



BRIEFING

Advanced Aviation Technologies platform-play: Positioning New Zealand as the location of choice for the emerging unmanned aircraft sector

Date:	29 August 2018	Priority:	High
Security classification:	In Confidence	Tracking number:	0346 18-19

Action sought		
	Action sought	Deadline
Hon Dr Megan Woods Minister of Research, Science and Innovation	<p>Agree to the proposed focus areas for the <i>Advanced Aviation Technologies</i> platform-play;</p> <p>Forward this paper to Hon Phil Twyford, Minister of Transport, for discussion; and,</p> <p>Forward this paper to Hon David Parker, Minister for Economic Development, for his information.</p>	3 September 2018

Contact for telephone discussion (if required)				
Name	Position	Telephone		1st contact
Dr Peter Crabtree	General Manager, Science, Innovation and International	04 901 3907	Privacy of natural persons	✓
Dr Kjesten Wiig	Director, Innovative Partnerships	04 901 3959	Privacy of natural persons	
Michelle Schulz	Strategic Partnership Manager, Innovative Partnerships	04 901 2135	Privacy of natural persons	

The following departments/agencies have been consulted
Ministry of Transport, Civil Aviation Authority, Airways Corporation, Callaghan Innovation, and New Zealand Trade and Enterprise.

Minister's office to complete:

- | | |
|-----------------------------------------------|----------------------------------------------|
| <input type="checkbox"/> Approved | <input type="checkbox"/> Declined |
| <input type="checkbox"/> Noted | <input type="checkbox"/> Needs change |
| <input type="checkbox"/> Seen | <input type="checkbox"/> Overtaken by Events |
| <input type="checkbox"/> See Minister's Notes | <input type="checkbox"/> Withdrawn |

Comments



BRIEFING

Advanced Aviation Technologies platform-play: Positioning New Zealand as the location of choice for the emerging unmanned aircraft sector

Date:	29 August 2018	Priority:	High
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Purpose

To seek agreement to the proposed focus area of the *Advanced Aviation Technologies* platform-play. An overview is provided in Annex One.

Executive Summary

In March 2018, Zephyr Airworks (Zephyr) officially announced its presence in New Zealand via an exclusive with *The New York Times* which included a welcoming statement from the Prime Minister. This has significantly lifted New Zealand's profile and presents a unique opportunity to position New Zealand as the global location of choice for the emerging unmanned aircraft (UA) sector.

This emerging sector is innovative and research and development (R&D) intensive. It includes a range of advanced aviation technologies (UA hardware, operations and services). In the short- to medium-term the presence of companies testing and trialling these technologies in New Zealand will grow and scale R&D, and stimulate cross-disciplinary technology innovation relevant to multiple sectors. In the long-term, the development of an UA sector could generate economic and social benefits and new areas of competitive advantage. It also has the potential to advance New Zealand's global profile as a zero carbon economy.

As for any new and transformative technologies, the UA sector also raises a number of challenges for policy-makers, in particular regarding: safety, national security and public acceptance.

To realise these benefits and manage the challenges, governments need to be able to move at pace with this emerging sector. As indicated in previous advice, New Zealand's risk-based UA regulatory regime and internationally reputable safety regulator, open for business mentality and a microcosm to develop and bring these technologies to market have so far been the key factors that attracted companies like Zephyr to New Zealand.

To position New Zealand as a location of choice for the emerging UA sector it is important that we remain at the forefront by ensuring our approach to UA operations harnesses the opportunities while addressing the challenges.

The Ministry of Transport (MOT), supported by the Civil Aviation Authority (CAA), Airways and MBIE, is leading the development of a vision for enabling a thriving, innovative and safe UA sector and providing a pathway for safe integration of small drones as well as more advanced UAs in New Zealand. The vision will support the development of a cross-government multi-year work-programme covering regulation, funding and investment, infrastructure and technology, and R&D.

It is important that this vision sends a clear signal that this Government is committed that New Zealand remains at the forefront in the UA sector, and that this work is undertaken as soon as possible. **Free and frank advice**

Free and frank advice

To support this broader vision and the multi-year work-programme, the proposed *Advanced Aviation Technologies* platform-play is nimble and bespoke, and specifically targeted at the needs of the emerging UA sector and companies testing and trialling, and commercialising advanced aviation technologies.

The platform-play's objective is to develop New Zealand's competitive advantage. Working with international and domestic businesses, research organisations, infrastructure providers and regulators, we co-create an enabling platform that brings together all the elements that influence innovators and investors' decision to conduct R&D, innovate, invest and build a sustained New Zealand presence.

We propose the following immediate focus areas:

- Work with the MOT and the CAA to ensure our regulatory regime and approach continues to safely support this highly innovative sector
- Facilitate testing and trialling activities and identify areas where pro-active public investments in technology and infrastructure are needed
- Support our existing industry, stimulate start-up activities and attract experienced innovators and investors
- Facilitate the development of domestic R&D capabilities and talent.

Under each of these focus areas this paper outlines a set of concrete actions. Some actions are already underway, whereas others need further exploration.

Should you agree to the proposed focus areas, we will work with relevant agencies to provide you with more detailed advice on the specific concrete actions proposed in this paper, including how these align with the broader multi-year work-programme developed by MOT.

We recommend you forward this paper to Hon Phil Twyford, Minister of Transport, for discussion in the coming weeks. We also recommend you forward this paper to Hon David Parker, Minister for Economic Development, for his information.

Recommended action

The Ministry of Business, Innovation and Employment recommends that you:

a. **Agree** to the proposed focus areas for the *Advanced Aviation Technologies* platform-play

- (i) Work with the MOT and the CAA to ensure our regulatory regime and approach continues to safely support this highly innovative sector;

Agree / Disagree

- (ii) Facilitate testing and trialling activities and identify areas where pro-active public investments in technology and infrastructure are needed;

Agree / Disagree

- (iii) Support our existing industry, stimulate start-up activities and attract experienced innovators and investors; and

Agree / Disagree

(iv) Facilitate the development of domestic R&D capabilities and talent;

Agree / Disagree

b. **Note** that should you agree with the proposed focus areas we will work with relevant agencies with more detailed advice on the specific concrete actions proposed in this paper;

Noted

c. **Forward** this paper to Hon Phil Twyford, Minister of Transport, for discussion; and,

Yes / No

d. **Forward** this paper to Hon David Parker, Minister for Economic Development, for his information.

Yes / No

Dr Kjesten Wiig
**Director, Innovative Partnerships
Science, Innovation and International
MBIE**

..... / /

Hon Dr Megan Woods
**Minister of Research, Science
and Innovation**

..... / /

Background

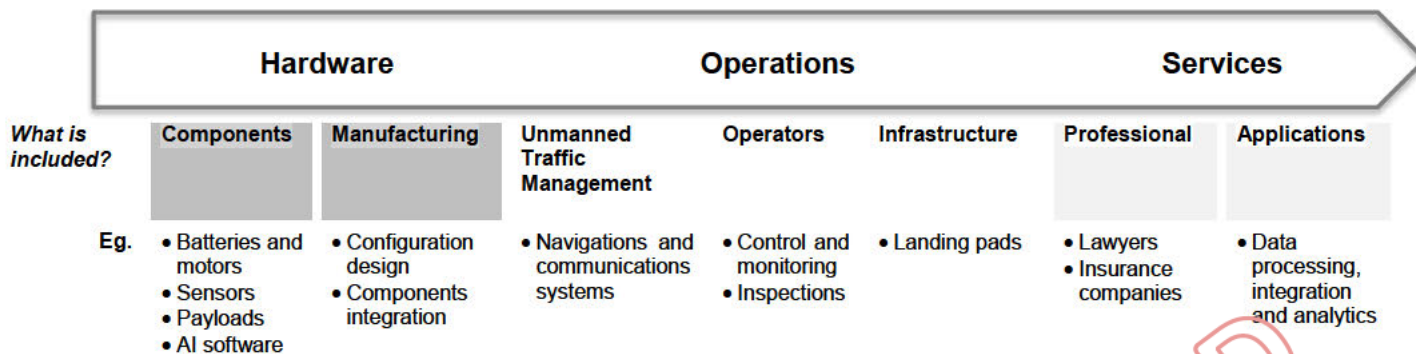
1. The Innovative Partnerships programme's platform-play is a sector-focused approach for building competitive advantage in transformative and emerging technology areas where growing research and development (R&D) capability and stimulating innovation is of strategic importance to achieving the Government's vision for a more sustainable, diversified, productive and inclusive economy [1269 17-18 refers].
2. *Advanced Aviation Technologies* was identified as a key focus areas in late 2017 [1269 17-18 refers]. This paper sets proposed focus areas for the *Advanced Aviation Technologies* platform-play seeking to position New Zealand as a location of choice for the emerging global unmanned aircraft (UA) sector. An overview is provided in Annex One.

New Zealand has a unique opportunity to become a location of choice for the emerging UA sector

Zephyr's presence in New Zealand has significantly lifted our profile in the emerging global UA sector

3. UAs are aircraft of all sizes that operate without a pilot on board. In the last decade small short-range remotely piloted UAs (aka drones) have become increasingly common for commercial and recreational activities (eg image capture and analytics, facilitation of labour intensive or difficult tasks).
4. Advances in technologies (eg batteries, software and artificial intelligence, sensors and lightweight materials) are now also providing the basis for the development and adoption of more advanced, larger, longer-range UAs capable of carrying passengers and cargo (eg 'air taxi' and package distribution services, delivery of medical supplies) and performing more complex tasks across a range of public and private sectors (eg search and rescue, connectivity, agriculture).
5. This emerging UA sector (drones and more advanced UAs) includes a range of advanced aviation technologies (eg UA hardware, operations and services, see Figure One overleaf), and builds on a wide range of high-tech and innovative industries (eg composite materials, high-value manufacturing, software development).
6. Zephyr Airworks (Zephyr), a flagship company of the Innovative Partnerships programme, is one of the leaders in the development of a fleet of electric and remotely piloted UAs designed to carry goods or up to two people. In March 2018, it officially announced its presence in New Zealand via an exclusive with *The New York Times* which included a welcoming statement from the Prime Minister.
7. Since the announcement, a number of other international companies developing similar technologies have expressed interest in New Zealand as a possible location for the testing and trialling of their advanced UAs Commercial Information, Information received in confidence With this increasing interest, there is potential for New Zealand to be also attractive to companies that are developing specific UAs componentry, or focus on UA operations and services. There are also a number of domestic companies that are developing advanced aviation technologies, and are looking for investors.

Figure One: UA sector ¹



The emerging global UA sector is innovative and R&D intensive

8. Start-ups are currently the main actors within this sector, and globally the sector has attracted more than USD \$3 billion in funding over the past five years (of which seventy-two percent is venture capital).
9. Alongside technology leaders (eg Google), large traditional aviation companies have invested significantly in technology development and are aggressively aiming to become world-leaders in more advanced UAs (eg Airbus, Boeing). Traditional car companies (eg Porsche) and leading-edge aviation research institutions (eg NASA and German Aerospace Centre) are also investing in these new technologies. As no single player has end to end capabilities, a number of joint venture partnerships are emerging. .
10. The focus of R&D is on automation, energy management, noise and configuration, positioning, detect and avoid systems, and air traffic management (see Annex Two). R&D conducted across these areas is also applicable to a range of other sectors. For example, R&D on automation is applicable to health, hazard management, and agri-tech. There is also significant potential for UAs to be integrated with other R&D intensive sectors (eg space).

The development of advanced aviation technologies in New Zealand has the potential to generate significant benefits

11. As indicated in previous advice, Commercial Information, Information recieved in confidence (estimated NZD 15 million to date in R&D, infrastructures, and staff), and these are expected to grow. Zephyr's presence has also acted as a catalyst for innovation, R&D, and talent development across our current research, science and innovation system.
12. In the short- to medium-term, the presence of companies testing and trialing advanced aviation technologies in New Zealand will grow and scale R&D, stimulate innovation and build talent and capabilities across a range of aviation technologies (eg positioning, detect and avoid, and air traffic management) and other technology areas (eg batteries, software and artificial intelligence (AI), sensors and lightweight materials, and data analytics). This provides an opportunity to foster new globally recognised niche capabilities in New Zealand relevant to the emerging UA and a range of other sectors (eg space, energy).
13. In the longer-term, the emerging UA sector has the potential to transform how we move goods and people, and how services are being delivered across a range of public and private sectors. As indicated above, UAs are already used for a range of activates (eg image capture and analytics, facilitation of labour intensive or difficult tasks). We expect that over the next three to five years, UAs will be technically able to provide new ways of delivering goods and services in semi-rural and rural areas, generating new economic as well as social

¹ Adapted from McKinsey&Company

opportunities. UAs are expected to provide easier access to remote areas and more effective responses in emergency situations.

14. Passenger carrying UA are also increasingly becoming a reality. How big of a role services like air taxis will play in New Zealand's future transport system is yet to be determined. They could provide an alternative urban transport option for time-sensitive passengers and passenger carrying services (eg medical emergencies), enhanced connectivity within the regions (eg serving communities that do not have regular air services) and reduce transport infrastructure costs.
15. The development of advanced aviation technologies also has the potential to advance New Zealand's global profile as a zero carbon economy. While there is some uncertainty around the extent to which widespread use of UAs would lower emissions, companies and research organisations developing these technologies aspire to provide lower emissions modes of transportations, The focus is on electric battery powered rotors, but there is also increasing interest in the potential for hydrogen motors.

... but it also raises a number of challenges

16. As with any transformative technology area and emerging sector, new activities also raise a number of challenges.
17. The current aviation system has been designed to operate with pilots. Beyond-visual line-of-sight (BVLOS) flight and integration of UAs in the national airspace are challenging policy makers around the world, to identify and manage implications for public safety.
18. Security is also a key challenge. UAs capable of carrying passengers and cargo and performing more complex tasks also have potential criminal and dual use applications.
19. Widespread use of UAs also requires policy makers to manage the interests of existing traditional aviation participants (eg access to airspace, technology requirements).
20. The concept of 'flying taxis' or freight delivery drones has also not yet been fully canvassed with the general public. In addition to safety and national security, privacy and public nuisance aspects are likely to be raised both with government and industry.

Government has a critical role to play to realise this opportunity

Governments need to be able to move at pace with this emerging sector and address the challenges it raises

21. As indicated in previous advice, the ability to conduct BVLOS flight and integration of UAs in the national airspace is critical for the emerging UA sector. It is one of the main factors that companies developing these technologies and investors consider when deciding where to locate their activities and investments.
22. Governments have a crucial role in planning ahead to ensure a future-focussed regulatory regime and approach, and to consider whether public investments is needed in technology (eg transponders) and infrastructure (eg UA traffic management and supporting infrastructure), to enable safe BVLOS flight and safe integration of advanced UAs, and address the challenges it raises.
23. To fully realise the benefits of the regulatory interventions and investments in infrastructure, governments also have a key role to play in supporting the growth of a domestic industry and the development of domestic R&D capabilities and talent.

Internationally other jurisdictions are increasingly adopting innovative approaches

24. As noted in previous advice, because of the benefits associated with the testing and trialing of these new and transformative technologies and the development of an advanced UA sector, other countries are moving quickly to put in place innovative initiatives that enable BVLOS flight and safe integration of advanced UAs.
25. In Europe, there are now six cities that are looking for partner companies to undertake demonstration projects for the integration of UAs under a special European Commission (EC) initiative. **Commercial Information**
[REDACTED]
[REDACTED] The demonstration projects are scheduled to be run in 2019, and lessons learnt from each demonstration project will inform EC's UA deployment strategy and roadmap.
26. In Singapore, the Civil Aviation Authority of Singapore, the European Aviation Safety Agency and Airbus have agreed to collaborate in the development of safety standards and regulatory requirements as well as operational and technological assessments for the deployment of UAs in urban environments.
27. In the US, the Secretary of Transportation recently initiated a Drone Integration Pilot Program to help tackle the most significant challenges, such as BVLOS, in integrating drones while reducing risks to public safety and security.
28. The above countries are also making investments and supporting the development of domestic industry and R&D capabilities.

The Ministry of Transport is leading the development of a vision for enabling a thriving, innovative and safe UA sector and provide for a pathway for safe integration of UAs

29. As indicated in previous advice, New Zealand's open for business mentality, risk-based UA regulatory regime, and internationally reputable safety regulator have so far been the key factors that attracted companies like Zephyr to New Zealand. To position New Zealand as a location of choice for the emerging UA sector, it is important that we remain at the forefront of the UA development by ensuring our approach to UA operations harnesses the opportunities while addressing the challenges.

The Ministry of Transport (MOT), supported by the Civil Aviation Authority (CAA), Airways and MBIE, is leading the development of a vision for enabling a thriving, innovative and safe UA sector and provide a pathway for safe integration of small drones as well as more advanced UAs into the aviation and wider transport system. A first draft of this has been provided to Minister Twyford this week. You will receive a copy.

30. The aim of this vision document is to provide the sector with an understanding of the government's role, strategic direction and priority areas to achieve safe integration of UAs. It will be used to support the development of a multi-year programme of work covering key aspects such as regulation, funding and investments, infrastructure and technology, and R&D. Public consultation on this vision is planned for September/October, and the vision and a detailed work-programme is scheduled to be considered by Cabinet later this year.
31. It will be crucial that this vision sends a clear signal that this Government is committed that New Zealand will be at the forefront and that a pathway to enable BVLOS flight and for safe integration of UAs is undertaken as soon as possible. Most companies and investors are scouting for locations based on the level of ambition to be at the forefront of safe UA integration, the approach and the nature of the interventions put in place, and what that

Commercial Information
[REDACTED]

means in terms of the timeframes and constrains around testing and market validation activities.

32. If a clear signal that New Zealand will be at the forefront for safe UA integration is not given and concrete actions are not put in place quickly and the approach to policy-making is not nimble and innovative, international companies will locate elsewhere.

Commercial Information, Confidentiality of advice to Government

33. Free and frank advice

We propose the development of an *Advanced Aviation Technologies* platform-play

A platform-play approach supports the realisation of the broader vision for a thriving, innovative and safe UA sector

34. The platform-play approach is a transformative, sector-focussed approach. It involves working with international and domestic businesses, research organisations, and infrastructure providers and regulators to create an enabling platform that brings together all the elements that influence a decision to conduct R&D, innovate, invest and build a sustained New Zealand presence (eg. supportive regulatory environment, enabling infrastructure, alignment of fundamental and applied R&D).
35. The objective of the *Advanced Aviation Technologies* platform-play is to develop New Zealand's competitive advantage. It provides a nimble and bespoke platform, with concrete actions that are specifically targeted at the needs of the emerging UA sector and companies testing and trialling, and commercialising advanced aviation technologies.
36. It supports the broader MOT-led vision and multi-year work-programme to realise safe UA integration by building policy-makers' understanding of these new and transformative technologies and public acceptance of a future when advanced UAs are more common.

We have identified four broad focus areas:

37. Under each of these focus areas there are a set of concrete actions, some are already underway, others need further exploring.

One: Working with the MOT and the CAA to ensure that our regulatory regime and approach continues to safely support the pace of this highly innovative sector

38. As noted in previous advice, in recent years, New Zealand has worked to position itself as a leader in testing and trialling of advanced UAs. 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.
39. So far, our regulatory regime and approach has proven flexible and effective enough to enable initial testing of UAs like Zephyr's prototype Cora. MOT and CAA advise that at this stage no regulatory barriers for companies like Zephyr to progress towards aircraft certification and operate commercially have been identified. MOT advises that as part of the multiyear work-programme being developed under the broader vision it will ensure that the regime remains fit for purpose and is able to quickly respond, should regulatory barriers be identified.

40. There are, however, some practical capacity and capability challenges for the regulator and operators. The technological developments require the regulator to make considerations beyond traditional aviation concepts and typical certification methods. The operators often do not have a traditional aviation background do not have a detailed understanding of what is required to certify an aircraft, and their timeframes to bring a service or product to market are often dramatically shorter than those of traditional aircraft. This makes the assessment process resource-intensive for the regulator, and can create frustrations for the operators.³

41. A number of actions have already been taken to mitigate this challenge. Earlier this year MBIE, in consultation with CAA, MOT and Airways MBIE has commissioned the development of a risk profile assessment process for enabling limited BVLOS operations **Information recieved in confidence** In 2017, MBIE and MOT each provided NZD 150,000 from their operating budget to help support this process. A successful Budget bid this year provided CAA with additional baseline funding of NZD 250,000 to build relevant capacity.

42. Confidentiality of advice to Government

[Redacted]

43. In addition to capacity and capability of the regulator and operators, to ensure that our regulatory regime and approach continues to safely support the pace of this highly innovative sector it is also important that CAA continues to fully engage with CAA with fora such as the International Civil Aviation Organization (ICAO), Joint Authorities on Rulemaking on Unmanned Systems (JARUS), and EASA. The New Zealand aviation system is developed and operates in the context of a global system. CAA has been increasing its engagements in these groups to understand new technology and to influence the design of future guidelines and standards. To be at the forefront it is important that New Zealand has a strong and innovative voice in these fora.

Two: Facilitate testing and trialling activities and identify areas where pro-active public investments in technology and infrastructure are needed

44. Supportive infrastructure and technologies are key for the development of the UA sector, and an important factor that companies developing advanced aviation technologies consider when making a decision on a location for their testing and trial, and commercial activities. Testing and trialling activities also play a key role in supporting and accelerating the policy development process.

45. Airways are conducting a number of trials intended to inform the development of a pathway to enable safe and effective UA integration, and at the same time support activities of companies like Zephyr. **Commercial Information**

[Redacted]

Commercial Information, Information recieved in confidence

[Redacted]

Automatic dependent surveillance – broadcast (ADS-B) is a surveillance technology in which an aircraft determines its position via satellite navigation and periodically broadcasts it, enabling it to be tracked. Under New Southern Sky, ADS-B is proposed to be mandated for aircraft operating in controlled airspace by 2021. Controlled airspace is airspace where there is an air traffic control service provided for the safety and efficiency of aircraft operations.

Commercial Information. Airways is also conducting a trial with the Auckland Council prototyping technologies for a UA traffic management system (UTM) to determine how UAs can be managed in an urban environment to enable safe and efficient low-altitude airspace operations.

46. Airways and MBIE will continue to work closely with companies **Commercial Information** to understand their requirements to test and trial new technologies in various situations, and help facilitate trials in New Zealand within the existing rules. For example, we intend to investigate current and potential future demand and applications for dedicated testing sites **Commercial Information**
47. We also intend to explore city-based pilots similar to those implemented in Europe and Singapore. We understand from our conversations that this approach is attractive to companies like Zephyr, Volocopter and Airbus as it allows them to demonstrate their technology quickly. Specifically for Zephyr, this approach could provide certainty that there is a clear process in place to test and showcase their activities in Christchurch. For Airbus and Volocopter, this could provide an incentive to consider Auckland as a potential location for their testing. Establishing these would require careful consideration of relevant safety requirements and risks mitigations, and the imperative to operate within the context of a global aviation system.

Three: Support our existing industry, attract experienced innovators and investors, and stimulate start-up activities

48. We have existing industry comprising UA manufacturers (eg Vickers) and componentry producers (eg Dotterel), and operations and services (eg Flightcell). New Zealand Trade and Enterprise (NZTE) and CI can support these companies to undertake R&D and internationalise. The introduction of R&D tax credits will also create additional incentives and support.
49. To support our existing industry effort will also be required to build strong connections with international innovators and investors who are experienced at growing companies in this sector. These innovators and investors will bring knowledge about the science and innovation that is needed, the international regulatory environment and connections to customers for the new and innovative products. As part of the platform-play we, together with NZTE, CI and Airways, are working to develop a targeted engagement plan to connect domestic industry with international innovators and investors.
50. It is also important that we educate the local investor base. This will be to lift their knowledge of the opportunities in investing in companies in this sector, along with connections and introductions to international investors, and how to best work with them. Hon Parker's work to strengthen our early stage capital markets is important here.
51. There are a number of broad-based initiatives to support and stimulate start-up activity. These include government co-funding for incubators, accelerator programmes, and support for the commercialisation of public research through the Pre-seed accelerator fund. These all aim to stimulate the pipeline of innovative, high-tech start-ups from both the public and private sector. Incubators and accelerators are particularly important for stimulating and connecting start-ups ecosystems, often acting as hubs for entrepreneurs, investors, and innovators.
52. The incubator programme is currently under review. MBIE will shortly be making recommendations to you on the future of the programme, including how we can better align their focus and connect it into the platform-plays. These connections should stimulate and focus activity from New Zealand entrepreneurs and investors, and provide support for early-stage start-ups or entrepreneurs looking to relocate to New Zealand as a result of the platform-play value proposition.

53. Innovation challenges are also a common vehicle to stimulate start-up activities, and accelerate the development of emerging sectors and transformative technologies. Under the Innovative Partnerships programme, we are currently developing a partnership between Airbus, Airways, Centre for Space Science and Technology, the University of Canterbury, Christchurch New Zealand and Ngai Tahu for a programme of innovation challenges placed in Christchurch. The target audience are post-graduate students and young entrepreneurs with the objective to generate start-up ideas/R&D programmes to be advanced here in New Zealand.

Four: Facilitate the development of domestic R&D capabilities and talent

54. We have some existing R&D capabilities. These existing capabilities provide the base to further develop our fundamental and applied R&D on simulation, batteries, AI, detect and-avoid technologies, integrated air-traffic-management (ATM) systems.
55. As part of the platform-play, we will continue to facilitate the establishment of partnerships between our research organisations Confidentiality of advice to Government and international companies. We also intend to explore how we can build on existing relationships with international partners (eg NASA and German Aerospace Centre), to enhance international connections and R&D capabilities in our domestic research organisation.
56. The development of a domestic talent base will also be critical. Similar to other high-tech, new and emerging sectors (eg space, ICT), there is a global shortage of talent that has the necessary base skills. This is a problem for industry as well as the regulator. Industry plays a key role in the development of talent. Zephyr is currently funding postgraduate students and engaging with the universities about training graduate engineers. Rocket Lab is taking a similar approach. We intend to discuss with relevant agencies, the industry and main tertiary providers what other practical initiatives may be put in place.

Risks and mitigations

57. As noted above, if the clear signal that New Zealand will be at the forefront for safe UA integration is not given and concrete actions are not put in place quickly, New Zealand will not be able to realise the opportunity to position itself as a location of choice for the development of advanced aviation technologies. In the long-term, New Zealand may still become an adopter of these new technologies, but we would not realise the short- to medium-term benefits associated with developing these technologies in New Zealand.
58. Also as noted above, Zephyr's presence in New Zealand has significantly lifted our profile. This creates a risk of an adverse reputational impact, by raising expectations that cannot be met. To mitigate this risk, it is important that the Government is clear about its long-term vision, level of ambition and how nimble and innovative we can be in providing a pathway for safe integration.

Next steps

59. Should you agree with the proposed focus areas, we will work with relevant agencies to provide you with more detailed advice on the specific concrete actions proposed in this paper, including how these could be progressed and aligned with the MOT-led broader multi-year work-programme. Indicative timeframes are provided in Annex Two.
60. We recommend you forward this paper to Hon Phil Twyford, Minister of Transport, for discussion. We also recommend you forward this to Hon David Parker, Minister for Economic Development, for his information.

Annexes

Annex One: Draft concept platform-play

Annex Two: Upcoming advice on specific actions.

PROACTIVELY RELEASED

Annex One: *Advanced Transport Technologies* platform-play

[Overview A3]

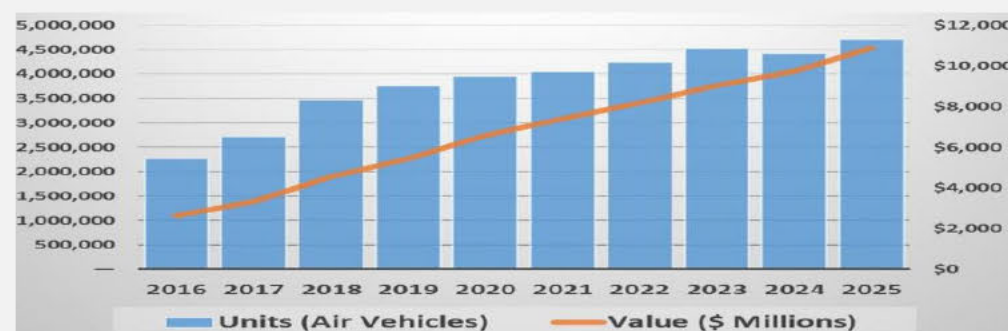
PROACTIVELY RELEASED

Advanced Transport Technologies *platform-play*: Positioning New Zealand as the location of choice for the emerging global unmanned aircraft (UA) sector

Why the UA sector?

The UA sector is **growing and future-focused** ...

Globally, **small and short-range** UAs, aka **drones**, have become more and more common for **commercial and recreational uses**



UAs capable of carrying passengers and cargo are becoming a reality

The emerging UA sector has the potential to **transform how we move goods and people, and how services are being delivered** across a range of public and private sectors.

Amir Husain, CEO of SparkCognition, "largest new market in our lifetimes."

... **innovative and R&D intensive**

Start-ups are currently the main actors within this sector.

\$3 billion in funding to start-ups over the past five years

Technology leaders, large traditional aviation and car companies are also investing in these new technologies

Key focus areas for R&D investments are in:

- Aviation technologies (eg positioning, detect and avoid, and air traffic management)
- Other technology areas (eg batteries, software, Artificial Intelligence, sensors and lightweight materials, and data analytics)

How can we develop our competitive advantage?

We have a **unique opportunity** ...

to realise it :

- We have an risk based UA regulatory regime and internationally reputable safety regulator
- We provide a microcosm to develop and bring these technologies to market
- We are a good place to conduct and invest in R&D
- We have some existing capabilities
- We need a clear vision and a pathway for UA integration in a way that manages safety, security, and public acceptance
- Increasing international competition means we need to be fast and nimble
- We need to build specific R&D capabilities and talent, and support our domestic industry to develop

The Ministry of Transport is leading the development of a vision for safe integration of UAs in New Zealand

The platform-play is **nimble and bespoke**, with specific concrete actions that are specifically targeted at the needs of the emerging UA sector:

FOCUS AREAS & ACTIONS

Ensure that our regulatory regime and approach continues to safely support this highly innovative sector

- Assessment of resources needed to support operators through certification process.
- **Navigatus** risk profile assessment process for enabling limited BVLOS operations **(using Zephyr as a case study)**
- Input into MOT review of regulatory regime.

Facilitate testing and trialing activities

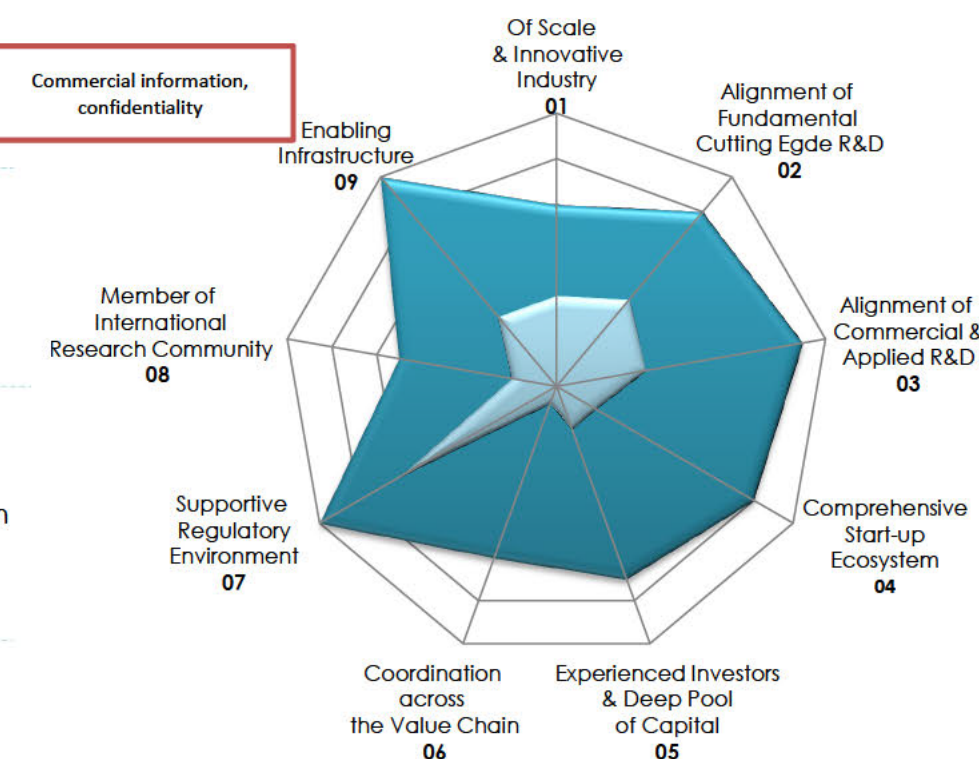
- Support existing technology trials
- Investigate current and potential future needs for dedicated testing sites
- Explore the establishment of city based demonstration pilots

Support our existing industry, stimulate start-up activities and attract experienced innovators and investors

- Use existing levers to support companies to undertake R&D and internationalise
- Develop a targeted engagement plan to connect domestic industry and investors with international innovators and investors
- Develop a programme of innovation challenges

Facilitate the development of domestic R&D capabilities and talent

- Facilitate the establishment of partnerships between our research organisation and international companies and research organisations
- Engage with industry and tertiary providers to support practical talent development initiatives



Light blue: where we currently are
Dark blue: where we need to be to retain and build our competitive advantage

PROACTIVELY RELEASED

Annex Two: Upcoming advice on specific actions

Focus areas	Actions	Scope of advice	Indicative timeframes	Agencies and partners involved
Ensure that our regulatory regime and approach continues to safely support the pace of this highly innovative sector	Assessment of resources needed to support operators through certification process	Capability and capacity requirements, whether additional investments are required, and what the options are.	TBC	MBIE, CAA
Facilitate testing and trialling activities	Investigate current and potential future needs for dedicated testing sites.	Initial advice on current landscape	October	MBIE, Airways, CAA, MOT
	Explore the establishment of city-based pilots	Initial advice on feasibility and design options	November	MBIE, Airways, CAA, MOT
Support our existing industry, attract experienced innovators and investors, and stimulate start-up activities	Develop targeted engagement plan to connect domestic industry with international innovators and investors.	Overview of key target markets and stakeholders	November	MBIE, Airways, CI and NZTE
	Programme of innovation challenges	Overview of objectives, and partnerships arrangements	September	MBIE, Airways, CSST, UC, CNZ, Ngai Tahu, Airbus
Facilitate the development of domestic R&D capabilities and talent	Facilitate the establishment of partnerships between our research organisation and international companies and research organisations	Overview of existing and potential partnerships opportunities	November	MBIE, Confidentiality of advice to Government