

New Zealand Space Policy Review Consultation

SEPTEMBER 2022

**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 or by calling us free on: **0800 20 90 20**.

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Foreword from the Minister for Economic and Regional Development

This is an opportunity for you to have your say on the government's approach to space activities, engagements with international partners and the use of space technologies and data.

New Zealand's association with space goes back centuries: the first Māori explorers navigated by the stars to Aotearoa New Zealand, and centuries later they were followed by European navigators whose instruments also looked to the stars. Today, our modern navigation systems are still guided from space.

New Zealand is home to space success stories, such as Bill Pickering, who went through Wellington College and Canterbury University before becoming director of NASA's Jet Propulsion Laboratory, and Peter Beck, the founder of Rocket Lab, launching satellites from the world's first fully private launch facility on Mahia Peninsula.

Our journey to becoming a space faring country has rapidly accelerated, following Rocket Lab's decision to launch rockets from New Zealand. This has been the catalyst for establishing the New Zealand Space Agency, within the Ministry of Business Innovation and Employment, and creating a regulatory system through the Outer Space and High-altitude Activities Act 2017.

Global space industry revenues are now more than NZ\$600 billion per annum. New Zealand is part of this growth. In 2018/19, our space sector contributed \$1.69 billion to our national economy and supported 12,000 jobs.¹

Space is also becoming more crowded and complex, and making sure it is used sustainably is a global challenge. As a small nation, we have an interest in having a strong international rules-based system that ensures space is used responsibly and peacefully. The data we get from space can help us address a range of critical challenges – for New Zealand and the world – and provides an opportunity to model sustainable practices in new ways.

As the Minister responsible for all payloads launched from New Zealand, I am acutely aware that we must ensure our system, and the principles and policies that we adhere to, remain consistent with the expectations of New Zealanders.

Your feedback on this consultation will help us develop a National Space Policy that reflects the values and interests of New Zealand in space, and will guide our future policies, regulations, and international engagements. Thank you.

Hon Stuart Nash

Minister for Economic and Regional Development

¹ Deloitte. (2019). New Zealand space sector: its value, scope and structure. Ministry of Business, Innovation and Employment. Retrieved from www.mbie.govt.nz/assets/new-zealand-space-sector-its-value-scope-and-structure.pdf

Have your say

This consultation is an opportunity to share your views on the values and policy objectives that underpin New Zealand's space activities and engagements.

WHAT TO CONSIDER

You may find it helpful to consider the following questions when providing your feedback:

- › Why is space important to you? Why are you interested in space?
- › To what extent do you agree with the space values and policies which currently guide New Zealand's activities and engagements on space?
- › What space activities and engagements should New Zealand be inviting and/or promoting?
- › Who should the New Zealand government be engaging with on space?
- › How do you want to be engaged on space issues?

HOW TO MAKE A SUBMISSION

Visit the MBIE consultation portal for details on how to make a submission: www.mbie.govt.nz/have-your-say/new-zealand-space-policy-review

HOW WILL MY FEEDBACK BE USED?

Your feedback will be collated into a summary of feedback report. This will assist the New Zealand government to create or amend space policies and to look at:

- › **Creating a National Space Policy:** a document which outlines New Zealand's values and objectives on space, including for our international partners.
- › **Articulating New Zealand's broad interests on space across multiple activities and engagements:** including at United Nations fora and with international space and security partners.
- › **Developing future space strategies, policies and regulatory changes:** including adjusting our policies and regulations to meet advancements in space technology.
- › **Future engagement on space policy with the New Zealand public:** including on any key areas of interest identified through the consultation.
- › **Considering whether legislative changes are required** to the Outer Space and High-altitude Activities Act 2017.

SEPARATE AEROSPACE CONSULTATION

The government is also consulting on an Aerospace Strategy which sets out a vision and goals to grow the wider aerospace sector (which includes space and advanced aviation) in New Zealand. See www.mbie.govt.nz/have-your-say/aotearoa-new-zealand-aerospace-strategy for further information. Alternatively, the Space Policy Review consultation highlights the broader values and interests for the space sector (including, and beyond, economic development benefits), which will assist with the development of future space policies.

The New Zealand government's role in space policy development

Rocket Lab's decision to launch rockets from New Zealand was the catalyst for the creation of the New Zealand Space Agency (NZSA) in 2016. The NZSA sits within the Ministry of Business, Innovation and Employment (MBIE) and leads space policy, regulation and development of the New Zealand space sector.

THE NEW ZEALAND SPACE AGENCY LEADS SPACE POLICY

Space policy: The NZSA develops space policies that support the effective implementation of the Outer Space and High-altitude Activities Act 2017 and grow the sector. It aims to ensure space activities and engagements help the space sector develop in a safe and secure way. When we refer to 'space' throughout this document, we are also referring to 'high-altitude' – as high-altitude activities are also the responsibility of the NZSA.

Space sector development: The NZSA also leads on policies to develop the New Zealand space sector, attracting international companies to invest in New Zealand, and engaging on international science investment programmes.

Space regulation: The Outer Space and High-altitude Activities Act 2017² governs the regulation of New Zealand space activities. MBIE is the regulator, including for all payloads launched from New Zealand.

Space policy objectives are cross-cutting: for example, as well as considering sector development and regulation interests, New Zealand's space activities and engagements should also be responsible, sustainable and aligned with our national security and interests. This reiterates the importance of a collaborative cross-government approach to space policy development.

² Read the law here: [The Outer Space and High-altitude Activities Act 2017](http://www.legislation.govt.nz/act/public/2017/0044/DLM2779010.html)



Many government agencies lead and inform space policy objectives

The New Zealand Space Agency engages with multiple government agencies to ensure space policies are consistent with New Zealand's obligations, laws and interests. This includes, but is not limited to the agencies shown here.



The Ministry of Foreign Affairs and Trade contributes to the development of international space policy, including engagement on space security, from space debris to the weaponisation of space, through United Nations space fora and engagement with international partners.



The Ministry of Defence ensures New Zealand's strategic defence interests are reflected in space policies. Leading engagements with strategic defence partners.



The Ministry of Transport engages on regulatory and sector activities that impact controlled airspace.



Te Arawhiti advises on Māori-Crown engagement in space policy development.



Te Puni Kōkiri ensures the interests of whānau, hapū and iwi are reflected in policy development, including through kaitiakitanga to enable protection and appropriate use of mātauranga and other taonga.



The Ministry for the Environment engages on the use of space technologies to meet New Zealand's environmental goals, including on climate change.



The New Zealand Defence Force uses space-based assets for its core functions, and for supporting its humanitarian assistance and disaster relief operations.



The New Zealand Intelligence Community ensures national security interests are reflected in space policies. This includes the Department of the Prime Minister and Cabinet, Government Communications Security Bureau, and New Zealand Security Intelligence Service.



The Ministry for Primary Industries engages on the use of space technologies to benefit New Zealand's primary industries.



Land Information New Zealand engages on the use of space technologies to inform land information and management.

Supporting New Zealand's values and interests in space

New Zealand's values speak to who we are as a nation and how we act in the world. The following are values that the New Zealand government aims to reflect and promote through space activities, engagements and the use of space technologies. These values are informed by the concept of kaitiakitanga (guardianship) as a guiding framework to ensure that space, and its benefits, remain accessible for all.

INNOVATION

We value innovation, science, and technology as means of advancing our knowledge about the universe, driving productivity in the economy and improving the wellbeing of New Zealanders. We also want to encourage innovation which is responsible, enables New Zealand to be a good steward of the environment, and enables collaboration with companies and other governments.

RESPONSIBILITY

Space is a unique domain which is shared by all states. We act responsibly to promote a peaceful, stable, and secure space environment and to inform responsible behaviours on Earth. This includes acting in accordance with the principles in the Outer Space Treaty and other international agreements and arrangements applicable to space, as well as New Zealand's domestic law and policies. We also seek to influence the development of new international instruments, and develop norms and standards with like-minded countries, where there are gaps.

STEWARDSHIP

Space offers a unique perspective that is crucial for understanding our environment, including to fight climate change, and better manage our natural resources. At the same time, we take care to act sustainably in space and on Earth to preserve the benefits of these environments for future generations.

PARTNERSHIP

We are better when we work together. Participation, Partnership, and Protection are key principles of Te Tiriti o Waitangi and we want to continue to engage with Māori on New Zealand's space activities and engagements. The government works alongside New Zealanders and the space sector in developing policy and regulations that impact them; collaborates with international partners on economic, security and other interests; and within international institutions to promote New Zealand's values.

CROSS-CUTTING GOVERNMENT INTERESTS IN SPACE

The New Zealand government pursues a range of cross-cutting interests in space, including economic, national security, safe and secure regulation, international, and environmental. These interests are often articulated in broader government policies, strategies and assessments and inform our approach to space policy interests. For example, the Economic plan for a productive, sustainable and inclusive economy,³ the Maritime Security Strategy 2020,⁴ the Defence Assessment 2021,⁵ and New Zealand's Pacific Engagement – Partnering for Resilience.⁶



ECONOMIC

New Zealand has natural advantages and niche expertise in space.

The New Zealand space sector has great potential for innovative and inclusive growth. In 2018-19 alone it contributed \$1.69 billion to our national economy and supported 12,000 jobs.



NATIONAL SECURITY

Space technologies protect and advance New Zealand's national security interests.

At a time when strategic competition is increasingly playing out in space, space technologies enhance our maritime domain awareness to prevent illegal fishing and support other New Zealand Defence Force operations.

INTERNATIONAL

New Zealand promotes the responsible use of space internationally.

We do so in order to preserve the benefits from space for future generations. There are substantial opportunities to use space for the benefit of everyone on Earth, including the science and knowledge that can be gained through cooperative international space exploration.



SAFE & SECURE REGULATION

New Zealand has the capability to send launch vehicles into space.

This comes with the responsibility to safely and securely regulate all New Zealand space activities, consistent with our Outer Space and High-altitude Activities Act 2017 and its Regulations.



ENVIRONMENTAL

New Zealand models the sustainable use of space.

The data from space technologies can assist with domestic and international sustainability challenges, including the use of natural resources, agricultural monitoring, and the delivery of education and health care to isolated regions.

³ See the Government's Economic Plan for a productive, sustainable and inclusive economy – www.mbie.govt.nz/assets/economic-plan.pdf

⁴ See www.transport.govt.nz/assets/Uploads/Report/MaritimeSecurityStrategy.pdf

⁵ See www.defence.govt.nz/publications/publication/defence-assessment-2021

⁶ See www.beehive.govt.nz/speech/aotearoa-new%20zealand%E2%80%99s-pacific-engagement-partnering-resilience

SPACE POLICY OBJECTIVES

The New Zealand government supports each of these interests by pursuing the following policy objectives:

- › Growing an innovative and inclusive space sector
- › Protecting and advancing our national security and economic interests
- › Regulating space activities safely and securely
- › Promoting the responsible uses of space internationally
- › Modelling a sustainable space and Earth environment

This consultation document looks at how New Zealand has implemented these objectives to date. Within each section are examples of space activities, engagements, and technologies which demonstrate alignment with these policy objectives, and the need for effective collaboration on space.



Rocket Lab's first electron rocket launched from New Zealand at Launch Complex 1 on Mahia Peninsula, New Zealand, January 2018.

Growing an innovative and inclusive space sector

A 2019 report from Deloitte showed that the New Zealand space sector contributed \$1.69 billion to the economy and supported 12,000 jobs in 2018/19.⁷

It highlighted the range of New Zealand expertise across the space sector including:

- › A mix of start up, well established, entrepreneur driven, and privately funded space companies
- › Strong space manufacturing and space applications sub-sectors, and cutting-edge research and development capability within several universities across the country
- › Drawing on local and international talent, with strong connections to the global space economy

OBJECTIVES

The New Zealand government supports the growth of an innovative and inclusive space sector. This means:

- › Promoting New Zealand's natural advantage for conducting space activities, and research and development expertise across the space value chain
- › Partnering within New Zealand and internationally to increase research and development capabilities
- › Identifying opportunities to increase diversity in the space sector
- › Using cutting-edge space technology and space sourced data to support New Zealand's values and interests

PROMOTING NEW ZEALAND'S NATURAL ADVANTAGES, AND RESEARCH AND DEVELOPMENT EXPERTISE

Promoting New Zealand's natural advantages and research and development expertise will attract further collaboration on space both within New Zealand and with offshore partners, and will increase space sector productivity.

With a remote location, clear skies and seas, New Zealand has one of the world's widest selections of launch angles (azimuths) for rocket launches, and offers natural benefits for ground-based space infrastructure (including for communications and observing space objects) and the operation of launch infrastructure. Our varied landscape is also useful for testing remote sensing space technologies that can detect physical land characteristics.

In addition to our natural advantages, New Zealanders have research and development expertise across the space value chain, including planetary science, rocketry and propulsion, remote sensing data analytics, and life sciences in space.

⁷ Deloitte. (2019). New Zealand space sector: its value, scope and structure. Ministry of Business, Innovation and Employment. Retrieved from www.mbie.govt.nz/assets/new-zealand-space-sector-its-value-scope-and-structure.pdf

PARTNERING IN NEW ZEALAND AND INTERNATIONALLY TO INCREASE RESEARCH AND DEVELOPMENT CAPABILITIES

There is an opportunity to grow research and development capability across the space value chain. Existing partnerships and investments include, but are not limited to:

Innovation partnerships with other space agencies: New Zealand has partnered with several major space agencies to progress research and development capability, including with NASA (United States) through a Framework Agreement,⁸ and with DLR (Germany)⁹ under the NZ-DLR Joint Research Programme. Joint projects are enabled through MBIE's Catalyst Fund which supports activities that initiate, develop and foster work partnerships that take advantage of international science and innovation for New Zealand's benefit.¹⁰

Partnerships on science missions: MethaneSAT is a state-of-the-art satellite designed to detect global methane emissions with unprecedented accuracy. New Zealand is making two main contributions to the MethaneSAT mission: funding an atmospheric science programme over four years, and building and operating the Mission Operations Control Centre.

Innovation partnerships with international companies: MBIE facilitates partnerships between New Zealand and international companies such as Axiom, Maxar Technologies and LeoLabs, to support the growth and competitiveness of New Zealand's space sector.¹¹

Partnerships with academic institutions: MBIE engages universities involved in space related research, such as Te Pūnaha Ātea (the University of Auckland's Space Institute), the University of Canterbury, and the Robinson Research Institute (Victoria University of Wellington).

Space scholarships: Since 2018, through an agreement with NASA, MBIE has provided scholarships for New Zealanders to take part in its International Internships Program.

Partnerships for the use, and protection, of land for launch activities: The government is committed to developing New Zealand as a hub for high value, knowledge intensive businesses that create value through innovation and R&D, whilst also protecting and rejuvenating our environment for future generations. We aim to work across government, with iwi, and with the sector, to facilitate the use of land for aerospace (space and advanced aviation) activities. The Tāwhaki joint venture situated at Kaitōrete Spit in the South Island is a recent example of this (see page 31 with Tāwhaki example).

Partnerships to facilitate a thriving aerospace sector: The New Zealand government have been collaborating with the aerospace sector (which combines space and advanced aviation) domestically and globally, to deliver a Strategy which will drive change at pace, provide a shared vision on what aerospace could look like by 2030, and how we will get there.¹²

8 www.beehive.govt.nz/release/govt-signs-nz-e2%80%93usa-agreement-launching-new-opportunities-space-sector

9 See www.mbie.govt.nz/about/news/new-zealand-dlr-frontier-joint-research-programme-funding-announced/

10 For more information about the Catalyst Fund visit www.mbie.govt.nz/science-and-technology/science-and-innovation/funding-information-and-opportunities/investment-funds/catalyst-fund/

11 For more information on MBIE's Innovative Partnerships Programme see: www.mbie.govt.nz/science-and-technology/science-and-innovation/international-opportunities/new-zealand-r-d/innovative-partnerships/

12 For more information about the Aerospace Strategy visit www.mbie.govt.nz/have-your-say/aotearoa-new-zealand-aerospace-strategy

IDENTIFYING OPPORTUNITIES TO INCREASE DIVERSITY

A diverse space sector can help ensure that the benefits of space technologies and their data are shared with underrepresented communities.

The government aims to increase diverse participation and partnership in the space sector, and the science and research sector more broadly.¹³ The goal is for an inclusive and diverse environment where everyone has an opportunity to participate to their fullest potential.

Resources are also being developed for young people on space, so that they consider space or related fields as a career option. To build student's awareness of New Zealand's achievements as a space faring nation, MBIE allocated funding for the development of the interactive Tūhura Tuarangi: New Zealand in Space Exhibition delivered by Otago Museum and Science Learning Hub's¹⁴ online resources for school teachers.

13 See www.mbie.govt.nz/science-and-technology/science-and-innovation/agencies-policies-and-budget-initiatives/diversity-in-science/

14 See www.sciencelearn.org.nz/resources/3159-aotearoa-new-zealand-in-space-an-introduction



USING CUTTING-EDGE SPACE TECHNOLOGY AND DATA TO SUPPORT NEW ZEALAND'S VALUES AND INTERESTS

With an increase in commercial space activity and high-value science, there is likely to be a significant increase in data generated by suborbital and orbital satellites and our space-based technologies. This can lead to benefits for all New Zealanders, aligning with our values for space activities.

Creating situational awareness in space

Situational awareness in space involves incorporating data from a range of sources to enhance what we understand about a location and how objects in Earth's orbit behave. Our values in space have progressed in several ways through adopting situational awareness space technology.

- › *Innovation*: MBIE's Innovative Partnerships Programme established a partnership with LeoLabs. In 2019, LeoLabs unveiled their phased array space radar in Naseby, Central Otago, capable of tracking small satellites and space debris. It was the first of its kind in the Southern Hemisphere.
- › *Partnership*: the New Zealand government uses its partnership with LeoLabs, and its participation in international discussions, to develop situational awareness with other space nations.
- › *Responsibility*: MBIE worked with LeoLabs to develop the Space Regulatory and Sustainability Platform. This enables MBIE to track and monitor space objects launched from New Zealand.
- › *Stewardship*: this partnership puts New Zealand at the forefront of monitoring satellites and taking a sustainable approach to the use of space.



Kiwi Space Radar, Naseby, Central Otago. Credit: LeoLabs.

Protecting and advancing our national security and economic interests

Space plays an important role in protecting New Zealand and New Zealanders, including our national security and economic interests.

New Zealanders rely on space assets to do everyday tasks, like banking, transporting goods, travelling by air, and talking with each other. As the world becomes more connected and digitised, our reliance on advanced space-based technology to support our daily lives is only going to increase.

Because we rely so heavily on space assets every day, such as GPS, any disruption is likely to be detrimental to our economic interests, in addition to any specific threat to our national security. Space is becoming more congested and contested, which means disruptions could result from threats to space assets (such as from irresponsible space activities that cause debris) or threats from space assets (such as malicious interference with our critical infrastructure).

As our space sector grows, we need to have systems in place to support this industry to reach its full potential while ensuring that New Zealand's national security and economic interests are appropriately protected.

OBJECTIVES

To sustainably grow our space sector by having due regard to our national interests we need to:

- › Use space assets to protect and advance New Zealand's national security and economic interests
- › Manage the broad range of security risks in space to protect New Zealand's space industry
- › Collaborate with international space and security partners to pursue New Zealand's national security and economic interests

USE SPACE ASSETS TO PROTECT AND ADVANCE NEW ZEALAND'S NATIONAL SECURITY AND ECONOMIC INTERESTS

Space technologies can help us advance our national security and economic interests, like using satellite imagery to help track illegal fishing, or GPS to support our maritime supply chains. They can also assist New Zealand in responding to wider regional challenges, including the conduct of military operations and humanitarian assistance and disaster relief.

Humanitarian Assistance and Disaster Relief Operations

Space-based assets are critical to the functioning of a range of government agencies, including those responsible for national security. For example, enabling the New Zealand Defence Force's core functions by providing communications, weather observations, navigation, and situational awareness.

Satellite communications pass updates and imagery back to New Zealand. Satellite-based navigation systems for aircraft navigation and geolocation of images are taken by on-board cameras to support humanitarian assistance and disaster relief. Satellite-based weather observations also detect volcanic ash clouds, enhancing aircraft and crew safety.



View of Nomuka, Tonga taken by Royal New Zealand Air Force P-3K2 Orion during reconnaissance flight on Monday 17 January following the volcanic eruption. Photo courtesy of the New Zealand Defence Force.

Stability and Support Operations

Space-based assets are used to support the security and stability of other nations as well. This includes enabling effective use of New Zealand resources and enhancing the security of our people and the regional partners we support. Multiple government agencies, including New Zealand Police and Customs, have used space systems to assist a range of countries.

As part of a multi-agency effort, the New Zealand Defence Force (NZDF) supported evacuation of New Zealanders, their families and other visa holders from Afghanistan in 2021. On operations such as this, the NZDF uses space-based capabilities, such as satellite communication and global navigation satellite systems, to enhance safety, efficiency and mission effectiveness.



Royal New Zealand Air Force Hercules being loaded with evacuees from Hamid Karzai International Airport in Kabul, Afghanistan, August 2021. Photo courtesy of the New Zealand Defence Force.

But while we use space to protect our national interests, space also creates additional risks to our national security and economic interests that we need to continue to manage. For example, a company or country with access to space may use our space capabilities, such as ground infrastructure, for a purpose other than what they have stated, and that may enable activities that are not in New Zealand's interests.

The feedback we receive from this consultation will help us ensure we have the right balance between growing New Zealand's space sector and protection of our national interests and national security.

MANAGE THE BROAD RANGE OF SECURITY RISKS IN SPACE TO PROTECT NEW ZEALAND'S SPACE INDUSTRY

As the importance of the space industry to New Zealand grows, along with the role that we play internationally, the attractiveness of our space sector as a target for disruption grows. This could take the form of:

- › *Remote interference with space systems:* The reliance on space-based systems means we are vulnerable to the risk of interference with satellites and supporting infrastructure. Interference with signals from satellites or the supporting ground-based infrastructure can have broad ranging negative impacts. For example, cyber attacks on space networks and jamming of navigation systems are also an increasing problem globally.
- › *Physical interference with space systems:* The greater access and use of space by both state and non-state actors increases the risks to satellites from collisions and orbital debris. Technology is also being developed which can interfere with, disable or destroy the critical space infrastructure New Zealand relies upon.

We need to continue to have good awareness and robust processes in place to proactively mitigate the risk of this kind of targeted disruption. One way we do this is through our regulatory approach, but as our space sector grows in importance, the risk to individual businesses also grows.

COLLABORATING WITH INTERNATIONAL SPACE PARTNERS TO PURSUE NEW ZEALAND'S NATIONAL SECURITY AND ECONOMIC INTERESTS

Nearly all of the space systems and assets we rely upon are designed, manufactured, launched, and controlled overseas. As space is a shared domain, risks to space assets have the potential to affect more than one country.

New Zealand collaborates internationally to promote our values on the responsible and sustainable uses of space, including through defence and security partnerships. Space assets, such as remote sensing satellites, that are launched from New Zealand can also support international partners and their national security.

Defence space cooperation

New Zealand has been part of the Wideband Global SATCOM (WGS) since 2012. This communications system is a multinational secure means of military communication.

Our defence agencies promote New Zealand's defence and security interests through Combined Space Operations (CSpO), a military space initiative consisting of New Zealand, Australia, Canada, France, Germany, the United Kingdom, and the United States. The CSpO Vision 2031 outlines a collective aim to ensure our national security space operations promote a secure, stable, safe, peaceful, and operationally sustainable space domain.

Space assets and the Ukraine War

The invasion of Ukraine on 24 February 2022 illustrated the benefits and risks of space assets in a conflict. For example, we have seen in this conflict:

- › The use of commercial satellite imagery to provide evidence of the buildup of troops and troop movements once the invasion began
- › Space-based internet services like Starlink allowing people in Ukraine to have access to the internet despite the invasion and damage to infrastructure on the ground
- › Space assets being targeted, like the 'cyber event' targeting Viasat, an internet service provider
- › The jamming or 'spoofing' of Global Navigation Satellite Systems (GNSS) leading to the rerouting of aircraft and, in some cases, the need to change destinations due to the inability to perform a safe landing procedure.

These impacts were not limited to Ukraine. They were also felt by the region surrounding the Baltic Sea and neighbouring states, eastern Finland, the Black Sea, and the eastern Mediterranean area, including Cyprus, Turkey, Lebanon, Syria, Israel, and northern Iraq.



An array of New Zealand Defence Force satellite communications antennae set up during a New Zealand Army field exercise in July 2020. Photo courtesy of the New Zealand Defence Force.

Regulating to ensure space activities are safe and secure

MBIE regulates the use of all launch vehicles, facilities, payloads, and high-altitude vehicles from New Zealand under the Outer Space and High-altitude Activities Act 2017 (the Act). A key purpose of the Act is to facilitate the development of New Zealand's space industry and provide for its safe and secure operation. This includes preserving New Zealand's national security and national interests and adhering to our international obligations relating to space activities.

A review was completed on the operation and effectiveness of the Act in May 2022. The review's report concluded that New Zealand's regulatory regime operates effectively and is well regarded by entities that engage with it. For further information on the review of the Act, visit www.mbie.govt.nz/assets/report-on-the-statutory-review-of-the-oshaa-2017.pdf

Objectives

The New Zealand government regulates to ensure New Zealand space activities are safe and secure. This means:

- › Facilitating the safe and secure use of emerging space technologies from New Zealand
- › Clarifying what New Zealand space activities are inconsistent with the national interest
- › Promoting and protecting New Zealand's interests through permitting space technologies

FACILITATING THE SAFE AND SECURE USE OF EMERGING SPACE TECHNOLOGIES FROM NEW ZEALAND

The review report highlighted emerging technology areas where future regulation may be required. This included constellations. Some of the relevant policy considerations here are set out in the following pages.



RIGHT: A satellite internet constellation transiting the night sky over the Pacific coast of California in 2019.

SATELLITE CONSTELLATIONS

What are they?

A satellite constellation is a group of artificial satellites that work together as a single system. They are now a growing proportion of all satellites being developed, manufactured and launched globally.

What are their uses?

Large satellite constellations (which can sometimes comprise hundreds or thousands of satellites) are used for a range of reasons including navigation, broadcasting, taking images of the Earth, or providing internet access to communities that have no access.

Are there concerns?

There are some concerns about the impact of constellations, including effects on night sky observation by scientists and astronomers – observation may be interrupted by frequent or bright satellites passing over observation points at viewing times. This may also affect astro-tourism, such as the Aoraki Mackenzie International Dark Sky Reserve. A paper submitted to the United Nations Committee on the Peaceful Uses of Outer Space makes recommendations about keeping skies dark and quiet for science and society.¹⁵

Are there benefits?

New Zealand is well placed to benefit from the growth of constellations, due to our broad-based space sector that covers manufacturing, launching, tracking and data. All of these functions are needed to build and operate constellations. Some applications of constellations also have the potential to directly benefit New Zealanders – such as improving internet access for rural communities.

Mātauranga Māori

There is a deep connection between mātauranga Māori and space, including through tātai arorangi (knowledge of outer space), whakapapa (genealogical origins being linked to the beginning of the universe) and wairuatanga (the spiritual connection between the Earth and the universe derived from Māori cosmology). Broad mātauranga Māori views received through this consultation will also inform future constellations policy work.

Future regulations

New Zealand has previously launched satellite constellations – but not those which have comprised hundreds or thousands of satellites. Although an operational policy is in development for constellations, future regulation may be required to give more certainty and transparency on our approach to the public and regulated parties.

¹⁵ Scientific and Technical Subcommittee. Recommendations to keep dark and quiet skies for science and society. United Nations Committee on the Peaceful Uses of Outer Space, 58th session, UN Doc A/AC.105/C.1/2021/CRP.17 (19 April 2021).

CLARIFYING WHAT NEW ZEALAND SPACE ACTIVITIES ARE INCONSISTENT WITH THE NATIONAL INTEREST

The Minister for Economic and Regional Development (the Minister) is responsible for the licencing and permitting of all New Zealand space activities.

Mandatory requirements in the Act

Before the Minister approves the launch of a payload from New Zealand, there are a number of threshold tests that need to be met, including but not limited to: establishing that the activity can be carried out safely, compliance with our international obligations,¹⁶ and provision of a suitable orbital debris mitigation plan.¹⁷ The full assessment process can be found on the MBIE website.¹⁸

National interest, a final safeguard in the Act

However, even if the threshold tests are met, the Minister may decline a payload permit if s/he is not satisfied that a payload's operation is in the national interest. The Minister may take into account, when considering the national interest: economic or other benefits to New Zealand; risks to national security, public safety, international relations or other national interests; risks that cannot be mitigated by conditions of the licence or permit; and any other relevant matters (e.g. whether the activity represents a frivolous use of space). As part of policy to inform the language in the Act, Cabinet has agreed to principles which inform the consideration of national interest for space activities, as well as setting out some specific activities that are not in New Zealand's national interests.

Foreign government applicants, aligned with strategic interests

Our diplomatic relations with other nations can provide New Zealand with a level of confidence in the integrity of information provided by foreign government applicants. For example, our deep and long-standing security relationship with the United States, supported by a legally binding treaty – the Technology Safeguards Agreement (TSA)¹⁹ – gives us a high degree of trust in U.S. space operations, ensuring we are provided with full information to check that any payload is consistent with New Zealand law, our international obligations, national security, and our national interests.

¹⁶ New Zealand is party to several international space treaties that regulate space activities carried out from New Zealand such as the Outer Space Treaty (United Nations), the Radio Regulations (International Telecommunication Union) and the Convention on the Registration of Objects Launched into Outer Space (United Nations). New Zealand is also party to other international treaties that are relevant to space payloads, including treaties on disarmament, the environment and human rights.

¹⁷ See www.mbie.govt.nz/assets/orbital-debris-mitigation-operational-policy.pdf

¹⁸ www.mbie.govt.nz/science-and-technology/space/our-regulatory-regime/

¹⁹ Agreement between the Government of New Zealand and the Government of the United States of America on Technology Safeguards Associated with United States Participation in Space Launches from New Zealand. (June 2016). Retrieved from www.mbie.govt.nz/dmsdocument/1398-technology-safeguards-agreement-us-pdf

NATIONAL INTEREST PRINCIPLES: THESE PRINCIPLES INFORM THE CONSIDERATION OF NATIONAL INTEREST FOR NEW ZEALAND SPACE ACTIVITIES



RESPONSIBILITY

That space activities from New Zealand should be conducted with due care and in such a way as to promote an orbital environment where actors avoid causing harm or interference with the activities of others.



NEW ZEALAND'S VALUES & INTERESTS

Space activity from New Zealand should uphold the values supported by New Zealanders and align with broader policy settings.



SAFETY

Space activities from New Zealand should be conducted in a way that does not jeopardise human safety, including the safety of people in space.



SUSTAINABILITY

New Zealand should promote sustainable space practices that preserve the benefits of space for future generations.

ACTIVITIES AGAINST THE NATIONAL INTEREST

The following activities are considered not to be in New Zealand's national interests (i.e. the responsible Minister will not authorise such activities):

- › Activities that contribute to nuclear weapons programmes or capabilities.
- › Activities with the intended end use of enabling or supporting specific defence, security or intelligence operations that are contrary to government policy.
- › Activities with the intended end use of harming, interfering with, or destroying other spacecraft or space systems on Earth.
- › Activities where the intended end use is likely to cause serious or irreversible harm to the environment.

To date, no payload permit or licence applications have been declined on the grounds that they are contrary to New Zealand's national interest. The range of activities that have been authorised so far offer direct and indirect benefits to New Zealand's economy as well as our international space and security relations.²⁰

The statutory review of the Act did not suggest any changes to the national interest provisions in the Act or its regulations but did recommend that the Minister considers developing more specific national interest criteria.

PROMOTING AND PROTECTING NEW ZEALAND'S INTERESTS THROUGH PERMITTING SPACE TECHNOLOGIES

As one of the world's few launching states, New Zealand has the opportunity to promote and protect our interests globally, including through facilitating the regulation of space technologies in New Zealand that align with our values, and actively participating in policy and regulatory fora on responsible space behaviour, removing international debris, global space traffic management and situational awareness.

Active debris removal

The growing quantity of space debris poses a danger. Active debris removal technologies present innovative and responsible solutions to these issues. There is increasing international interest in such technologies, as well as complex legal issues regarding the use of them (including whether consent of the owner of the debris is required). It is likely that future domestic regulations will be required to facilitate the adoption of these technologies in New Zealand, which will aim to protect our national security interests in a responsible, sustainable space environment.

Our regulatory system will need to keep pace with other emerging technologies such as these, and targeted stakeholder engagement will be needed to address future regulatory policy development. Ongoing consultation with Māori will also be required to understand the intersection between te ao Māori and the use of emerging technologies in Aotearoa New Zealand and from space.

²⁰ Summary of payloads approved for launch: www.mbie.govt.nz/science-and-technology/space/permits-and-licences-for-space-activities/payloads-approved-for-launch/

Promoting the responsible uses of space internationally

Space activity has long relied on countries working together due to the cost and complexity of travelling to, and working in, outer space.

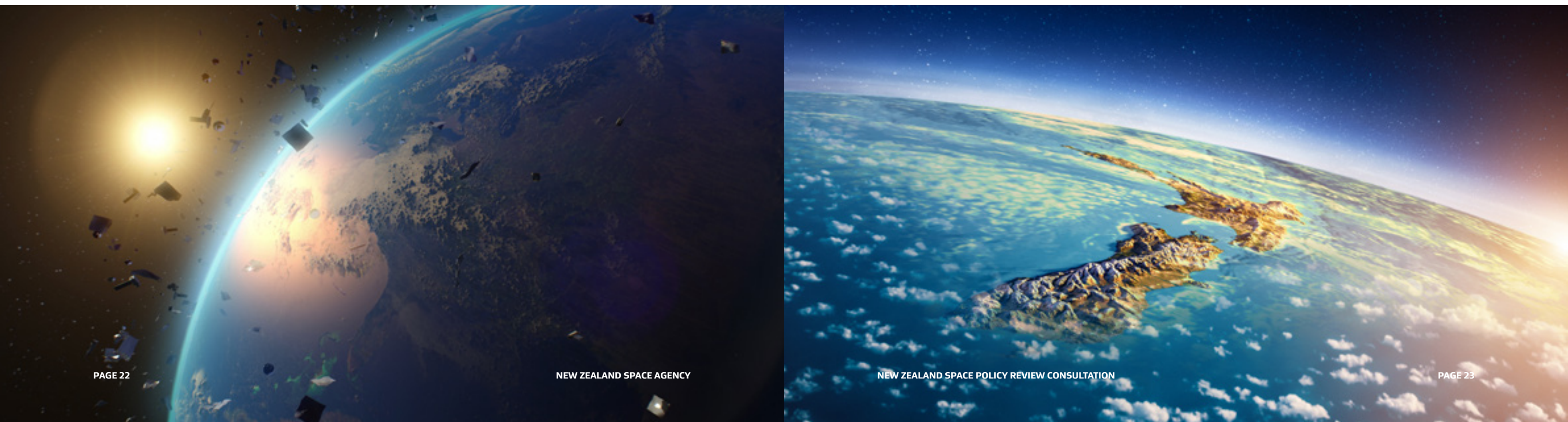
New Zealand is one of the few countries that has space launch capability. This gives us a credible voice internationally, and a responsibility to actively preserve the benefits of space for future generations and other nations across the world.

New Zealand's space sector is well placed to take advantage of the opportunities presented by launch activity, including attracting innovative technologies, engaging in space exploration, and helping to mitigate global challenges such as climate change.

OBJECTIVES

The New Zealand government promotes the responsible uses of space internationally. This means:

- › Advocating for effective international rules, norms and standards in space
- › Partnering with like-minded launch states to adopt peaceful, responsible and sustainable space practices
- › Collaborating internationally to increase New Zealand's influence and capabilities in the global space sector



ADVOCATING FOR EFFECTIVE INTERNATIONAL RULES, NORMS AND STANDARDS

New Zealand is party to the main international agreements that promote a safe, responsible, sustainable and peaceful space environment.²¹ We reflect these international laws and governance arrangements in our domestic legislation and policies.

The key international space forum where New Zealand advocates for effective rules, norms and standards in space is the United Nations Conference on the Peaceful Uses of Outer Space (COPUOS). This conference is responsible for developing rules and norms about how civilians use outer space safely and sustainably. New Zealand joined COPUOS in 2017. Since then, we have been involved in negotiating guidelines on the long-term sustainability of outer space activities²² and setting up the working group that will implement the guidelines.

Most international laws on space activities were developed in the 1960s. Since then, the global space landscape has vastly changed, including through the rise of commercial organisations in space, when it was previously dominated by government programmes from a few large nations.

As a result, gaps exist in the international regulatory framework, and New Zealand advocates for additional rules, norms and standards where these exist. This includes seeking agreement to ensure over-arching obligations (including that space activities are for peaceful purposes, in the interest of maintaining international peace and security, and for the benefit and interest of all countries).

We are pursuing developing norms and principles as the most pragmatic way forward.²³ To that end, New Zealand has been a strong supporter of the UK-led resolution on developing norms and principles of responsible behaviours in outer space. New Zealand is actively participating in the resulting open-ended working group at the United Nations, with the objective of developing common understandings of what responsible behaviour in outer space looks like in practice.

²¹ These agreements include the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (also known as the Outer Space Treaty), agreed in 1967; the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (also known as the Rescue Agreement), agreed in 1969; and the Convention on International Liability for Damage Caused by Space Objects (also known as the Liability Convention), agreed in 1974. In 2018, New Zealand acceded to the Convention on the Registration of Objects Launched into Outer Space (the Registration Convention), in time for the first launch of spacecraft from New Zealand.

²² See www.unoosa.org/res/oosadoc/data/documents/2018/aac_1052018crp/aac_1052018crp_20_0_html/AC105_2018_CRP20E.pdf

²³ New Zealand Ministry of Foreign Affairs and Trade. (2021). Norms, rules and principles of responsible behaviours in space: New Zealand contribution. Retrieved from <https://front.un-arm.org/wp-content/uploads/2021/05/Space-responsible-behaviours-submission-to-UN-New-Zealand.pdf>

PARTNERING WITH LIKE-MINDED LAUNCH STATES TO ADOPT PEACEFUL, RESPONSIBLE AND SUSTAINABLE SPACE PRACTICES

Every country has an interest in ensuring the orbital space around Earth is accessible and sustainable. This includes ensuring satellites can safely function and spacecraft can safely transit through orbital space. Sometimes, the risks to space assets are outside anyone's control, particularly with regard to space weather. Risks are also not obvious or predictable.

Some behaviours which can threaten the continued sustainability of near-Earth space include placing weapons in space, anti-satellite (ASAT) missile testing, and developing ground or orbital systems that cause intentional interference with satellites or their operations. Other activities, while not inherently irresponsible, can lead to heightened risks of interference, increased debris, and the limitation of resources such as desirable orbital positions.

Engaging with other like-minded launch states on common values, and with all satellite owners/operators on these values, is essential to safeguard space as a peaceful, responsible and sustainable domain. New Zealand's bilateral space and security partnerships also provide broader domestic benefits to our national security and international relations.



United Nations building in Vienna which hosts the Committee on the Peaceful Uses of Outer Space.

Modelling responsible space behaviours

In 2021, New Zealand submitted ideas to the U.N. General Assembly on the further development and implementation of norms, rules and principles of responsible behaviours and on the reduction of the risks of misunderstanding and miscalculations with respect to outer space. These responsible behaviours are examples of mitigating some of the aforementioned challenges and New Zealand's efforts in modelling these.



MITIGATING CREATION OF SPACE DEBRIS

States have a responsibility to not intentionally or knowingly create or support the creation of debris. If space becomes less accessible, emerging space countries could face severe difficulties in using it effectively and this is not equitable or in line with our commitments to the Outer Space Treaty.



TRANSPARENCY & COMMUNICATION

Space actors are encouraged to communicate their intention prior to engaging in an activity, to create predictability, opportunities for feedback or risk notification, and more effective management of risks. Regarding applications to conduct space activities from New Zealand, MBIE regularly releases information about every payload permitted.



SUPPORTING THE DEVELOPMENT OF INTERNATIONAL LAW

New Zealand seeks to employ the full range of tools available to us. This means engaging through multilateral forums at the United Nations bodies, as well as engaging with smaller groupings where we see opportunities to influence the future rules. Our participation in the Artemis Accords is an example.



SPACE SITUATIONAL AWARENESS

Includes the ability to incorporate data from a variety of sources to enhance understanding of the location and behaviour of objects in Earth's orbit and ensure that all stakeholders have a more complete picture of the operating environment. MBIE's partnership with LeoLabs has demonstrated the value of this tool for our own regulatory processes.

COLLABORATING INTERNATIONALLY TO INCREASE NEW ZEALAND'S INFLUENCE AND CAPABILITIES IN THE GLOBAL SPACE SECTOR

New Zealand is also committed to working with all countries that explore space. We see this as an opportunity for scientists, researchers and other New Zealanders to join international efforts to learn about our solar system, galaxy, and the universe, and to share knowledge from space exploration endeavours for the benefit of humankind.

New Zealand's contributions to space exploration can also advance technology solutions or science in areas of national importance, including climate change resilience and natural disaster recovery, particularly in the Pacific, and our sustained scientific investigations of Antarctica.

Artemis Accords

In May 2021, New Zealand signed the Artemis Accords²⁴ with the United States. We are one of 19 signatories to date representing a diverse group of countries.²⁵ The Accords set principles for the peaceful exploration of space, transparency, interoperability, release of scientific data, safe and sustainable use of resources, safe disposal of debris, and prevention of harmful interference in others' activities among other principles.

Many celestial bodies contain rare, valuable minerals. Extracting these resources is likely to play a role in the exploration of deep space. Some commercial companies are also interested in extracting them and bringing them back to Earth. It is difficult to estimate the potential economic value from accessing space. However, a 2018 study commissioned by the Luxembourg Space Agency expects the space resource utilisation (SRU) industry will generate up to €170 billion between 2018 and 2045.

New Zealand does not currently intend to extract space resources. New Zealand's position is that the basic level of regulation provided by existing international law is not sufficient to regulate SRU in the long term. Therefore, New Zealand advocates for multilateral rules, norms, or standards in order to ensure the long-term sustainability of SRU, reinforce the peaceful use of outer space, and effectively implement the existing international rules on SRU. Before we take part in any SRU activity, we will also make sure to meaningfully consult on our position with New Zealanders.

New Zealand's launch capability has provided a new strand to the development of our diplomatic and economic relationships, in turn supporting our security objectives. While launch capabilities are increasingly in the private sector, governments continue to make up a large proportion of the customer base for launch providers. These payloads can range from research and development, to operational civil services, to military and intelligence payloads. As a trusted partner, launch providers operating from New Zealand are well placed to provide this service.

All payloads, including those owned by foreign governments, must meet the tests required under New Zealand's regulations and New Zealand's international obligations. Provided prospective payloads meet this test, it is not only a valuable source of business for New Zealand-based firms, but creates high paying jobs for New Zealanders and facilitates research partnerships with New Zealand institutions. New Zealand's status as a responsible launch nation also amplifies our voice in international settings, where we advocate for the peaceful, responsible, and sustainable use of space to safeguard benefits for all countries and future generations.



LEFT: Dr. Peter Crabtree, former Head of the New Zealand Space Agency (left) and former Chargé d'Affaires of the U.S. to New Zealand, Kevin Covert, following New Zealand signing the Artemis Accords on May 31, 2021.

²⁴ NASA. (14 October 2020). NASA, international partners advance cooperation with first signings of Artemis Accords. [webpage]. Retrieved from www.nasa.gov/press-release/nasa-international-partners-advance-cooperation-with-first-signings-of-artemis-accords

²⁵ The other 18 signatories are Australia, Bahrain, Brazil, Canada, Colombia, Israel, Italy, Japan, Luxembourg, Mexico, Poland, the Republic of Korea, Romania, Singapore, Ukraine, the United Arab Emirates, the UK and the U.S.



Modelling sustainable space and Earth environments

Sustainability supports our economic, national security, regulatory and international interests in space. We want to ensure that both space and Earth environments are sustainably used to preserve their benefits for future generations.

OBJECTIVES

The New Zealand government advocates for the sustainable use of space to ensure its benefits remain available to future generations. At the same time we seek to use space, and space technologies, to gain understanding and better protect our environment on Earth. Specifically this means:

- › Encouraging inclusive, sustainable space collaborations within New Zealand
- › Assessing the cumulative impact of space activities on the Earth environment
- › Assisting with solving sustainability challenges through space data, including to better monitor or understand the Earth's environment
- › Investing in New Zealand's capability to retain, grow, access and use sustainable space technologies

ENCOURAGING INCLUSIVE, SUSTAINABLE SPACE COLLABORATIONS WITHIN NEW ZEALAND

Mātauranga Māori and space are deeply connected, with space representing whakapapa (genealogical links to the beginning of the universe), wairuatanga (the spiritual connection between Earth and the universe, derived from Māori cosmology), and tātai arorangi (Māori knowledge of astronomy). The government aims to provide opportunities for Māori including, but not limited to, partnering with the space sector, and one way of doing this is through a joint venture such as Tāwhaki.



LEFT:
Sunrise over
Kaitōrete Spit,
Canterbury,
January 2022.

Tāwhaki

Tāwhaki is a new and unique commercial joint venture partnership co-designed and co-developed between Te Taumutu Rūnanga, Wairewa Rūnanga (together as Kaitōrete Limited) and the Crown. The joint venture has secured 1,000 hectares of land on Kaitōrete Spit in Canterbury with the purpose to:

- › Protect and rejuvenate the Kaitōrete environment, an area of significant cultural importance to the Rūnanga and home to numerous threatened and locally endemic plant, invertebrate, bird, and reptile species, with internationally recognised ecological value.
- › Develop aerospace activities and R&D facilities that have the potential to generate significant and sustainable economic opportunities through job creation, capital investment and adjacent sectors serving the aerospace economy.

In line with the values and objectives outlined in this document, Tāwhaki is an example of the New Zealand space sector in:

- › *Innovation*: developing aerospace (space and advanced aviation) activities and research and development facilities that can generate significant, sustainable economic opportunities through jobs, capital investment and adjacent sectors that serve the aerospace economy.
- › *Partnership*: a commercial joint venture between Kaitōrete Limited and the Crown. Kaitōrete Limited is represented by two Ngāi Tahu Rūnanga: Te Taumutu Rūnanga and Wairewa Rūnanga.
- › *Stewardship*: protecting and rejuvenating the environment at Kaitōrete Spit for future generations.

For more information about Tāwhaki, visit: www.mbie.govt.nz/dmsdocument/14756-project-tawhaki-a-unique-partnership-for-kaitorete

ASSESSING THE CUMULATIVE IMPACT OF SPACE ACTIVITIES ON THE EARTH ENVIRONMENT

In New Zealand, there are now more frequent launches and launch vehicles returning to Earth. This gives us the opportunity for further research on the cumulative impacts these space activities have on air, land and sea, compared with those of commercial aircraft.

With regard to assessing impacts on the maritime domain, The International Maritime Organization recognises the emerging issue of rocket launch debris, and the impacts this may have. However, little is known about the cumulative impact that launch debris has on the world's marine environment.

In 2016, NIWA assessed the ecological risks to New Zealand's marine environment from launch debris.²⁶ This assessment has informed New Zealand legislation on permissible space launch deposit in our exclusive economic zone (EEZ).

²⁶ NIWA. (2017). Ecological risk assessment of the impact of debris from space launches on the marine environment. Retrieved from <https://environment.govt.nz/assets/Publications/Files/Ecological-Risk-Assessment-of-the-impact-of-debris-from-space-launches-on-the-marine-environment.pdf>

ASSISTING WITH SOLVING SUSTAINABILITY CHALLENGES THROUGH SPACE DATA

New Zealand has the potential to lead sustainable space access, including designing sustainable and cost-effective techniques for removing space debris. MBIE has partnered with Japan-based company, Astroscale, on space safety and sustainability including addressing policy challenges and the associated costs of active debris removal missions.

Space technologies and data can also assist with the following sustainability challenges:

- › Contributing toward achieving the UN 2030 Sustainable Development Goals²⁷
- › Assisting New Zealand and our partners with the sustainable use of natural resources, including:
 - › Mitigating global emissions
 - › Delivery of education
 - › Delivery of health care
 - › Agricultural monitoring
 - › Humanitarian aid to disaster stricken areas
 - › Providing early warning of natural disasters
 - › Improving responses after disasters and emergencies.
 - › Contributing to objectives within the Climate Change Response (Zero Carbon) Amendment Act 2019²⁸
 - › Monitoring variables that affect crops, such as soil moisture, surface temperature and pest infestations

This data can help us make sustainable decisions, for example, how to most effectively use land, seeds, fertilisers, and water.



RIGHT: Lake Waitaki, Lake Waitaki Dam, and the Waitaki River. Sourced from the Land Information New Zealand (LINZ) Data Set, New Zealand 10m Satellite Imagery 2022.

²⁷ See <https://sdgs.un.org/goals>

²⁸ Ministry for the Environment. (2021). Climate Change Response (Zero Carbon) Amendment Act 2019. Retrieved from <https://environment.govt.nz/acts-and-regulations/acts/climate-change-response-amendment-act-2019/>

INVESTING IN NEW ZEALAND'S CAPABILITY TO ACCESS AND USE SUSTAINABLE SPACE TECHNOLOGIES

Investing in New Zealand's capability to access and use sustainable space technologies will enable New Zealand to understand and mitigate a range of global issues. For example, space-based data can help us understand and mitigate global emissions. The MethaneSAT space mission is an example of New Zealand's involvement with international initiatives that will benefit all New Zealanders.

MethaneSAT space mission: measuring and mapping methane emissions to mitigate climate change

The MethaneSAT space mission is developing a satellite that is scheduled to be launched in 2023. The satellite will quantify and map global methane emissions, and contribute to the mission's goal of speeding up a reduction in methane emissions from oil and gas infrastructure by at least 45 per cent by 2025.

The Environmental Defense Fund²⁹ and its subsidiary MethaneSAT LLC are leading the mission. New Zealand is investing \$26 million in the mission, which will fund the Mission Operations Control Centre for the satellite. It will also fund research on using the satellite's data to identify and measure methane emissions from agricultural sources in New Zealand and around the world.

Our investment will build important capability in our space sector, as our researchers will get to work with world leading atmospheric scientists. The work will also make an important contribution to slowing down global warming.

The Mission Operations Control Centre will be developed by Rocket Lab and hosted by the University of Auckland's Te Pūnaha Ātea (Auckland Space Institute). The New Zealand science team will use data from the mission to collaborate with our international partners to reduce methane emissions from agriculture.

For more information about MethaneSAT, visit www.mbie.govt.nz/methanesat-mission



LEFT: A representation of MethaneSAT in orbit. Credit: Ball Aerospace.

²⁹ The Environmental Defense Fund is an American non-governmental organisation.

MORE INFORMATION

This document reflects New Zealand's space values (innovation, responsibility, stewardship and partnership) informed by the concept of kaitiakitanga (guardianship), and policy objectives against a wide range of interests in space (economic, national security, regulation, international and environmental). Further information on New Zealand Space Agency activities and engagements can be found on the MBIE website.³⁰

³⁰ See www.mbie.govt.nz/science-and-technology/space





Te Kāwanatanga o Aotearoa
New Zealand Government

NZSA 8426