



MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Te Kāwanatanga o Aotearoa
New Zealand Government

Aotearoa New Zealand Aerospace Strategy 2023-2030

Te Rautaki Ātea-ā-rangi o Aotearoa 2023-2030

JULY 2023



Ministry of Business, Innovation and Employment (MBIE) Hīkina Whakatutuki – Lifting to make successful

MBIE develops and delivers policy, services, advice and regulation to support economic growth and the prosperity and wellbeing of New Zealanders.

More information

Information, examples and answers to your questions about the topics covered here can be found on our website: www.mbie.govt.nz.

Acknowledgements

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Ministers' foreword

Te kupu whakataki a te Minita

We are excited to release the Aotearoa New Zealand Aerospace Strategy (the Strategy) to drive the growth of our aerospace sector through to 2030 and beyond.

The Government has set ambitious goals for Aotearoa New Zealand to become a high-wage, low emissions economy that guarantees economic security for New Zealanders. The aerospace sector already employs New Zealanders throughout the country in highly paid and skilled jobs, and through this Strategy we want to create opportunities for a wider and more diverse range of people to get involved in the sector.

Aerospace technologies are key to how we connect with the world, from satellite communications to our use of planes to transport goods and people. In Aotearoa New Zealand and around the world, aerospace technologies will greatly improve how we respond to issues like climate change, emergency management and monitoring our ecosystems and natural resources.

Government has a critical leadership role to play in unlocking the potential of an internationally competitive aerospace sector that is safe, innovative and thriving. Aotearoa New Zealand has natural advantages and existing strengths in aerospace can help secure its position as a leading place to safely test, trial and adopt aerospace technologies.

As Ministers with responsibility for aerospace, this Strategy outlines our ambitions for the future state of the Aotearoa New Zealand aerospace sector in 2030. To achieve this vision, we need to strengthen the pillars that underpin the success of the sector – building strong economic foundations, providing supportive government-led initiatives and growing participation and engagement in the sector. These pillars will enable us to work towards five ambitious goals that build on our existing strengths and that will bring together expertise from across the sector.

Collectively, this work will ensure all New Zealanders benefit from the opportunities this sector offers across the land, sea, skies, and beyond.

We thank those New Zealanders who contributed to the development of this Strategy through the consultation period. Your feedback has been crucial in refining the content of this Strategy and shape the actions identified in the Action Plan. We look forward to working with industry, Māori, academia and wider communities through the Action Plan to build a strong, resilient and inclusive aerospace sector.



Hon Dr Ayesha Verrall
Minister of Research, Science and Innovation



Hon Barbara Edmonds
Minister for Economic Development



Hon Kiri Allan
Associate Minister of Transport

Executive summary

Te whakarāpopototanga matua

A strategy to build our aerospace sector

The global aerospace sector is growing fast, already worth over \$600 billion annually.¹ Past estimates have valued the Aotearoa New Zealand space economy at over \$1.69 billion², while the benefits of using drones are estimated at up to \$7.9 billion over 25 years.³ The value of the wider aerospace sector, which includes design, manufacturing, fabrication, and engineering and technical services, is even higher.

An increasing number of commercial space and advanced aviation companies are launching, flying, manufacturing, and operating in Aotearoa New Zealand. There is also an increasing market for products and services using the data generated by aerospace technologies.

The Aotearoa New Zealand Aerospace Strategy aims to establish a distinct New Zealand approach to developing the aerospace sector, by building on our national strengths, while managing national security risks. The Strategy comprises three foundational pillars for the sector:

1. **Unlocking Aerospace Potential**
2. **Future-facing Government**
3. **Aerospace Nation**

The Pillars will enable us to achieve the ambitious Goals for the sector for 2030:

1. **Establish a sustainable air-passenger journey**
2. **Safely integrate autonomous aerial vehicles**
3. **Be at the forefront of sustainable space activities**
4. **Actively support exploration in space**
5. **Enhance decision-making using Aerospace-enabled data**

A staged Action Plan outlines the work required to deliver on this ambitious vision.

Aotearoa New Zealand's strengths across the aerospace value chain are in research and development, manufacturing, operations and data processing. We also have natural advantages for aerospace activities. The diversity of our geography is ideal for developing and testing a variety of technologies and our clear seas and skies provide access to a wide range of launch and take-off angles.⁴

Our aerospace sector is highly innovative, with products and services developed here helping to address challenges such as decarbonising the economy, conservation, improving agricultural productivity, protecting our seas, monitoring natural hazards and supporting emergency response.

Aotearoa New Zealand has cutting-edge research capabilities and a highly educated workforce⁵, but barriers to education and training, as well as diversity and inclusion challenges are limiting the pipeline of talent entering the sector.

While Aotearoa New Zealand has a business-friendly environment⁶ and a government that supports innovation, we need to continue addressing barriers to innovation as the global sector evolves and opportunities arise.

1 The Space Report 2020 Q2, The Space Foundation (July 2020)
2 Deloitte New Zealand Space Economy Report 2019
3 Drone: Benefits Study, Market Economics Limited 2019
4 Deloitte New Zealand Space Economy Report 2019
5 OECD Skills Strategy: New Zealand (2019)
6 PWC Doing Business in Aotearoa New Zealand Guide 2022

Defining aerospace

Te whakamārama i te ātea-ā-rangi

Aerospace in Aotearoa New Zealand covers a wide range of space and advanced aviation activities, from transport, advanced manufacturing, design and engineering services through to technical consulting and professional services.

Aircraft and spacecraft in Aotearoa New Zealand are regulated under the Civil Aviation Act and the Outer Space and High-altitude Activities Act respectively.

The aerospace sector is actively engaged in:

- › research and development
- › manufacturing and testing of aircraft, space launch vehicles and spacecraft
- › products and systems that contribute to or rely on aerospace technologies, including sustainable propulsion technologies and alternative fuels.

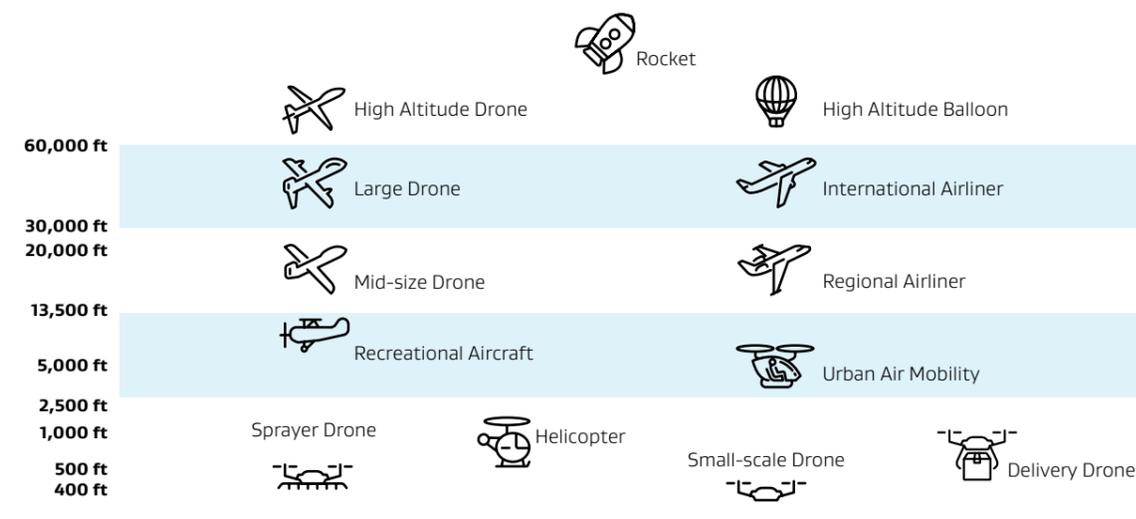
Aerospace also includes technologies that harness aerospace data, including ground stations or aerospace-enabled services such as technical analysis and data storage.

This Strategy covers aircraft and spacecraft that operate at different altitudes, from drones that operate at low levels to rockets that reach Earth's orbit and beyond. It includes satellites and the design and manufacture of satellite subsystems.

While the Strategy is not focused on traditional aviation, emerging aviation technologies will support the traditional aviation system to continue to operate safely and securely and to adopt new technologies.

The scope of the Strategy includes defence applications for aerospace technologies such as Maritime Domain Awareness and acknowledges that the dual use nature of these technologies could give rise to potential national security risks that need to be addressed.

Combining the related space and advanced aviation sectors helps to bring together smaller industries in our economy to strengthen Aotearoa New Zealand's position in aerospace internationally. It also creates opportunities to strengthen enablers such as manufacturing capabilities and supply chains for the benefit of both the aviation and space sectors. Both emerging and well-established innovators will benefit from a collective focus on critical infrastructure and investment.



2030 Future State

2030 Ngā Āhuatanga Anamata

Our vision for aerospace in Aotearoa New Zealand in 2030

Aerospace in Aotearoa New Zealand is a diverse and inclusive sector that is thriving, supporting tens of thousands of quality jobs and inspiring a diverse range of young people to seek out numerous career pathways in aerospace.

Government supports a sector which is safe, innovative, and productive, and is made up of hundreds of research and development intensive firms with strong international connections. Our regulations enable technology development for use across low altitude, high altitude, sub-orbital and orbital operations.

Aerospace actively contributes towards our environmental stewardship by reducing greenhouse gas emissions and enhancing sustainability across Aotearoa New Zealand's economy.

Aerospace assets and downstream data contribute to the protection and advancement of Aotearoa New Zealand's national security. National security risks associated with the sector are managed effectively to keep Aotearoa New Zealand safe.

This multi-billion-dollar industry leads the world in disruptive aerospace technologies and companies that champion solutions and products which reduce or minimise environmental impact.

Our reputation for innovation in aerospace and our international connections support us to promote our values and national interests on the world stage.

Unlocking the benefits of aerospace Te wetewete i ngā hua o te rere ātea-ā-rangi

Aotearoa New Zealand has strengths across the aerospace value chain, in research and development, manufacturing, operations, and data processing. Aotearoa New Zealand also has natural advantages for aerospace activities.

The diversity of our geography is ideal for developing and testing a variety of technologies. Our unique position surrounded by clear sea and skies provides access to a wide range of launch and take-off angles. Our low-population density and large open spaces provide opportunity for safe trialling and testing of new technologies.

Aotearoa New Zealand's cutting-edge research capabilities are supported by a highly educated workforce. We know that further steps are necessary to support the pipeline of talent entering the sector, including by addressing barriers to participation in relevant education and training, as well as wider efforts to support diversity and inclusion in the sector.

While New Zealand has a business-friendly environment and a government that supports innovation, we know we need to continue addressing emerging barriers to innovation as the global sector evolves and opportunities arise. This includes paying close attention to coordination across the government system.

Positioning our sector to take advantage of opportunities will require future-focused, anticipatory policy and regulation that enables our sector to continue to develop safely and to mitigate a range of national security risks. Continued investment in our regulatory agencies will be important for ensuring our policy and regulatory systems keep pace with technology development to maintain the safety and security of New Zealanders.

Role of government Te wāhi ki te kāwanatanga

Government has an important leadership role to play in developing an internationally competitive aerospace sector that is safe, innovative and thriving.

Government can support sector development through support for research and development, innovative procurement and investment, workforce development, maintaining an enabling business environment, facilitating strong international partnerships and connections and maintaining a supportive regulatory regime.

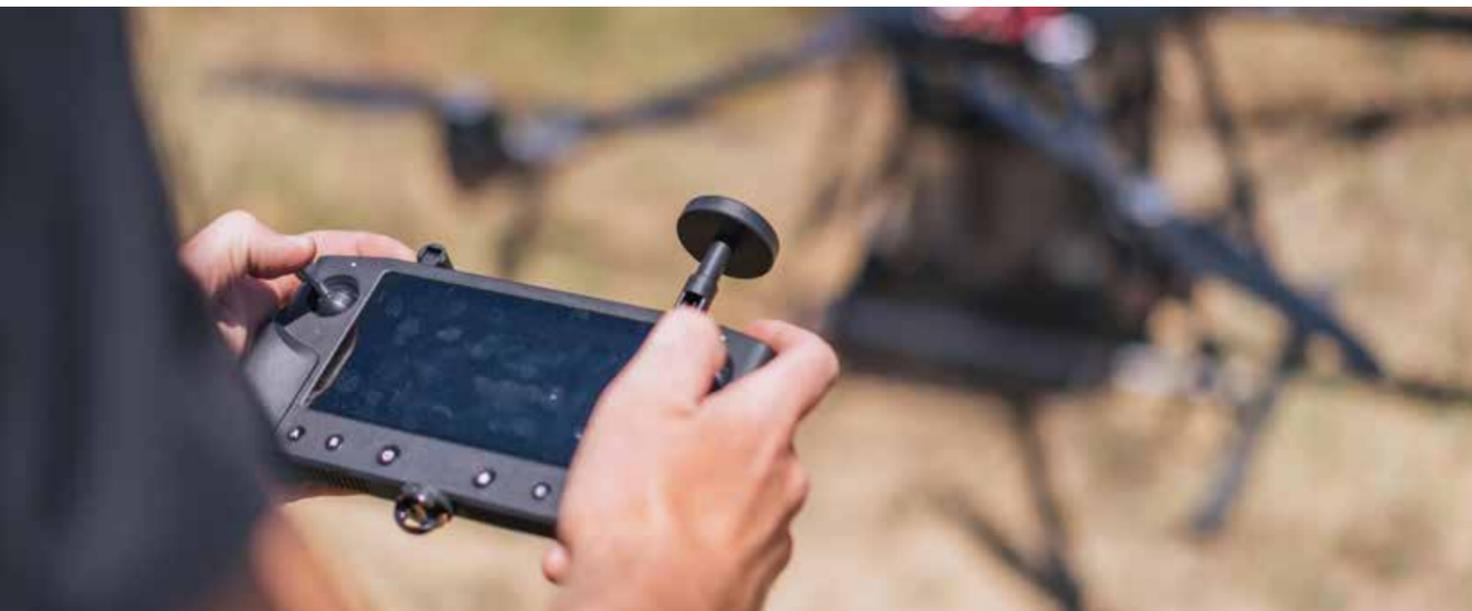
Positioning our aerospace sector to take advantage of opportunities will require future-focused, proactive regulation that enables the sector to develop safely while mitigating a range of national security risks. Continued investment in our regulatory agencies will be important to ensure our policy and regulatory systems keep pace with technology development to maintain the safety and security of New Zealanders

The Government has a key role to play in identifying and supporting greater participation for those under-represented in the sector. Work is also needed to address barriers to inclusion for young people,

women, Māori, Pacific peoples, disabled people and LGBTQIA+/Takatāpui/MVPFAFF+ along the education to employment pipeline. Partnering with industry to identify and address barriers for these communities will enable a wide range of ideas and world-views to support innovation in the sector.

In growing Aotearoa New Zealand's aerospace sector, our aerospace activities must also be consistent with Aotearoa New Zealand's international obligations, domestic laws and other policies across government. Consideration of our national interests, including national security and Aotearoa New Zealand's foreign policy, will be important as sector development plans are designed and implemented.

The Strategy aligns with and supports other government policies. A list of related strategies, papers, government policies and regulations will be updated on the Ministry of Business, Innovation and Employment website throughout implementation of the Strategy.



NASA Deputy Administrator Pam Melroy, NASA Administrator Bill Nelson, Prime Minister Chris Hipkins and US Ambassador Stewart Udall.
Photo credit: Ola Thorsen/US Embassy

Lead agencies:



Ministry of Business, Innovation and Employment (MBIE)
Leads on economic development, research and innovation policy, research and development investment, business support, space sector development, and space policy and regulation.



Te Manatū Waka Ministry of Transport (MoT)
Develops policy and regulations for transport, including emerging aviation technologies.

Support agencies:



Civil Aviation Authority (CAA)
As the national aviation regulator, ensures the safe entry and operation of aircraft within the aviation system.



The Ministry of Foreign Affairs (MFAT)
Supports Aotearoa New Zealand interests in aerospace, including through international fora, supporting bilateral engagement with other space-faring nations in international fora, and managing export controls and trade agreements.



New Zealand Trade and Enterprise (NZTE)
Supports aerospace firms with access to international markets and supply chains, including through business development grants, business advice and marketing.



Callaghan Innovation
Supports innovators with commercial advice as well as research and development assistance and funding.



Ministry of Defence (MoD)
Ensures Aotearoa New Zealand's strategic defence interests are reflected in space and aerospace policies. Leads engagements with strategic defence partners alongside the New Zealand Defence Force.



New Zealand Defence Force (NZDF)
Uses space assets to enable the efficient and effective performance of its core functions in close co-operation with partner militaries. Facilitates a significant amount of industry training and workforce development in the aviation sector.



New Zealand Intelligence Community (NZIC)
Ensures that national security interests are reflected in policies and supports the safe development of the space sector, including through undertaking national security risk assessments. The NZIC includes the Department of the Prime Minister and Cabinet, Government Communications Security Bureau (GCSB), and New Zealand Security Intelligence Service (NZSIS).



Photo credit: Tāwhaki

Engaging Māori on aerospace Te whai wāhi ki a Ngāi Māori mō ngā take ātea-ā-rangi

Our plans to support the aerospace sector need to be consistent with the Crown's commitments under Te Tiriti o Waitangi.

We will foster partnerships with Māori in aerospace through:

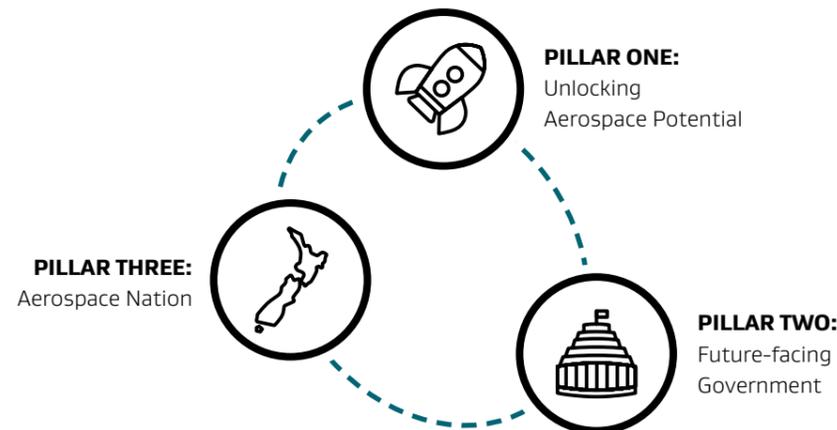
- › our work with Māori businesses and collectives on using aerospace technologies to further regional and national economic development
- › ensuring Māori can excel in sector opportunities, employment and training
- › developing sector development initiatives that engage Māori expertise.

We worked closely with a group of Māori experts in aerospace during the development of the Aerospace Strategy on what actions would be needed as part of implementation of the strategy. As a result of this work, we will undertake a specific analysis of current Māori participation and aspirations for the sector, as well as work on specific economic opportunities for Māori in aerospace. Updates on this work, and engagements with Māori on aerospace, will be provided on the MBIE website.

Pillars Ngā Pou

Building strong foundations for our aerospace sector

To achieve the ambitions of the 2030 Future State, we need to build on Aotearoa New Zealand’s strengths in aerospace, address the needs of the sector and identify opportunities for the future. The Pillars will enable collaboration between the sector and government to address cross-cutting enablers that will benefit from a coordinated approach.



PILLAR ONE: Unlocking Aerospace Potential **TE POU TUATAHI: Te Whakatuwhera i te Pito Mata o te Ātea-ā-rangi**

Creating strong economic foundations that meet the needs of the sector

We want to enable Aotearoa New Zealand’s aerospace sector to thrive in the fast-moving international industry, and support the rapid prototyping, validation and commercialisation of new technologies. The investments in research and development and wider support for business over the next decade will stimulate co-investment and will pave the way for change.

We will focus on:

- › Actively supporting new start-up and scale-up activity and attracting innovators and investors from around the world
- › Scaling up existing commercial and research activity in all parts of the aerospace value chain
- › Developing leadership in high-growth areas and emerging sectors
- › Fostering international partnerships as a mechanism to build domestic capacity and capability
- › Promoting early adoption of aerospace technologies in government and investing in research and development infrastructure and support activity
- › Building connections with wider government initiatives that are investing in high-tech sectors.

PILLAR TWO: Future-facing Government **TE POU TUARUA: Te Aro-Anamata o te Kāwanatanga**

Building aligned and supportive government-led initiatives

We want to create an enabling environment for aerospace technologies to be developed and tested safely so that Aotearoa New Zealand can benefit from aerospace innovation. A responsive, fit-for-purpose regulatory system that enhances the ease of doing business while continuing to protect the safety and security of New Zealanders will best be achieved through a shared understanding of the pressures facing both industry and regulators. Capability in aerospace technologies and assets is also increasingly critical to maintaining the safety and security of Aotearoa New Zealand and New Zealanders.

We will focus on:

- › Ensuring key policies are aligned and our regulatory systems are fit-for-purpose
- › Facilitating a system which enables safe and secure uptake and integration of aerospace technologies into the advanced aviation and space systems
- › Enabling testbed environments for aerospace activities that support innovators to take technologies from concept to market
- › Improving the accessibility and relevance of support provided by government to businesses
- › Engaging domestic and international partnerships to enable ongoing information sharing, alignment with other jurisdictions, and the promotion of Aotearoa New Zealand’s values and interests in the international rules-based order
- › Building on our national strengths to provide a gateway to high altitude and space activity through integrated services and infrastructure.

PILLAR THREE: Aerospace Nation **TE POU TUATORU: He Iwi Ātea-ā-rangi**

Strengthening engagement in the aerospace sector and marketing to the world

We want to inspire the next generation of New Zealanders and highlight aerospace as an important contributor to our national identity. Aerospace and its technologies are creating exciting opportunities for New Zealanders through enhancing wellbeing and transforming the way we live and work, however many people are unaware of the critical role these technologies play.

We will focus on:

- › Sharing a collective vision for aerospace, including incorporating our national space values such as stewardship, innovation, responsibility, and partnership to help promote our uniquely Aotearoa New Zealand brand to the rest of the world
- › Building a positive narrative domestically that demonstrates the everyday relevance of the sector and clearly communicates the benefits of aerospace technologies to the public
- › Promoting Aotearoa New Zealand’s innovation in aerospace on the global stage
- › Ensuring we plan for a workforce that meets the evolving needs of the sector
- › Encouraging diversity and inclusion for the sector for Māori, Pacific, women and other under-represented communities in aerospace education, training and the workforce, including by supporting initiatives to create a more diverse, safe and welcoming sector
- › Fostering enthusiasm for science, technology, engineering and mathematics (STEM) subjects, leveraging industry and community-led initiatives.



Goals for 2030 Ngā Whāinga mō te 2030

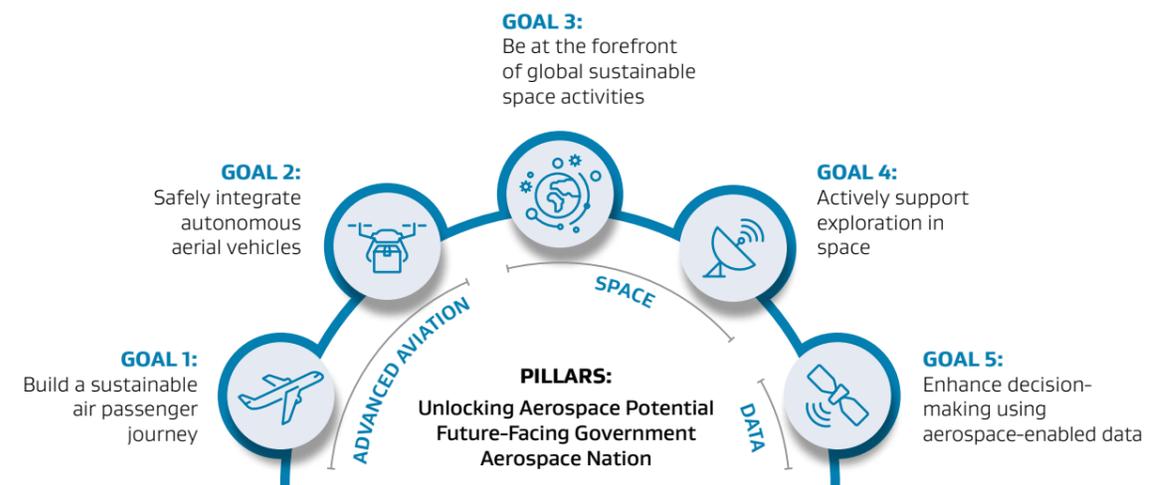
Ambitions for the future

The ambition of our Goals for 2030 provide a set of objectives for aerospace in Aotearoa New Zealand to develop strengths in targeted areas of the global industry. We will unlock innovation and technological development across the aerospace value chain to accelerate progress towards our vision for the sector in Aotearoa New Zealand.

We have developed five Goals for 2030 in consultation with the sector. These goals represent areas that Aotearoa New Zealand can play a significant role in - building on domestic science, research and development strengths, and by pursuing opportunities with global partners.

These goals will align industry aspirations with government priorities, policies and regulations moving forward. Collective work towards these goals will build important capabilities our country needs to address critical societal and environmental challenges as we look towards 2030 and beyond.

We have developed goals specific to space, advanced aviation and downstream data to address the specific needs of each of these subsectors. Each of the goals will be supported by activity across the Pillars.



Delivery of the Goals for 2030 will require commitment from across the aerospace sector. By bringing together government, industry and academia, we can create partnerships on projects with lasting benefits for Aotearoa New Zealand. The Goals for 2030 will guide future government investments in aerospace and signal our priorities to our international partners, providing a platform to attract investment and capability.

We want to inspire more people to get excited about aerospace and highlight the wide-ranging benefits of aerospace technologies. This also includes motivating and supporting more young people and people in groups currently underrepresented in the sector to seek careers in aerospace.



Photo credit: Tāwhaki



GOAL ONE: Build a sustainable air passenger journey
WHĀINGA TUATAHI: Te waihanga i te hāereere rererangi a te tāngata
kia toitū

Using advanced aviation and clean energy technologies to create sustainable options for passengers at every stage of an air passenger journey

Defining the goal:

Aotearoa New Zealand can be a leader in trialling and adopting emerging low emissions technologies and developing supporting infrastructure. We plan to leverage our strong track record on innovation in the aviation sector to demonstrate sustainable aviation technologies, including opportunities to derive these from our renewable energy resources.

Why is this goal needed?

Aotearoa New Zealand is geographically isolated and relies on aviation to transport goods and people. Aviation faces a difficult transition from the use of fossil fuels to more environmentally sustainable alternatives. Decarbonising the sector requires the development of innovative new fuels and aircraft technologies as well as increasing the adoption of technologies already available, such as electric propulsion and Sustainable Aviation Fuels.

Examples of existing work:

- › Te Manatū Waka Ministry of Transport has established Sustainable Aviation Aotearoa, a public-private partnership to support coordination on aviation decarbonisation
- › MBIE is working with the sector to investigate the infrastructure requirements to establish hydrogen hubs at airports
- › Government is supporting the testing and trialling of emerging aviation technologies in Aotearoa New Zealand, including hydrogen, hybrid and electric aircraft.

Actions for implementing this goal are detailed in the Action Plan later in this Strategy. Further details about relevant work are available on the MBIE website and will be updated throughout the duration of the Strategy.



Photo credit: Tāwhaki and Kea Aerospace



Photo credit: Wisk Aero



GOAL TWO: Safely integrate autonomous aerial vehicles
WHĀINGA TUARUA: Te whai wāhi mai o ngā rererangi kaitaraiwa kore kia haumaruru

Enabling the safe and secure operation of autonomous aerial vehicles alongside other forms of transport

Defining the goal:

Aotearoa New Zealand will work to integrate autonomous vehicles into domestic and international aviation systems. The government will work to remove barriers to the safe use of autonomous aerial vehicles in Aotearoa New Zealand so we can unlock significant economic and environmental opportunities while managing national security risks.

Why is this goal needed?

Fast-paced technology development has seen rapid global adoption of advanced aviation technologies. One of the biggest challenges facing regulators is how to safely integrate autonomous aerial vehicles into existing aviation systems, including remotely-piloted aircraft with autonomous components and semi-autonomous craft.

Examples of existing work:

- › Te Manatū Waka Ministry of Transport is developing policy measures for the safety and compliance of autonomous aerial vehicles through the Enabling Drone Integration programme
- › The Civil Aviation Authority has established an Emerging Technologies Programme to act as a bridge between the regulator and the aerospace sector.

Actions for implementing this goal are detailed in the Action Plan later in this Strategy. Further details about relevant work are available on the MBIE website and will be updated throughout the duration of the Strategy.



Photo credit: Dawn Aerospace



GOAL THREE: Be at the forefront of global sustainable space activities
WHĀINGA TUATORU: Te noho whakaihuwaka ki ngā mahi o te ao mō te ātea-ā-rangi toitū

Leading in sustainable space activities and the development of the policies that enable them

Defining the goal:

Through world-leading policy and regulation and international partnerships, Aotearoa New Zealand will be a leader in preventing the growth of the space debris population and enabling novel technologies for cleaning up Earth orbit. Aotearoa New Zealand will leverage its existing reputation as a responsible space actor to reduce the environmental impact of space activities and position ourselves at the forefront of sustainable space.

Why is this goal needed?

Space debris presents an increasing challenge to the global aerospace industry, threatening the safety and sustainability of Earth orbit. Managing the growth of the space debris population and improving the sustainability of space activities is important to ensure we can continue to explore space and benefit from these activities. Space activity also affects our view of space from Earth – for cultural, scientific and recreational purposes. We will engage internationally to further develop and represent Aotearoa New Zealand’s interests in this area.

Examples of existing work:

- › American space firm LeoLabs built the Kiwi Space Radar in Central Otago to track small satellites and space debris
- › Japan-based company Astroscale has an agreement with MBIE on space safety and sustainability. Astroscale is working with Rocket Lab and Te Pūnaha Ātea – Auckland Space Institute to study the feasibility of removing debris from orbit
- › Government funding has supported the development of non-toxic and fuel-less propulsion systems, altitude control systems for collision avoidance, and orbital debris mitigation that reduce space debris risks for small satellites.

Actions for implementing this goal are detailed in the Action Plan later in this Strategy. Further details about relevant work are available on the MBIE website and will be updated throughout the duration of the Strategy.



Photo credit: RocketLab



Photo credit: Te Pūnaha Ātea - Space Institute, University of Auckland



GOAL FOUR: Actively support exploration in space
WHĀINGA TUAWHĀ: Te āta tautoko i ngā mahi ki te toro i te ātea-ā-rangi

Building on existing strengths to create a niche in developing high-value solutions that support a sustained presence in space

Defining the goal:

Aotearoa New Zealand can contribute at the forefront of space exploration, providing a gateway to space and being at the leading edge of technology development to advance exploration and scientific discovery. We can specialise in developing high-value solutions that support space exploration and draw on our existing strengths.

Why is this goal needed?

Growing Aotearoa New Zealand’s participation in the exploration of space through collaboration with our international partners will advance exploration and scientific discovery while allowing us to expand our role in the global space economy. Aotearoa New Zealand has existing strengths to support this goal, including in advanced manufacturing, in-space propulsion, optical communications, infrastructure for harsh environments, space mission operations and launch services. These strengths are supported by world-leading research in astrobiology, health and life sciences, and planetary sciences.

Examples of existing work:

- › Aotearoa New Zealand is a signatory to the Artemis Accords, an international arrangement led by the National Aeronautics and Space Administration (NASA) to support peaceful exploration and activity in space
- › The New Zealand Space Agency is part of the International Space Exploration Coordination Group, working alongside other space agencies to coordinate global space exploration efforts.

Actions for implementing this goal are detailed in the Action Plan later in this Strategy. Further details about relevant work are available on the MBIE website and will be updated throughout the duration of the Strategy.



Photo credit: LeoLabs



Photo credit: MAUI63



GOAL FIVE: Enhance decision-making using aerospace-enabled data
WHĀINGA TUARIMA: Te whakapai haere i ngā mahi whakatau take mā te whakamahi i ngā raraunga ka hua mai i te ātea-ā-rangi

Seizing opportunities from aerospace-enabled data to make data-driven decisions while enhancing productivity and economic value

Defining the goal:

Aotearoa New Zealand can generate and use aerospace-enabled data to drive productivity, develop new products and services and address key challenges. To build our capability in this area we will support the development of a range of air and space-based platforms. We will grow downstream data and software innovation, especially in geographic analytics and geographic information systems (GIS), artificial intelligence, and the development of robust data sets.

Why is this goal needed?

Aerospace technologies produce data and services which provide evidence for critical decision-making by government and others in Aotearoa New Zealand. We can use aerospace-enabled data to monitor the effects of disasters and adapt to climate change, track the health of our ecosystems, improve the efficiency of precision agriculture and measure carbon sequestration for climate change mitigation. This data can also support Aotearoa New Zealand’s national security sector to achieve its objectives.

Examples of existing work:

- › The TakiWaehera New Zealand Geospatial Hackathon delivered in partnership by MBIE and Maxar encouraged students to develop new solutions that address pressing challenges with high-resolution satellite imagery and emerging technologies
- › Air New Zealand and NASA worked together on the Rongowai mission to collect environmental data during flights to monitor climate change
- › Datasets derived from aerospace data are available through Toitū Te Whenua Land Information New Zealand’s Data Service, the Integrated Data Infrastructure and the Land-use and Carbon Analysis System.

Actions for implementing this goal are detailed in the Action Plan later in this Strategy. Further details about relevant work are available on the MBIE website and will be updated throughout the duration of the Strategy.

Alignment between Pillars and Goals

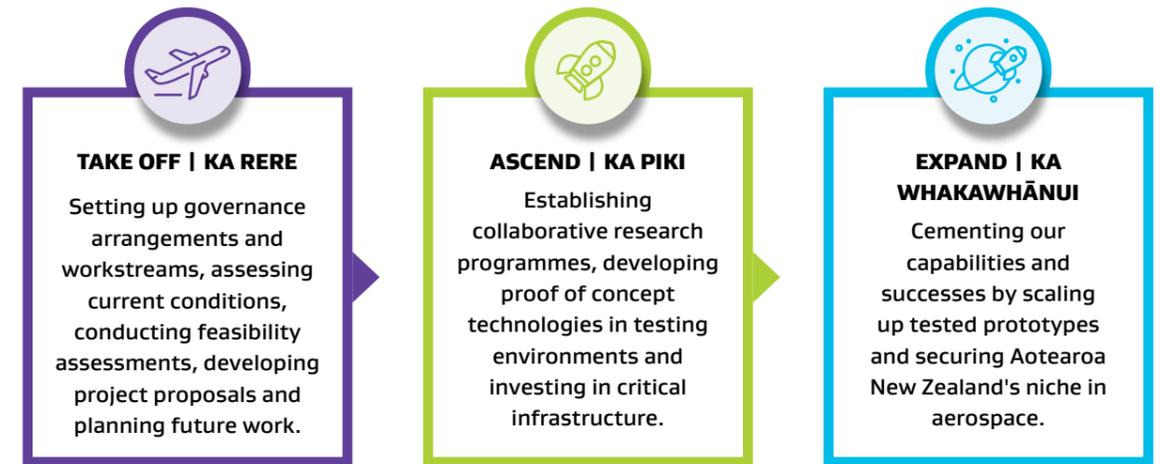
Te Hāngaitanga o ngā Pou me ngā Whāinga

Work on cross-cutting enablers across the three Pillars will support achieving each of the Goals. Areas of alignment between the Pillars and Goals have inform the Action Plan for the Strategy.

	PILLAR ONE: Unlocking Aerospace Potential	PILLAR TWO: Future-facing Government	PILLAR THREE: Aerospace Nation
GOAL ONE: Build a sustainable air passenger journey	Drive early adoption of low-emission aviation technologies, attract start-up activity and investment and leverage international partnerships to accelerate uptake.	Work with industry to position Aotearoa New Zealand airports as hubs for innovation and create regulatory testbeds for cutting-edge aviation technologies to maintain an enabling regulatory environment.	Engage domestically and internationally on the value of sustainable aviation technologies to meet sustainability goals while keeping Aotearoa New Zealand connected to the world.
GOAL TWO: Safely integrate autonomous aerial vehicles	Provide a supportive environment for research and development on autonomous aerial vehicles in Aotearoa New Zealand to support start-ups to scale up and attract world-leading talent.	Develop a fit-for-purpose regulatory framework through testbed environments, modern regulatory frameworks and information sharing with international partners to enable anticipatory regulation.	Build social licence and create opportunities for a wide range of New Zealanders to utilise autonomous aerial vehicles in their day-to-day life, especially to improve safety and efficiency.
GOAL THREE: Be at the forefront of global sustainable space activities	Provide a supportive environment for early adoption of sustainable space technologies and leverage international partnerships to drive global change.	Enable the uptake of sustainable space technologies through policy, legal and regulatory discussions domestically and internationally.	Build on Aotearoa New Zealand's reputation as a sustainable space nation and promote Aotearoa New Zealand's sustainable space efforts.
GOAL FOUR: Actively support exploration in space	Provide a supportive environment for research and development to leverage international partnerships, attract start-ups and investment, and increase access to international markets.	Consider infrastructure needs and engage in international policy, legal and regulatory discussions on rules and norms for safe and sustainable space exploration.	Inspire people to get excited about aerospace, attract people into the sector and promote Aotearoa New Zealand as a partner for space exploration activities.
GOAL FIVE: Enhance decision-making using aerospace-enabled data	Support early adoption and use of aerospace-enabled data solutions in government, and specialise in solutions including algorithms and environmental monitoring to attract commercial and research activity.	Lead globally in data governance and increase use of aerospace-enabled data for government decision-making and design of policy and regulatory frameworks to tackle key challenges such as climate change.	Build social licence by demonstrating the benefits of aerospace technologies and creating new job opportunities.

Action Plan He Mahere Mahi

The Action Plan outlines our plan to work towards and realise the 2030 Future State. To implement the Strategy, we have designed a three-phase approach to work on the Goals and Pillars.



Action under each of the Pillars will focus on cross-cutting enablers that support development of the sector and create the foundations for implementing the Goals.

Implementing the Strategy will involve close collaboration between government, the aerospace sector and other interested groups. We will report on the progress of initiatives throughout the lifetime of the Strategy to inform future planning by government and the sector.

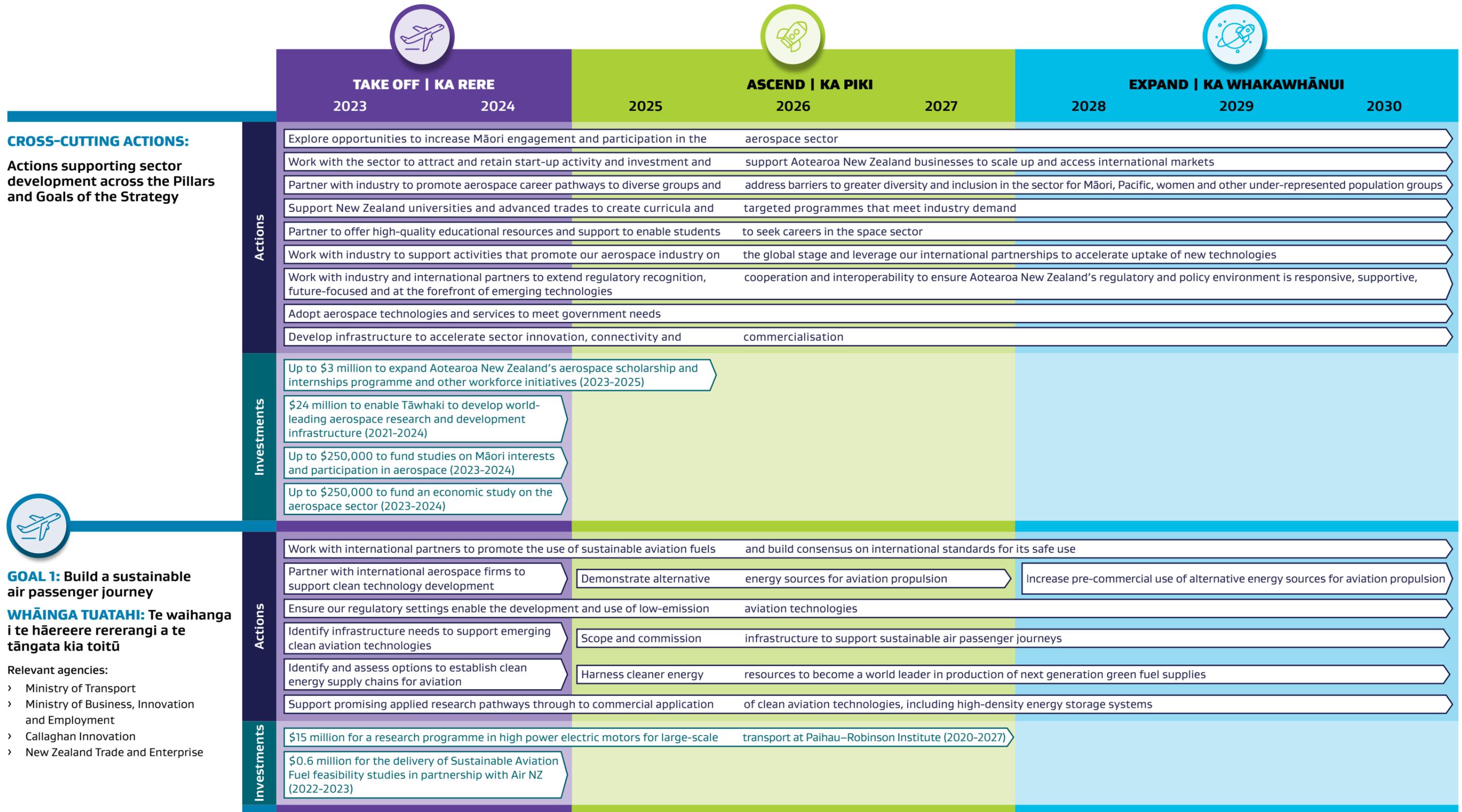
Funding for investments in later phases of implementing the Strategy will be considered over time and will be subject to government decision-making processes.



Photo credit: Tāwhaki and Dawn Aerospace

This Action Plan summarises current and planned actions supporting implementation of the Funding for investments in later phases of implementing the Strategy will be considered over time

Aotearoa New Zealand Aerospace Strategy. and will be subject to government decision-making processes.



GOAL 1: Build a sustainable air passenger journey

WHĀINGA TUATAHI: Te waihanga i te hāereere rererangi a te tāngata kia toitū

Relevant agencies:

- > Ministry of Transport
- > Ministry of Business, Innovation and Employment
- > Callaghan Innovation
- > New Zealand Trade and Enterprise



GOAL 2: Safely integrate autonomous aerial vehicles

WHĀINGA TUARUA: Te whai wāhi mai o ngā rererangi kaitaraiwa kore kia haumarū

Relevant agencies:

- > Ministry of Transport
- > Civil Aviation Authority
- > Ministry of Business, Innovation and Employment
- > Callaghan Innovation



GOAL 3: Be at the forefront of global sustainable space activities

WHĀINGA TUATORU: Te noho whakaihuwaka ki ngā mahi o te ao mō te ātea-ā-rangi toitū

Relevant agencies:

- > Ministry of Business, Innovation and Employment
- > Ministry of Foreign Affairs and Trade
- > Callaghan Innovation
- > New Zealand Trade and Enterprise

		 TAKE OFF KA RERE 2023 2024		 ASCEND KA PIKI 2025 2026 2027			 EXPAND KA WHAKAWHĀNUI 2028 2029 2030			
Actions	Explore enhancements to certification pathways for novel aviation technologies	Identify and implement sustainable funding models for certification of novel aviation technologies								
	Identify and progress improvements to the regulatory system that support development of emerging technologies	Maintain regulatory settings that enable innovation while maintaining the security and safety of New Zealanders								
	Establish industry partnerships for emerging aviation technologies	Partner with industry to support safe and secure development and deployment of new aviation technologies								
	Demonstrate the use of autonomous aerial vehicles for applications such as heavy cargo routes, delivery of lightweight, time-sensitive cargo and passenger transport flights									
	Use autonomous aerial vehicles with advanced sensors and artificial intelligence to ensure faster and more successful search and rescue operations and to support post-disaster recovery and impact assessments									
	Increase the use of automated aerial technologies in forestry, conservation, agriculture and horticulture for the management of natural ecosystems, pests and diseases, and to enhance productivity and efficiency and improve safety									
Investments	Up to \$5 million to support policy and regulatory stewardship in the Civil Aviation Authority and Ministry of Transport (2023-2026)									
	\$0.6 million for the delivery of Sustainable Aviation Fuel feasibility studies in partnership with Air NZ (2022-2023)									
Actions	Partner with other governments to extend regulatory recognition, cooperation and interoperability to enable technologies such as active debris removal and on-orbit servicing									
	Continue to build on Aotearoa New Zealand's reputation as a leader in space sustainability to position Aotearoa New Zealand as global leader in this area through international engagement									
	Support research and development on novel space propulsion and space situational awareness technologies	Support demonstration of novel space propulsion technologies			Support mission utilisation of new space propulsion technologies					
	Partner with leading commercial and research organisations on space safety and sustainability to build capability and capture a growing proportion of the global clean space market									
	Integrate policy, regulation, monitoring and international coordination									
	Build capabilities in fundamental areas of active debris removal operations, sustainable space access, space situational awareness and space traffic management									
	Promote development of international norms and principles for responsible and sustainable space activities									
	Develop reusable launch vehicles that reduce the impact of aerospace activities									
Investments	\$8.9 million Catalyst funding for a joint Research Programme with the German Aerospace Centre (DLR) that includes advanced propulsion as a focus area (2022-2025)*									
	\$11.6 million Endeavour funding for magnetic field propulsion research at the Paihau-Robinson Institute (2020-2025)									



GOAL 4: Actively support exploration in space

WHĀINGA TUAWHĀ: Te āta tautoko i ngā mahi ki te toro i te ātea-ā-rangi

Relevant agencies:

- › Ministry of Business, Innovation and Employment
- › Ministry of Foreign Affairs and Trade
- › Callaghan Innovation
- › New Zealand Trade and Enterprise



GOAL 5: Enhance decision-making using aerospace-enabled data

WHĀINGA TUARIMA: Te whakapai haere i ngā mahi whakatau take mā te whakamahi i ngā raraunga ka hua mai i te ātea-ā-rangi

Relevant agencies:

- › Toitū Te Whenua Land Information New Zealand
- › Statistics NZ
- › Callaghan Innovation
- › New Zealand Trade and Enterprise
- › Department of Conservation
- › Ministry for the Environment
- › Ministry of Defence
- › New Zealand Defence Force



TAKE OFF | KA RERE

2023

2024



ASCEND | KA PIKI

2025

2026

2027



EXPAND | KA WHAKAWHĀNUI

2028

2029

2030

Actions

- Encourage industry involvement in and development of fit for purpose guidance and standards for space activity
- Strengthen international partnerships to develop technologies and regulatory frameworks that support global efforts for a sustained off-Earth presence
- Make strategic investments in research to support capability development
- Create opportunities for Aotearoa New Zealand to participate in international space exploration programmes, leveraging connections with our Artemis Accords partner space agencies and international commercial space companies

Investments

- \$9 million Catalyst funding for joint research, including in support of NASA's Artemis Program (2023-2026)*
- \$8.9 million Catalyst funding for a joint research programme with the German Aerospace Centre DLR that includes space communication as a focus area (2022-2025)*
- Up to \$3.5 million for new space research and development projects to build national capabilities (2023-2025)
- \$3.35 million Strategic Science Investment Funding for the establishment of the Mission Operations Control Centre at Te Pūnaha Ātea – Auckland Space Institute (2020-2025)
- \$760,000 for Axiom Space to test a University of Canterbury prototype module on the International Space Station (2023-2024)

Actions

- Partner internationally to collect aerospace data that will support government decision making on key issues
- Support access to and better use of modern positioning services in Australia and Aotearoa New Zealand
- Identify priority areas across government for collection and use of aerial and satellite data
- Leverage aerospace technologies to enhance environmental monitoring, pest-management, maritime domain awareness and meet other government priorities
- Conduct a stocktake of Earth observation data purchasing and use across government
- Consolidate and streamline access to and use of Earth observation data
- Explore new ways the government can use aerospace-enabled data to tackle challenges facing Aotearoa New Zealand
- Support an all-of-government approach to aerospace-related investment and capability development and influence government procurement to consider space-based options
- Drive greater application of remote sensing data for Aotearoa New Zealand researchers, industry and government
- Facilitate sharing of information, tools, data and knowledge between end users such as councils, government, Māori, businesses and research institutes and improve public access to analysis-ready data
- Strengthen the Earth observation sector, including promoting Earth observation science, building capability, sharing and aggregating data, enhancing compliance with standards and improving accuracy
- Partner in Earth observation initiatives that unlock data of specific value to Aotearoa New Zealand, including to help with climate adaptation and mitigation efforts

Investments

- \$750 million investment with Australia in SouthPAN to improve accuracy and reliability of satellite-based positioning services in Australia, Aotearoa New Zealand and Antarctica (2022-2032)
- \$26 million for MethaneSAT mission to monitor methane emissions, including mission operations control centre in Aotearoa New Zealand and research project and atmospheric science research project to understand applicability of satellite's measurements to agricultural methane emissions (2020-)
- \$9 million Catalyst funding for NASA joint research supporting Earth Observation science (2023-2026)*
- \$8.9 million Catalyst funding for a joint research programme with the German Aerospace Centre DLR that includes Synthetic Aperture Radar as a focus area (2022-2025)*

*Catalyst funding for joint research with NASA and the German Aerospace Centre is shared across implementation of the relevant goals.



Te Kāwanatanga o Aotearoa
New Zealand Government

LSE 9389