

27 February 2023

Tēnā koe [REDACTED]

I refer to your emails dated 27 January 2023, requesting the following under the Official Information Act 1982 (the Act):

Request 1

Any document relevant to the resource and funding constraints associated with establishing and recruiting for the Emerging Technologies Unit.

Request 2

I request a summary of the Thursday, 17 November, Aerospace Ministers meeting, what was said, what decided, in addition to the immediately previous request.

What was in scope

We have found three documents which fall within the scope of request 1. The documents are attached to this letter. Note that some information has been withheld in reliance on sections:

- 9(2)(a) of the Act, as it relates to the privacy of natural persons
- 9(2)(g)(i) of the Act, as it relates to maintaining the effective conduct of public affairs through the free and frank expression of opinions by or between Ministers of the Crown or members of an organisation or officers and employees or any public service agency or organisation in the course of their duty.

Briefing OC210787 has a draft Cabinet paper in its Appendix. This paper did not go to Cabinet and was prepared prior to Budget 22. This paper, and the other briefings in scope represent a point-in-time view of the planning, budgeting and thinking that went into development of the emerging technology unit within the CAA, the EDI package, and the Ministry's policy capacity. This does not represent the structure that was implemented or the package that was approved in Budget 22. The budgeting done here was in response to requests to plan a fully scoped emerging technology unit.

For request 2, there was no formal summary taken from the meeting. We understand that the recommendations noted in the briefing to support the meeting were discussed and agreed to. Minister Nash also requested regular updates to be shared with him when appropriate at the official's meetings he has with the Ministry of Business, Innovation and Employment.

In regard to the information that has been withheld under section 9 of the Act, I am of the opinion that there are no countervailing considerations that make it desirable, in the public interest, to make the information available. You have the right to seek an investigation and review of this response by the Ombudsman, in accordance with section 28(3) of the Act. The relevant details can be found on the Ombudsman's website www.ombudsman.parliament.nz.

The Ministry publishes our Official Information Act responses and the information contained in our reply to you may be published on the Ministry website. Before publishing we will remove any personal or identifiable information.

Nāku noa, nā

A handwritten signature in blue ink that reads "Alec Morrison". The signature is written in a cursive, flowing style.

Alec Morrison
Policy Delivery Lead Strategy

[BUDGET SENSITIVE]

Office of the Minister of Transport

Cabinet Economic Development Committee

Funding of emerging aviation technologies and drone integration in New Zealand

Proposal

- 1 This paper seeks in-principle agreement from Cabinet on a proposed upcoming bid for Budget 22 to fund ongoing cross-government work to facilitate drone integration and foster the growth of the emerging aviation technology sector in New Zealand.
- 2 Approval at this time will allow the Civil Aviation Authority (CAA) to proceed with recruitment of key specialists for a new Emerging Aviation Technology Unit (ETU). This ETU will be a key to improving capacity and capability within the CAA and unlocking the benefits of emerging aviation technologies for all New Zealanders.
- 3 The paper outlines the key elements of a budget bid that will be submitted as part of Budget 22 to fund a package of initiatives to unlock the benefits of emerging aviation technologies for New Zealanders.

Relation to government priorities

- 4 Fostering the growth and use of emerging aviation technologies in New Zealand will enable New Zealanders and New Zealand businesses to benefit from new technologies and lift productivity and wages through innovation.
- 5 The development and uptake of emerging aviation technology will also contribute to wider emissions reduction and environmental impact minimisation efforts in New Zealand, especially in the aviation sector where decarbonisation is particularly challenging.

Executive Summary

- 6 [TBC following input from departmental consultation]

Background

- 7 Over the course of 2021, my colleagues, the Minister of Research, Science and Innovation and the Minister for Economic and Regional Development, and I have been working to foster the growth of New Zealand's nascent aerospace and emerging aviation technology sectors. We believe that with the right support these sectors have the potential to grow into significant cornerstones of the national economy and further elevate our global reputation as a location for leading research and development.
- 8 Emerging aviation technology is a broad term that describes an array of new technologies, operations, and advancements in the field of aviation. These include unmanned aircraft (often referred to as drones), electric propulsion for aircraft, alternative fuels for aircraft, artificial intelligence, new materials, automation, computer vision, and vehicles that operate at the edge of space. Developments in this area have numerous crossovers and synergies with the space sector, and growth in one sector will invariably benefit the other.
- 9 Technology and its role in ensuring safety has always been a primary focus of the aviation system. However, in recent years, the types of technologies entering the

aviation system have changed dramatically. Further, the pace at which these new technologies have entered the system has continued to accelerate.

- 10 For several years, officials at the Te Manatū Waka Ministry of Transport (MoT), CAA, and the Ministry of Business, Innovation, and Employment (MBIE) have worked proactively to position New Zealand as a leader in this space, especially with regards to drones. Examples of these initiatives include:
- 10.1 Putting in place the Civil Aviation Rules Part 101 and Part 102 in 2015. These rules separated the regulatory requirements for drone operations based on the risks they posed for people, property, and other airspace users. This regime recognises that prescriptive rules alone cannot anticipate all potential drone applications or future requirements. The flexible regulatory approach of Part 102 has helped attract a number of aviation innovators to New Zealand.
 - 10.2 Publication of *Taking Flight: an aviation system for an autonomous age* in 2019, setting out a cross-government vision for the integration of drones into the New Zealand aviation system based on four building blocks.
 - 10.3 Publication of the *Drone Benefit Study* which quantified the potential benefits, savings, and extra efficiencies which may be achieved through a greater uptake of drones throughout all sectors of our economy.
 - 10.4 Launch of the Airspace Integration Trials Programme (AITP) with a vision to establish New Zealand as location of choice for the safe development, testing and market validation of advanced drones and adjacent technologies. This programme is accelerating the integration of advanced aircraft and innovative aviation technologies in New Zealand.
- 11 These workstreams were intended to ensure that New Zealand was able to maintain pace with these developments and to secure New Zealand's position at the forefront of the development of emerging aviation technologies. The work has paid dividends, and New Zealand's emerging aviation technology sector is expanding. However, the success of these workstreams is leading to resourcing challenges, which are increasingly becoming a pain point for the sector. The sector has been raising concerns around processing times, responsiveness, and technical capability at the CAA. These issues cannot be addressed through existing funding mechanisms.

The benefits of emerging aviation technologies extend far beyond the aviation sector

Emerging aviation technology can boost economic activity

- 12 While the development of emerging aviation technologies poses some difficulties, the potential benefits of this work for all New Zealanders are significant. I believe that emerging aviation technologies offer a genuine opportunity to lift productivity and wages through innovation, with flow-on benefits for all New Zealanders.
- 13 The Drone Benefit Study commissioned by MoT and MBIE indicated that an optimistic valuation of the benefit of the use of drones could be as much as \$7.9 billion over the course of 25 years. These benefits come in the form of direct revenue increases, cost savings for businesses, efficiency lives saved, and productivity gains throughout all of our major industries. It should be noted that these benefits are not all restricted to participants in the aviation sector but are spread across the

population, especially the people and business working in our primary industries (particularly agriculture).¹

- 14 No specific assessments have been carried out on the potential economic benefits which could arise from the wider emerging aviation technology and aerospace sectors. However, engagement with the sector itself indicates that there is a credible opportunity to create numerous high skilled jobs, attract foreign investment, and grow high-value weightless exports. Sector participants have estimated that the future value of the aerospace sector could be as high as \$10 billion by 2030.
- 15 As with drones, the benefits stemming from the aerospace sector are not restricted to the sector itself, as greater uptake of technology will boost productivity, safety, and revenues throughout the economy.

Emerging aviation technology could play a role in our environmental response

- 16 Emerging aviation technologies could make a significant contribution towards our environmental targets and emission goals.
- 17 As a small, geographically isolated nation, New Zealand is highly dependent on aviation to support economic development, but this sector is coming under significant pressure to decarbonise. Emissions reductions in the aviation sector are difficult to achieve, due to a lack of suitable alternatives. However, emerging aviation technologies are rapidly advancing and there is an opportunity for New Zealand to play a leading role in this space, through support for research and development as well as investments to ensure that the regulatory environment is supportive and enabling of new technologies (including drones and other electric aircraft, and potentially hydrogen-powered aircraft).
- 18 The transition to low- or no-emission propulsion or electric propulsion aligns with the recommendations set out by the Climate Change Commission regarding creating options to decarbonise heavy transport and freight by 2050. It also aligns with the recommendations in the Government's Emissions Reduction Plan on supporting electric aircraft and technology development and use, particularly for smaller aircraft operating short-haul domestic flights.
- 19 Utilising drone technology throughout the economy has the potential to further reduce emissions by acting as a substitute for traditional aircraft, such as helicopters, small aeroplanes, or even land-based vehicles.
- 20 Emerging aviation technology can also be used for precision agriculture and data gathering practices (e.g. remote sensing) and monitoring to improve environmental practices. The Drone Benefit Study specifically noted that practices such as precision agricultural application will lead to reduced nitrogen leaching and improved water quality. Similar benefits could be seen as a result of using precision spraying in forestry. Several academic studies from as early as 2015 have also repeatedly emphasised the potential effectiveness of using drones to collect environmental data and carry out monitoring.

¹ The results of the study indicated that the dairy sector alone could see benefits of up to \$1.6 billion over 25 years. Other types of agriculture could see benefits of up to \$1.2 billion, but this would require a regulatory environment which allows routine operations beyond the visual line of site of the pilot.

Emerging aviation technologies capitalise on New Zealand's unique benefits and advantages

- 21 New Zealand is routinely ranked as one of the best countries for doing business in the world. However, from the perspective of emerging aviation technologies, New Zealand is an especially good location. Fostering the growth and uptake of these technologies can help us capitalise on these natural advantages.
- 22 New Zealand's regulatory systems in relation to emerging aviation technologies and space are relatively transparent and understandable. This allows for an open environment for developers working on new technologies and operations.
- 23 New Zealand's location on the globe is particularly advantageous for space, near-space, and high-altitude launches, and allows a large number of launch angles.
- 24 The size, shape, and geography of New Zealand provide access to a range of testing conditions, with varied terrain within proximity of vital infrastructure.
- 25 New Zealand's power is generated predominantly from renewable sources. Given that a significant portion of emerging aviation technology is electric, this provides an opportunity to create a sector with low environmental impact.

New workstreams will address challenges and unlock the benefits of emerging aviation technology

Enabling Drone Integration and future policy work

- 26 The rapid growth of the commercial and advanced drone sector has given rise to a key opportunity to realise the economic and social benefits that drones can provide to New Zealand. However, integrating them into the aviation system is a major challenge for regulators around the world. The existing aviation regulatory system is based on the assumption that aircraft will have pilots on board who can 'see and avoid' other aircraft. While New Zealand has made good progress, further work will be needed over several years to modernise the aviation system and enable a greater range of aircraft with varying technological capabilities.
- 27 MoT, with CAA support, is currently working on a package of measures that would be a first step towards integrating drones into the civil aviation system while addressing existing problems related to aviation safety and security. MoT recently conducted public consultation on a package of complementary measures,² including:
 - 27.1 Rule updates – this includes a re-assessment of the effectiveness of some of the Part 101 rules (individually and combined with the other proposed measures) and of the regulatory design for the rules applicable to drone operations.
 - 27.2 Basic operator accreditation - the introduction of mandatory online theory testing for Part 101 drone operators
 - 27.3 Drone registration - the introduction of mandatory registration of all drones weighing 250 grams or more and their owners
 - 27.4 Remote identification - the introduction of mandatory use of remote identification capability on certain drones during flight to enable the

² See [Enabling Drone Integration | Ministry of Transport](#).

transmission of a range of data (e.g. drone unique registration number, real time geolocation) to third parties.

- 27.5 Geo-awareness – this includes the creation of a single standardised map available in different formats that provides all necessary aeronautical information, as well as the mandatory use of geo-awareness technology on certain drones or for certain operations.
- 28 By themselves, these measures do not solve the issue of drone integration. Instead, they are the fundamental steppingstones towards drone integration and more advanced operations. These measures are intended to play a key role in a potential future Unmanned Aircraft Traffic Management (UTM) system³, which is often considered to be a solution that would help unlock the full benefits of drones.
- 29 MoT and CAA have been considering the feedback received during the public consultation and refined the policy accordingly. Cabinet will shortly be considering a Cabinet paper that includes a set of policy recommendations on this proposed approach. If approved, these measures will be implemented by the CAA.

CAA and the Emerging Aviation Technology Unit

- 30 The CAA has identified that to maintain pace with the development of emerging aviation technologies, it needs a new approach to how it engages with sector participants.
- 31 Currently, many prospective applicants for certification under Civil Aviation Rule Part 102⁴ require extended interaction with technical staff at the CAA prior to lodging their application. This is primarily because they are not traditional participants in the aviation system and do not use traditional technologies, so they often require extensive engagement to assist them with preparing a suitable application. This engagement directly competes with the resources available to carry out certification work.
- 32 The cost of the certification process carried out by the CAA can be recovered from the applicant. However, significant portions of the engagement with prospective applicants take place prior to an application being lodged. As it stands there are no cost-recovery mechanisms which allow the cost of this engagement to be recovered. However, this early engagement is a vital step in the process to ensure that the applications are familiar with the relevant standards and understand what it would take to develop their technology to the point where certification is feasible. In many cases, applicants are seeking certification for an aircraft or use case which is entirely novel and without international precedent.
- 33 To address this situation, the CAA is beginning the process of establishing a new Emerging Technology Unit (ETU), which will be the primary point of engagement between current and prospective sector participants and the technical specialists within the CAA. The new structure will allow a deeper and more effective engagement with sector participants, while allowing technical staff more time to focus on certification. The skills within its technical teams will also be expanded through

³ UTM is a term used to describe the collection of systems needed to control unmanned aircraft traffic, especially in cities and other locations with busy airspace or above people and property.

⁴ Civil Aviation Rules Part 102 apply to operations that fall outside of the scope of the Rules Part 101, such as flying beyond the line of sight of the pilot, flying at night, flying above people or property without consent, flying drones exceeding 25kg, or flying within 4 kilometres of an aerodrome without consent.

concentrated efforts to recruit relevant technical experts (e.g. in areas such as artificial intelligence and electric propulsion).

- 34 The CAA has also identified that it needs to build its internal capacity and capability across all operations related to emerging aviation technologies, and not just those directly related to certification work. With this in mind, the new ETU is intended to be backed by increased capacity and capability across the CAA, especially in relation to policy capacity, risk assessment, and airspace design.

Aerospace Strategy and Airspace Integration Trials Programme

- 35 Officials at MBIE are working on an aerospace strategy with a focus on economic development and driving innovation in the sector. The intent behind the strategy is to seize the opportunity to grow an internationally competitive aerospace sector that makes a natural contribution to New Zealand's economic performance and underpins broader Government objectives.
- 36 The strategy will link together the already productive areas of advanced aviation and space to boost innovation through addressing needs and building on shared strengths. This will enable better outcomes for the sector through building critical mass and adopting a joined-up approach. The strategy will also align existing cross-agency work and principles to further drive sector growth.
- 37 The AITP was established in 2019 to make New Zealand a location of choice for the safe development, testing and market validation of advanced unmanned aircraft and adjacent technologies. The Programme is led by the Innovative Partnerships programme of MBIE, in partnership with MoT, CAA and Airways.
- 38 The AITP supports industry partners to test and develop drone platforms for a range of use cases in New Zealand, including hazard management and monitoring, agriculture, passenger transportation and cargo delivery.
- 39 Testing activities undertaken by industry partners will generate evidence that can inform and accelerate policy and regulatory development. Adequate resourcing will be required both to support these testing activities and to enable data and evidence to feed in to other workstreams being led by MoT and CAA.

Continuing this work requires funding assurance

- 40 Drones and other emerging aviation technology represent a nascent industry with significant potential to positively influence New Zealanders and New Zealand businesses. However, to achieve its full potential, this sector requires investment from the Crown for an initial period while the industry scales up. This would be an investment in innovation and economic development, with the return on investment coming in the form of jobs, higher incomes, increased productivity and other benefits in areas such as improved safety and environmental outcomes.
- 41 The CAA, MoT and MBIE are poised to continue work to unlock the benefits of drones and ensure that the benefits accrue to all New Zealanders. However, these workstreams require funding assurance to proceed.
- 42 To date, the work on emerging aviation technology has been funded either through each agency's respective baselines or through a reallocation of \$3 million from vote Business, Science, and Innovation (BSI).

43 The reallocation is scheduled to end in June 2022. However, the CAA has requested a carry-forward of \$918,000 of the previously allocated funding, which was unspent due to delays in recruitment largely as a consequence of COVID-19, compounded by the impact of an organisational restructure. If approved, the carry-forward will proceed through the October Baseline Update in November 2021. This funding would only be enough to maintain the existing level of capacity until approximately the end of the 2023/24 financial year. It would not be sufficient to enable additional investment in regulatory capability or recruitment into new roles.

Funding the Emerging Technology Unit

- 44 Work is currently underway on a further reallocation of approximately \$1.3 million from the Research, Science and Innovation (RSI) portfolio to fund the initial work to establish the ETU.
- 45 This reallocation is for the 2021/22 financial year and is only intended to fund the initial steps of establishing the ETU. To proceed further with the establishment and to initiate recruitment of key staff, the CAA will require assurance of funding beyond the immediate period (preferably for 5 years).
- 46 Without assurance of ongoing funding beyond 30 June 2022, the CAA Board is unable to offer permanent positions to potential candidates. This will significantly limit the pool of candidates, and virtually eliminate the possibility of finding overseas talent.
- 47 The current unscaled estimates for the cost of establishing the ETU and recruiting the necessary staff up to 2025/26 are outlined below.

Table 1 Cost estimates for the ETU

2021/22	2022/23	2023/24	2024/25	2025/26	TOTAL
1,357,565	5,249,775	5,478,123	5,618,856	5,763,812	22,110.566

- 48 These are initial estimates, and the underlying assumptions and modelling will be tested as part of the process of preparing a bid for Budget 22.⁵
- 49 Creating a separation between engagement and certification work will not undermine the CAA's ability to recover costs from applicants undergoing a certification, as this will continue to be self-funding. It will provide better insights into the full cost, scope, and audience for the engagement work. This will not only improve operational efficiency but will provide valuable data about the size of the market, and how cost recovery mechanisms could be applied in the future.

Funding the Enabling Drone Integration measures

50 Officials at MoT and CAA are finalising a proposed package of measures to support the integration of drones into the aviation system and address existing regulatory issues. If agreed, all these measures will require additional capital and operating funding from the Crown.

⁵ Funding is not expected to be sought for 2021/22, as work is already underway to cover these costs through the reallocation described elsewhere in this paper.

BUDGET SENSITIVE

51 Officials are working on a potential bid for Budget 22, which would include this work, if the measures are approved. Current estimates for the funding for this work are as follows:

Table 2 Cost estimates for the EDI measures

	2022/23	2023/24	2024/25	2025/26	TOTAL
Operating	1,491,364	1,890,808	1,385,677	1,417,405	6,185,254
Capital	1,000,000-	500,000-	250,000		1,750,000-

Funding policy capacity at MoT

- 52 Drone integration will be a multi-year process, which will require ongoing policy and regulatory work to ensure that it develops in line with government objectives. The task is made more difficult by the evolving nature of emerging technologies.
- 53 To continue its work, MoT needs to at least maintain this policy capacity beyond the timeframe of the existing funding reallocation. Ideally, this capacity would increase to match the growing scope and complexity of the work.
- 54 Furthermore, MoT has identified that more work is needed to scope out the requirements of a UTM, the review of current air navigation settings, alternative aviation fuels, electric propulsion, the role of data and data sharing in aviation, the role of government in supporting uptake of drones by small business, developing noise frameworks, and addressing emerging privacy and security risks. This list will inevitably grow as the technology and its uses evolve further.
- 55 Current estimates for the funding required to support policy development at MoT is as follows:

Table 3 Cost estimates for MoT policy capacity

2022/23	2023/24	2024/25	2025/26	TOTAL
575,000	575,000	575,000	575,000	2,300,000-

56 The above estimates take into account public sector pay restraints and the relative scarcity of the staff with relevant policy and aviation expertise.

Financial Implications

57 This paper seeks in-principle agreement to the bid for Budget 22 outlined in this paper, as follows:

Table 4 Cost estimates as outlined in the proposed emerging aviation bid

Funding Sought (\$m)	2022/23	2023/24	2024/25	2025/26	TOTAL
MoT -Policy capacity	575,000	575,000	575,000	575,000	2,300,000-
CAA - Emerging Technology Unit	5,249,775	5,478,123	5,618,856	5,763,812	22,110.566

BUDGET SENSITIVE

CAA – Implementation of EDI measures	1,491,364	1,890,808	1,385,677	1,417,405	6,185,254
TOTAL	7,316,139	7,943,931	7,579,533	7,756,217	30,595,820

58 Full analysis of the initiative, including cost-benefit analysis, will be provided as part of the Budget 22 process.

59 s 9(2)(g)(i)

Climate Implications of Policy Assessment

60 This paper has no direct climate implications.

61 As indicated earlier, there are indications that the uptake of drones and emerging aviation technology could align with New Zealand's climate and emissions goals, but there is no specific modelling or assessments of the size of this potential impact.

Population Implications

62 There are no population implications arising from this paper.

63 The EDI measures detailed earlier in this paper may have relevant implications, but these will be addressed in a separate paper provided to you at a later date.

Human Rights

64 There are no human rights issues or implications associated with this paper.

Consultation

65 [Ongoing – details to be confirmed and comments to integrated into the paper]

Communications

66 [TBC]

Proactive Release

67 This paper will be released in part within 30 days of Cabinet decision. Portions of the paper will be withheld, as they are Budget sensitive.

Recommendations

68 **Note** that in December 2020, Cabinet agreed for MoT to proceed with consultation on the Enabling Drone Integration discussion document (DEV-19-MIN-0160), and instructed officials to prepare a package of policy recommendations which would require Crown funding.

69 **Note** that Cabinet will shortly receive a paper outlining a proposed package of policy measures for enabling drone integration, which will provide further details on the costs of implementing these measures.

BUDGET SENSITIVE

- 70 **Note** that drones and emerging aviation technologies represent a significant opportunity for New Zealand, but the workstreams to unlock the benefits require ongoing funding.
- 71 **Agree** in principle with the outlined bid for Budget 22, providing CAA with certainty to initiate recruitment for key positions in the ETU

Authorised for lodgement

Hon Michael Wood
Minister of Transport

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27 August 2021

OC210577

Hon Michael Wood
Minister of Transport

Action required by:
Friday, 10 September 2021

Hon Dr Megan Woods
Minister of Research, Science and Innovation

Hon Stuart Nash
Minister for Economic and Regional Development

OPTIONS FOR FUNDING FUTURE WORK ON EMERGING AVIATION TECHNOLOGIES

Purpose

This briefing details the current funding and resourcing pressures at the Civil Aviation Authority (CAA) and Te Manatū Waka Ministry of Transport (MoT) across their work on emerging aviation technologies. The briefing also outlines potential funding options available to build the capacity and capability needed for this work to continue.

Key points

- The global aviation system was built on decades of small incremental changes and regulation set through international collaboration. However, emerging aviation technologies have accelerated the pace of change, forcing regulators and policy makers to manage new issues at an unprecedented pace.
- New Zealand is likely to see significant economic, environmental, and productivity benefits, if we can overcome the challenges posed by emerging aviation technologies.
- MoT, the CAA, and the Ministry of Business, Innovation, and Employment (MBIE) are all leading workstreams as part of the wider cross-government efforts to help foster the growth of the aerospace sector and to integrate drones into the aviation system and the wider transport sector.
- Until now, the workstreams on emerging aviation have been funded through baseline expenditure and a reprioritisation of funds from MBIE to CAA and MoT. However, the

growing workload is straining existing capacity, and the reprioritised funds will end in mid-2022.

- The financial situation is compounded by several factors, such as the ongoing impacts of COVID-19 on the CAA, the difficulty of recovering the costs from sector participants, and ongoing capacity, capability, and retention issues at the CAA.
- To capitalise on the vast opportunities offered by the emerging aviation sector, decisions need to be made now regarding the future funding of the workstreams across the three agencies, and in particular, the CAA.
- We believe that the potential benefits offered by emerging aviation to the wider national economy justify treating additional funding as an investment, which will result in new economic opportunities, environmental benefits, and the creation of numerous high-skill jobs.
- Officials at MBIE, MoT, and CAA are prepared to initiate work on preparing a bid for Budget 2022. Officials have also identified an opportunity for an additional reprioritisation of funds from MBIE to CAA to provide financial certainty while work is carried out to secure more sustainable sources of funding.
- If no new sources of funding are confirmed, we can expect that the ongoing work on emerging aviation technologies will be slowed down significantly, and portions of the work will stop entirely.
- Even with additional funding, recruiting, and retaining technical staff at the CAA will be an ongoing challenge and a risk to realising the full potential of the aerospace sector. This will require ongoing monitoring and collaboration across ministerial portfolios.

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Recommendations

We recommend you:

1. **agree** that officials from MoT and MBIE report back to joint Ministers in September 2021 with a draft Cabinet paper seeking: Yes/No
 - 1.1. agreement to reprioritise funding from Vote Business, Science and Innovation to Vote Transport to support the establishment of an Emerging Technology Unit (ETU) within the CAA.
 - 1.2. In-principle agreement to a Budget bid in 2022 to secure resourcing for the ongoing cross-government work on emerging aviation technologies.

2. **agree** that officials from MoT progress through the October Baseline Update process: Yes/No
 - 2.1. confirmation of the carry-forward of \$918,000 relating to CAA's drone integration work into the 2021/22 financial year
 - 2.2. allocation of the \$918,000 across the 2022/23 and 2023/24 financial years (\$700,000 in 2022/23 and \$218,000 in 2023/24) to enable CAA's roles to be funded for the intended three year term of this work.



Richard Cross
Manager, Strategic Policy and Innovation
Te Manatū Waka Ministry of Transport

27 / 08 / 2021



Dr Kjesten Wiig
Director, Innovative Partnerships
Ministry of Business, Innovation and Employment

27 / 08 / 2021



John Kay
Deputy Chief Executive, System Design and Practice
Civil Aviation Authority

27 / 08 / 2021

Hon Michael Wood
Minister of Transport

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Hon Dr Megan Woods
Minister of Research, Science and Innovation

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Hon Stuart Nash
Minister for Economic and Regional Development

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- Minister's office to complete:**
- Approved
 - Declined
 - Seen by Minister
 - Not seen by Minister
 - Overtaken by events

Comments

Contacts

Name	Telephone	First contact
Richard Cross, Manager, Strategic Policy and Innovation, Ministry of Transport	s 9(2)(a)	✓
Joe McKay, Strategic Partnership Manager, Ministry of Business, Innovation, and Employment		✓
John Kay, Deputy Chief Executive, System Design and Practice, Civil Aviation Authority		✓
Kirill Kruger, Senior Adviser, Strategic Policy and Innovation, Ministry of Transport		

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OPTIONS FOR FUNDING FUTURE WORK ON EMERGING AVIATION TECHNOLOGIES

Emerging aviation technologies are a catalyst for fundamental changes in the aviation system

- 1 The global aviation system is advancing at an unprecedented rate, with new technologies, materials, and aircraft being rapidly deployed and new use-cases being constantly developed and tested.
- 2 The present aviation system was built on decades of incremental developments and ongoing international collaboration. However, emerging aviation technologies are advancing rapidly and changing the system. Drones and other new aircraft are lowering the barriers to entry into the aviation system, introducing not only new types of aircraft, but an entirely new class of participant. Many of the new aircraft no longer have a pilot onboard, an aspect which previously had been one of the most consistent principles in the regulation of the aviation system.
- 3 The advancing technologies employed in emerging aviation are rapidly pushing the boundaries of the skills that regulators and policymakers need to understand and utilise, as concepts like cybersecurity, artificial intelligence, data ownership become part of everyday civil aviation.
- 4 The inevitable advancement of aviation brings with it significant benefits. However, these benefits come with a plethora of challenges for regulators and policy makers around how we shape the regulatory system, how we design airspace, and what skills and infrastructure will be required in the future.

The emerging aviation sector has the potential to provide significant benefits that we are trying to unlock

- 5 The emerging aviation technology sector has credible potential to herald fundamental changes to the New Zealand economy through innovative approaches to addressing a range of societal challenges (including reductions in carbon emissions) and improving the way we do business through boosting productivity, developing new high-value exports and creating a large number of highly skilled jobs. Unlocking the potential of the sector could see improvements to the wellbeing of all New Zealanders, and not just those directly involved with emerging aviation technology.
- 6 The Drone Benefit Study jointly commissioned in 2018 by MoT and MBIE indicates that the benefit of drones to the New Zealand economy over a period of 25 years could be as high as \$7.9 billion¹. The study indicated that some of our most prominent sectors, such as forestry and agriculture, could be among the biggest beneficiaries of drone technology.
- 7 Technologically ambitious uses for unmanned aircraft, such as regional passenger transport or urban package delivery, could provide further economic benefits of up to

¹ The Drone Benefit Study was published in 2019 alongside Taking Flight. The \$7.9 billion estimate is the upper range of the aspirational model. The range for the value of the benefits in the conservative model was \$1.2 billion to \$4.9 billion over 25 years.

\$1.4 billion and \$0.8 billion, respectively. While we do not have exact estimates on when different use cases for drones will be ready for deployment in New Zealand, we are already seeing development, testing and some commercial deployment in New Zealand and overseas.

- 8 In addition to the benefits of drones as described above, in 2018/19 the annual value of the New Zealand space sector was estimated to be worth \$1.69 billion. We expect that combining space and emerging aviation will have a synergistic effect on the aerospace sector due to having shared services and supply chains.
- 9 It is possible that a portion of the forecast benefits could eventually be realised without concentrated government efforts and assistance. However, to realise the full economic potential of the aerospace sector, government needs to provide leadership and coordination across the sector. Taking a proactive approach will improve the size and scope of the benefits, while also ensuring they are realised sooner. Early engagement with the sector will also help ensure that the aerospace activities are aligned with government priorities and deliver positive outcomes for the wellbeing of New Zealanders.

We already have work programmes in place to grow and unlock the potential of emerging aviation technology

- 10 Progress is being made across government to integrate unmanned aircraft into the New Zealand civil aviation system and to grow the aerospace sector. This work requires strong cross-government collaboration as the workstreams are all interrelated.
- 11 Despite the willingness of agencies to contribute to the cross-government work on emerging aviation technologies, the rate of progress is limited by available resourcing. Resourcing constraints are increasingly becoming risks to the success of the work.

Enabling Drone Integration and other policy work

- 12 MoT is leading a comprehensive work programme to update the regulatory framework for the use of drones in New Zealand. It recently completed public consultation on a proposed package of regulatory measures to enable the safe integration of drones into New Zealand's aviation system.
- 13 The proposed regulatory measures are Civil Aviation Rules updates, the introduction of a requirement for drone operators to have a basic pilot qualification, a requirement for drones over 250 grams to be registered by their owners, and requirements related to the remote identification of drones and geo-awareness capabilities.²
- 14 The proposed measures are intended to form the foundational building blocks for extensive future policy and regulatory work to help integrate drones into the aviation system and wider transport sector. This work will help ensure that drones and other advanced aircraft can operate safely and seamlessly in the same airspace as manned aircraft. In time, these measures will help us develop tools to manage air

² Remote identification refers to a technical capability which allows drones (and pilots, potentially) to be identified remotely by a third-party. Geo-awareness refers to a digital map which is read and utilised by drones when flying, which also allows for spatial restrictions.

traffic digitally, through Unmanned Aircraft Traffic Management (UTM)³ systems, which are widely considered to be the key to facilitating the use of remotely piloted and autonomous aircraft in urban and rural environments.

- 15 Funding will be required across both CAA and MoT to implement the proposed measures outlined in the Enabling Drone Integration discussion document. In particular, funding will be required to design and implement the registration and basic pilot qualification, geo-awareness, and remote identification systems, as these measures require new online systems and digital infrastructure.
- 16 MoT also provides policy support to other aspects of the cross-government work on emerging aviation technologies. We anticipate that as emerging technologies mature, there will be a growing need to initiate new policy work on issues such as advanced alternative fuels, electric propulsion, an air navigation review, UTM, and other upcoming issues and technologies that are likely to emerge. MoT has limited scope to reprioritise from its baseline, due to a growing work programme to meet ministerial expectations in other areas including priority work to decarbonise the transport sector.

Enabling greater innovation and investment

- 17 MBIE is leading the work to deliver an aerospace strategy, which seeks to drive rapid change in the innovative and nascent part of the aerospace sector. By focusing on economic development and innovation in this sector, we can position New Zealand to be internationally competitive while addressing broader Government objectives.
- 18 The strategy seeks to build on other work already underway to create an aerospace sector which is thriving, innovative, and safe. This sector will also be supported by the building blocks of regulation, funding and investment, infrastructure, and research and development (R&D).

The CAA is leading regulatory and certification work, and faces significant pressures

- 19 The CAA plays a key role in the work to foster the growth and development of emerging aviation technologies. The CAA is the regulator for all aviation activities (licensing, certification, etc.), and given its regulatory role it is a primary point of contact for aviation participants, and a key agency in the development and implementation of policy and regulation.
- 20 CAA's reputation as a solution-focussed and risk-based regulator helped establish New Zealand's competitive advantage for drones and aerospace activities. Without appropriate resourcing, there is a risk that this competitive advantage will be lost, and the growth potential of the industry would be significantly constrained. Aerospace sector representatives have consistently identified CAA resourcing as the greatest risk to the development of the aerospace industry in New Zealand.

³ UTM describes a concept whereby a collection of systems and data sources are unified into one system with the aim of enabling and controlling operations of drones. UTM are comparable to existing Air Traffic Control systems but are explicitly intended to be used for autonomous aircraft.

The demand for CAA's certification services is outstripping its ability to cope

- 21 As New Zealand's aviation regulator, the CAA is responsible for certifying operations under Civil Aviation Rule Part 102 (which is the relevant Rule for most advanced commercial drone operations).
- 22 The continued growth of the drone sector has led to a corresponding growth in demand for certifications. The table below illustrates the total number of applications made per year since 2016, and the total number of applications processed:

Year	2016	2017	2018	2019	2020	2021
Applications received	78	82	110	119	86	129
Applications processed	61	61	105	102	102	100

- 23 Part 102 does not set out how advanced drone operations must be carried out or what technical criteria must be met for an operation to be certified. Instead, the rules are intended to be enabling and risk-based, meaning that any operations could be certified if the operators can adequately demonstrate that they can operate safely and mitigate risks appropriately.
- 24 This flexible approach to regulating new technology is resource-intensive. It requires the CAA to draw on specialist expertise across its organisation to understand and identify the unique set of risks inherent in each operation. A bespoke regulatory approach is then required to ensure all these risks are appropriately mitigated.
- 25 As the sector advances and new technologies and operations are developed, the complexity of the applications received by CAA has increased significantly. Complex applications take more time and resources to assess, and more specialist skills and knowledge.

Certification is not the only area facing pressures

- 26 Certification is just one aspect of the CAA's work to effectively regulate the emerging aviation technology sector. Other areas, which are as resource-intensive include testing and trialling, education and outreach, operational policy and guidance, airspace design, and regulatory policy.

The CAA is facing retention pressure

- 27 Resourcing pressures at CAA are compounded by several additional factors:
- 27.1 The emerging aviation sector requires experts with specialist skills. In many cases, current (and former) CAA staff are some of the only candidates in New Zealand with these skills. Several staff have already left the CAA to work in the private sector. The CAA is not able to offer remuneration packages to match those offered in the private sector, as this would be inconsistent with public service pay restraint guidance and would likely create pay inequity between new staff and the CAA's existing staff.
- 27.2 Some of the skills needed are also rare on a global scale, and the CAA will need to compete with other regulators who are competing to attract emerging aviation businesses. In many cases, the remuneration packages expected by

these regulators are higher than those currently offered in New Zealand. Recruiting for these skills is also made more difficult by the current immigration settings, border closures, and availability of space in MIQ facilities.

- 27.3 Several positions within the CAA are funded out of a reallocation from MBIE to CAA. As of yet, no decisions have been made on the funding of these positions beyond June 2022, creating a lack of certainty about the future of these positions.

These pressures have been compounded by COVID-19 related challenges

- 28 The pressures that the CAA are facing around emerging technology are coming at a time where it is having to adapt to a number of challenges brought on by COVID-19. The pandemic has required aviation regulators around the world to adapt their approach to facilitate the recovery of the entire global aviation system. Aviation organisations are continuing to operate under financial strain, which creates new safety risks that regulators must respond to. Other challenges have and will present themselves as the global aviation system begins to recover, including the requirement of additional regulatory oversight as pilots and aircraft begin to return to service.
- 29 On top of this, the CAA is also facing significant funding pressures. This is due to a drop in revenue associated with less international aviation activity. It is currently reliant on Crown funding to make up some of this shortfall. However, as confirmed by independent reviews, this is capped to a level where the CAA will continue to face significant resourcing pressures both in terms of its work on emerging technology, and in its wider regulatory activities.
- 30 On 1 March 2021, Cabinet agreed to a report back in mid-late 2021 with an update on the context for the transport sector, options for service delivery, and a pathway back to funding sustainability, including directing the agencies to undertake funding reviews, as appropriate [CAB-21-MIN-0034 refers].
- 31 The funding review will assess CAA's long-term resourcing requirements. Cost and resourcing pressures in some parts of the CAA's core business may require Budget 2022 support. This would be in addition to any funding provided to establish the ETU.

The CAA has proposed a new Emerging Technology Unit

- 32 The CAA has identified that to build the capability and capacity needed to do anticipatory work and to address the growing backlog of applications for certification under Part 102, it will need to implement structural changes.
- 33 To meet this need, the CAA has proposed the creation of an ETU to act as a central liaison and contact point for sector participants making applications or submissions to the CAA.
- 34 The new unit is expected to improve the efficiency of applications by creating a central point of contact for all applicants, allowing them to better navigate the certification process and access expertise within the CAA.

- 35 A significant portion of the applicants from the emerging aviation sector do not have previous experience working in the aviation system. The ETU would facilitate the development of better application systems, processes, and guidelines. The unit would allow the CAA to work closely with applicants on technology and concepts which have not yet been proven. It allows close collaboration with the sector, to develop regulatory approaches in an iterative and anticipatory manner.
- 36 While this sort of approach would normally introduce a risk of regulatory capture, the new unit would help mitigate against this by ensuring final certification activity is done by the core technical certification teams outside of the ETU. The ETU would act as a “bridge” between the technical regulatory functions undertaken by the CAA, and the emerging technology entities. Similar approaches have been adopted by the CAA UK and the European Aviation Safety Agency.
- 37 Under the current CAA structure, applicants (especially applications using emerging aviation technologies) require significant levels of engagement and input from technical staff prior to lodging an application. While this engagement ultimately helps improve the quality of applications, it also requires considerable input and time from the certification teams.
- 38 The time spent assisting prospective applicants to prepare an application cannot be charge back to prospective applicants. The net effect is a reduction in the time available to assess applications, without any increase in revenue to support the core technical resource base.
- 39 Under the proposed structure, the technical capability and capacity of the CAA would be bolstered through employing several technical experts with an understanding of current and emerging aviation technologies. Further, the regulatory and policy capability of the CAA would be expanded through additional staff. The proposed structure for the ETU is outlined in Appendix 1.
- 40 The ETU will provide a cohesive approach to the CAA’s work. We have seen this work well in other areas, such as New Southern Sky, a multi-year/multi-agency relating to the modernisation of New Zealand’s air navigation system.

Current funding mechanisms are coming to an end, and our options are limited

- 41 All agencies working on emerging aviation technology currently have access to the resources needed to continue their work in the immediate term. However, to expand the scope or timeframe for the work, new funding streams will need to be confirmed.

CAA and MoT are operating on a limited reallocation of funds from MBIE, and we propose that previous underspends are reallocated into future years

- 42 In 2019, a total of \$3 million was reallocated by MBIE from vote Business, Science, and Innovation (BSI) to Transport to advance the regulatory work done on drones, and to build the capacity and capability needed to progress certification of drones and advanced aircraft. The total funding package was split across three years, under the following schedule:

BUDGET SENSITIVE

Target	2019/20	2020/21	2021/22	Total
CAA	\$0.7m	\$0.7m	\$0.7m	\$2.1m
MoT	\$0.3m	\$0.3m	\$0.3m	\$0.9m

- 43 The reallocation has been used to fund two roles at MoT and five roles at the CAA. This funding is due to end in June 2022, and no decisions have been made on how these positions could be maintained if no additional funding is secured. There is a risk that progress on this work will stop if no alternative funding can be secured.
- 44 The CAA has requested a carry-forward into 2021/22 of \$918,000 of the previously allocated funding, which was unspent due to delays in recruitment largely as a consequence of Covid-19, compounded by the impact of an organisational restructure. This carry-forward has been approved in-principle by the Minister of Transport and the Minister of Finance.
- 45 MoT will seek Minister of Transport and Minister of Finance approval to confirm the carry-forward of \$918,000 through the October Baseline Update in November.
- 46 The CAA has also requested that the carry-forward of \$918,000 is allocated across the 2022/23 and 2023/24 financial years (\$700,000 in 2022/23 and \$218,000 in 2023/24) to enable to five roles to be funded for the intended three year term. MoT and MBIE support the reallocation of this funding as requested by CAA and propose this change is also approved by joint Ministers in the October Baseline Update.
- 47 The loss of these staff would reduce the CAA's capacity and capability back to pre-2019 levels. It would also hinder the implementation of the measures proposed under Enabling Drone Integration regulatory package, and any new measures or activity stemming from the Airspace Integration Trials Programme, the Aerospace Strategy, or Project Tāwhaki⁴.

Recovering costs from the private sector is not viable in the short-term

- 48 There is currently no mechanism to recover the cost of all the work carried out by the CAA to support the emerging aviation sector. The diverse nature of the sector means it would be difficult to identify a specified group of participants to recover costs from. Additionally, the resource-intensive approach to working with this sector does not lend itself easily to an hourly charge. Such charges would also present a significant financial barrier for many businesses and reduce the attractiveness of New Zealand as place to test and trial new technologies.
- 49 It would be inappropriate for the CAA to fund this work using levies collected from other parts of the aviation sector. The traditional aviation sector would object strongly to this sort of cross-subsidisation, given the significant financial pressures it is under due to COVID-19.
- 50 While we expect that cost recovery may be a feasible proposition in the future - should the new entrants to the sector grow in line with current projections - we do not yet have any estimates on what level of sector growth is needed until this can happen.

⁴ A commercial partnership between Te Taumutu Rūnanga and Wairewa Rūnanga (together as Kaitōrete Limited) and the Crown with the primary purposes of overseeing the land purchase on Kaitōrete Spit in Canterbury, advancing options to establish aerospace and R&D facilities, and protecting and rejuvenating the Kaitōrete environs.

- 51 Given the nascent nature of this sector, we propose that decisions on a cost-recovery based model are delayed until we can demonstrate that the majority of industry participants are generating reasonable levels of revenue and can therefore bear the costs of supporting regulatory activities on a cost-recovery basis.
- 52 As part of our ongoing work to support the development of the sector, we plan to undertake detailed analysis which will allow us to understand current and future, revenue projections. We will build this information into our existing evidence base to give us a clearer sense of when we may be able to move towards a cost-recovery model.

We have identified short and medium-term options for funding the work

- 53 In evaluating the immediate and ongoing resourcing needs of the workstreams on emerging aviation technologies, we have identified two options:
- 53.1 Seeking agreement to reprioritise funds from the Research, Science and Innovation (RSI) portfolio to fund the initial work to establish the ETU.
- 53.2 Seeking five years of funding through Budget 2022 to maintain and expand the cross-government work programme on emerging aviation technologies.

Reprioritisation of funds from RSI

- 54 The current reprioritisation of funds from MBIE to CAA and MoT ends in June 2022.
- 55 MBIE has identified funds which could be reprioritised to support the work towards fostering the growth and integration of emerging aviation technologies.
- 56 Approximately \$1.358 million could be reprioritised, and allocated to CAA as follows for the period to 30 June 2022:

Category	Cost
Fully Built up Salaries	\$802,802
Recruitment & Relocation	\$100,000
Travel- Domestic	\$91,300
Travel - International	\$22,500
Other Costs (Licenses etc)	\$253,435
One off set up costs (Desk & Devices)	\$87,528
TOTAL	\$1,357,565

- 57 The estimates above are based on a staged recruitment approach, factoring in the scarcity of relevantly skilled candidates and the current immigration settings in New Zealand. The assumptions behind the costings are set to reduce the probability of underspends, where possible.
- 58 If the reprioritisation is approved, MoT and MBIE will determine the best means of monitoring the use of the reprioritised funds to ensure that it is being used in line with the expectations set out by Ministers. We anticipate that this will take the form of regular updates to Ministers on the use of the funds and progress towards establishing the ETU.

- 59 If the funds are approved, we would also consider how we can leverage government resources to help overcome recruitment challenges. This could include seeking support from the Ministry of Foreign Affairs and Trade, New Zealand Trade and Enterprise, and other agencies with a footprint overseas who may be able to help identify suitable candidates.
- 60 Without agreement from Cabinet to fund additional positions over a longer term, the CAA is likely to face significant difficulties in recruiting the relevant experts into the ETU. While reprioritisation of funding would enable the CAA to begin recruiting staff, the CAA Board would not take the risk of appointing people to those roles without certainty that it would be able to continue to fund them beyond July 2022.

Allocation of new funds via Budget 2022

- 61 As noted previously, to realise the full potential of the aerospace sector, extensive work needs to be carried out by both MoT and the CAA over several years. Officials are in the process of preparing estimates of the resourcing required for each workstream.

Next steps

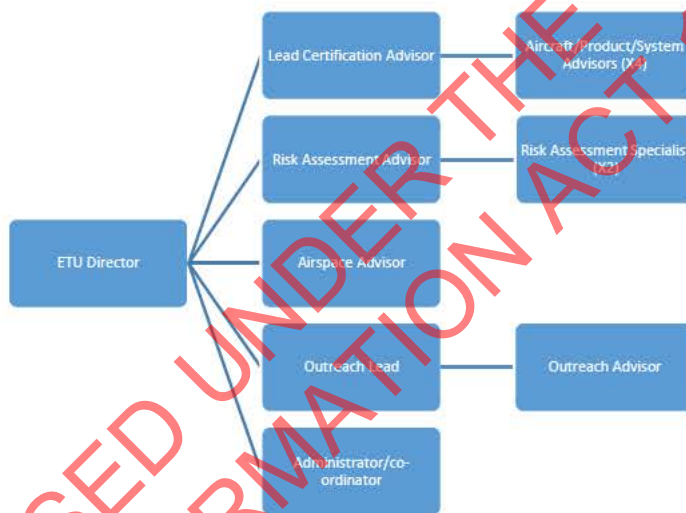
- 62 If you agree in principle with the approach outlined in this paper, officials at MBIE and MoT will initiate work on a Cabinet paper to:
- 62.1 Outline the benefits to New Zealand of supporting emerging aviation technologies and the need to invest in this sector
 - 62.2 Outline the pressures felt across the system, especially at CAA, and the need for additional resourcing
 - 62.3 Seek agreement to reprioritise funding from Vote Business, Science and Innovation to Vote Transport as a short-term solution to enable the CAA to begin establishing the ETU
 - 62.4 Outline what monitoring measures will be put in place to ensure that the reprioritised funds are used in line with expectations
 - 62.5 Seek in-principle agreement to progress a bid for Budget 2022.

Appendix 1

The structure of the proposed ETU is similar to the successfully implemented New Southern Sky programme, which was established within the CAA in 2014. The CAA believes that confirmation of the ETU would provide much needed confidence for employees and the sector about the CAA intentions for the space.

Once fully resourced, the new unit would require 13 FTE's, with an additional 15 FTE's allocated to operations within the main body of the CAA. The distribution of the positions is illustrated below

Within the ETU:



Within CAA core body:





5 October 2021

OC210787

Hon Michael Wood

Action required by:

Minister of Transport

Tuesday, 12 October 2021

cc Hon Dr Megan Woods

Minister of Research, Science and Innovation

Cc Hon Stuart Nash

Minister for Economic and Regional Development

OPTIONS FOR A POTENTIAL EMERGING AVIATION CABINET PAPER

Purpose

This paper seeks confirmation on your preferred option for proceeding with a Cabinet paper seeking in-principle agreement from Cabinet for an upcoming bid on emerging aviation technologies being prepared for Budget 22. This paper also proposes the alternative approach of merging the proposed paper with an upcoming Cabinet paper seeking approval of a package of measures related to drone integration.

Key points

- The emerging aviation technology sector in New Zealand has the potential to foster new economic opportunities, boost productivity, and create a number of new high-skill jobs. However, unlocking these benefits requires support from government, fit-for-purpose policies and regulations, and an aviation regulator with the capacity and capability to maintain pace with these technologies.
- Officials at Te Manatū Waka Ministry of Transport (the Ministry), the Civil Aviation Authority (CAA) and the Ministry of Business, Innovation and Employment (MBIE) have been collaborating for several years on a set of workstreams to unlock these benefits.
- As part of this work, the CAA has begun establishment of a new Emerging Technologies Unit (ETU), which is intended to be the main point of engagement between the sector and technical specialists within the CAA. This unit would be complemented by an increase in the policy and technical capacity within the CAA.
- The Ministry has been working on a potential bid for Budget 22. This would include the funding needed to establish of the ETU, as well as funding to increase policy

capacity at the Ministry, and implement the regulatory measures outlined in the *Enabling Drone Integration* discussion document. The regulatory measures will be considered by Cabinet in November 2021.

- We begun work on a Cabinet paper outlining the importance of the emerging aviation technology sector for New Zealand and the work needed to support it. The paper sought in-principle agreement to our proposed approach and bid for Budget 22. The approval and subsequent funding assurance would allow the CAA to continue work on the ETU, and to commence recruitment of key technical, engagement, and policy staff. Without this funding assurance, positions could not be filled until several months after funding has been confirmed via Budget 22 (and even later for any international recruitment).
- Following consultation of the draft Cabinet paper with Treasury, we received confirmation that the approvals sought are a financial commitment for the Crown and pre-empt the Budget process. The Treasury does not support the approach set out in the Cabinet Paper, and we have not been able to identify any other options that would provide longer-term funding assurance to the CAA Board (the Board) without pre-empting the Budget process.
- If Ministers wish to seek funding now, rather than through Budget 22, the next step would be to consult with the Minister of Finance on the draft Cabinet paper. We would likely need to amend the paper to note that it is not supported by the Treasury.
- An alternative option would be to merge elements of this draft Cabinet paper with an upcoming Cabinet paper seeking approval of the Enabling Drone Integration package of measures. This pathway would not provide the CAA with immediate funding but will still relay to Cabinet the importance and potential benefits of the work and the upcoming Budget bid.
- This paper seeks confirmation from you on whether you would like to proceed with the Cabinet paper seeking funding assurance, as initially intended, or whether you would like us to merge the two upcoming papers, recognising that this would delay the establishment of the ETU.

Recommendations

We recommend you:

- | | | |
|---|--|------------------------------------|
| 1 | confirm your preferred option for proceeding with a Cabinet paper regarding the future funding of the work on emerging aviation | |
| | <ul style="list-style-type: none"> • Option 1: Lodge the paper with Cabinet in its current form • Option 2: Combine key elements of the current paper with the EDI Cabinet paper | Yes / No
Yes / No |
| 2 | advise whether you wish to discuss this in more detail with officials | Yes / No |



Richard Cross
Manager, Strategic Policy and Innovation

Hon Michael Wood
Minister of Transport

05 / 10 / 2021

20 / 10 / 2021

Minister's office to complete:

- Approved
- Declined
- Seen by Minister
- Not seen by Minister
- Overtaken by events

Comments

Contacts

Name	Telephone	First contact
Richard Cross, Manager, Strategic Policy and Innovation	s 9(2)(a)	✓
Kirill Kruger, Senior Adviser, Strategic Policy and Innovation		

RELEASED UNDER THE OFFICIAL INFORMATION ACT 1982

OPTIONS FOR A POTENTIAL EMERGING AVIATION TECHNOLOGY CABINET PAPER

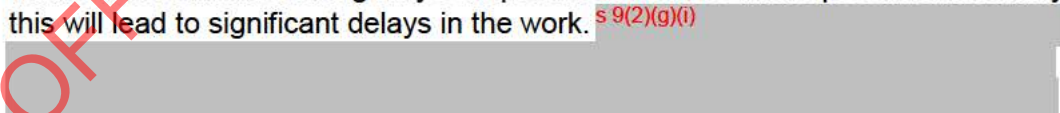
Background

- 1 As you are aware, officials at the Te Manatū Waka Ministry of Transport (the Ministry), the Civil Aviation Authority (CAA) and the Ministry of Business, Innovation and Employment (MBIE) have been working to support the growth and development of the emerging aviation technology sector in New Zealand.
- 2 As part of this work you, along with the Minister of Research, Science, and Innovation (Hon Dr Megan Woods) and the Minister for Economic Development (Hon Stuart Nash) have collectively approved the development of an MBIE-led aerospace strategy, which aims to capitalise on New Zealand's unique advantages as a location for the testing and development of aerospace and emerging aviation technologies. You have also regularly engaged with representatives from the aerospace sector to discuss the issues they have identified as limiting the growth of the sector.
- 3 You will also be aware that officials at the Ministry are currently working on a package of measures aimed at enabling the integration of drones into the civil aviation system, as set out in the *Enabling Drone Integration discussion document* (EDI). This consists of updates to the Civil Aviation Rules, basic operator accreditation, drone registration, remote identification requirements, and mandating geo-awareness capabilities on drones. The EDI Cabinet paper is undergoing departmental consultation now and is expected to be provided to you by the end of the month.
- 4 To meet the growing demands placed upon it by the emerging aviation technology sector, the CAA has proposed establishing a new Emerging Technology Unit (ETU). This new unit is intended to act as a central point of engagement on all matters related to emerging aviation technologies. The unit is intended to be backed by an expansion of the capabilities throughout the CAA, via recruitment of additional specialist technical staff and an increase in the relevant policy capacity.

Capacity and capability are key constraints for this work

- 5 To date, the work on emerging aviation technology has been funded either through each agency's respective baselines or through a reallocation of \$3 million from Vote Business, Science, and Innovation (BSI).
- 6 The reallocation is scheduled to end in June 2022. However, the CAA has requested a carry-forward of \$918,000 of the previously allocated funding, which was unspent due to delays in recruitment largely as a consequence of COVID-19, compounded by the impact of an organisational restructure. If approved, the carry-forward will proceed through the October Baseline Update in November 2021. This funding would only be enough to maintain the existing level of capacity through until FY 2023/24. It would only maintain existing position and would not be sufficient to enable increased capacity or additional investment in regulatory capability.
- 7 Officials at the Ministry, CAA, and MBIE are also working on a potential further reallocation of \$1.3 million from the Research, Science, and Innovation (RSI) portfolio

to fund the establishment of the ETU. This reallocation is for the 2021/22 financial year only.

- 8 While the funding will allow work to begin on establishing the new unit, it does not allow CAA to start recruiting permanent positions within the unit itself or for the additional policy and technical staff needed to support its activities. This recruitment cannot proceed until the CAA has further assurance of long-term funding (preferably for five years).
- 9 If funding assurance is not secured prior to a decision on the Budget, the CAA will not be able to begin recruitment until April 2022, once Budget decisions have been announced. Given the highly specialised nature of the positions, it is possible that the recruitment process will take several months. The situation could be further exacerbated if the CAA needs to look for candidates overseas.
- 10 The effect would be that progress to establish the ETU could not be made until July 2022 or later. This will likely cause further frustrations with industry stakeholders who have been vocal about their concerns with CAA's capacity and capability.
- 11 You recently provided the Minister of Finance with a briefing (OC210709 refers) detailing the initiatives which you would like to see invited to submit a bid for Budget 22. If invited, the initiative on emerging aviation technologies will outline a bid to fund the following measures:
 - 11.1 Ensuring continued policy capacity within the Ministry to maintain existing FTE dedicated to this work, and to baseline the positions created through the original funding reallocation
 - 11.2 Funding the implementation of the measures outlined by EDI, including updates to the current Civil Aviation Rules applicable to drones, and the capital costs of implementation and maintenance of a drone registration and operator accreditation systems (if approved)
 - 11.3 Funding the establishment and operation of the ETU, and providing the funding certainty needed for the CAA to initiate recruitment of key technical staff
- 12 If this initiative is not invited to apply, or if it is not approved as part of the Budget process, new sources of funding will need to be sought to continue the work on emerging aviation technologies. If no new sources of funding are secured, the work will be funded from each agency's respective baselines where possible. It is likely that this will lead to significant delays in the work. s 9(2)(g)(i)


We have prepared a draft Cabinet paper to address these issues

- 13 You have jointly requested that officials prepare a Cabinet paper underlining the importance to New Zealand of the work on emerging aviation technologies and seeking some assurance of future funding for the work. An initial draft of Cabinet paper is attached in Appendix 1.

- 14 The paper sets out the known and expected benefits to New Zealand stemming from the emerging aviation sector. It outlines how the work aligns with the existing manifesto commitments regarding the future of work and wider environmental goals.
- 15 If the recommendations in the paper are approved, the CAA would have the assurance needed to begin recruitment for the ETU in 2021.
- 16 However, based on departmental consultation, we understand that there are significant risks in lodging the paper in its current form.

Seeking assurance from Cabinet for funding commitment against Budget 22 carries risk

- 17 The current draft Cabinet paper seeks an in-principle agreement to the potential budget bid outlined in this paper. This would provide assurance to the Board that funding will be available beyond 1 July 2022 and enable the CAA to begin recruiting staff for the ETU immediately.
- 18 However, there are robust conventions against seeking pre-commitment to the Budget unless there is an absolute and pressing need to do so. We understand that in the current Budget cycle, the pre-commitments which are being sought through Cabinet are related directly to measures responding to COVID-19. As such, it is unlikely that Treasury, or the Minister of Finance, would support the paper in its current form.

19 s 9(2)(g)(i)

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There are two options to proceed with the Cabinet paper

- 20 Given the factors outlined in this paper, there are two options to proceed with this Cabinet paper. The Ministry's view is that Option 2 (Combine key elements of the current paper with the EDI Cabinet paper) is preferable, as we do not believe that the capacity issues at CAA are significant enough to justify a pre-commitment against the Budget. However, Ministers may have a different view about the urgency of addressing these challenges.

Option 1: Lodge the paper with Cabinet in its current form

- 21 If Ministers consider it vital to address capacity concerns at the CAA immediately, we can finalise the attached Cabinet paper and provide it to you for Ministerial consultation and eventual lodgement with the Cabinet Economic Development Committee (DEV).
- 22 We have already provided the attached version to Treasury for comment and have received an initial reply. The Treasury believes that a decision which allows CAA to begin recruitment will effectively tie the Crown and pre-empt the Budget process.

Given the CAAs current financial pressures and its cost pressure bid in Budget 2022, the Treasury does not see how Cabinet could decide to pre-commit funding now.

- 23 Given the nature of Treasury's concerns, we are unlikely to reach a position where the recommendations can be amended to a point where they both provide the CAA with the needed assurance and allay Treasury's concerns. As such, the finalised Cabinet paper is likely to include a comment stating that Treasury does not support the approach in the paper.
- 24 Given that this paper seeks approval of funding, it will also be necessary for you to consult on the contents with the Minister of Finance. The Cabinet Office will not put the Cabinet paper on the agenda until consultation has been carried out or the Minister of Finance confirms that consultation is not needed in this case.
- 25 Even if the paper is lodged as soon as possible, the paper is unlikely to be seen by Cabinet before late-November 2021. However, this would still enable the CAA to start filling roles in early 2022.

Option 2: Combine key elements of the current paper with the EDI Cabinet paper

- 26 If Ministers decide against seeking a pre-commitment against the Budget, we could reframe the Cabinet paper as a noting paper. Rather than presenting it as a stand-alone paper, we propose to merge elements of the attached draft paper with the upcoming Cabinet paper seeking Cabinet approval for the EDI package of measures (expected to be provided to you on 25 October 2021 for lodgement in the week ending 19 November 2021).
- 27 There is a natural overlap in the subject-matter between the papers. While this would not address the immediate funding challenges at the CAA, it would underline to Cabinet the importance of the cross-government work on emerging aviation technology, the significant future benefits of this work to New Zealanders, and the need for a regulator with adequate capacity and capability.
- 28 Under this option, the CAA would not be able to commence recruitment for the ETU until Cabinet has made its decision on Budget 22 and communicated that decision back to the CAA. This means that the CAA would not be able to advertise the roles until April/May 2022 at the earliest. The key risk with this option is that aerospace sector representatives would continue to express their frustrations at what they would perceive to be a lack of commitment towards addressing capacity challenges which are having a material impact on their businesses. It is possible that this may cause some of these companies to scale back their investments in New Zealand, although we consider this to be a relatively low risk.
- 29 Merging these papers is not expected to result in any delays to the possible lodgement of the EDI paper.

Next Steps

- 30 If you decide to proceed with the Cabinet paper, we will address any feedback from you, Minister Woods and Minister Nash, and provide another version for you to consult with the Minister of Finance.

- 31 If you decide not to proceed with the Cabinet paper, we will incorporate key messages regarding the importance of the ETU and continued resourcing into the EDI paper. We will also continue to work on a bid for Budget 22. We will also work with CAA to ensure that it is ready to begin recruitment and establishment of the ETU as soon as possible when budget announcements have been made.

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**APPENDIX 1 - OC210746 FUNDING AND WORK ON EMERGING
AVIATION TECHNOLOGIES**

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1 November 2021

OC210871/ 2122-1587

Hon Michael Wood
Minister of Transport

Action required by:
Wednesday, 3 November 2021

Hon Dr Megan Woods
Minister of Research, Science and Innovation

Hon Stuart Nash
Minister for Economic and Regional Development

NEXT STEPS AND OPTIONS FOR EMERGING AVIATION FUNDING

Purpose

This briefing outlines the outcome of Te Manatū Waka Ministry of Transport's Budget 22 bid for funding for the ongoing work on emerging aviation technologies. We propose two potential next steps to seek funding and ensure the continuation of this work.

Key points

- Te Manatū Waka Ministry of Transport (the Ministry) submitted an initiative for Budget 22 to fund regulatory updates and an expansion of the capacity, capability, and operations at Civil Aviation Authority (CAA).
- The bid was not invited to participate in Budget 22. However, a complementary bid prepared by Ministry of Business, Innovation and Employment (MBIE) was invited. The MBIE bid seeks to fund programs which foster the growth of the aerospace sector in New Zealand.
- Funding programs which foster sector growth without funding the regulatory updates and adequately resourcing the regulator will slow down progress in the sector. It will likely lead to worse aviation safety outcomes and could exacerbate existing concerns that some participants have about the CAAs responsiveness.
- s 9(2)(g)(i)
- We suggest two possible routes forward for securing funding:

- Discussing the issue with the Minister of Finance, seeking either a reconsideration of the decision or the opportunity to incorporate portions of the transport bid into the MBIE bid, or
- Instructing officials to explore alternative options for funding, primarily through reprioritisations.

Recommendations

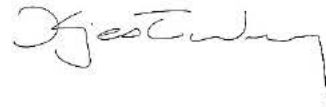
We recommend you:

1. **note** that the Ministry and MBIE prepared two related bids for the Budget 22 process, but only the MBIE bid was invited to proceed further.
2. **confirm** whether you wish to hold a joint meeting with officials to discuss this issue and potential options further. Yes / No
3. **agree** to:
 - 3.1. collectively discuss this issue further with the Minister of Finance, OR Yes / No
 - 3.2. instruct officials at MBIE, the Ministry, and the CAA to provide further advice on funding which could potentially be reprioritised to fund the measures outlined in the Ministry's bid. Yes / No

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Richard Cross
Manager, Strategic Policy and Innovation
 01/11/2021



Dr Kjesten Wiig
Director, Innovative Partnerships, MBIE
 01/11/2021

Hon Michael Wood
Minister of Transport
 / /

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

Hon Stuart Nash
Minister for Economic and Regional Development
 / /

- Minister's office to complete:**
- Approved
 - Declined
 - Seen by Minister
 - Not seen by Minister
 - Overtaken by events

Comments

Contacts

Name	Telephone	First contact
Richard Cross, Manager, Strategic Policy and Innovation, Ministry of Transport	s 9(2)(a)	✓
Kirill Kruger, Senior Adviser, Strategic Policy and Innovation, Ministry of Transport		
Dr Kate Calcott, Principal Policy Advisor, Innovative Partnerships, MBIE		

NEXT STEPS AND OPTIONS FOR EMERGING AVIATION FUNDING

Te Manatū Waka's bid for funding in Budget 22 has not been invited to proceed

- 1 Te Manatū Waka Ministry of Transport (the Ministry) submitted an initiative for Budget 22, which outlined a bid for funding three interrelated workstreams on emerging aviation technologies:
 - 1.1 Implementation of the Enabling Drone Integration package of policy measures which aims to introduce several foundational updates to the regulatory system related to drones to ensure safety and compliance in the aviation system.
 - 1.2 Establishing a new Emerging Technologies Unit (ETU) within the Civil Aviation Authority (CAA) and building the capacity and capability needed for the CAA to keep pace with the sector and meet the demands placed on it by the cross-government workstreams on drones, emerging aviation technology, and aerospace.
 - 1.3 Bolstering policy capacity within the Ministry, including baselining the positions currently funded from a historic reallocation of \$0.9 million¹ from Vote Business, Science, and Innovation (BSI) which will come to an end on 30 June 2022.
- 2 The initial indicative costs for these measures, as outlined in the initiative invite submission are provided in Appendix 1.
- 3 On 22 October 21, the Minister of Finance Hon Grant Robertson confirmed in a written letter that this initiative would not be invited to bid as part of Budget 22. As a result, there is currently no assured funding sources for any of the workstreams described above, and they cannot be funded from agency baselines.
- 4 Simultaneously, the initiative prepared by MBIE titled "*Growing innovation in the New Zealand aerospace sector and supporting the transition towards a low-carbon economy*" has been invited to bid in the Budget 22 process. This bid will grow the aerospace sector through building the future workforce with a focus on R&D capabilities, fostering R&D collaborations and encouraging greater levels of sector investment in R&D. These activities are likely to have impacts on the rest of the aviation system and the CAA.

Lack of funding will have a drastic impact on work to modernise the aviation system and support innovative aviation businesses

- 5 As you are aware, the workstreams in the Ministry bid are foundational elements of the cross-government efforts to modernise the aviation system while maintaining and improving safety standards. These workstreams are also integral to the ongoing work to unlock the benefits of emerging aviation technologies and to foster the growth of the aerospace sector.

¹ This amount is part of a wider \$3 million reallocation, with the remaining amount provided to CAA.

The lack of funding will have a tangible impact on drone integration

- 6 Without funding, the CAA will not be able to implement the package of policy measures set out in Enabling Drone Integration (EDI).² The draft Cabinet paper detailing these measures is expected to be provided to Minister Wood in early November 2021, to be considered by Cabinet Economic Development Committee in early-2022.³
- 7 The EDI package forms a fundamental steppingstone towards a system where drones can operate safely in urban areas and alongside traditional aircraft.
- 8 As detailed in the EDI Cabinet paper, the current Civil Aviation Rules were enacted as an interim measure in 2015. Since then, the existing regulatory environment and rules for drones have not been updated to keep pace with developments and growth in the sector. These rules and regulations are no longer fit for purpose, and do not match cross-government ambitions for the sector.
- 9 If the regulatory system governing the use of drones is not updated and if appropriate systems and infrastructures are not built, the risks to public safety and other aviation participants will inevitably rise. This will also seriously compromise any efforts to modernise the aviation system and will hamper our efforts to grow the sector. Any advantages that New Zealand currently boasts as a destination for research and development in this area will be lost.
- 10 This has been echoed to you by the representatives of the aerospace sector, who have indicated their frustrations with the ability of the regulatory system to cope with the existing needs of the sector. They have also expressed to you an expectation that support be provided to the entire system dealing with emerging aviation, not just the parts which directly promote growth.

Without additional funding, the CAA is unable to establish the new ETU or do the required regulatory work to facilitate growth of the sector

- 11 Without assurance of funding, the CAA will not be able to commence recruitment of key technical, policy, and engagement staff for the new ETU. Given the CAA's current financial situation which has been heavily impacted by COVID-19, the work cannot be funded out of the CAA's baseline.
- 12 Officials explored the feasibility of funding the establishment of the ETU through an offer from MBIE to transfer a further \$1.3 million for the current year from reprioritised Vote Business, Science, and Innovation (BSI) funding. However, this was not pursued further, as the CAA could not begin permanent recruitment of necessary specialists without assurance of several years of funding.
- 13 The ETU is intended to be a primary point of engagement between current and prospective sector participants and the technical specialists within the CAA. This would go a long way towards addressing some of the concerns raised by aerospace sector representatives. The ETU would help expand the CAA technical capability

² Currently, the proposed policy package consists of Updates to the Rules applicable to drones, Basic operator accreditation, registration, Remote identification, and Geo-awareness.

³ The initial draft of the Cabinet paper was based on an assumption that the work would be funded by the Crown through Budget 22. The paper has now been delayed while we investigate options for funding the work.

through concentrated efforts to recruit relevant technical experts (e.g. artificial intelligence, electric propulsion, etc.). The ETU would also be backed by increased capacity and capability in policy, risk assessment, and airspace design.

- 14 Without the extra funding we do not see any practical option for expanding the CAA capacity and capability. This effectively puts a limit on its ability to carry out certification work, regulatory updates, and additional policy work. As such, without funding the Ministry would not be able to support any new or upcoming workstreams which would place an extra burden on the already stretched capacity within the CAA, including the MBIE-led Aerospace Strategy.
- 15 Further, without assurance of funding, the CAA will not have the capacity and capability to undertake the significant regulatory work required to safely facilitate the testing, trialling and certification of new aviation technology. This will significantly hamper growth of the industry.
- 16 As you are aware, the aerospace industry has expressed significant concern regarding the CAA's ability to properly support work in the emerging technology sector. Without funding, these frustrations will grow, and there is a material risk these companies will leave New Zealand, to develop their technologies overseas.

Expected growth of the aerospace sector through MBIE-led initiatives is expected to put further strain on the system

- 17 The invited MBIE initiative is intended to fund the ongoing work to foster the growth of the aerospace sector in New Zealand. The workstreams set out in this bid will further strain CAA's already limited capacity and raise expectations to a level which cannot be reached without additional resourcing.
- 18 While all agencies are supportive of MBIE's bid, we believe that the measures outlined in the EDI package and the capacity built through the ETU will form part of the necessary foundation for the Aerospace Strategy and the wider Innovative Partnerships programme's work. Without this foundation, the MBIE bid would not achieve the desired outcomes.

Options for next steps are limited

- 19 We are seeking further feedback from Treasury to understand why this initiative was not invited to Budget 22. However, we do not expect that this avenue will lead to any grounds for the decision to be overturned.
- 20 We believe there are now two options of how to proceed in regards to funding the work on emerging aviation technologies.

Option 1: Pursuing the matter further with the Minister of Finance

- 21 You may wish to collectively discuss the situation and to underline the pressing need for funding with the Minister of Finance. You may also wish to discuss the need for regulatory functions to be funded in parallel to the expansion of the aerospace and emerging aviation sectors.

- 22 You may wish to seek a reconsideration of the decision not to include the emerging aviation bid in Budget 22. This could either be through reinstating it as a stand-alone bid or incorporating aspects into a wider aerospace bid with MBIE. This would not be possible without approval from the Minister of Finance, as the elements covered by the Ministry's bid would be beyond the scope of MBIEs bid.
- 23 We anticipate that if elements of the Ministry bids are incorporated into the MBIE bid, the funding to support the establishment of an ETU would need to be scaled down. However, to remain effective, the EDI measures would need to be implemented in full and with the same staging as described in the relevant Cabinet paper.
- 24 If you pursue this option, it should be noted that even if the Ministry bid is invited in some way, there is no guarantee that it will be approved and funding will be granted. The Minister of Finance has specifically underlined the number of initiatives and funding sought through the invited bids already outstrips the availability of funding.

Option 2: Seeking alternative avenues for funding

- 25 If you do not wish to pursue the issue with the Minister of Finance, officials at MBIE and the Ministry can explore the potential scope to further reprioritise funds from our portfolios.
- 26 It is unlikely that this option could provide funding to match the amounts sought through Budget 22. Further work would need to be done to determine what funding is available, the effect that this would have on other planned work, whether the funding provided adequate assurance, and how the limited funding could be prioritised across the key elements of the bid through scaling.
- 27 If you support this option, Ministry and MBIE officials will work together and report back to you with further advice, which could include advice on the steps needed to give effect to a reprioritisation if it is determined to be a feasible option.

Appendix 1:

Funding Sought (\$m)	2022/23	2023/24	2024/25	2025/26	TOTAL
MoT -Policy capacity	575,000	575,000	575,000	575,000	2,300,000-
CAA - Emerging Technology Unit	5,249,775	5,478,123	5,618,856	5,763,812	22,110.566
CAA – Implementation of EDI measures	1,491,364	1,890,808	1,385,677	1,417,405	6,185,254
TOTAL	7,316,139	7,943,931	7,579,533	7,756,217	30,595,820

Funding Sought (\$m)	2022/23	2023/24	2024/25	TOTAL
Registration system	1,000,000-	500,000-	250,000	1,750,000-

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