently underway to determine the best method to facilitate ongoing engagement with the aviation sector and to maintain communication and information flows between government and the sector. This includes aligning the communications strategies of the government agencies involved with drones to ensure that the public and media receives up-to-date and consistent messaging regarding drone integration.
55. The Ministry is preparing to establish a regular Drone Forum to gather relevant stakeholders to discuss issues related to drones and drone integration. The Forum will be attended by representatives of the drone sector, the general aviation sector, government, and other relevant stakeholders.

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Departmental consultation

56. The following government departments and agencies were consulted on this paper and their comments have been taken into consideration in developing this paper:
- 56.1. Treasury, State Services Commission, Ministry for the Environment, Worksafe, Fire and Emergency New Zealand, Police, Ministry for Primary Industries, Ministry for Culture and Heritage, Civil Aviation Authority, Office of the Privacy Commissioner, New Zealand Transport Agency, Department of Conservation, New Zealand Defence, and Te Puni Kōkiri.
57. The Department of the Prime Minister and Cabinet has been informed of the contents of the paper.

Financial implications

58. There are no additional financial implications arising as a direct result of this paper. However in the long-term, integration may require funding to support regulatory development, capability expansion and infrastructure development.

Human Rights, gender implications and disability perspective

59. There are no human rights, gender or disability issues or implications associated with this paper.

Legislative implications

60. There are no legislative implications arising as a direct result of this paper. However, ongoing work toward drone integration may require legislative updates to facilitate the expanded uses for drones.

Regulatory Impact Analysis

61. There are no regulatory implications arising as a direct result of this paper.
62. The Ministry has work underway to review the regulations applicable to drone use. Future regulatory updates may be required to encourage the expanded uses of drones. Any future regulatory changes would require a Regulatory Impact Assessment.

Proactive release and publicity

63. The proactive release of this paper and any associated papers will be within 30 days of the Cabinet decision.
64. If Cabinet approves, I propose to:
- 64.1. release the integration paper, and make it publicly accessible via the Ministry website
- 64.2. issue a media statement and supporting communication material on the integration paper
- 64.3. release the finalised Drone Benefit Study.

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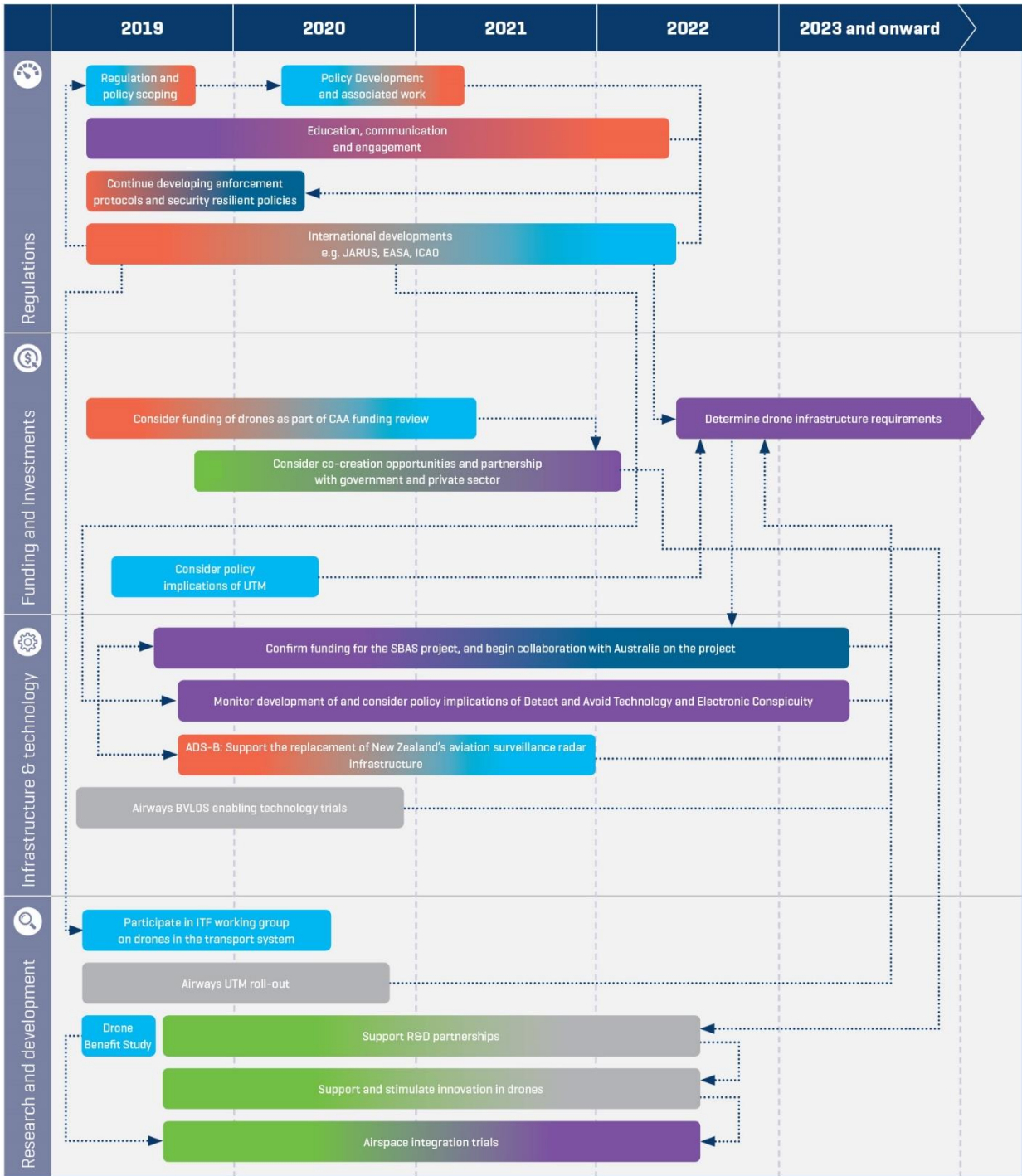
Recommendations

65. The Minister recommends that the Committee:
1. **approve** the release of Taking Flight: an aviation system for the autonomous age, which sets out the Government's vision and strategy for integrating drones into the New Zealand aviation system
 2. **authorise** the Ministry of Transport to make any necessary editorial changes that arise during the finalisation of the integration paper
 3. **agree** that the Ministry of Transport publish the integration paper on its website
 4. **note** that my transport officials are exploring and investigating policy options to review and update New Zealand drone regulatory settings
 5. **note** the indicative work programme set out in Appendix 1 and the more detailed programme in Appendix 2.

Authorised for lodgement

Hon Phil Twyford
Minister of Transport

Appendix 1: Indicative drone integration work programme



- Ministry of Transport
- CAA
- Airways
- MBIE
- Multi-agency or commercial
- Other government agency

Appendix 2 – Detailed Ministry and CAA integration work programme

Integration (Regulatory)

Complementary

Response/Resilience

Intervention

Stage

Operating rules	Registration	E-identification	Geo-fencing/ Geo-awareness	Pilot competence	UTM	Education	Communications & Engagement	Anti-drone technologies	Management protocols
<p>Current state Drone users are expected to comply with all relevant civil aviation rules and regulations. The following rules are specific to drones:</p> <ul style="list-style-type: none"> • Civil Aviation Rule Part 101: applies to all drone operations that do not need specific CAA approval • Civil Aviation Rule Part 102: drone operations flying outside Part 101 (including higher risk operations and all drones weighing above 25kg) must be certified. <p>The existing rules, if followed, provide for a safe aviation system and are viewed internationally as progressive. Recent incidents involving drones have represented clear breaches of the rules. However, the nature of drones means enforcement is challenging.</p> <p>Penalties for breaching the rules apply under the Civil Aviation (Offences) Regulations 2006; Civil Aviation Act 1990; Crimes Act 1961; Summary Offences Act 1981.</p> <p>Work underway Policy exploration to consider updates to the rules to:</p> <ul style="list-style-type: none"> • improve clarity • address issues identified with the current rules and ensure they fulfil risk-based safety objectives • enable innovation • examine the relevant penalties for non-compliance. <p>This work includes considering the following, as part of a package of regulatory interventions:</p> <ul style="list-style-type: none"> • revising sub-categories based on actual risk, including potentially removing requirements for low-threat drones under 250g (align internationally) • alternatives to the consent provision (seen as restrictive and not fulfilling a safety role) • how to treat model aircraft associations. <p>Civil Aviation Bill work includes removing any barriers to drone development and our ability to manage drones.</p> <p>Introducing ADS-B infrastructure through New Southern Sky programme will support drone integration.</p> <p>The Ministry of Transport, working closely with the Civil Aviation Authority, is exploring these interventions as a package of options, to improve compliance, the ability to enforce the rules and the proportionality of the rules; and to support system sustainability and future integration. Many of the proposed measures are interdependent/complementary.</p>	<p>Current state New Zealand does not have any of these measures in place.</p> <p>Work underway A number of comparable countries have either introduced or are working on introducing these requirements. We are engaging in international discussions to understand technical and regulatory developments and have begun interagency discussions to test early thinking.</p> <ul style="list-style-type: none"> • Designing a useful registration system is complex, but lots of potential benefits if we get it right • Enables pilot/drone identification and supports enforcement. Must be combined with e-identification to maximise benefits • May be linked to pilot competence • Can be used as an opportunity to educate/make direct contact with drone operators • Potential to charge users through registration to contribute to system management • Improve data on drone use. <p>(AirShare, managed by Airways, is a voluntary service that enables operators to register and track their flights.)</p>	<ul style="list-style-type: none"> • E-identification/ remote identification (i.e. technology that transmits drone identification data during flight) will be critical to identify non-compliant users and enable enforcement • Technology is developing – a few jurisdictions have introduced compulsory e-identification requirements but are working through how to implement it. 	<ul style="list-style-type: none"> • Compulsory geo-awareness capability to allow “geo-fencing” i.e. a system that informs the drone operator when a drone is entering, or stops a drone from entering designated sites (e.g. airports, critical infrastructure) • Technology is still nascent – no fail-safe solutions are yet available • A few jurisdictions have made it compulsory and there is a lot of investment internationally on developing the technology. 	<ul style="list-style-type: none"> • Drone operators are currently required to operate according to the rules, but there are no formal pilot competency or testing requirements • Could be tied to registration process • Different types of accreditation likely to be appropriate depending on risk level and/or complexity of operations. 	<p>Current state A UTM (Unmanned Traffic Management) is a system that allows operators to connect to a coordinating service that simultaneously manages multiple drone operations at low altitudes or in controlled airspace.</p> <p>Some countries have started to implement UTM systems, but these are still at early stages of development. In New Zealand, the AirShare app provides basic, voluntary UTM services and Airways is working to develop its capability.</p> <p>Work underway MOT is leading scoping work looking at the possible requirements for a UTM system in New Zealand.</p> <p>UTM, registration, e-identification and geo-fencing are complementary interventions.</p> <p>MoT and CAA are contributing to international work relevant to UTM systems and enabling advanced drone operations.</p>	<p>Current state CAA has prioritised investment in activities to improve drone safety and compliance with the existing rules, including</p> <ul style="list-style-type: none"> • launching a new website to explain the rules simply www.flyyourdrone.nz • providing brochures to major retailers to distribute at point of sale • working with Air New Zealand to provide information for tourists, and • working with schools on safe use of drones. <p>Opportunities? A widespread education campaign (similar to drink drive campaigns) may have some benefit, but would require significant additional funding and may take years to result in behavioural change. The target would be operators ignorant of the rules and tourists. CAA levies cannot be used to fund this.</p> <p>Education needs to be backed by effective enforcement.</p>	<p>Current state MoT, CAA and Airways have agreed a communications protocol to support consistent public messaging about the safe use of drones. We are working to refine this.</p> <p>Work underway We are developing public messaging around incidents to stress the importance of complying with existing drone rules, as well as looking at proactive opportunities to promote awareness</p> <p>Early public engagement on the regulatory work will also be a useful communications opportunity.</p>	<p>Current state Anti-drone technology currently limited. UK and others have deployed some technologies, with Gatwick and Heathrow airports recently investing in military-grade and commercial equipment. Advice from international counterparts is that a combination of anti-drone technologies, supported by other measures, is needed.</p> <p>Work underway Ongoing interagency discussions on protocols for managing drone incursions and use of anti-drone technology. This includes questions around responsibility, funding and associated safety risks.</p>	<p>Current state Protocols are in place between Airways, CAA, NZ Police and controlled airports for responding to drone incursions to minimise disruption. Incidents to date have primarily been by careless or negligent operators.</p> <p>Work underway We have engaged with the UK and others on “lessons learnt” following the incidents at Gatwick and Heathrow Airports. A number of practical measures have been recommended to help manage incidents. CAA will lead work with airports and Airways to support the implementation of any appropriate additional measures at airports, as well as assess how lessons might apply to managing incidents outside airports.</p> <p>The Aviation Security Forum (May) will be used to further share this information and to discuss additional work needed.</p> <p>Airways is trialling advanced radar systems at Auckland Airport to detect threats and support response.</p>

Likely impact on behaviour of drone operators

Responsible	Minimal safety impact because these operators are already behaving responsibly. However, strong benefits in implementing these measures to enable future integration								Limited impact (These users are unlikely to create significant risks, particularly if appropriate regulatory measures are in place).	
Compliant <i>if clear rules and penalties</i>	High	High	High	High	High	High	High	High	High	High
Negligent <i>(Tasman-fire type incident)</i>	Low	Medium	Medium	Medium	Medium	Medium	Medium	Medium	High (deterrence)	Medium
Determined disrupters <i>(Gatwick-style incident)</i>	No impact*	No impact*	No impact*	Low*	No impact	Low*	No impact	No impact	Medium (response)	Medium

*Although these regulatory interventions will not affect the behaviour of determined disrupters or help eliminate a threat, they may help with threat detection.