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SPACE TRAILBLAZER

Deloitte Access Economics

Innovation for growth
Charting the Space and Advanced Aviation sectors

Ministry of Business, Innovation and Employment

Economic Study of the Space and Advanced Aviation Sector

April 2025

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Acknowledgements

Deloitte Access Economics and Space Trailblazer gratefully acknowledges the assistance of all stakeholders involved in the preparation of this report.

The survey data used in this report could not have been collected without the enthusiastic co-operation of multiple organisations who agreed to distribute the survey on behalf of Deloitte Access Economics and Space Trailblazer. A list of organisations who offered to distribute this survey is provided in Appendix A.

Organisations and individuals also generously offered to share their insights confidentially. On technical aspects, in particular, a wide range of space-related organisations and subject matter experts offered valuable insights and resources.

Deloitte Access Economics and Space Trailblazer prioritises the confidentiality of survey participants.

This report presents independent research conducted by Deloitte Access Economics and Space Trailblazer and commissioned by the Ministry of Business, Innovation and Employment (MBIE).

MBIE were independent of the collection, analysis, and interpretation of respondent data (except where they provided government data on behalf of the NZ Space Agency and other government departments involved in the Space and Advanced Aviation sectors).

All data collected remained purely confidential and only accessible to Deloitte Access Economics for the purposes of analysis and aggregation.

Glossary

Acronym	Full Name
ANZSIC	Australian and New Zealand Standard Industrial Classification
DTH	Direct-to-home broadcasting
EBITDA	Earnings before interest, taxes, depreciation, and amortisation
EO	Earth observation
FTE	Full-time equivalent
GDP	Gross domestic product
GOS	Gross operating surplus
IO	Input-output
MBIE	Ministry of Business, Innovation and Employment (New Zealand)
NZD	New Zealand Dollar
OECD	Organisation for Economic Cooperation and Development
PNT	Position, navigation and timing
R&D	Research and development
USD	United States Dollar

Executive summary

This report charts the present landscape of New Zealand's Space and Advanced Aviation sectors, showcasing strong innovation and growth for the country.

What is the motivation and scope of this report?

In New Zealand's recent Space and Advanced Aviation strategy the Government has set out the goal to double the size of the sectors by 2030. To understand the current size of the sectors, Deloitte Access Economics and Space Trailblazer have been engaged by the Ministry of Business, Innovation and Employment (MBIE) to assess the current market size, composition and economic contribution of the New Zealand Space and Advanced Aviation sectors for the Financial Year 2024 (July 2023 to June 2024; FY24).

This marks the second report on the New Zealand's Space sector and the debut report on the Advanced Aviation sector. The first report (*The New Zealand Space Sector: Its value, scope and structure*) was published in 2019 and estimated the market size and economic contribution of the Space sector. This report is informed by a bespoke survey, fielded between 11 November 2024 to 21 January 2025.

New Zealand's rapidly growing Space sector

Key survey insights on the Space sector

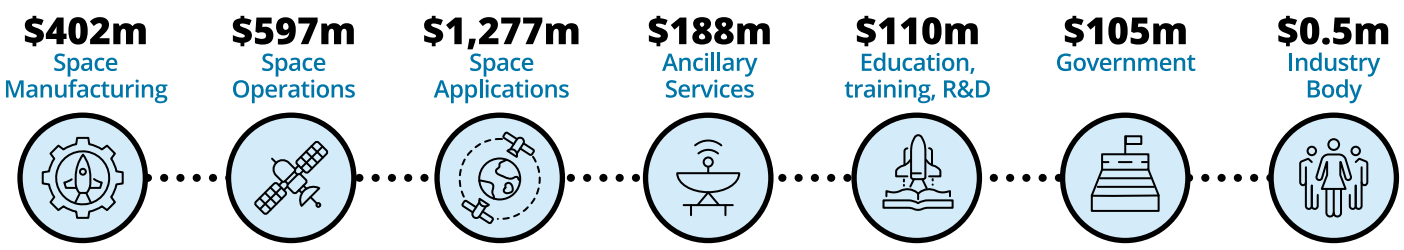
Based on the survey data, the structure of the New Zealand Space sector is commercially led. Key insights are:

- **Location:** Survey data shows 45% of the organisations are based in Auckland, 22% in Christchurch, 11% in Wellington and the balance are distributed across New Zealand.
- **Maturity:** The Space sector has become more mature, and the data suggests some mature companies from other industries have diversified into the Space sector. Organisations have been able to leverage the market interest and activity generated by key leaders in the Space sector to build on existing capability.
- **Turnover:** While the majority of organisations earned between $200,000 to $2 million, there are now almost 40% of organisations in the Space sector which had a turnover range in FY24 that was greater than $2 million**.** This reflects the growing number of mature firms operating in the Space sector. The Space sector also shows growth in the lower turnover ranges.
- **Research and Development:** The Space sector has deep research and development (R&D) capability across the country, with 18 research institutions in 2024. The Space sector is more than 8 times R&D intensive than the New Zealand average - R&D for Space is 11% compared to the New Zealand average of 1.4%.[1]
- **Workforce:** New Zealand's Space sector is generally home-grown. 78% of respondents reported that more than 50% of their workforce draws on New Zealanders to conduct their operations. In addition, 7% of respondents identified as a Māori business.
- **Exports:** The New Zealand Space sector generated almost 29% of revenue from abroad, which is a higher export share than the New Zealand economy overall (in 2023 it was 24%[2]). Export markets vary and include USA, Canada, Europe, Singapore, India, Japan, and Korea.

What is the estimated market size of New Zealand's Space sector today?

In the five years since 2019, the New Zealand Space sector has expanded from an estimated $1.75 billion to $2.68 billion, marking a 53% increase or year-on-year growth of 8.9%.[3] This outpaced Global Space sector's growth of 40.6% over the same period.[4,5] New Zealand's Space sector has also outpaced local economic growth over this period, which was 8.7%, or year-on-year growth of 1.9%[6].

Figure 1: Size of the Space sector – Breakdown by sub-sector



The Space sub-sector definitions are as follows:

Space Manufacturing: includes the design and/or manufacture of Space equipment and subsystems.

Space Operations: includes the launch and/or operation of satellites and/or spacecraft and ground stations.

Space Applications: includes applications making use of satellite signals and data.

Ancillary Services: includes organisations involved in the provision of specialised support services.

Research & Development: Space related research & development.

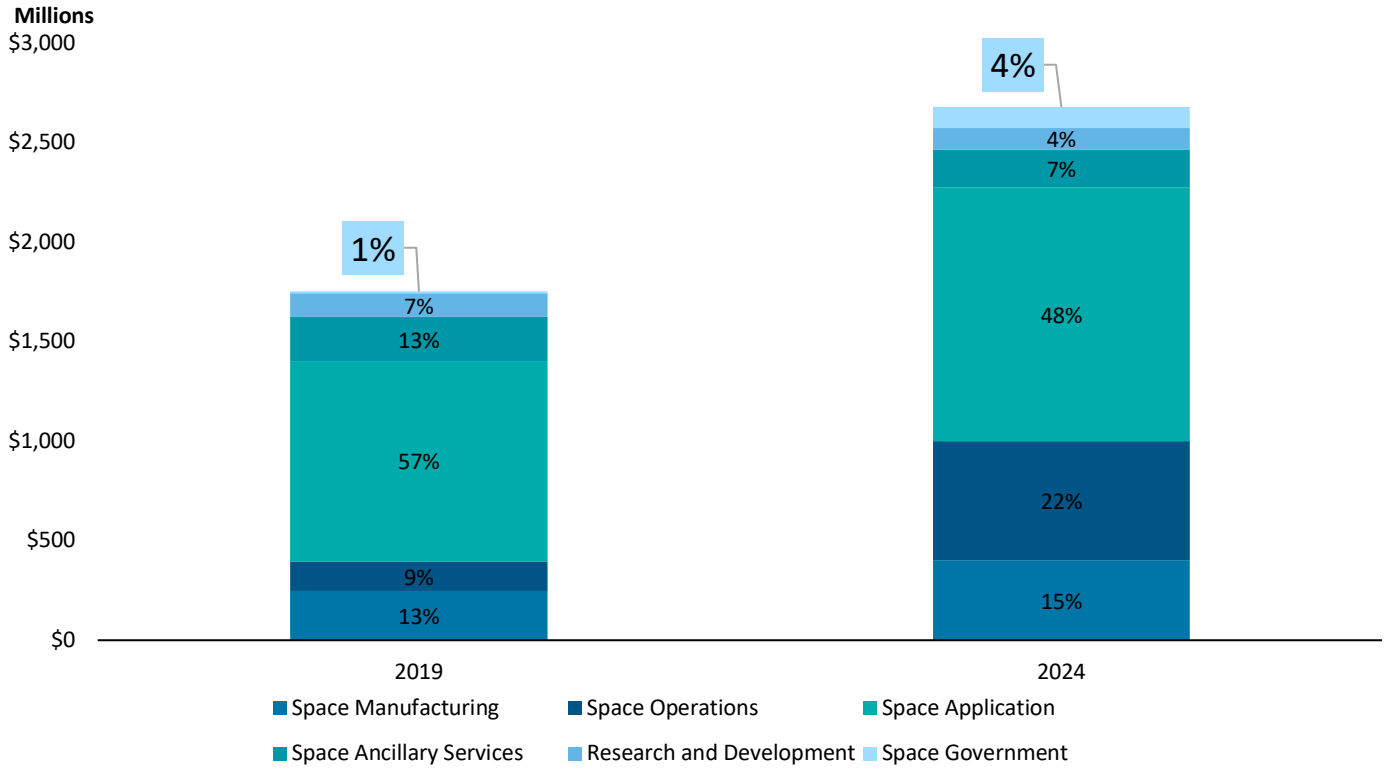
Education and training: includes any up-skilling activities that are specific to the Space sector.

Government: Space-related activities that require regulatory oversight, space related policy-making and sector development functions including provision of funding for research and development.

Industry Body: a representative body that provides a collective voice for or maintains oversight over individual organisations within the Space sector.

The proportion of total revenue by each sub-sector has shifted since 2019 with Space Manufacturing and Space Operations making up a much larger proportion of total revenue in 2024. The following figure illustrates the comparison of revenue or gross output between 2019 and 2024.

Figure 2: Space sub-sector company size distribution – 2019 vs. 2024



Source: Deloitte Access Economics

What is the economic contribution of New Zealand's Space sector today?

Drawing on data from the survey and financial reports of key participants in the Space sector, the economic contribution analysis estimates the direct and indirect value added to New Zealand's Space economy.

- The direct contribution of the Space sector to New Zealand GDP (value added by the activities of businesses within the Space sector) in FY24 was $1.26 billion, representing a value-added share of 47% of total revenue.
- The indirect contribution of the Space sector to the New Zealand economy (the value added by the Space sector's expenditure on goods and services used in the production process) in FY24, was $1.21 billion.
- Space directly supports an estimated 7,000 full-time equivalent roles (FTEs). Total employment, including indirect effects, was 17,000 FTE jobs.
- The total economic contribution was $2.47 billion, equivalent to 90% of the Space sector's revenue and 0.58% of New Zealand's GDP.

The economic contribution of the Space sector to New Zealand was **$2.47 billion** in the 2024 financial year.

Space market size 2024

53%
growth since 2019

8.9%
equivalent year-on-year

$402m
Space Manufacturing

$1,277m
Space Applications

$105m
Government

$2.68bn
The total estimated revenue of the Space sector in New Zealand in 2024

$110m
Education, training, R&D

$188m
Ancillary Services

$0.5m
Industry Body

$597m
Space Operations

Economic contribution of the Space sector

$2.47bn
Total Economic Contribution 2023-24

$1.26bn
Direct economic contribution

$1.21bn
Indirect economic contribution

7,000 FTE
Direct employment

11%
R&D as a % of sector revenue

29%
Exports as a % of sector revenue

10,000 FTE
Indirect employment

New Zealand's current Advanced Aviation sector

Estimating the market size of the Advanced Aviation sector was based on the guideline used by the Emerging Technologies Unit and the Civil Aviation Authority (CAA)'s guidance on the definition of emerging technologies outlined below:

"An emerging technology is an all-encompassing term that refers to any aviation capability that:

- *Has not been certified or approved before*
- *Is novel*
- *Is not routine*
- *Is not limited to unmanned aircraft.*

To be considered part of this sector, you or your firm only need to meet one of the above criteria. For example, if you are developing technology that is (or will be) certified or approved by the CAA, but it is novel or non-routine, you are considered part of the Advanced Aviation Technologies sector."

Key survey insights on the Advanced Aviation sector

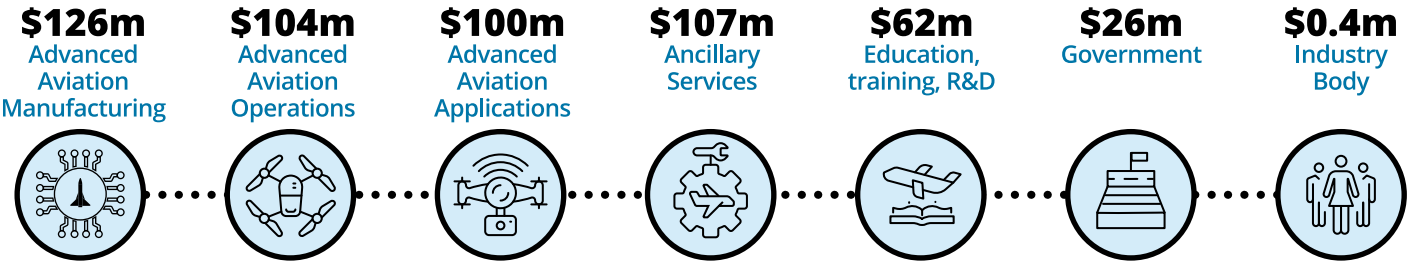
Based on the survey data, key findings on the composition of the Advanced Aviation sector are:

- **Location:** Survey data shows 38% of the organisations are based in Auckland, 28% in Christchurch, 11% in Wellington, with the balance distributed across New Zealand.
- **Maturity:** The Advanced Aviation sector is a combination of younger, smaller organisations and larger well-established organisations. A third have been operating for more than 20 years, with most organisations operating across both Space and Advanced Aviation. Organisations with a core focus on Advanced Aviation are typically observed to have been operating for less than five years.
- **Turnover:** Survey data indicates that turnover levels vary significantly. Organisations primarily focused on Advanced Aviation tend to experience lower turnover ranges, whereas those involved in both Space and Advanced Aviation typically fall into higher turnover ranges.
- **Research and Development:** The sector has a high R&D intensity of 21% of total revenue or 15 times our current national average. A number of research institutions focus on the Advanced Aviation sector and over 50% operate across both Space and Advanced Aviation.
- **Workforce:** 84% of survey respondents reported that more than 50% of their workforce draws on New Zealanders to conduct their operations.
- **Exports:** Based on the survey data, exports for the sector accounts for 16% of total revenue in FY24 across several export markets, including USA, Australia, Canada, Israel, and the Pacific Islands.

What is the market size of New Zealand's Advanced Aviation sector today?

The total estimated revenue of the New Zealand Advanced Aviation sector was $0.53 billion in 2024, based on the emerging technologies definition used in this study. This is equivalent to 0.11% of the New Zealand economy.[7]

Figure 3: Size of the Advanced Aviation Sector – Breakdown by sub-sector



Advanced Aviation Manufacturing: includes the design and/or manufacture of Advanced Aviation equipment and subsystems.

Advanced Aviation Operations: include the operation of Advanced Aviation technologies.

Advanced Aviation Applications: include applications making use of Advanced Aviation technology.

Ancillary Services in Advanced Aviation: include organisations involved in the provision of specialised support services for Advanced Aviation organisations.

Research & Development: Advanced Aviation related research & development.

Education and training in Advanced Aviation: include any up-skilling activities that are specific to the Advanced Aviation sector.

Government: Advanced Aviation-related activities that require regulatory oversight, policy-making and sector development functions.

Industry Body: a representative body that provides a collective voice for or maintains oversight over individual organisations within the Advanced Aviation sector.

What is the economic contribution of New Zealand's Advanced Aviation sector today?

The economic contribution analysis estimates the direct and indirect value added to New Zealand's Advanced Aviation sector based on survey data and financial reports of key participants.

- The direct contribution of the Advanced Aviation sector to New Zealand's GDP (value added by the activities of businesses within the Advanced Aviation sector) in FY24 was $0.30 billion, representing a value-added share of 57% of total revenue.
- The indirect contribution of the Advanced Aviation sector to the New Zealand economy (the value added by the Advanced Aviation sector's expenditure on goods and services used in the production process) in FY24 was $0.18 billion.
- Advanced Aviation directly supports an estimated 2,000 FTEs. Total employment, including indirect effects, was 3,700 FTE jobs.
- The total economic contribution was $0.48 billion, equivalent to 88% of the Advanced Aviation revenue and 0.11% of New Zealand's GDP.

The economic contribution of the Advanced Aviation sector to New Zealand was **$0.48 billion** in the 2024 financial year.

Advanced Aviation market size 2024

$0.53bn

The total estimated revenue of the Advanced Aviation sector in New Zealand in 2024

$126m
Advanced Aviation Manufacturing

$107m
Ancillary Services

$104m
Advanced Aviation Operations

$100m
Advanced Aviation Applications

$62m
Education, training, R&D

$26m
Government

$0.4m
Industry Body

Economic contribution of the Advanced Aviation sector

$0.48bn
Total Economic Contribution 2023-24

$182m
Indirect economic contribution

$299m
Direct economic contribution

21%
R&D as a % of sector revenue

16%
Exports as a % of sector revenue

3,700
Full-time employees
Includes both direct and indirect employees

With the right building blocks in place, New Zealand can unlock innovation, economic growth, scientific advancement, and global leadership in Space and Advanced Aviation, meeting the ambition to double the size of New Zealand's Space and Advanced sectors by 2030.

This report

Charting New Zealand's Space and Advanced Aviation sectors – innovation to uplift productivity and growth, now and into the future.

Purpose and scope of this report

The New Zealand Space and Advanced Aviation Strategy 2024 to 2030 sets out the Government's objective of doubling the size of New Zealand's Space and Advanced Aviation Sectors by 2030. To inform future government initiatives that would support sector development and to measure the impact of those initiatives, the Government needs to understand the size and other current characteristics of New Zealand's Space and Advanced Aviation sectors.

To do this, Deloitte Access Economics and Space Trailblazer have been engaged by the Ministry of Business, Innovation and Employment (MBIE) to perform an economic analysis of the New Zealand Space and Advanced Aviation sectors.

The scope of the analysis included:

- Fielding a detailed survey to collect data on the Space and Advanced Aviation sectors.
- Mapping of the Space and Advanced Aviation sub-sectors in New Zealand.
- Developing a picture on the size, composition, and economic contribution of the Space and Advanced Aviation sectors.

Approach

The approach used for this current report is based on the approach taken in the 2019 report "New Zealand Space Sector: Its value, scope and structure". This is the second report on the value, composition, and economic contribution of Space, and the first report on the Advanced Aviation sector. The report integrates research and analysis from the following primary focus areas:

Defining the Space and Advanced Aviation sectors

This report uses the OECD definition of the Space sector as a basis and draws on the detailed definitions in studies of Space sectors in other economies to clarify which activities fall into individual sub-sectors. Deloitte Access Economics and Space Trailblazer worked together with the New Zealand Space Agency and the Ministry of Transport to agree on the definition used for the Advanced Aviation sector in the context of this study.

Mapping New Zealand's Space and Advanced Aviation sectors

Data used to inform key insights concerning New Zealand's Space and Advanced Aviation sectors predominantly comes from the bespoke survey.

Measuring economic contribution

To measure the economic contribution of New Zealand's Space and Advanced Aviation sectors, Deloitte Access Economics performed Input-Output (IO) modelling using survey response data as the primary input. Detailed information on this approach is provided in Appendix A.

About the survey

In 2024, **Deloitte Access Economics** and **Space Trailblazer** worked together to distribute the survey to known organisations operating in the Space and Advanced Aviation sectors. **Space Trailblazer** had a full marketing campaign, promotional videos, and wide support from a number of organisations to distribute the survey on our behalf. See Appendix D for more details.

The 2024 New Zealand Space and Advanced Aviation survey was designed and based on the 2019 Space survey distributed by Deloitte Access Economics five years earlier. The survey asked respondents for general information about their business, their involvement in Space and Advanced Aviation, financial information for the last year, information about employees, and any insights on barriers to growth in the Space and Advanced Aviation sector.

The survey was open for responses between 11 November 2024 and 21 January 2025. However, there were some responses collected shortly after the survey closure date. All data included in this report has been aggregated and de-identified to maintain the confidentiality of the operations of New Zealand organisations.

Outline of this report

The report is structure into four parts:

PART 1: Definitions – What is Space and Advanced Aviation?

Chapter 1 defines the Space sector based on the Organisation for Economic Co-operation and Development (OECD) definition.

Chapter 2 defines Advanced Aviation sectors based on the Civil Aviation Authority's (CAA) guidance on the definition of emerging technologies.

Chapter 3 provides context on the current and future states of the Space and Advanced Aviation sectors, including key trends in each sector.

PART 2: market size and composition

Chapter 4 and 5 present and discuss the market sizing results of each sector and their sub-sector sizes. It also describes the sector survey results with respect to firm maturity, turnover, and employee composition.

PART 3: Economic contribution of Space and Advanced Aviation

Chapter 6 introduces economic contribution studies and discusses the results of both sectors.

PART 4: barriers and enablers of growth

Chapter 7 outlines the survey views on future growth, the key themes where survey participants described barriers to growth and then puts forward views on enablers for growth.

APPENDICES

Appendix A outlines our methodology, including details of the research design, data collection, and analysis techniques used to derive the report's findings.

Appendix B includes comparison of the New Zealand Space sector to international Space sectors.

Appendix C provides a directory summarising the organisations operating within each sub-sector of the Space and Advanced Aviation sectors.

Appendix D includes our survey questions that were distributed to both sectors.

Appendix E provides an in-depth look at the Input-Output (IO) modelling approach, including the key assumptions that underline the economic analysis.

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Part 1:
Definitions – what is Space and Advanced Aviation?

What is Space?

To provide an estimate of the contribution and scope of New Zealand's Space sector, it is necessary to first define it.

What is Space?

In the 2019 study and report "New Zealand Space Sector: Its value, scope and structure" Deloitte Access Economics and the New Zealand Space Agency (NZSA)[8] defined the New Zealand Space sector based on the following OECD definition. To ensure comparability the same OECD definition of Space sector has been used in the current report. The 2019 OECD definition of Space sector firms is as follows:[9]

> *"The full range of activities and the use of resources that create and provide value and benefits to human beings in the course of exploring, understanding, managing and utilising space. Hence, it includes all public and private actors involved in developing, providing and using space-related products and services, ranging from research and development, the manufacture and use of space infrastructure (ground stations, launch vehicles and satellites) to space-enabled applications (navigation equipment, satellite phones, meteorological services, etc.) and the scientific knowledge generated by such activities.*
>
> *It follows that the space economy goes well beyond the space sector itself, since it also comprises the increasingly pervasive and continually changing impacts (both quantitative and qualitative) of space-derived products, services and knowledge on economy and society."*

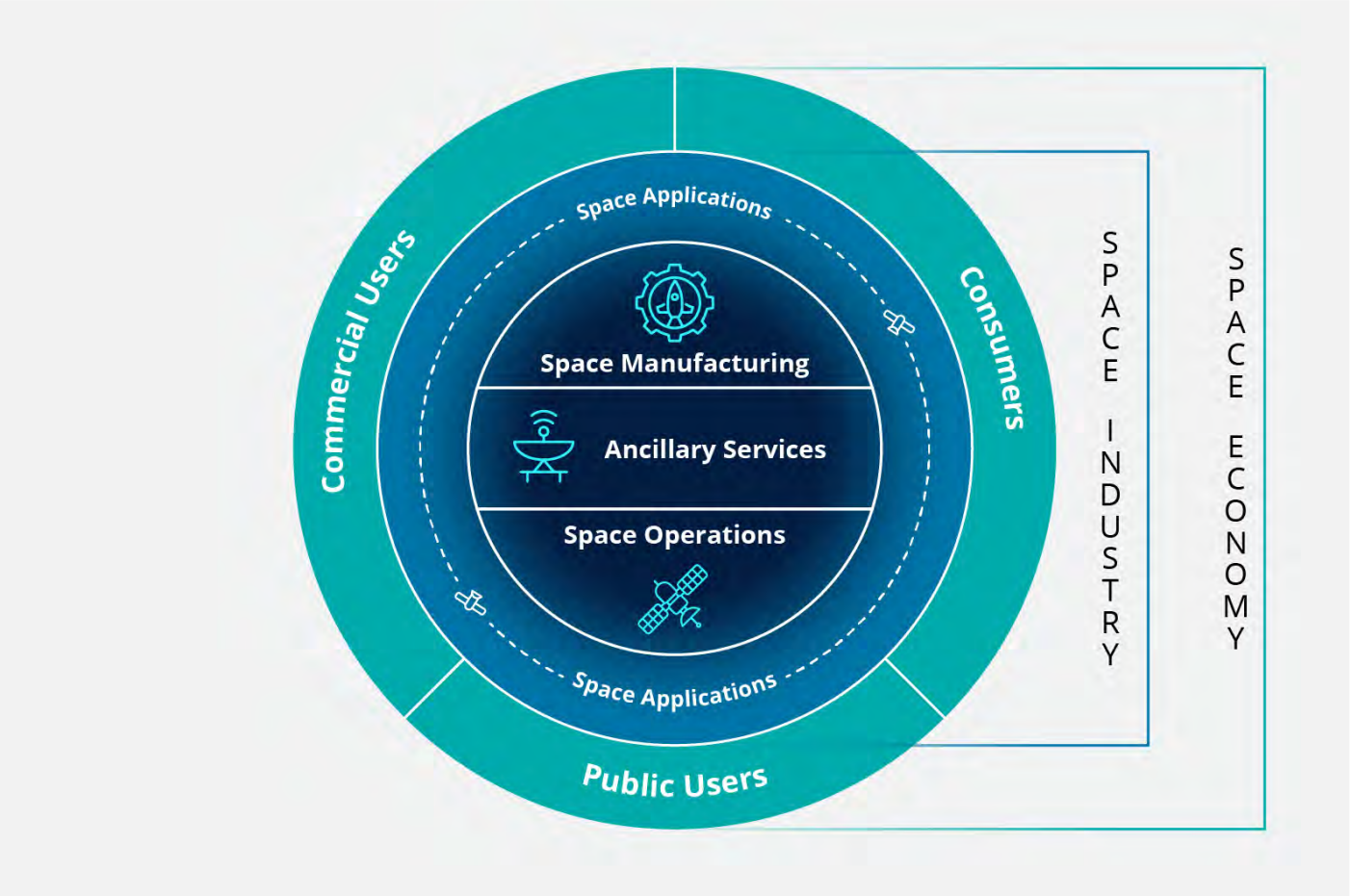
This definition has since been revisited by the OECD in their 2022 update to the OECD Handbook on Measuring the Space Economy.[9] This update provided further clarity that organisations that use technologies and products produced by the Space sector as an intermediate input should be included in the definition of Space. This was prompted by the increased use of embedded satellite signals and data in mass marketed products. The update also provided further clarity on the three main segments of the Space economy, being the upstream segment, downstream segment, and activities that are derived from Space activities but are not dependent on it to function.

Figure 4 below, which is adapted from the UK Space Agency report, provides a detailed picture of the interrelated nature of sub-sectors within the Space sector, and how they contribute to the Space economy more broadly.

The Space sector comprises the interactions between the industrial base (Space Manufacturing and Space Operations, supported by Ancillary Services, R&D and Education & Training) and Space Applications. The activities these sub-sectors are engaged in are directly related to space, or the transformation and application of space derived data. The Space economy broadens to include the way in which the Space sector is engaged with non-space sectors of the economy. This includes Government, commercial users, and consumers which all benefit directly from the Space sector, but which are not directly engaged.

For the purposes of this report, the term 'Space sector' is used to refer to the Space economy. The figure below outlines the scope and segmentation of the Space economy.

Figure 4: Scope of the Space economy



Source: Deloitte Access Economics adapted from UK Size and Health report (2022)

What are the sub-sectors of Space?

As with the 2019 study, Deloitte Access Economics have given careful consideration of what activities are space-related, regardless of whether they take place in Space or on Earth. As such, we have also used the same sub-sectors (Manufacturing, Operations, Applications, Ancillary, Research and Development (R&D), Education and Training and Government) as the 2019 study.

Each sub-sectors are described below, and includes the following sub-sectors:

Table 1: Description of the Space sub-sectors

Sub-sector	Space Manufacturing	Space Operations	Space Applications	Ancillary services	Education, Training, and Research & Development	Government	Industry Body
Activity	Launch Vehicles and Subsystems	Launch services	Direct-To-Home (DTH) broadcasting	Launch and satellite insurance (including brokerage) services	Commercial	Policy-making	Industry body or association
	Satellites/payloads/ spacecraft and subsystems	Proprietary satellite operation (including sale/lease of capacity)	Fixed and mobile satellite communications services (including VSAT)	Financial services	Education	Regulation	
	Scientific instruments	Third-party ground segment operations	Location-based signal and connectivity service provider	Legal services	Secondary	Oversight	
	Ground segment systems and equipment (control centres and telemetry)	Ground station networks	Supply of user devices and equipment	Construction	Tertiary		
	Suppliers of materials and components		Processors of satellite data	Software and IT services	Professional training services		
	Scientific and engineering support		Earth Observation Services & Applications	Market research and consultancy services			
	Fundamental and applied research		Satellite Communications Services Providers	Business incubation and development			
	Specialisation on nano and micro satellites (<50kg)		Satellite Navigation Service & Applications	Transport			
			Health in Space	Logistics			
			User of Space enabled services	General component, material, engineering supply			
				Tourism			

Source: Deloitte Access Economics

Space Manufacturing includes the design and/or manufacture of Space equipment and subsystems, operating across many of the primary functions of the Space sector, including launch activities, satellites, the ground segment, and the specialisation in nano and micro satellites (<50kg). Organisations within this sub-sector include Rakon Limited and Shamrock Industries.

Space Operations include the launch and/or operation of satellites and/or spacecraft. Firms operating in this sub-sector typically have significant Space assets. The sub-sector is dominated by satellite operators which work with commercial and government users. Space Operations is the functional component of the Space supply chain. It includes the operational requirements of Space systems, which typically consist of one or more Earth stations and a Space station, which transmit and receive information to and from Earth stations or other Space stations using radio communications. Organisations within this sub-sector include Rocket Lab Limited and Dawn Aerospace Limited.

Space Applications include applications making use of satellite signals and data. Space Applications fall into the following categories: Earth Observation (EO), provision of satellite communication services, and Position, Navigation and Timing (PNT), including Global Navigation and Satellite Systems (GNSS). Organisations within this sub-sector include Sky Network Television Limited, Gateway Teleport Limited, and mobile and satellite broadband service providers utilising satellite signals and data.

Ancillary Services include organisations involved in the provision of specialised support services. Support services range from finance, insurance, consulting services, to transport and logistics and market development services. Organisations within this sub-sector include Dentons Kensington Swan and Duncan Cotterill Limited.

Research & Development includes Space related research & development. Investments in research and development generate new knowledge, products, and processes.

Education and training include any up-skilling activities that are specific to the Space sector. This includes secondary and tertiary education, and professional training services.

Government refers to Space-related activities that require regulatory oversight, Space-related policy-making and sector development functions. The Government also invests in delivery of critical space-based services for New Zealanders. Set up in 2016, The New Zealand Space Agency is the main organisation responsible for regulating and supporting the sector in New Zealand.

Industry Body refers to a representative body that provides a collective voice for or maintains oversight over individual organisations within the Space sector.

What is Advanced Aviation?

This report expanded the horizons of the survey to include Advanced Aviation. It aims to capture information about novel and non-routine aviation.

What is Advanced Aviation?

There is no set international definition for Advanced Aviation, which limited this report to draw on international studies to define the sector. Therefore, in developing the definition for the Advanced Aviation sector, Deloitte Access Economics and Space Trailblazer consulted with the New Zealand Space Agency, Ministry of Transport, and targeted stakeholders.

For purposes of this report, the Advanced Aviation sector is defined following guidance provided by the New Zealand Civil Aviation Authority's (CAA) on Emerging Aviation Technologies. Using the CAA's definition on emerging technology and guidance from key stakeholders, Advanced Aviation technology is defined as follows:[10]

"Emerging technology is an all-encompassing term that refers to any aviation capability that:

- *Has not been certified or approved before*
- *Is novel*
- *Is not routine*
- *Is not limited to unmanned aircraft.*

To be considered part of this sector, you or your firm only need to meet one of the above criteria. For example, if you are developing technology that is (or will be) certified or approved by the CAA, but it is novel or non-routine, you are considered part of the Advanced Aviation Technologies sector.

Technologies include but are not limited to:

- *Advanced air mobility*
- *Alternative fuels*
- *New aviation infrastructure*
- *Uncrewed traffic management*
- *Simplified vehicle operations."*

An organisation can be considered part of the Advanced Aviation sector by only meeting one of the criteria within this definition. For example, if an organisation's product or service is (or will be) certified or approved by the CAA, but it is novel or non-routine, the organisation is considered part of the Advanced Aviation sector. Further, we adopted the CAA's definition for this first study but recommended that the definition will be required to evolve as this sector evolves.

What are the sub-sectors of Advanced Aviation?

Consultation with targeted stakeholders and regulators confirmed the Advanced Aviation sector comprises of the interactions between the industrial base (Manufacturing and Operations, supported by Ancillary Services, R&D and Education & Training) and Applications. The activities these sub-sectors are engaged in are directly related to Advanced Aviation. The Advanced Aviation sector also includes Government, commercial users, and consumers which all benefit directly from the Advanced Aviation sector.

The table below provides a more detailed description of the Advanced Aviation sub-sectors.

Table 2: Description of the Advanced Aviation sub-sectors

Sub-sector	Advanced Aviation Manufacturing	Advanced Aviation Operations	Advanced Aviation Applications	Ancillary services	Education, Training, and Research & Development	Government	Industry Body
Activity	Airspace design and management, uncrewed aircraft system traffic management	Beyond Visual Line of Sight (BVLOS)	Aerial surveying	Insurance services	Commercial	Policy-making	Industry body or association
	Communication, navigation and surveillance (CNS), Remote identification (Remote ID) and Detect and Avoid (DAA)	Transportation of goods, supply chain, delivery	Drone logistics	Financial services	Education	Regulation	
	Landing sites and physical infrastructure, vertiports	Transportation of people	Uncrewed traffic management	Legal services	Secondary	Oversight	
	Advanced Air Mobility	Simplified vehicle operations (technologies and software that automate traditional pilot tasks)	Primary industry, forestry, agriculture	Construction	Tertiary		
	Urban Air Mobility	High altitude operations	Photography and filming	Software and IT services	Professional training services		
	Regional Air Mobility	Evolved conventional operations	Emergency management, response, search and rescue	Market research and consultancy services			
	New Aircraft designs		Police, security and defence	Business incubation, development, venture and investment			
	Electric propulsion and alternative fuels		Entertainment	Transport			
	Enabling Technologies and capabilities (cyber security, safe assurance, AI, radio frequency spectrum management).		Aerial surveying	Logistics			
	Software		Drone logistics	General component, material, engineering supply			
				Tourism			

Source: Deloitte Access Economics

Advanced Aviation Manufacturing includes the design and/or manufacture of Advanced Aviation equipment and subsystems, operating across many of the primary functions of the Advanced Aviation sector. Organisations in this sub-sector include Fabrum Solutions Limited and Argus Group Limited.

Advanced Aviation Operations include the operation of Advanced Aviation technologies such as Beyond Visual Line of Sight (BVLOS), vertical take-off and landing (eVTOL) and high-altitude operations and drone cargo services. Organisations in this sub-sector include Ferntech NZ Limited and Kea Aerospace Limited.

Advanced Aviation Applications include applications making use of Advanced Aviation technology such as aerial surveying, drone logistics and applications in primary industry, forestry and emergency response. Organisations in this sub-sector include Precision Spray Drones Limited and Nova Systems NZ Limited.

Ancillary Services in Advanced Aviation include organisations involved in the provision of specialised support services for Advanced Aviation organisations. Support services range from finance, insurance, consulting services, to transport and logistics and market development services. Organisations in this sub-sector include OneReg Limited and Navigatus Consulting Limited.

Research & Development related to Advanced Aviation generates new knowledge, products, and processes.

Education and training in Advanced Aviation includes any up-skilling activities that are specific to the Advanced Aviation sector. This includes secondary and tertiary education, and professional training services.

Government refers to Advanced Aviation-related activities that require regulatory oversight, policy-making and sector development functions. The Civil Aviation Authority (CAA) is the main government organisation responsible for regulating and supporting the sector. The Ministry of Transport is the Government's system lead for transport including aviation policy and is supported by other agencies such as MBIE.

Industry Body refers to a representative body that provides a collective voice for or maintains oversight over individual organisations within the Advanced Aviation sector. For example, key industry bodies that operate within the Advanced Aviation sector in New Zealand are UAVNZ and Aerospace New Zealand.

Current and future state context

This section explores the current and future state trends within the Space and Advanced Aviation sectors.

What are the trends of Space?

The Space sector is growing, and it is essential to capitalise on the opportunities presented by this growth. The global Space economy is now valued at US$630 billion and is projected to be US$1.8 trillion by 2035.[11]

Key trends shaping the future of Space are:

Space is more accessible than ever. New Zealand is a global leader in Space launches, with rocket launches from New Zealand increasing from three in 2019 to 16 in 2024. Innovations in commercial launch have drastically reduced the cost and increased the cadence of getting satellites and payloads into Space. For example, there was a **400x decrease** in launch cost per kilogram of payload, from **$1500 in 2024** compared to **$85.2K in 1981.**[12]

There is an unprecedented number of satellites in Space. The number of satellites in Space is growing exponentially, with each satellite functioning essentially as its own computer. Smaller, disaggregated constellations mirror the shift from centralized to distributed computing. Once futuristic use cases, such as Space-based data centers, are becoming a reality. Today there are 10,000 satellites in orbit, and this is estimated to increase to 100,000 satellites by 2032.[13]

Satellite telecommunications are becoming mainstream. For example, satellite broadband internet subscribers saw significant growth, from 1,500 in 2020, to 12,000 in 2023 and 37,000 in 2024. New Zealand now has the highest number of satellite connections per capita in the OECD.[14]

Globally, Space is no longer exclusively a government domain. Although Government remains a large and stable source of funding, public and private investment has increased dramatically, with commercial use cases and business models developing rapidly. Since 2013, global commercial investment has reached USD$270 billion, driven by continued government demand, including USD$60 billion spent by the US Government on contracts in FY23 alone.[15]

The growing trend towards private investment highlights confidence in the viability and profitability of New Zealand's Space ventures. Venture capital and private equity firms are increasingly backing Space start-ups globally. We have seen some examples of this in New Zealand since 2019 with numerous space companies receiving significant backing from New Zealand venture capital firms. These investments are playing a critical role in accelerating research and development, fostering technological advancement, and scaling operations.

Data generated in Space is growing rapidly. With the growing number of satellites in Space, a massive amount of data is being generated. This data supports a variety of use cases such as agriculture, insurance, digital twins, and urban planning. Today data generated is approximately 100 Terabytes daily, and by 2030 it is estimated to be 230 Petabytes daily.[16] New Zealand specific data in this context is limited, but we expect it to be under-utilised to date.

Please refer to Appendix B for a comparison of the New Zealand Space economy to other international Space economies, where data is available.

What are the trends of Advanced Aviation?

Advanced Aviation includes uncrewed aircraft and any new aviation capability that is innovative, has not been certified or approved before, and is not routine.[17] Other examples include alternative fuels such as bio-jet fuels, electro-jet fuels, liquefied methane, hydrogen, and ammonia; advanced air mobility, electric vertical take-off and landing (eVTOL) and infrastructure to support it (referred to as Vertiports), uncrewed traffic management and simplified vehicle operations**.**

Advanced Aviation has been evolving and innovating for the last 100 years. As of 2015 the government had an increased focus on Advanced Aviation. As it is captured in this study, Advanced Aviation includes the newest technology in the aviation sector.

The Government is actively enabling new activities and providing guidance to support commercial adoption of Advanced Aviation technologies. For example, the Government announced an Advanced Aviation package in September 2024 to support the growth of the sector. This includes the allowance of the rapid iteration and testing of ideas and technology, establishment of restricted airspace areas exclusively for testing technologies, updating rules for timely decision making and co-designing an emerging technology programme.[18]

Key trends in New Zealand's Advanced Aviation sector can be summarised as:

- *Novel systems* are being integrated into the wider aviation ecosystem.
- Innovation is being applied to existing systems in new ways.
- The inclusion of technologies that have matured over the past 10 years since the initial rollout of drone regulations in 2015.

Since 2019 **notable consolidation has occurred within the Advanced Aviation sector**, particularly in the eVTOL and air taxi segments, where redundancy is becoming evident. The initial enthusiasm surrounding "virtual take-off" five years ago has collided with the stark practicalities of certification expenses and infrastructure prerequisites, presenting substantial hurdles. Internationally, formerly promising firms like Volocopter (France) and Lilium (Germany) are swiftly depleting their financial resources. Companies that are well-funded are likely to endure, leading to a market landscape that is anticipated to be controlled by major players.

In New Zealand, there has been a **remarkable surge in the adoption of agrichemical drones**, which have proven to be highly efficient, and safer for horticulturists and farmers who can now function as owner-operators. This technology has evolved to be incredibly precise, leading to significantly reduced spray waste. The drone payloads have seen a substantial increase, growing from 10kg in 2019 to 50kg by 2024, rendering them economically feasible for direct business applications.

A significant portion of **uncrewed aircraft applications is in surveying and filming**, particularly within the agriculture and photography domains. The use of drones in emergency management, response, and search and rescue activities is also experiencing substantial growth. Notably, drones were utilised during the recent Cyclone Gabrielle for field-based mapping and LiDAR surveys of landslides,[19] as well as for capturing aerial photographs of affected areas.[20]

Key future growth areas include, but are not limited to, LiDAR in forestry, demand driven by the primary industries and urban mapping. The trend towards internal data collection, as opposed to depending solely on third-party satellite data providers, is propelling the adoption of LiDAR technology across various businesses.

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SPACE TRAILBLAZER

Part 2:
Market size and composition

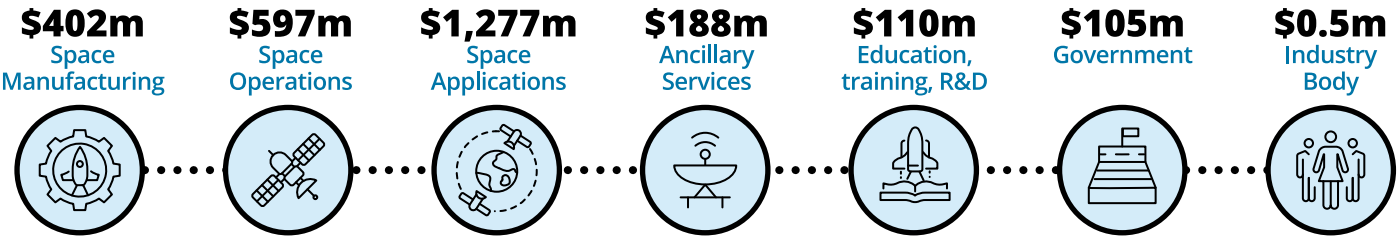
Space sector: Market size and composition

New Zealand's Space sector outperformed global growth. Total estimated revenue of the Space sector was $2.68 billion in 2024. This reflects a 53% growth since 2019, which is the equivalent of 8.9% year-on-year. This is greater than global Space sector growth of 40% over the same period.

What is the current market size?

The total estimated revenue or gross output of the Space sector was **$2.68 billion** in 2024, representing 0.24% of global Space sector revenues.

Figure 5: Breakdown of estimated Space revenue across sub-sectors – 2024



Source: Deloitte Access Economics

Table 3: Breakdown of Space size by sub-sector

Sub-sector	NZD millions (2024 dollars)	Proportion of total revenue (%)
Space Manufacturing	402	15.00%
Space Operations	597	22.28%
Space Applications	1,277	47.66%
Ancillary Services	188	7.02%
Research and Development	110	4.11%
Government	105	3.92%
Industry Body	0.5	0.02%
Total	**2679.5**	**100%**

Source: Deloitte Access Economics

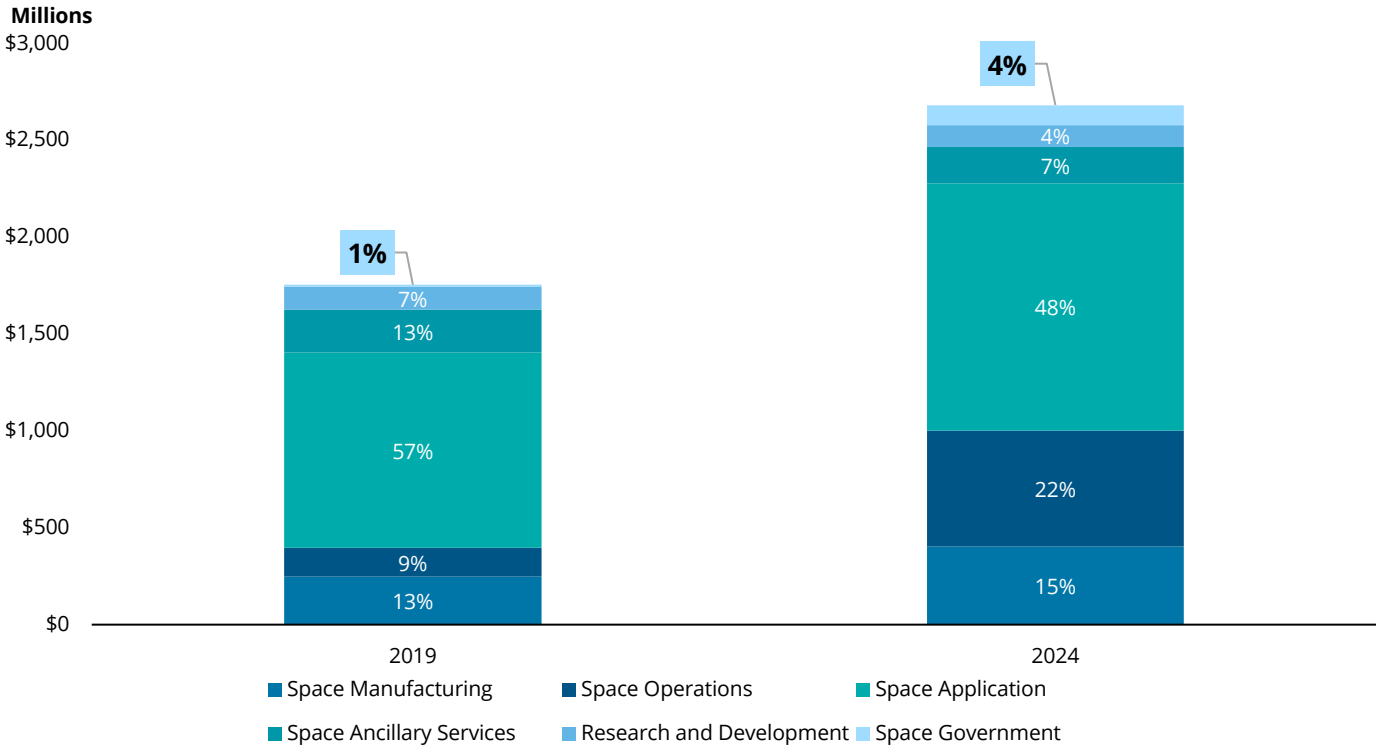
The recent estimated market size for the Space sector demonstrates a positive trend over the last five years. In 2019, the estimated revenue or gross output was $1.75 billion. By 2024, the Space sector demonstrated a remarkable 53% increase from 2019, translating to a solid 8.9% year-on-year growth rate. The New Zealand Space sector outpaced the growth of the global Space sector, which had growth of 40% over the same period.

The revenue changes since 2019 for each sub-sector are detailed below:[21, 17]

- **Space Manufacturing** witnessed an increase from $247 million in 2019 to $402 million in 2024, resulting in a 10% year-on-year growth rate. This expansion has exceeded the growth of New Zealand's manufacturing sector, which saw growth of -2%. It is also in line with the latest estimate in the UK, which reported a growth rate of 7%. The key drivers behind this growth were the manufacturing of space sub-systems, scientific instruments, ground segment systems and equipment, as well as materials and components. Domestically, the growth of New Zealand's largest Space company, Rocket Lab, has had flow-on effects for manufacturing companies that produce parts for the rockets and satellites they launch.
- **Space Operations** experienced an increase from $150 million in 2019 to $597 million in 2024, resulting in a 32% year-on-year growth rate, which aligns closely with the growth rate of UK Space Operations at 30%. The significant growth factors included launch services, a rise in the number of organisations engaged in satellite operations, as well as advancements in ground station operations and networks.
- **Space Applications** saw an increase from $1,007 million in 2019 to $1,277 million in 2024, resulting in a 5% year-on-year growth rate. New Zealand exhibited strong growth in this sub-sector when compared to the UK Space sector, which experienced a decline of 5%. The primary driver for this growth stemmed from broadcasting, communication services, and the use and accessibility of satellite data.
- **Space Ancillary Services** experienced a decline from $221 million in 2019 to $188 million in 2024, resulting in a -3% year-on-year growth rate. In comparison, the UK Space sector had an annual growth rate of -23%. The decrease in New Zealand could be attributed to reduced demand due to high interest rates and inflation within the local economy in 2024.
- **Research and Development** saw a decline from $119 million in 2019 to $110 million in 2024, resulting in a -2% year-on-year growth rate. The research and development firms involved in the 2024 survey did not disclose their revenue ranges, so the reported revenue figure is based solely on publicly accessible information. It is important to note that for the purposes of this analysis, research and development included in revenue or gross output refers to commercial revenue and not research and development expenditure.
- **Government Space spending** has risen from $10 million in 2019 to $105 million in 2024. The majority of this change is investment into SouthPAN and the inclusion of funding for Space-related research and development through the publicly funded science system. It also includes funding for core Space policy and regulatory functions. The reported figures do not encompass levy and fee-derived funding, or the research and development tax incentive. The figure includes both baseline funding but largely comprises time-limited projects and does not represent long-term funding commitments in Space by the Government. There are also gaps in the data, such as in security and geospatial services, which could not be collated for reporting purposes.

As a result of the changes discussed above, the distribution of total revenue among each sub-sector has shifted since 2019. Initially, the Space sector's primary source of value was derived from Space Applications rather than Space Manufacturing or Operations. However, by 2024, Space Manufacturing and Space Operations accounted for a significantly greater proportion of the total revenue. The following figure illustrates the comparison of revenue or gross output between 2019 and 2024.

Figure 6: Size by Space sub-sector – 2019 vs. 2024



Source: Deloitte Access Economics

Charting the Space sector

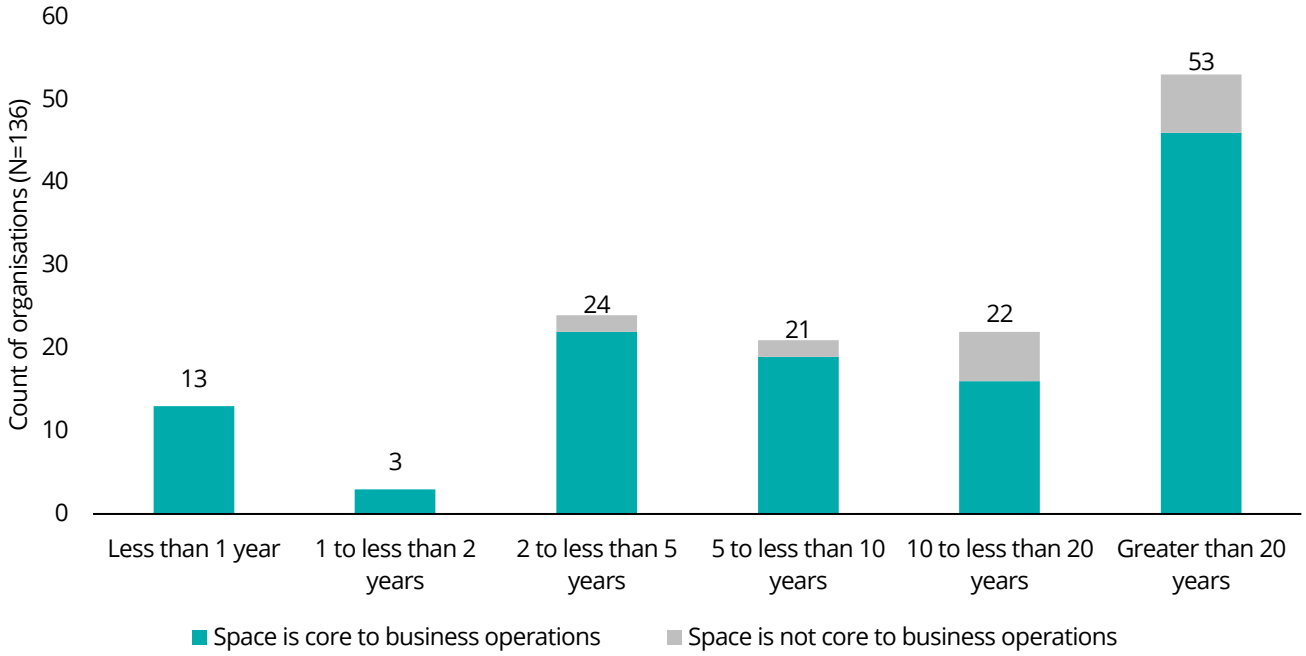
Key survey insights include:

- **The Space sector has matured** and mature firms from other sectors of the economy or overseas have entered the New Zealand Space sector. Organisations have been able to leverage the market interest and activity generated by key leaders in the Space sector to build on existing capability.
- **From a turnover perspective, while the majority of organisations earned between $200,000 to $2 million, there are now almost 40% of organisations in the Space sector which had a turnover range in FY24 that was greater than $2 million.** There are now more well-established companies earning $10 million or more. This reflects the growing number of mature firms operating in the Space sector. The Space sector also shows growth in the lower turnover ranges, but it is noted there is a long tail of small firms that cannot typically be fully captured by survey methodologies.
- **The Space sector has deep research and development capability** across the country. The number of research institutions was 18 organisations.
- **New Zealand's Space sector's workforce is generally home-grown**. 78% of respondents reported that more than 50% of their workforce draws on New Zealanders to conduct their operations. In addition, 7% of respondents identified as a Māori business.
- Similar to the 2019 study, **New Zealand's Space sector is commercially led**, characterised by a mix of start-up and well-established, small and large entrepreneur-driven and privately funded space companies which service both government and non-government customers. While many Space sectors around the world are seeing a shift from a more traditional model (primarily government funded), New Zealand has always been, and continues to be commercially led.

Maturity of organisations in the Space sector

Respondents were asked to select whether Space is core to their business, and to select the maturity of their business.

Figure 7: Number of Space organisations – By age of organisations



Source: Deloitte Access Economics

The largest proportion of firms in the Space sector have been operating for longer than 20 years. The majority of these firms consider Space as core to their business. This makes up 39% of survey respondents compared to 26% in the 2019 survey. This suggests mature companies from other sectors have diversified into the Space sector. Comparing this to businesses operating across all sectors in New Zealand, more firms in the space sector have been operating for more than 20 years, 18% of all firms in New Zealand have been operating for more than 20 years.[22]

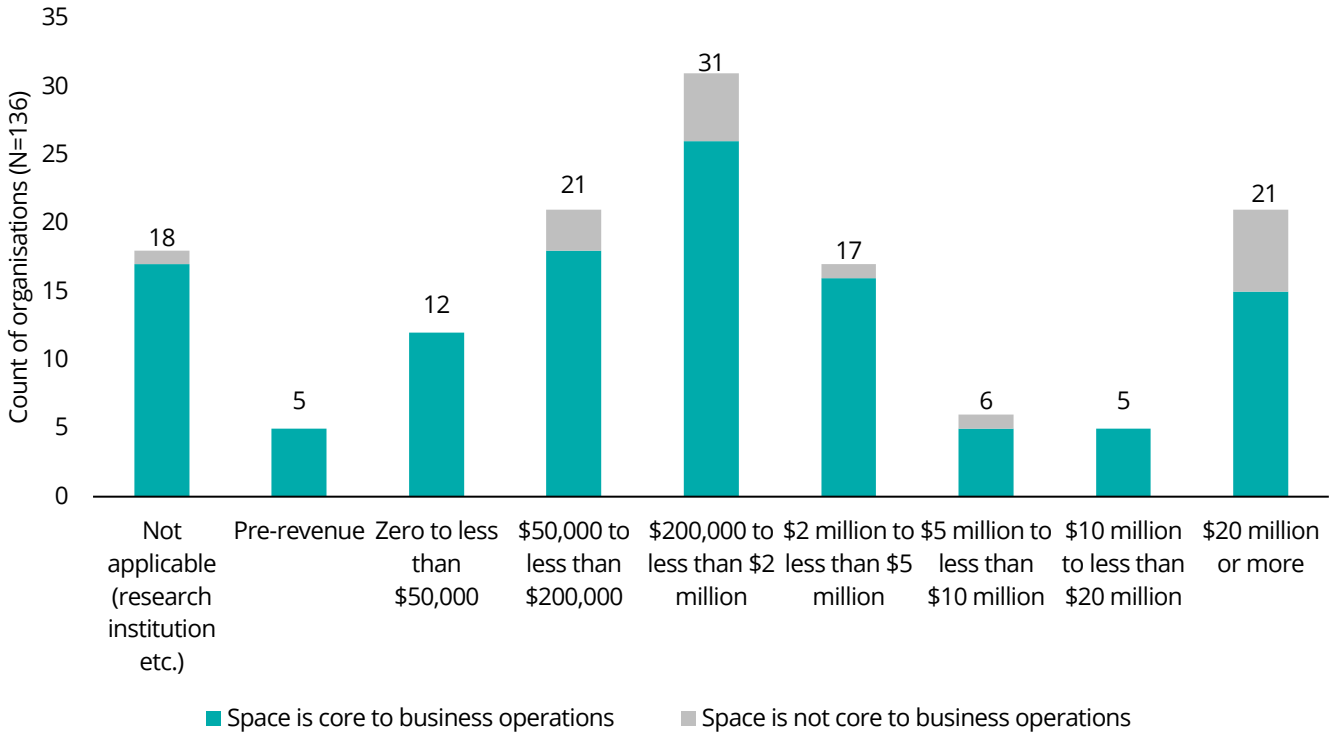
There was a relatively even split between firms that had been operating for 2-5 years, 5-10 years and 10-20 years with 24, 21, and 22 firms, respectively. This is in contrast to all firms operating in New Zealand across all sectors as the largest proportion of firms have been operating for less than five years (39% of firms) followed by 11 to 20 years (24% of firms).[22]

The number of new firms, operating for less than two years, makes up a smaller percentage of the overall firms at 12% in 2024 compared to 13% in 2019. This demonstrates the attractiveness of the Space sector during a time where New Zealand experienced an economic downturn across 2023 and 2024.

Turnover

Respondents were asked to select which turnover range was most appropriate for FY24.

Figure 8: Turnover range in New Zealand's Space sector



Source: Deloitte Access Economics

Key survey insights include:

Almost 40% of organisations in the Space sector had a turnover range in FY24 that was greater than $2 million. Survey data shows there are 17 companies earning $2 million to $5 million and six companies earning $5 million to $10 million. This composition is similar to the 2019 survey data, reflecting stability in the Space sector. However, there are now more well-established companies earning significant revenue. In 2024 there was a significant number of firms earning $20 million or more. This reflects the growing number of mature organisations operating in the Space sector, as evidenced by the rise in organisations earning over $10 million which grew from 13% of survey respondents in the 2019 to 19% in 2024.

The greatest number of firms earned between $200,000 to less than $2 million in the 2024 financial year. This is similar to the sector in 2019, where the largest number of firms were also earning between $200,000 to $2 million, however, the number of firms in this category has grown since 2019.

The number of research institutions was 18 organisations – one less research institution compared to 2019. This illustrates stability in the Space sector's deep research and development capability. This capability is crucial to

being a competitive participant in the global space sector; redefining frontiers and growing human capital expertise is fostered by the strength of capability located across the supply chain.

The Space sector also shows growth in the lower turnover ranges. Survey data also shows the number of companies earning $50,000 to less than $200,000 has grown since 2019 – from 12 in 2019 to 21 in 2024. There is a small number of pre-revenue companies.

Figure 9 below shows a comparison of the total Business Demography turnover size data with the Space survey data, mapped according to the turnover ranges in the business demography data.[22]

Figure 9: Turnover size group – Total New Zealand vs. Space Sector

Source: Deloitte Access Economics; Statistics New Zealand, 2024 Business Demographic data, Table 18

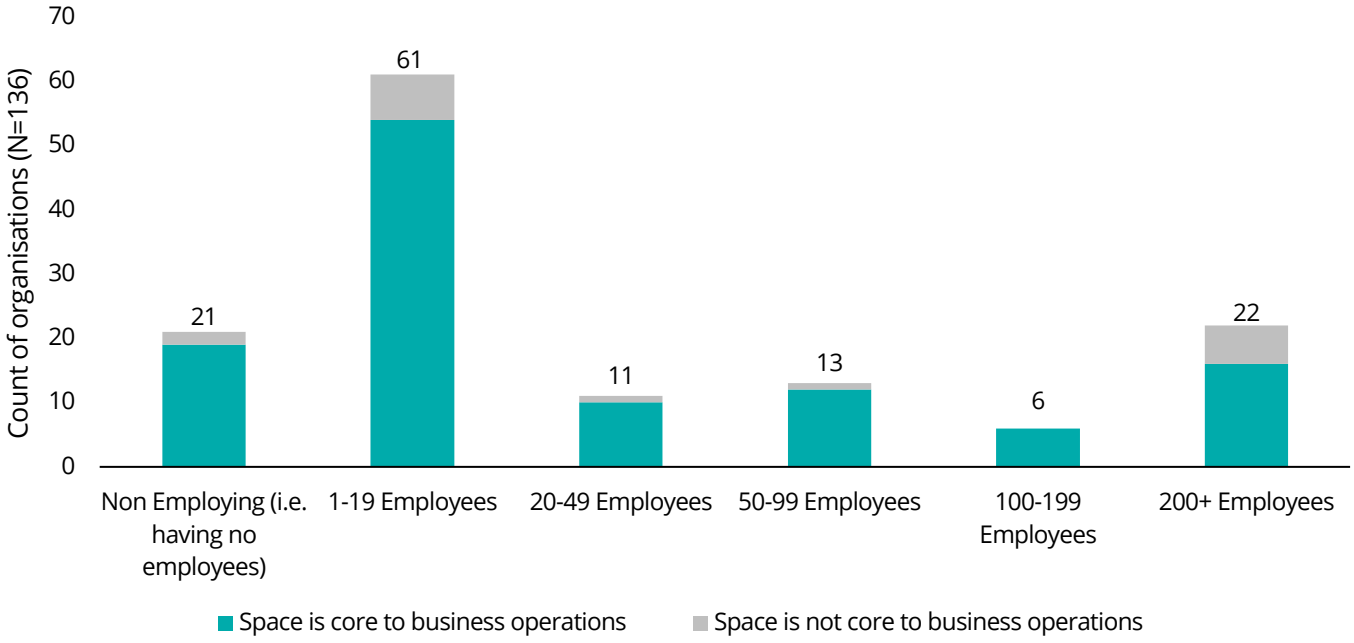
The Space sector survey data shows a similar distribution across most turnover ranges with two exceptions – companies earning $20 million or more are more prevalent in the Space sector compared to New Zealand overall, whilst companies earning $100,000 or less is much smaller. There are several possible reasons why there is this difference in smaller firms. The first is that the survey may have missed smaller firms as they may not be as well known. The second is that there may be specific challenges that are experienced by small and medium sized firms which force them to close or scale up quickly. The last possible explanation is that the recent slow economic conditions in New Zealand have resulted in a greater number of smaller firms closing in the Space sector.

The results in this report can therefore be considered as conservative. This is because, compared to the general New Zealand Business Demographic by size, it is evident that there is a long tail of small firms that cannot typically be fully captured by survey methodologies.

Employees

Respondents were asked to select the most appropriate employee FTE range for FY24.

Figure 10: Employee FTE ranges in New Zealand's Space sector



Source: Deloitte Access Economics

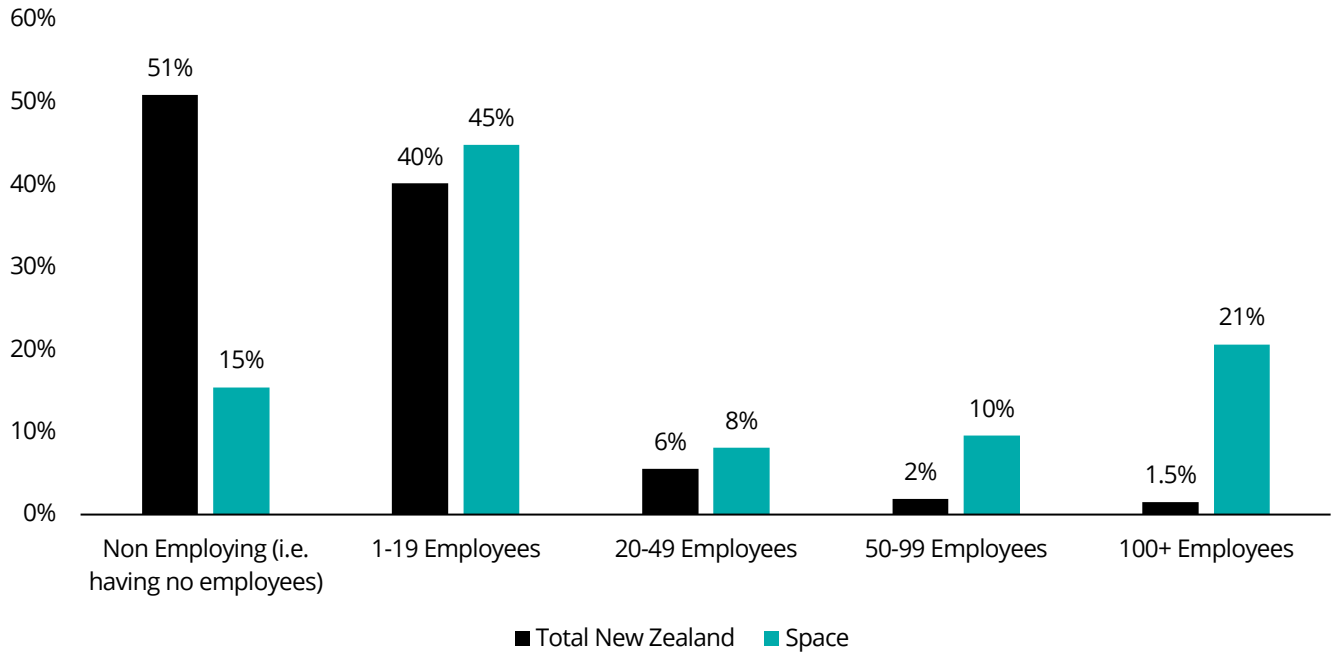
The New Zealand Space sector is bimodal with the largest number of businesses having 1-19 employees and the second largest number of businesses having over 200 employees. The survey findings highlight:

- The majority of companies in this sector are small-medium enterprises, with less than 20 employees. A total of 61 organisations, representing 45% of the sample, fell within the 1-19 employee range. This distribution aligns with the 2019 study, where 43% of organisations also employed 1-19 employees.
- Organisations with 20-199 employees make up 22% of the Space sector, slightly higher than the 19% reported in the 2019 study.
- There is a notable presence of firms with over 200 employees, indicating more mature, high-earning firms in the sector. In the current survey, 22 organisations selected the 200+ range, representing 16% of the total sample, a slight increase from the 15% of organisations employing more than 200 FTEs in the 2019 study.

Mapping the distribution of FTEs in Space sector firms to the New Zealand's Manufacturing sector shows a same general trend but with distinct differences:[22]

- When looking at all manufacturing businesses in New Zealand the majority have no employees with a tail to the right (51%), while the Space sector has 15%. This suggests that there could be a long tail of small firms that cannot typically be fully captured by survey methodologies.
- Within the employee range 1-19 and 20-49, the Manufacturing Business Demographic and Space sector has a similar distribution. The key difference is in the range of 100+ employees, reflecting the nature of organisations operating in the Space sector; i.e. organisations operating in Space-related activities are larger.

Figure 11: Employee ranges – Total Manufacturing sector vs. Space Sector



Source: Deloitte Access Economics, Statistics New Zealand, Business Demography survey data; Table 1

The survey respondents revealed that New Zealand's Space sector is generally home-grown. 78% of respondents reported that more than 50% of their workforce draws on New Zealanders to conduct their operations.

Exports, Research and Development expenditure and Māori business ownership

In addition:

- **7% of respondents identified as a Māori business**.
- **In terms of exports**, the New Zealand Space sector generated almost 29% of revenue from abroad, which is a higher export share than the New Zealand economy overall (in 2023 it was 24%). Export markets vary and include USA, Canada, Europe, Singapore, India, Japan, and Korea.
- The Space sector is more than **8 times R&D intensive than the New Zealand average** – R&D for Space is 11% compared to the New Zealand average of 1.4%.

Please refer to Appendix C for a directory of the number of survey respondents within each of the Space sub-sectors.

Advanced Aviation sector: Market size and composition

Advanced Aviation is characterised by emerging technologies and innovations. The size of the Advanced Aviation sector in New Zealand in **2024** is estimated at **$0.53 billion**.

What is the current market Size?

What gets measured gets managed, or so the saying goes. In order to develop a plan for the future of New Zealand's Advanced Aviation sector, it is important to first understand its current size and scope. However, the niche capabilities of players in New Zealand's Advanced Aviation sector, coupled with the blurred boundaries between other sectors such as space, aerospace, defence and advanced manufacturing, have meant that, to date, measurement of the Advanced Aviation sector has not been conducted. As explained in Chapter 1, Deloitte Access Economics and Space Trailblazer fielded a survey to develop a snapshot of New Zealand's current Advanced Aviation sector.

In **2024** the total estimated revenue of the Advanced Aviation sector was **$0.53 billion**, equivalent to 0.11% of the total New Zealand economy.

Figure 12: Breakdown of estimated Advanced Aviation size across sub-sectors – 2024

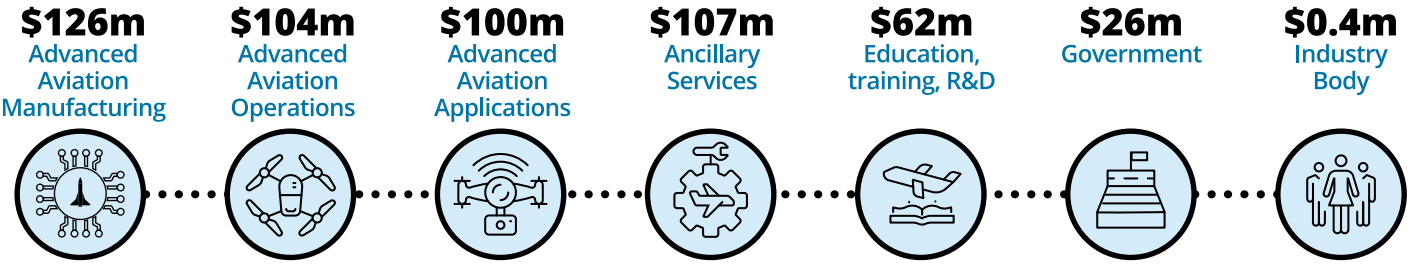


Table 4: Breakdown of Advanced Aviation size by sub-sector

Sub-sector	NZD millions (2024 dollars)	Proportion of total revenue (%)
Advanced Aviation Manufacturing	126	24.00%
Advanced Aviation Operations	104	19.81%
Advanced Aviation Applications	100	19.05%
Ancillary Services	107	20.38%
Research and Development	62	11.81%
Government	26	4.95%
Total	**526**	**100%**

Source: Deloitte Access Economics

The Advanced Aviation sector is relatively equally distributed across the sub-sectors, with Manufacturing (20%), Operations and Ancillary services (20%), Operations (19%), Research and Development (12%) and Government (5%).

Overall, this first estimate of the Advanced Aviation sector is a conservative one based on known information through the survey, sector databases, and publicly available information. The current definition for Advanced Aviation would need to evolve to capture future developments as the sector advances, i.e. it is recommended that the definition should evolve to capture maturing technologies that are currently novel but will eventually become routine.

The balance of this chapter takes a deeper dive into mapping the Advanced Aviation sector based on the 2024 survey data.

Charting the Advanced Aviation sector

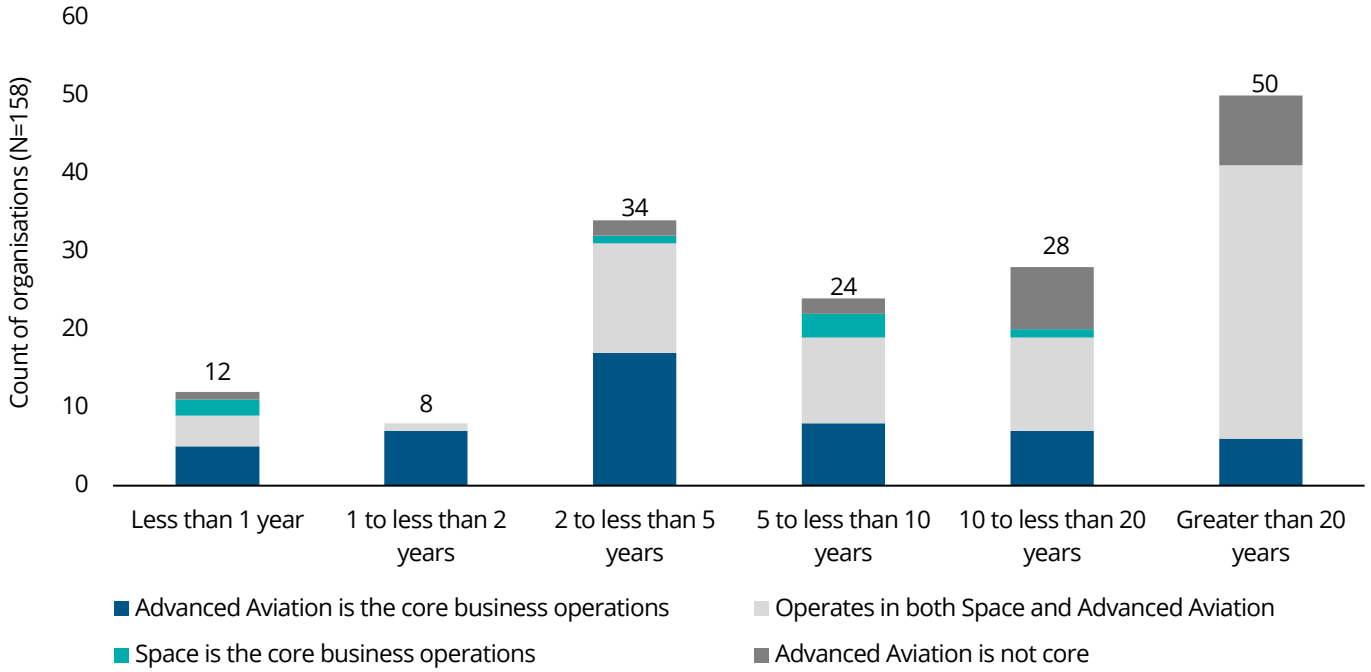
Based on the survey data, key findings on the composition of the Advanced Aviation sector are:

- **The Advanced Aviation sector is a combination of younger, smaller companies and larger well-established organisations**. A third have been operating for more than 20 years, with mostly organisations operating across both Space and Advanced Aviation. Organisations with a core focus on Advanced Aviation only are more commonly found among those that have been operating for less than five years.
- **From a turnover perspective,** survey data shows the turnover ranges are mixed between lower and higher ranges. Organisations with a core focus on Advanced Aviation are more shown in the lower turnover ranges, and organisations with a focus on both Space and Advanced Aviation are more shown in the higher turnover ranges.
- **The are a number of research institutions,** and the sector has a high **R&D intensity of 21% of total revenue, or 15 times our current national average**. 50% of research institutions operate across both Space and Advanced Aviation. There are a small number of pre-revenue organisations that completed the survey – a mix of a core focus on Advanced Aviation, Space, and both.
- **The sector has a strong domestic focus from a workforce perspective**. 84% of survey respondents reported that more than 50% of their workforce draws on New Zealanders to conduct their operations.
- Based on the survey data, **exports for the sector accounts for 16% of total revenue in FY24**, and across several export markets, including USA, Australia, Canada, Israel, and the Pacific Islands.
- **For a location perspective**, survey data shows 38% of the organisations are based in Auckland, 28% in Christchurch, 11% in Wellington and the balance are distributed across New Zealand.

Maturity of organisations in the Advanced Aviation sector

Respondents were asked to select whether Advanced Aviation is core to their business, and to select the maturity of their business.

Figure 13: Number of Advanced Aviation organisations – By age of organisations



Operations	> 1 year	1 to >2 years	2 to > 5 years	5 to > 10 years	10 to > 20 years	< 20 years
Advanced Aviation is the core business operations	5	7	17	8	7	6
Advanced Aviation is not core	1		2	2	8	9
Operates in both Space and Advanced Aviation	4	1	14	11	12	35
Space is the core business operations	2		1	3	1	
Total	**12**	**8**	**34**	**24**	**28**	**50**

Source: Deloitte Access Economics

Key survey insights include:

The Advanced Aviation sector is made up of a combination of smaller younger companies and larger well-established organisations, but also is a mix of organisations with a core focus on Advanced Aviation, organisations operating across both Space and Advanced Aviation and organisations without a core focus of operations. Organisations captured in this section indicated that they operate in the Advanced Aviation sector, but Advanced Aviation operations are not a core part of their business activity.

The survey data shows 50 organisations (or 32%) have been operating for more than 20 years. For organisations operating for more than 20 years, 70% of the organisations operate across both Space and Advanced

Aviation, and 12% selected Advanced Aviation as their core business. The balance of the organisations does not have a core focus on Advanced Aviation but still operate in the sector.

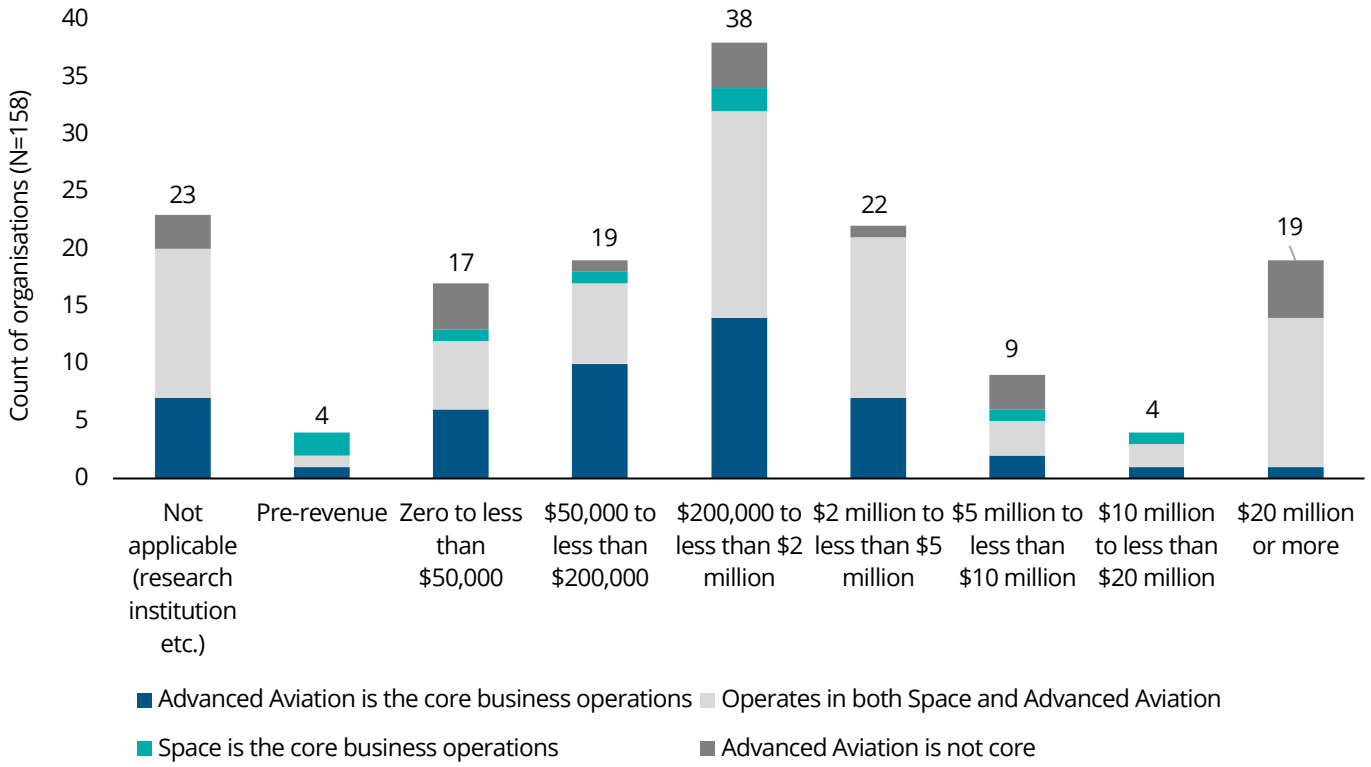
The second largest group of firms are those that have been operating for **two to less than five years, which makes up 22% of the sector**. Organisations where Advanced Aviation is its core operation are the majority within the duration range (50%), followed by organisations across both Space and Advanced Aviation (41%). This could suggest that over the last five years, organisations operating in Space expanded to Advanced Aviation and vice versa.

Organisations operating for less than a year (12 or 8%) and less than 2 years (8 or 5%) are dominated by organisations with a core focus on Advanced Aviation, reflecting the emerging nature that defines this sector.

Turnover

Respondents were asked to select which turnover range was most appropriate for FY24.

Figure 14: Turnover range in New Zealand's Advanced Aviation sector



Source: Deloitte Access Economics

Key survey insights include:

Survey data shows the turnover ranges are mixed between lower and higher ranges. Organisations with a core focus on Advanced Aviation is more dominant in the lower turnover ranges, and organisations with a focus on both Space and Advanced Aviation are more dominant in the higher turnover ranges.

The majority of organisations earned less than $2 million, however there were 19 firms (or 12%) that reported earning over $20 million. Survey data shows organisations with a core focus on Advanced Aviation comprised 5% of this turnover range, whereas organisations with both a focus on Space and Advanced Aviation comprised 68%; and 25% of organisations do not have a core focus on Advanced Aviation.

Almost one quarter of organisations in the Advanced Aviation sector had a turnover range of $200,000 to less than $2 million. 47% of these organisations operate across both Space and Advanced Aviation, and 37% of the organisations have a core focus on Advanced Aviation.

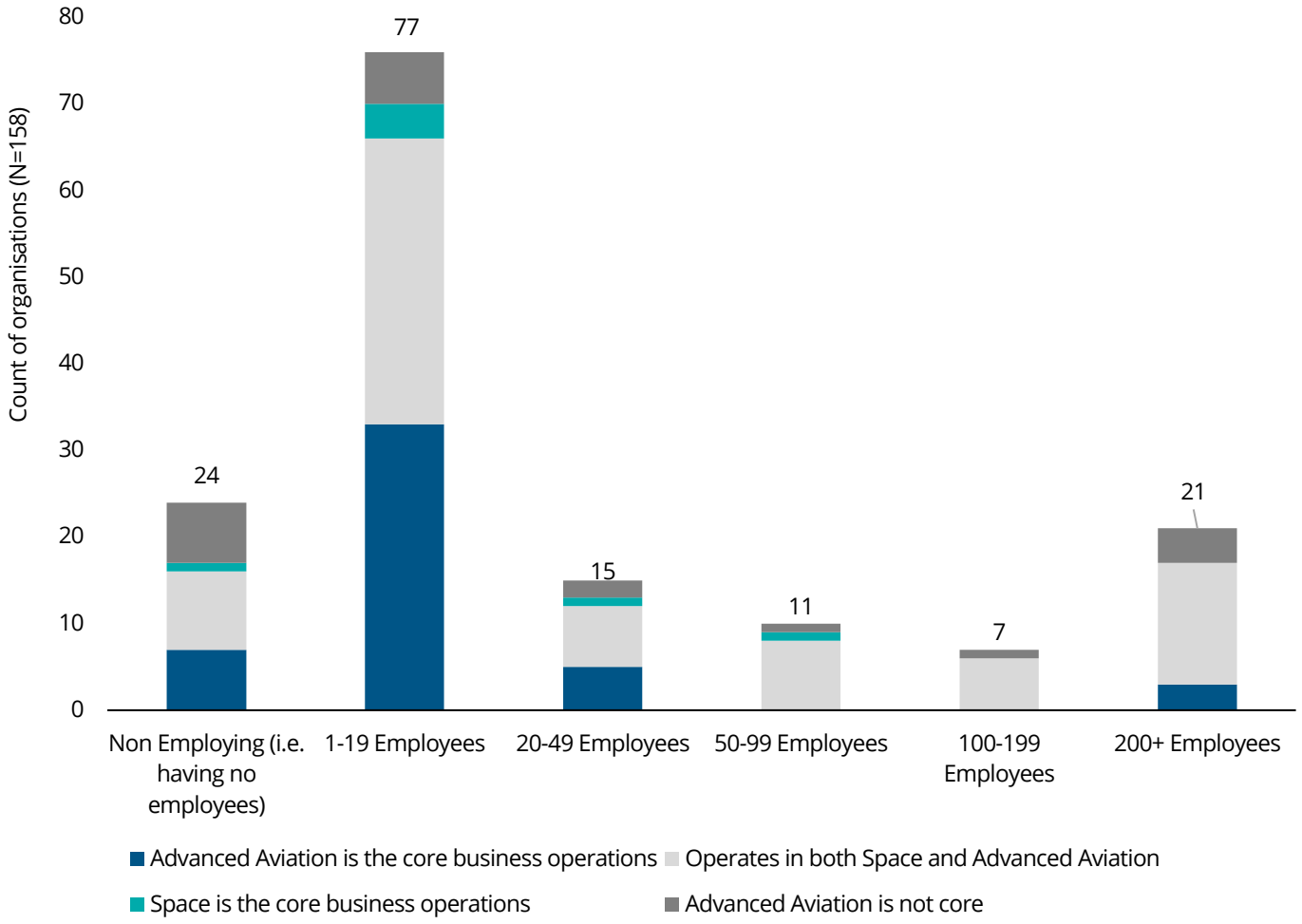
Another quarter of the organisations had a turnover range of less than $200,000. The most commonly reported turnover range of organisations in the Advanced Aviation economy was $200,000 to less than $2 million. This range represented 24% of firms in the sector. More than half of the organisations with a core focus on Advanced Aviation earned $50,000 to less than $200,000, and about a third less than $50,000. Survey data shows organisations operating across both Space and Advanced Aviation are about one third of the turnover ranges less than $200,000.

The number of research institutions was 23 organisations, with 13 operating across both Space and Advanced Aviation. This illustrates strong research and development capability. **There are a small number of pre-revenue organisations** that completed the survey – a mix of a core focus on Advanced Aviation, Space and both.

Employees

Respondents were asked to select the most appropriate FTE employee range for FY24.

Figure 15: Employee FTE ranges in New Zealand's Advanced Aviation sector



Source: Deloitte Access Economics

Half of the Advanced Aviation sector consists of organisations with fewer than 19 employees.
33 organisations have a core focus in Advanced Aviation, 33 have a focus across both Space and Advanced Aviation and 11 organisations are either not a core focus on Advanced Aviation, or a core focus on Space. The Advanced Aviation sector has a **strong presence of non-employing organisations as well**, mostly driven by newly established firms.

There is a notable presence of firms with over 200 employees, indicating the sector also includes high-earning firms in the sector. In the current survey, 21 organisations selected the 200+ range, representing 13% of the total sample – the majority of the organisations have a focus across both Space and Advanced Aviation.

84% of survey respondents reported that more than 50% of their workforce draws on New Zealanders to conduct their operations. In addition, 10% of respondents identified as a Māori business.

Please refer to Appendix C for a directory of the number of survey respondents within each of the Advanced Aviation sub-sectors.

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SPACE TRAILBLAZER

Part 3:
Economic contribution of Space and Advanced Aviation

Economic contribution results

In 2024, the New Zealand Space sector contributed an estimated $2.47 billion to the New Zealand economy. In the same year, the Advanced Aviation sector contributed an estimated $0.48 billion.

Economic contribution studies can be conducted to help policy makers, market participants and investors understand the direct and indirect contribution a sector has on employment and wider economic activity across the economy. This chapter discusses these results for both the Space and Advanced Aviation sectors.

Overview of Economic contribution studies

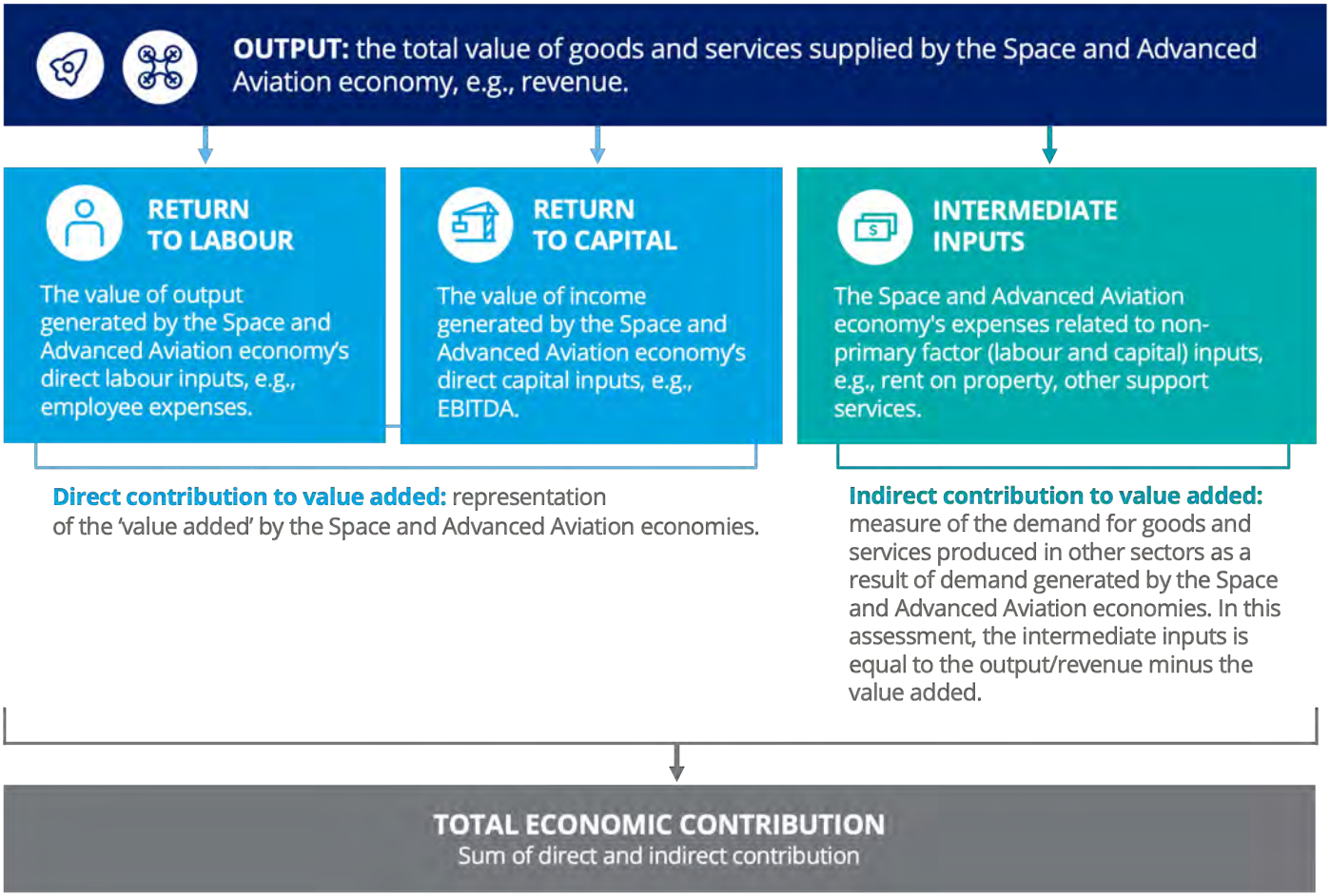
Using an in-house Input-Output (IO) model, Deloitte Access Economics estimated the direct and indirect contribution of the Space and Advanced Aviation sectors for the Financial Year 2024 (July 2023 – June 2024).

To estimate the economic contribution, the IO modelling was conducted in two steps:

1) **Market Size:** Estimate the gross output or total revenue of the Space and Advanced Aviation sectors. Chapters 3 and 4 of this report, present these results. While revenue is a useful indicator for the size of a sector it does not measure the economic contribution these sectors have across the rest of the economy.
2) **Economic Contribution:** Using the market size data in step one, IO modelling can provide a snapshot of the total economic contribution of each sector. It does this by estimating the:
    a. Direct contribution of the Space and Advanced Aviation sectors on their own sector operations.
    b. Indirect contribution of the Space and Advanced Aviation sectors, through the flow-on effects of each sector expenditure on intermediate inputs across other areas of the economy.

The process to estimate the economic contribution is summarised in Figure 16.

Figure 16: Visual representation of the process to estimate the economic contribution



Source: Deloitte Access Economics

Direct economic contribution

Direct contribution captures the economic activity of the sector itself and is measured as the value added by the activities of businesses (i.e. the sum of returns to labour and capital) within the Space/Advanced Aviation sector. This is estimated using the income approach to GDP which sums return to capital and return to labour. Return to capital is calculated through Gross Operating Surplus (GOS), while returns to labour are determined through wages and salaries.

Indirect economic contribution

The indirect contribution measures the demand for goods and services produced in other sectors because of demand generated by the Space and Advanced Aviation sectors. The linkages and interdependencies between various sectors of an economy are used to analyse the inputs that represent final demand and flow to other sectors as inputs.

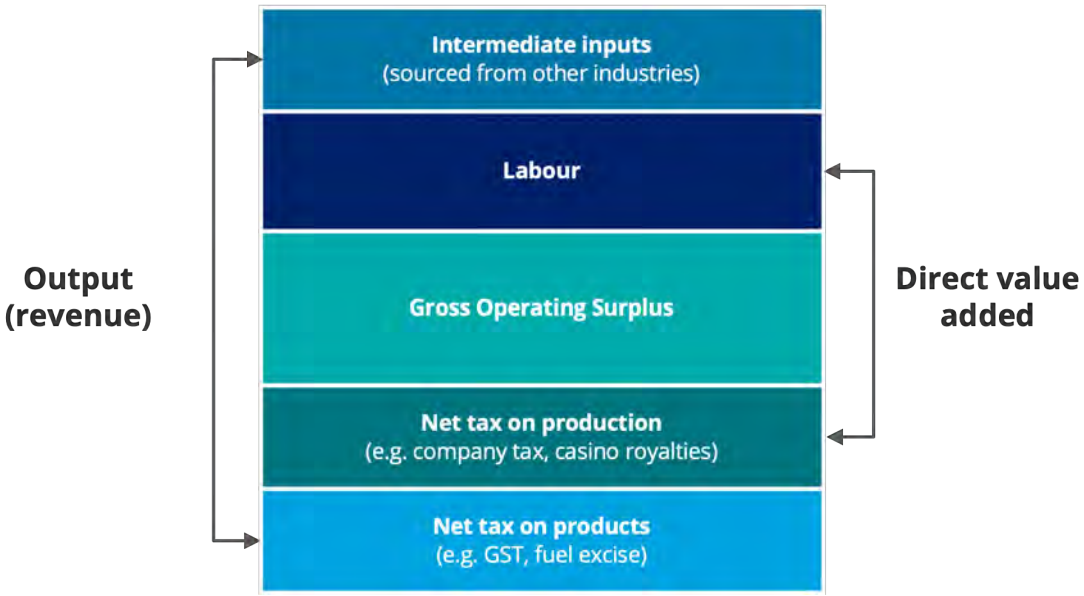
To address the risk of double counting in assessing the indirect contribution of the space sector as a whole, Deloitte Access Economics developed a weighted index across all the Space sub-sectors to capture the intermediate

expenditure profile; as well as a separate weighted index across all the Advanced Aviation sub-sectors to capture the intermediate expenditure profile.

Total economic contribution

The total economic contribution of the Space and Advanced Aviation sectors is the sum of the direct and indirect contribution as described above. Put in other words, the total economic value add can be thought of as the value of the output of the Space and Advanced Aviation sectors as measured by the income associated with labour and capital. The accounting framework shown below is used to evaluate economic activity, along with the components that make up output.

Figure 17: Economic activity accounting framework



Source: Deloitte Access Economics

There are several estimates that are key outputs from economic contribution calculations. These are defined in Table 5 below.

Table 5: Definitions of economic contribution estimates

Estimate	Definition
Gross operating surplus (GOS)	GOS represents the value of income generated by the entity's direct capital inputs, generally measured as the earnings before interest, tax, depreciation, and amortisation (EBITDA).
Labour income	Labour income is a subcomponent of value added. It represents the value of production generated by the entity's direct labour inputs, as measured by the income to labour.

Estimate	Definition
Value added	Value added measures the value of production (i.e. goods and services) generated by the entity's factors of production (i.e. labour and capital) as measured in the income to those factors of production.
Employment (FTE)	Employment is a fundamentally different measure of activity to those above. It measures the number of workers (measured in full-time equivalent terms) that are employed by the entity, rather than the value of the workers' product.
Direct economic contribution	The direct economic contribution is a representation of the flow from labour and capital committed in the economic activity.
Indirect economic contribution	The indirect contribution is a measure of the demand for goods and services produced in other industries because of demand generated by economic activity.
Total economic contribution	The total economic contribution to the economy is the sum of the direct and indirect economic contributions.

Source: Deloitte Access Economics

Economic contribution of the Space sector

The Space sector is estimated to have contributed $2.47 billion to the New Zealand economy over FY24. This contribution consisted of:

- Direct contribution of $1.26 billion, in value-added terms to the economy.
- Indirect contribution, reflecting expenditure on intermediate inputs equal to $1.21 billion in value-added terms.

Table 6: Total economic contribution of the Space sector, 2024 ($ millions)

	Direct	Indirect	Total
Value added	**1,261**	**1,208**	**2,470**
Labour income	688	557	1,245
Gross operating surplus	573	651	1,224

Source: Deloitte Access Economics

Direct and indirect economic contribution

The total economic contribution was $2.47 billion, equivalent to 90% of the Space revenue and 0.58% of New Zealand's GDP.

The **direct contribution** of the Space sector was made up of $573m in gross operating surplus and $688m in wages. The ratio of direct to indirect contribution has stayed constant since 2019 as the relationship between each Space sub-sector and other sectors of the economy have stayed relatively constant over time. The total direct contribution is 49% of the total revenue or gross output.

The **indirect contribution** of the sector is made up of $651m in gross operating surplus and $557m in wages. The total indirect contribution of the sector was $1.21b. This shows the Space sector's wider economic impact on other sectors of the economy, and that its indirect contribution was almost as large as the direct economic contribution.

The **economic contribution by sub-sector** has changed significantly since the 2019 report. While Space Applications remains the largest sub-sector as a proportion of the direct contribution, the proportional size of Space Manufacturing and Space Operations has increased. The breakdown of the direct contribution by sub-sector is shown in Table 7 below.

Deloitte Access Economics developed a weighted index for the space sector as a whole to assess the indirect contribution. For this reason, the estimated indirect contribution cannot be attributed to a specific space sub-sector. In particular:

- To calculate the indirect contribution of the Space and Advanced Aviation sector Deloitte Access Economics used Statistics New Zealand industry codes to allocate interactions between different sectors of the economy. As ANZSIC codes do not directly include Space, Deloitte Access Economics developed a weighted index for the Space sector as a whole to assess the indirect contribution.
- For example, Space Manufacturing was allocated to Aircraft manufacturing and repair services, and Space Applications was allocated to broadcasting and internet publishing and telecommunication services. For this reason, the estimated indirect contribution cannot be attributed to a specific Space sub-sector as the contribution is proportional to the allocation by Deloitte Access Economics.

Table 7: Breakdown of the direct contribution of Space - By sub-sector

Sub-sector	Direct contribution (NZD millions, FY24)	Proportion of the direct contribution (%) (FY24)	Direct contribution (NZD millions, FY19)	Proportion of the direct contribution (%) (FY19)
Space Manufacturing	238	19%	160	18%
Space Operations	345	27%	200	22%
Space Applications	478	38%	398	44%
Ancillary Services	116	9%	78	9%
Research and Development	84	7%	61	7%
Total	**1,261**	**100%**	**897**	**100%**

Source: Deloitte Access Economics

Note: Figures for each sub-sector in the 'Proportion of direct contribution (%) (FY24)' column do not total 100% due to rounding.

Direct and indirect employment

In 2024 the Space sector directly employed ~7,000 FTEs and supported another ~10,000 FTEs in other sectors that provide services to the Space sector. This is an increase since 2019, with an increase of 2,000 direct FTEs and 3,000 indirect FTEs.

Direct employment captures those who are employed by the Space sector such as engineers working in Space Manufacturing. Indirect employment captures those that supply inputs to companies in the Space sector such as transport services and financial services. For every 100 FTE jobs created by the Space sector, 135 are supported indirectly by the sector. For comparison the direct employment of New Zealand's Space sector represents about 0.37% of the total current FTEs in the total workforce in New Zealand or 3.2% of the manufacturing sector in New Zealand.[23] The table below shows the direct employment contribution by sub-sector in both 2024 and 2019.

Table 8: Breakdown of the direct contribution to FTE jobs in Space – By sub-sector

Sub-sector	FTE FY24	Proportion of the direct contribution (%) FY24	FTE (FY19)	Proportion of the direct contribution (%) (FY19)
Space Manufacturing	1,518	22%	1,417	28%
Space Operations	1,957	28%	1,223	24%
Space Applications	2,252	31%	1,579	31%
Ancillary Services	697	10%	415	8%
Research and Development	625	9%	414	8%
Total	**7,049**	**100%**	**5,048**	**100%**

Source: Deloitte Access Economics

Economic contribution of the Advanced Aviation sector

Comparatively, the Advanced Aviation sector is estimated to have contributed $0.48 billion to the New Zealand economy in 2024. This contribution consisted of:

- Direct contribution of $299 million, in value-added terms to the economy.
- Indirect contribution, reflecting expenditure on intermediate inputs of $183 million in value-added terms.

Table 9: Total economic contribution of the Advanced Aviation sector, 2024 ($ millions)

	Direct	Indirect	Total
Value added	**299**	**183**	**482**
Labour income	207	89	296
Gross operating surplus	92	94	186

Source: Deloitte Access Economics

Direct and indirect economic contribution

The total economic contribution was $0.48 billion, equivalent to 88% of the Advanced Aviation revenue and 0.11% of New Zealand's GDP. The **direct contribution** of the Advanced Aviation sector was made up of $92m in gross operating surplus and $207m in wages. Notably, the return to labour made up a higher proportion of the direct value added than the gross operating surplus. The **indirect contribution** of the Advanced Aviation sector was made up of $89m in wages and $94m in gross operating surplus. This more balanced distribution between labour income and gross operating surplus reflects the more balanced nature of sectors supporting the Advanced Aviation sector such as transport and insurance.

The proportion of the direct economic contribution of the Advanced Aviation sub-sectors is relatively balanced. Ancillary Services and Manufacturing both make up 23% of the direct contribution followed by Applications at 22% and Operations at 17%.

Table 10: Breakdown of the direct contribution of Advanced Aviation – By sub-sector

Sub-sector	Direct contribution (NZD millions, FY24)	Proportion of the direct contribution (%) (FY24)
Manufacturing	69	23%
Operations	50	17%
Applications	66	22%
Ancillary Services	68	23%
Research and Development	46	15%
Total	**299**	**100%**

Source: Deloitte Access Economics

Deloitte Access Economics developed a weighted index for the Advanced Aviation sector as a whole to assess the indirect contribution. For this reason, the estimated indirect contribution cannot be attributed to a specific Advanced Aviation sub-sector.

Direct and indirect employment

The Advanced Aviation sector directly employed ~2,100 FTEs in 2024 and indirectly supported an additional ~1,600 FTEs. This means that the Advanced Aviation sector supported a total of 3,700 FTEs in 2024. For comparison the direct employment of New Zealand's Advanced Aviation sector represents approximately 0.11% of the total current FTEs in the total workforce in New Zealand, or 1% of the manufacturing sector in New Zealand and 16% of the mining sector.[23]

Indirect and direct employment estimates suggest that for every 100 jobs that the Advanced Aviation sector directly employs, an additional 78 jobs are indirectly supported by the sector. In practice, those directly employed by the Advanced Aviation sector would include roles from software and aviation engineers to drone pilots in agriculture or photography, to administration and communication advisors.

The distribution of FTEs by sub-sector is different to the distribution of direct economic contribution. Manufacturing supports the majority of the FTE jobs making up 26% of the direct employment, followed by Applications at 21% and Ancillary Services at 20%. This suggests that although Ancillary Services make up a higher proportion of the direct economic contribution it is less labour intensive than sub-sectors such as Manufacturing and Applications.

Table 11: Breakdown of the direct contribution to FTE jobs of Advanced Aviation – By sub-sector

Sub-sector	FTE (FY24)	Proportion of the direct contribution (%)
Manufacturing	531	26%
Operations	368	17%
Applications	423	21%
Ancillary Services	422	20%
Research and Development	339	15%
Total	**2,083**	**100%**

Source: Deloitte Access Economics

The direct economic contribution of the Advanced Aviation sector is mostly made up of the Manufacturing sub-sector followed by Applications and Ancillary Services. The relatively balanced proportion of the direct contribution illustrates that there is not one sub-sector that is defining the industry.

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SPACE TRAILBLAZER

Part 4:
Barriers and enablers of growth

Barriers and enablers of growth

Many survey respondents provided insight on the future of the Space and Advanced Aviation sectors. Overall, firms were optimistic about the future but also acknowledged barriers to growth.

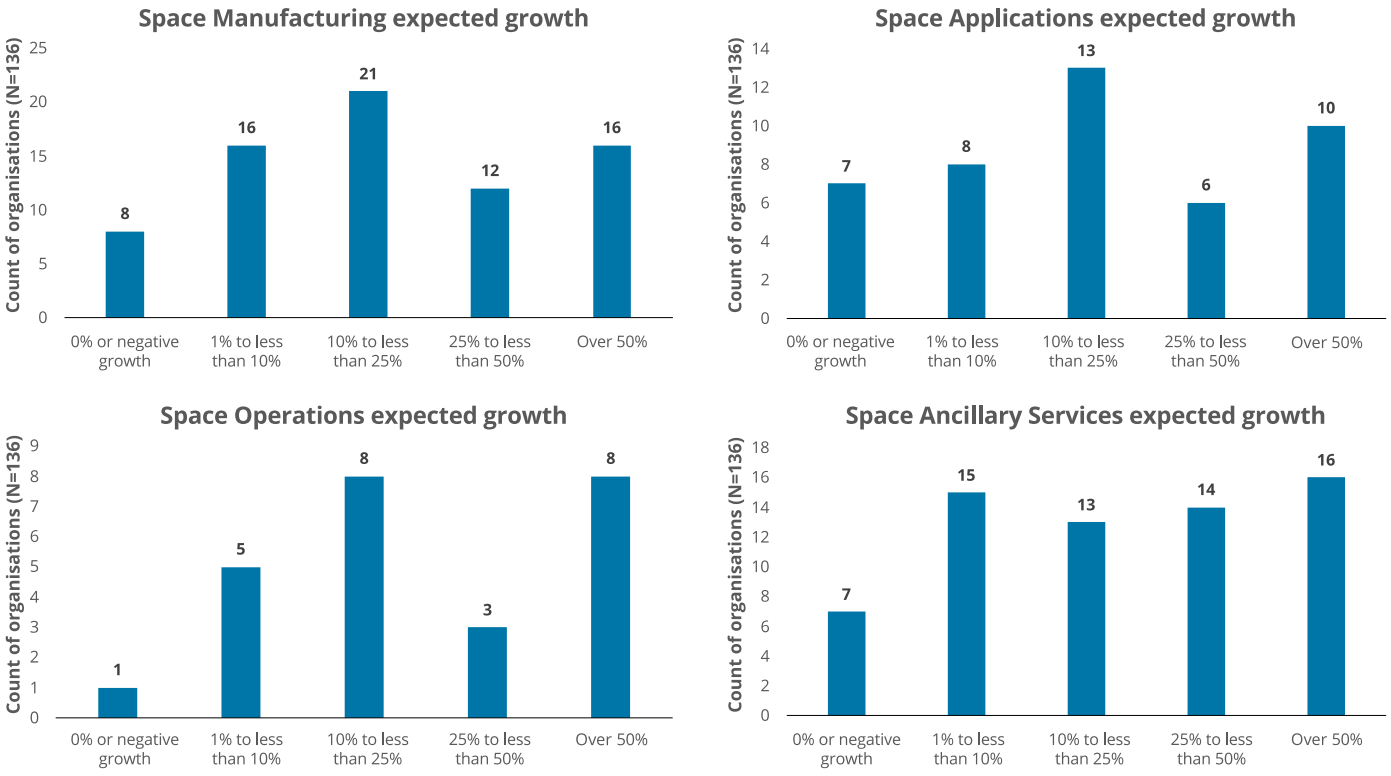
This chapter summarises the sectors optimism in figures based on the survey results and outlines the key themes where survey participants described barriers to growth. This chapter then puts forward examples to address these barriers. These examples are by no means a roadmap for New Zealand but provide an indicative range of options and direction for the New Zealand Space and Advanced Aviation sectors to consider as possible ways of supporting future growth. To ensure these policies and solutions are appropriate for the New Zealand Space and Advanced Aviation sectors, further research and analysis should be conducted.

Optimism and future growth

Space sector

Organisations operating within the Space sector are relatively optimistic about the future. Survey data shows 35% of firms expect growth over 25% over the next 2-3 years. There is a small subset that are less optimistic with 10% of firms expecting no or negative growth.

Figure 18: Expected growth across Space sub-sectors

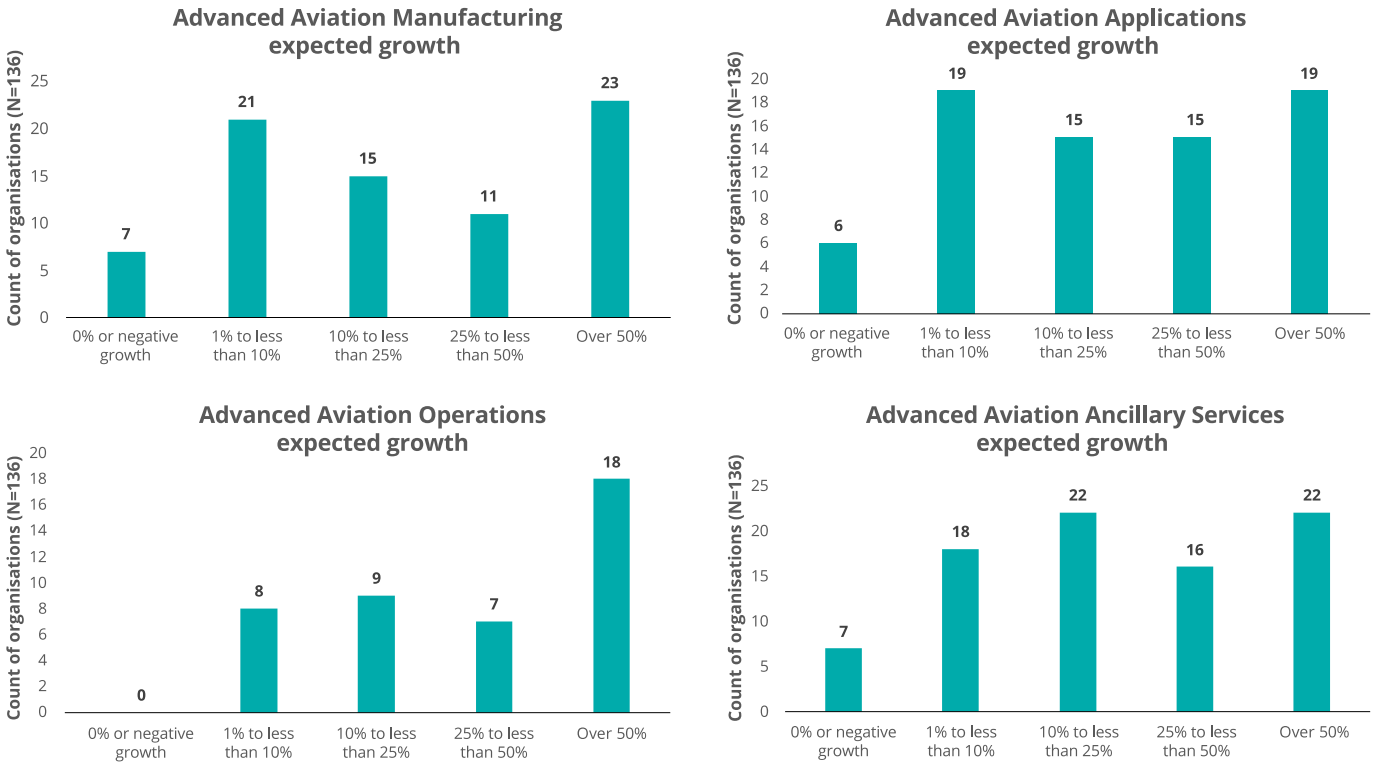


Source: Deloitte Access Economics

Advanced Aviation sector

The Advanced Aviation sector is also optimistic about the future, 38% of surveyed organisations expect over 25% growth in the next 2-3 years. The Advanced Aviation Operations sub-sector is most optimistic, with approximately 40% of survey respondents expecting 50% growth over the next 2 – 3 years. There is a small number of firms expecting no or negative growth at 10% of survey respondents.

Figure 19: Expected growth across Advanced Aviation sub-sectors



Source: Deloitte Access Economics

Barriers and enablers of growth

Survey participants in both the Space and Advanced Aviation sector described access to capital, talent and knowledge gaps, regulation, collaboration and awareness as key barriers to growth. The following section describes each barrier in more detail and then puts forward a number of examples where other sectors or countries have implemented policies and actions that may be worth further investigation in the New Zealand context.

Improve access to capital

The growth observed over the last five years has been driven by public and private investment. To continue this growth the sector has said further investment is needed. Traditional government funding through grants and subsidies,[24] and private investment through initial public offerings (IPOs) [25]and venture capital funds[26] have been used to date, however, companies and Space Agencies overseas have illustrated other models that may be successful here.

Enablers for growth

- Access to early-stage capital is often a challenge for start-ups as the financial returns are typically low in the early stages, making it difficult to get private funding. Facilitating awareness among start-ups and small businesses about available grants and funding opportunities in New Zealand is crucial for growth. This could also involve **improving the availability of debt funding and tax incentives** to support organisations in Space and Advanced Aviation sectors.

- Government investment can support innovation in emerging areas that are seen as too risky for private investors.[27] Sector specific Space and Advanced Aviation infrastructure, such as that at Tāwhaki Joint Venture, was mentioned as a positive enabler for growth, but additional funding for infrastructure across New Zealand would support the sector. Another example of potential investment is investing in air traffic control systems to help integrate uncrewed aircraft and vertiport-style landing pads.
- **Public-Private Partnerships (PPPs)** have commonly been used for large transport infrastructure projects in New Zealand.[28] But, PPPs are also currently being used by the Japan Aerospace Exploration Agency (JAXA) to develop lunar rovers, autonomous navigation systems, and simulation and testing platforms within the Japan Space Robotics and Artificial Intelligence Research Centre (J-SPARC).[29] Encouraging public-private partnerships (PPPs) can enhance the synergy between commercial interests and international cooperation.

Address talent and knowledge gaps

Growing the skilled workforce of the Space and Advanced Aviation sector is crucial to the growth of both sectors and sustainability in the long run. This challenge is not unique to the Space and Advanced Aviation sector, workforce training and retention is a constant challenge for many New Zealand sectors.

Enablers for growth

- In the survey responses many organisations highlighted the difficulty they had attracting skilled workers, including recent university graduates. Through **enhancing the awareness of career pathways offered by the Space and Advanced Aviation sectors** it may be easier to attract and retain talent. This involves promoting vocational pathways for students and highlighting the diverse opportunities available in these sectors. Implementing an entrepreneurial-minded programme for young talent could nurture innovation and creativity, equipping individuals with the skills and mindset needed to drive entrepreneurship and sector growth the Space and Advanced Aviation sectors.
- Broader immigration and education policies play a key role in building New Zealand skilled workforce in the long-term, but **strategic and targeted immigration policies** are needed in the short-term to address shortages in the Space and Advanced Aviation sector. Implementing targeted fast-track immigration policies can facilitate the attraction of global talent, particularly skilled engineers for Space and Advanced Aviation, to make it easier for both start-ups and well-established organisations to grow.
- Space and Advanced Aviation organisations also identified a workforce gap in skilled engineers and other specialists which posed challenges to growth and innovation. **A talent strategy could centre on mid-career professionals** could help address this issue. For example, in Singapore, programmes like the Professional Conversion Programmes (PCPs) aim to reskill experienced engineers from non-space industries and facilitate their transition into the Space sector. Additionally, offering 22 design training courses for senior engineers helps cultivate relevant skills before making a mid-career switch.[30]
- Leveraging Space-based and Advanced Aviation-based solutions for sectors outside Aerospace necessitates **a skilled workforce equipped with the expertise to interpret and utilise satellite/aerial imagery data** effectively. Bridging the skills and talent gap through training and upskilling initiatives could help maximise the value of Space and Advanced Aviation technologies across diverse sectors.

Current and future regulation

The regulatory regime can be viewed as a key comparative advantage in New Zealand's Space and Advanced Aviation sectors given its flexibility, speed at development, and being less prescriptive relative to other jurisdictions.

Enablers for growth:

- **Promoting our open regulatory framework globally** could attract additional international projects to the country. New Zealand retains distinctive strengths, offering opportunities for the testing of innovative Space and Advanced Aviation technologies.
- **Providing knowledge** to the sector on the **reasons and factors influencing the cost associated with fee applications and procedures** for Advanced Aviation could alleviate concerns around perceived high costs or long regulatory time frames.
- **Regulation on airspace integration is a long game**. The Government has already introduced a light-touch regulatory approach in a bid to give business certainty and boost productivity and is committed to having a world-class regulatory framework by the end of 2025. In the context of Advanced Aviation, the focus is to allow rapid testing and iteration of aircraft and technologies. Airspace integration is likely to remain a challenge for new technologies in Advanced Aviation over the long term. To overcome this challenge, a national all of government effort may be required to modernise the aviation system and increasing adoption of new technologies.

Collaboration and awareness

Survey participants noted the siloed in nature of the sectors, and that they were not aware of what other companies offered or what they do. To expand the reach of the Space and Advanced Aviation sector and improve collaboration, the sector should look at the distribution of firms around New Zealand.

Enablers for growth:

- From a local perspective, **increasing collaboration and agglomeration could improve growth prospects**. Agglomeration benefits that develop from a cluster or concentration of businesses is a common phenomenon and driver of growth in other sectors including the Aerospace sector around the world. California, Seattle, Toulouse, Hamburg, Chengdu and Bangalore are all examples of Aerospace clusters that provide an ecosystem which is conducive for collaboration and rapid dispersal of technology and market information.[31] This is already happening in New Zealand, for example, through the Christchurch cluster in the Space sector and the continuation of this could improve growth prospects.

- There appears to be limited international awareness of the New Zealand Space and Advanced Aviation sector outside of our growing launch capabilities. Formal agreements such as the Australian-India corridor could **facilitate awareness at the economy level and provide the sector with strategic connections to other growing Space and Advanced Aviation sectors**. Wider trade policies can broaden our export opportunities, but strategic Space and Advanced Aviation corridors may be more efficient if New Zealand targets specific Space and Advanced Aviation sectors globally.

- Survey results show that, while there are number of firms who export to several international markets, there is a significant proportion of firms who only service domestic demand. While it is possible to increase domestic demand for Space and Advanced Aviation services, particularly as both sectors are further integrated into our everyday lives, there is significant opportunity for growth by accessing international markets. A global perspectives survey of New Zealand's Space and Advanced sector could be helpful to inform our New Zealand sectors' point of differentiation and identify gaps we can build on to make our New Zealand Space and Advanced Aviation sector story stronger to the world.

Doubling the size of the Space and Advanced Aviation Sector

This chapter has outlined a number of examples which could support the New Zealand Space and Advanced Aviation Strategy mission to double the size of the Space and Advanced Aviation sector by 2030. This list is non-exhausted and further research is required to ensure these policies and solutions are appropriate for the New Zealand context.

Further research

From this study there have been several areas identified where further research may be beneficial to better understand the Space and Advanced Aviation sectors in New Zealand. This includes:

- A study on the public awareness of the Space and Advanced Aviation sectors in New Zealand. Public perception of the Space and Advanced Aviation sectors in New Zealand is mixed, and understanding exactly how individuals and businesses view the sector could aid with growth and opportunities. As an extension of this, understanding how the international Space and Advanced Aviation sectors view the New Zealand sectors could result in improved international opportunities for New Zealand businesses and help to raise the profile of New Zealand in these sectors.
- A study on the use cases of Space and Advanced Aviation. Space and Advanced Aviation have a wide range of applications, understanding these and how they can apply across New Zealand organisations is important; it could also help connect organisations with solutions and new ideas and increase the utilisation of Space-enabled data.
- Sub-sector specific insight reports on the drivers underpinning growth from 2019 to 2024. This report has identified that there has been growth from 2019 to 2024 but it would be valuable to understand the drivers of growth and to learn from this from this in the future.
- An exploration of the definition of Advanced Aviation. The Advanced Aviation definition as used in this report targets emerging technologies, as a result this study has captured organisations that fall within this definition. However, looking to the future, as the current emerging technology becomes routine, organisations may drop out of this definition and as such sector of Advanced Aviation. Exploring how this definition can evolve with time will help with comparability to the 2024 study when the study is replicated again.
- A study on the workforce constraints that are impacting the Space and Advanced Aviation sectors. One of the factors commonly identified as limiting growth in the sectors within this study was workforce constraints. Understanding the workforce demographics, the drivers behind workforce gaps, and the necessary skills and occupations will help to establish a baseline of New Zealand's capabilities and the identification of what is required going forward.
- Through consultation with sector stakeholders, it was identified that more regular mapping of the Space and Advanced Aviation sectors would be beneficial. More detailed data could help with future studies on the sector, however, unlike other sector analysis which uses the IDI and the LBD to conduct detailed sector analysis it is not possible to do this for Space and Advanced Aviation sectors. While it would be ideal to look at micro data to understand business practices and financials in the Space and Advanced Aviation sectors, those two sectors are not identified by the standard Statistics New Zealand ANZIC codes. As a result, it would not be possible to identify if organisations are operating in Space or Advanced Aviation, let alone if there is any overlap between them, and what percentage of their business is attributed to Space and Advanced Aviation.

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Appendices

Appendix A. Approach

To understand the market size and economic contribution of New Zealand's Space and Advanced Aviation sectors, Deloitte Access Economics undertook a market sizing survey with Space Trailblazer in late 2024.

Survey

The 2024 New Zealand Space and Advanced Aviation survey was designed and based on the 2019 Space survey distributed by Deloitte Access Economics five years earlier. The survey asked respondents for general information about their business, their involvement in Space and Advanced Aviation, financial information for the last year, information about employees, and any insights on barriers to growth in the Space and Advanced Aviation sector.

Firms were first asked about the characteristics of their organisation. They provided information on whether their core operations were related to Space, Advanced Aviation, both or neither. They were also asked to identify what subsectors of Space and Advanced Aviation they operated in.

They were then asked to identify key financial information such as their revenue for the financial year 2024 and how it was allocated between Space and Advanced Aviation operations. They then identified how many employees their business employed in FY24, what percentage of them worked in Space and Advanced Aviation related activities and the average wages of their non-executive employees. The full survey that firms were sent is shown in Appendix D. This information was used as the primary input to estimate the market size of the Space and Advanced Aviation sectors and their economic contribution to the New Zealand economy.

Deloitte Access Economics worked with Space Trailblazer to distribute the survey to companies known to operate in the Space and Advanced Aviation sectors. This included distribution of the survey through industry bodies and known organisations operating within New Zealand. Organisations that offered to distribute the survey to their networks are listed below.

- Advanced Manufacturing Aotearoa
- Aerospace Auckland
- Aerospace New Zealand
- Aero + Space South
- AgriTech New Zealand
- Forestry New Zealand
- Aviation New Zealand
- New Zealand Defence Industry Association
- New Zealand Law Society
- New Zealand Telecommunication Forum

- New Zealand Trade and Enterprise
- Outset Ventures
- Royal Aeronautical Society
- Snowdon Consulting
- SpaceBase
- Technology New Zealand
- Telecom Users Association of New Zealand
- UAVNZ
- Women in Space Aotearoa New Zealand

The survey was open for responses between 11 November 2024 and 21 January 2025. However, there were some responses collected shortly after the survey closure date. After data cleaning and validation these responses were used to estimate the market size and economic contribution of the two sectors. All data included in this report has been aggregated and de-identified to maintain the confidentiality of the operations of New Zealand organisations.

Database

Once all survey responses had been received there were several steps that were taken to ensure that the data was as complete and accurate as possible. The first was to validate the survey dataset by removing incomplete responses or imputing missing values using publicly available information such as annual reports. The second step was to generate an additional dataset using known firms operating in Space and Advanced Aviation who had not responded to the 2024 survey from Deloitte Access Economics' in-house Space and Advanced Aviation dataset. Finally, a scaled-up database was created to estimate the total market size based on the proportion of known firms who did not respond to the survey and did not have publicly available information.

The dataset collected from the Space and Advanced Aviation survey was first cleaned to ensure the integrity of the dataset. Data cleaning is the process of identifying and correcting errors or inconsistencies in data to improve its quality and ensure it is accurate and reliable for analysis. For the responses to the 2024 survey, this consisted of a manual data validation exercise in which Deloitte Access Economics checked for:

- Coherence and comparability
    - For example, this included checking for duplication of responses (such as where multiple responses from a single organisation were received). In the context of this survey, this was most common for university organisations where multiple parts of the University were engaged in the Space or Advanced Aviation sectors.
- Clarity and accessibility
    - This included checking for the appropriateness of responses, such as the degree of completeness. Where organisations did not provide complete responses desktop research was carried out to fill in incomplete responses or, if there was no publicly available information, the organisation was included in the scaling database described below.
    - All responses were checked against publicly available information such as the New Zealand companies register and annual reports to ensure the reliability of responses.

In addition, as firms were given ranges for a number of questions in relation to annual revenue and employee numbers, there were a number of firms that selected the top (open ended) bracket. Deloitte Access Economics researched each of these firms to identify their revenue and employee numbers where it was publicly available to ensure accurate market

size estimates. For firms without publicly available data, the lower bound was used. Firms that responded in any of the middle bracket categories were assigned the midpoint of the range that they selected. This validated dataset formed the 2024 survey dataset which was used as the base of the market size and economic contribution calculations.

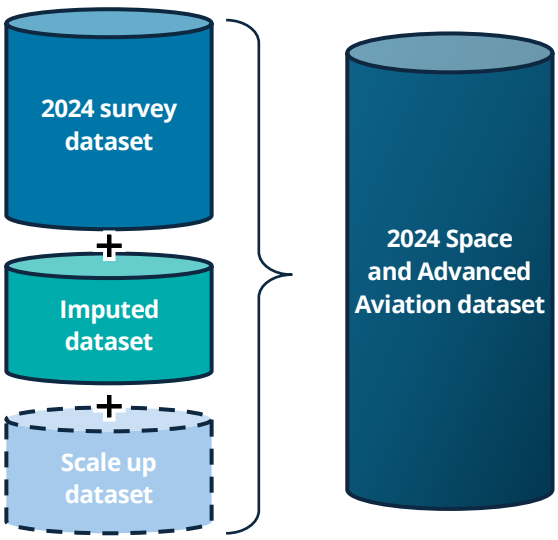
Deloitte Access Economics and Space Trailblazer were aware of a number of organisations that are currently active in the Space and Advanced Aviation sectors that had not answered the 2024 Space and Advanced Aviation survey. As such, these companies were used to create an imputed dataset to add to the 2024 survey dataset. This dataset was constructed using the following steps:

1. Identified known companies operating in the Space sector that did not respond to the 2024 survey.
2. Check companies register and publicly available information for:
   - 2024 annual returns,
   - Name changes, or
   - Liquidations.
3. Remove companies that had liquidated or left New Zealand.
4. Add Advanced Aviation companies based on Deloitte Access Economics' in-house aerospace database.
5. Collect revenue and employment information on remaining companies from public records.

Each of these firms were then assigned to either the Space sector, Advanced Aviation sector or both through desktop research. This dataset then formed the imputed dataset for 2024. This dataset was combined with the 2024 survey dataset before upscaling was performed.

The dataset was then upscaled as there were organisations that Deloitte Access Economics had identified as operating in Space or Advanced Aviation that had not responded to the 2024 survey or did not have publicly available information. This was done by dividing the number of firms included in the 2024 survey dataset and imputed dataset by the total number of known organisations operating in the sector. This was generated by subsector to avoid overinflating the final revenue and employment figures, as the completeness of responses varied by subsector. Each upscale factor was applied to the 2024 survey dataset and imputed dataset with the large firms excluded to ensure that results were not upwardly skewed. The total 2024 Space and Advanced Aviation dataset can be visualised as shown below.

Figure 20: 2024 Space and Advanced Aviation dataset



Source: Deloitte Access Economics

The scaling factors and numbers of firms in the survey dataset and imputed dataset for Space and Advanced Aviation are shown in Table 12 and Table 13 below.

Table 12: New Zealand Space sector scaling approach

	Total # of Surveyed Organisations	Total # of Imputed Organisations	Total # of Upscaled Organisations	Assumed Scaling Factor
Manufacturing	65	11	21	0.78
Operations	22	6	4	0.88
Application	38	28	38	0.63
Ancillary Services	55	2	38	0.60
Education and Training	16	0	21	0.43
Government and Other	-	-	-	-
Industry Body	9	-	-	1.00
Total	203	47	122	

Source: Deloitte Access Economics

Table 13: New Zealand Advanced Aviation sector scaling approach

	Total # of Surveyed Organisations	Total # of Imputed Organisations	Total # of Upscaled Organisations	Assumed Scaling Factor
Manufacturing	63	7	14	0.83
Operations	37	7	6	0.88
Application	58	11	6	0.92
Ancillary Services	73	5	23	0.77
Education and Training	24	1	5	0.83
Government and Other	-	-	-	-
Industry Body	11	-	-	1.00
Total	266	31	54	

Source: Deloitte Access Economics

The scaling factors were applied to the market size and employment statistics from the survey responses once revenue and employment were allocated proportionally between the sub-sectors. This created a conservative estimate as to the total revenue and employment associated with the sectors based on the number of firms known to

have not responded to the survey. These figures tested by excluding the largest Space and Advanced Aviation firms to ensure that numbers were not artificially inflated.

These scaling factors are conservative as they are based on only the ratio of known firms that did not answer the 2024 survey. This means that unknown firms that did not answer the survey have not been captured in the scaling factor. As a result, numbers in this report are likely an underestimate.

Limitations of the 2024 Space and Advanced Aviation Survey

There is no comprehensive dataset that covers businesses operating in the Space and Advanced Aviation sectors in New Zealand other than the two datasets that Deloitte Access Economics have collected through the 2019 Space survey and the 2024 Space and Advanced Aviation survey. While the data collected is the best available data on the Space and Advanced Aviation sectors there are several concerns that should be taken into account.

In surveys one of the most significant limitations is the potential for sample bias. The firms that responded to the survey may not be representative of the entire population of firms operating in the Space and Advanced Aviation sectors. Deloitte Access Economics has assessed the potential sampling bias by comparing the results in the Space sector to the results in the 2019 survey and by comparing the results to the New Zealand economy and other sectors of the New Zealand economy. This comparison is included throughout the report and suggests that there may have been a skew in the data collected towards more established firms.

The response rate of firms that were sent the survey could also impact the survey validity. While Deloitte Access Economics and Space Trailblazer distributed the survey to as many known Space and Advanced Aviation organisations in New Zealand, there will inevitably be firms that are operating within the sectors and were not aware of the survey. Space Trailblazer also found that many firms were not sure whether they met the definition of the Space or Advanced Aviation sectors defined in the survey. This meant that many firms that should have responded to the survey did not out of confusion. Other firms declined to respond to the survey due to the time of year that the survey was distributed as they were too busy and had responded to several other surveys in the months prior to receiving the 2024 New Zealand Space and Advanced Aviation survey. If the firms that declined to respond to the survey all had similar characteristics, there is a chance that the survey dataset is biased.

Appendix B. International comparison

The table below provides an international comparison of Space economies across the world, where data is available.

Table 14: Space sector international comparisons

	Countries							
	New Zealand	**United Kingdom**	**Canada**	**France**	**Germany**	**Italy**	**Korea**	**United States**
First satellite in orbit	Humanity Star (2018)[33]	Ariel (1962)	Alouette 1 (1962)	Astérix (1965)	Azur (1969)	San Marco 1 (1964)	KITSAT-1 (1992)	Explorer 1 (1958)
First successful orbital launch	2018 (Electron) [34]	1971 (Black Arrow)	-	1965 (Diamant A)	-	-	2013 (Naro-1)	1958 (Juno 1)
Number of spaceports (as of 2022)	2 (1 operational in Mahia and 1 in development at Tāwhaki)	6 (under development)	1 (under development)	1 (Kourou Space Centre in French Guiana)	1 (under consideration)	1 (under development)	1 (Naro Space Centre)	3 federal, 13 commercially-licensed (two of which are co-located on a federal range), 3 exclusive-use
Space-related workforce	7,000[35] (as of 2024)	48,800 (as of 2020)	11,600 (as of 2021)	32,200 (as of 2020)	9,200 (as of 2021)	7,000 (as of 2020)	9,797 (as of 2021)	360,000 (as of 2021)
Space-related commercial revenues (in 2022 USD)	$1.5 billion[36] (FY 2024)	$21.6 billion (as of 2020)	$3.9 billion (as of 2021)	$12.3 billion (as of 2020)	$2.8 billion (as of 2021)	$2.3 billion (as of 2020)	$2.8 billion (as of 2021)	$211.6 billion (as of 2021)
2022 Government Space budget (in 2022 USD)	~$60 million[37] (FY 2024)	$0.9 billion	$0.3 billion	$2.7 billion	$1.8 billion	$1.4 billion	$0.6 billion	~$60 billion
Government Space budget Per capita as of 2022 (USD)	$11.65 (FY 2024)	$9.80	$7.70	$39.40	$22.00	$23.60	$10.10	$186.10

Note: The figures for the United Kingdom, Canada, France, Germany, Italy, Korea, and the United States are sourced from The Space Economy in Figures Responding to Global Challenges. See the individual country profiles for the United Kingdom on pg. 141, Canada on pg. 111, France on pg. 115, Germany on pg. 119, Italy on pg. 123, Korea on pg. 127, and the United States on pg. 145. Figures for New Zealand are sourced from this report and underlying data for the Government space budget was provided by the New Zealand Space Agency. As noted by the OECD: 'Although the issue of international comparability is improving, national data on space industry employment and revenues are still not always directly comparable, due to structural differences in the composition of countries' respective space industries (e.g. the presence of satellite television providers will lead to higher revenue aggregates) as well as the scope of the underlying industry survey/data collection (which industry segments, inclusion of higher education and research institutes)'.

Appendix C. Sector directories

What does the current Space sector directory look like across sub-sectors?

Based on the survey responses received, the tables below provide a summary of the organisations within each of the Space sub-sectors. Organisations self-selected the sub-sectors in which they operate.

Table 15: Space sector directory based on survey responses

Respondents were asked to select whether Space is their core operation, whether they operate across both Space and Advanced Aviation, or non-core to operations. Respondents were also asked to select the sub-sectors they operate in.

Sub-Sector	A. Core operations	B. Across both Space and Advanced Aviation	C. Non-Core to operations	D. Research Institution or pre-revenue	Total considered for market sizing
Manufacturing	29	47	4	15	**65**
Operations	12	11	3	4	**22**
Applications	18	25	7	12	**38**
Ancillary Services	22	38	7	12	**55**
R&D, Education and Training	10	20	2	16	**16**
Government		2	1		
Industry body	1	8			**9**
Total	**92**	**151**	**24**	**59**	**205**

Source: Deloitte Access Economics (n=136)

Note: In the sample of 136 firms that responded to the survey as operating in the Space sector many identified as operating across multiple sub-sectors. As a result, the total number is greater than the sample size to keep the proportions of firms in each sector accurate.

This Space directory shows **the Space sector is far beyond just rockets, and several businesses operate across sub-sectors**. This is a key change compared to the 2019 study, where most organisations had one primary focus within a sub-sector. This indicates organisations are diversifying their business focus, and that skills can be transferrable across sub-sectors to some extent.

From a location perspective, survey data shows 45% of the organisations are based in Auckland, 22% in Christchurch, 11% in Wellington and the balance are distributed across New Zealand.

Space Manufacturing, Space Applications and **Space Ancillary Services** have the largest the number of the number of organisations present in New Zealand's Space sector. These key sub-sectors are the areas of growth in the New Space era and supports both upstream and downstream activities.

Space Manufacturing had an uptick from 25 organisations in 2019, to 65 revenue generating organisations today. There are 15 research institutions and pre-revenue organisations operating in Space Manufacturing.

Space Operations had an uptick from 8 organisations in 2019 to 22 revenue generating organisations today. There are now 4 research institutions and pre-revenue organisations operating in Space operations. This uptick is explained in the diversification of organisations in Space Applications to Space Operations and the growth in launch services and ground station networks and segment operations.

Space Applications had an uptick from 29 organisations in 2019 to 38 revenue generating organisations today. There are 12 research institutions and pre-revenue organisations operating in Space Applications.

Space Ancillary Services had an uptick from 18 organisations in 2019 to 55 revenue generating organisations today. There are 12 research institutions and pre-revenue organisations in Space Ancillary Services. This illustrates the greater demand required in New Zealand in 2024 for Ancillary Services to support the Space sector.

What does the current Advanced Aviation sector directory look like across sub-sectors?

Based on the survey responses received, the table below provides a summary of the organisations within each of the Advanced Aviation sub-sectors. Organisations self-selected the sub-sectors in which they operate.

Table 16: Advanced Aviation sector directory based on survey responses

Respondents were asked to self-select whether Advanced Aviation is their core operation, whether they operate across both Space and Advanced Aviation, or non-core to operations. Respondents were also asked to self-select the sub-sectors they operate in.

Sector	A. Core	B. Across both Space and Advanced Aviation	C. Non-Core	D. Research Institution or pre-revenue	Total considered for market sizing
Manufacturing	35	34	8	14	**63**
Operations	30	10	1	4	**37**
Applications	36	27	7	12	**58**
Ancillary Services	32	44	9	12	**73**
R&D, Education and Training	14	18	6	14	**24**
Government	1	4	2	2	
Industry body		11			**11**
Total	**148**	**148**	**33**	**58**	**266**

Source: Deloitte Access Economics (n=158)

Note: In the sample of 158 firms that responded to the survey as operating in the Advanced Aviation sector many identified as operating across multiple sub-sectors.

This Advanced Aviation directory shows **several businesses operate across sub-sectors**. **Advanced Aviation Manufacturing and Ancillary Services** have the largest number of organisations present in New Zealand's Advanced Aviation sector. This is followed by **Applications**, which is driven by the demand such as aerial surveying, drone logistics, applications in the primary sector, forestry, emergency management.

From a location perspective, survey data shows 38% of the organisations are based in Auckland, 28% in Christchurch, 11% in Wellington and the balance are distributed across New Zealand.

Manufacturing comprises of 35 organisations with a core focus on Advanced Aviation, and 34 organisations with a focus on both Space and Advanced Aviation, illustrating the transferable skills and knowledge between these sectors in manufacturing.

Ancillary Services comprise of 32 organisations with a core focus on Advanced Aviation, and 44 organisations with a focus on both Space and Advanced Aviation.

Operations also have a strong presentation, with mostly organisations with a core focus on Advanced Aviation, focusing on Advanced Aviation-related activities such as transportation of goods, high altitude operations.

Research and Development and Education and Training is a strong focus of Advanced Aviation, with 24 revenue generating organisations. There are 11 Industry bodies with a focus on both Space and Advanced Aviation.

Appendix D. Survey questions

Below is the list of questions from the data capture survey. The questions about organisation name and contact were compulsory and all other questions were optional. This means that the survey analysis varies in total responses for each question.

Due to confidentiality agreements, participants' answers have not been included.

Table 17: Survey questions

1	**Organisation name**	[Free Text]
2	**Contact name**	[Free Text]
3	**Contact email address**	[Free Text]
4	**Website**	[Free Text]
5	**Location of New Zealand operations**	
	City	[Free Text]
	Region	[Free Text]
6	**How long has your organisation been in operation in New Zealand?**	
	Less than 1 year	
	1 to less than 2 years	
	2 to less than 5 years	
	5 to less than 10 years	

	10 to less than 20 years
	> 20 years

7	**Please select which statement best represents your organisation's current level of engagement and/or activity in Space and Advanced Aviation**
	Space is the core of my business operations
	Advanced Aviation is the core of my business operations.
	My organisation operates in both Space and Advanced Aviation
	My organisation (or I as an individual) is not currently active in Space and Advanced Aviation.

8	**Does your organisation identify as a Māori business?**
	Yes
	No

9	**Please nominate which of the following sub-sector(s) of the Space sector you operate in. If you operate in more than one sector or sub-sector please select all that you operate in**
	Space Manufacturing
	Launch vehicles and subsystems
	Satellites/payloads/spacecraft and subsystems
	Scientific instrument
	Ground segment systems and equipment (control centres and telemetry)
	Suppliers of materials and components

Scientific and engineering support
Fundamental and applied research
Specialisation on nano and micro satellites (<50kg)
Space Operations
Launch services
Proprietary satellite operation (including sale/lease of capacity)
Third-party ground segment operations
Ground station networks
Space Applications
Direct-To-Home (DTH) broadcasting
Fixed and mobile satellite communications services (including VSAT)
Location-based signal and connectivity service provider
Supply of user devices and equipment
Processors of satellite data
Earth observation services & applications
Satellite communications services providers
Satellite navigation service & applications
Health in Space
User of Space enabled services
Ancillary Services
Launch and satellite insurance (including brokerage) services
Financial services
Legal services
Construction

	Software and IT services
	Market research and consultancy services
	Business incubation, development, venture and investment
	Transport
	Logistics
	General component, material, engineering supply
	Tourism
	Education & Training
	Secondary
	Tertiary
	Professional training services
	Government and other
	Industry body or association
	Policy-making
	Regulation
	Oversight

10	**Please nominate which of the following sub-sector(s) of the Advanced Aviation you operate in. If you operate in more than one sector or sub-sector please select all that you operate in**
	Advanced Aviation manufacturing
	Airspace design and management, uncrewed aircraft system traffic management
	Communication, navigation and surveillance (CNS), Remote identification (Remote ID) and Detect and Avoid (DAA)

Landing sites and physical infrastructure, vertiports
Advanced Air Mobility
Urban Air Mobility
Regional Air Mobility
New Aircraft designs
Electric propulsion and alternative fuels
Enabling Technologies and capabilities (cyber security, safe assurance, AI, radio frequency spectrum management).
Software
Advanced Aviation Operations
Beyond Visual Line of Sight (BVLOS)
Transportation of goods, supply chain, delivery
Transportation of people
Simplified vehicle operations (technologies and software that automate traditional pilot tasks)
High altitude operations
Evolved conventional operations
Advanced Aviation Applications
Aerial surveying
Drone logistics
Uncrewed traffic management
Primary industry, forestry, agriculture
Photography and filming
Education
Emergency management, response, search and rescue
Police, security and defence

	Entertainment
	Training
	Ancillary Services
	Insurance services
	Financial services
	Legal services
	Construction
	Software and IT services
	Market research and consultancy services
	Business incubation, development, venture and investment
	Transport
	Logistics
	General component, material, engineering supply
	Tourism
	Education & Training
	Secondary
	Tertiary
	Professional training services
	Government & Other
	Industry body or association
	Policy-making
	Regulation
	Oversight

11	**CONFIDENTIAL: What was your turnover range in FY20 in New Zealand?**
	Zero to less than $50,000
	$50,000 to less than $200,000
	$200,000 to less than $2 million
	$2 million to less than $5 million
	$5 million to less than $10 million
	$10 million to less than $20 million
	$20 million or more
	Pre-revenue
	Not applicable (research institution etc.)

12	**CONFIDENTIAL: What was your turnover range in FY21 in New Zealand?**
	Zero to less than $50,000
	$50,000 to less than $200,000
	$200,000 to less than $2 million
	$2 million to less than $5 million
	$5 million to less than $10 million
	$10 million to less than $20 million
	$20 million or more
	Pre-revenue
	Not applicable (research institution etc.)

13	**CONFIDENTIAL: What was your turnover range in FY22 in New Zealand?**

	Zero to less than $50,000
	$50,000 to less than $200,000
	$200,000 to less than $2 million
	$2 million to less than $5 million
	$5 million to less than $10 million
	$10 million to less than $20 million
	$20 million or more
	Pre-revenue
	Not applicable (research institution etc.)

14	**CONFIDENTIAL: What was your turnover range in FY23 in New Zealand?**
	Zero to less than $50,000
	$50,000 to less than $200,000
	$200,000 to less than $2 million
	$2 million to less than $5 million
	$5 million to less than $10 million
	$10 million to less than $20 million
	$20 million or more
	Pre-revenue
	Not applicable (research institution etc.)

15	**CONFIDENTIAL: What was your turnover range in FY24 in New Zealand?**
	Zero to less than $50,000
	$50,000 to less than $200,000

	$200,000 to less than $2 million
	$2 million to less than $5 million
	$5 million to less than $10 million
	$10 million to less than $20 million
	$20 million or more
	Pre-revenue
	Not applicable (research institution etc.)

16	**If your organisation is active in both Space and Advanced Aviation, please indicate the percentage of your turnover in FY24 from each sector:**	[Free Text]

17	**CONFIDENTIAL: What percentage of your annual turnover range would you classify as primarily related to Space and Advanced Aviation in FY24 in New Zealand?**
	None
	<21%
	21-40%
	41-60%
	>60%

18	**CONFIDENTIAL: How many employees (FTEs) did you have in FY24 in New Zealand? This includes contractors.**
	Non-Employing (i.e. having no employees)
	1-19 Employees
	20-49 Employees
	50-99 Employees

	100-199 Employees
	200+ Employees

19	**CONFIDENTIAL: With respect to your organisation's activities in New Zealand, what proportion of your employees (FTEs) performed activities related to Space and Advanced Aviation in FY24? This includes contractors.**
	<21%
	21-40%
	41-60%
	61-80%
	>80%

20	**CONFIDENTIAL: Please estimate your salaries and wages as a proportion of total business expenditure in FY24 in New Zealand**
	None
	<21%
	21-40%
	41-60%
	>60%

21	**CONFIDENTIAL: What was the average wage of your non-executive Space and Advanced Aviation employees in your business in FY24 in New Zealand?**
	Zero
	Less than $50,000

	$50,000 to less than $80,000
	$80,000 to less than $120,000
	$120,000 to less than $180,000
	$180,000 or more

22	**Are the majority (greater than 50%) of your New Zealand-based employees New Zealand citizens?**
	Yes
	No
	Don't know

23	**CONFIDENTIAL: What was the value of your exports from Space and Advanced Aviation activities in FY24 from New Zealand?**
	Zero
	Less than $50,000
	$50,000 to less than $200,000
	$200,000 to less than $2 million
	$2 million to less than $5 million
	$5 million to less than $10 million
	$10 million or more
	Not applicable (research institution etc.)

24	**CONFIDENTIAL: What percentage of your New Zealand revenue (related to Space and/ or Advanced Aviation), do you export internationally?**
	None

	<21%	
	21-40	
	41-60%	
	>60%	

25	**CONFIDENTIAL: If you export internationally, how many countries do you export to?**	[Free Text]

26	**CONFIDENTIAL: Can you name the countries you export to if possible?**	[Free Text]

27	**CONFIDENTIAL: Have you received financial assistance (of any type) from the New Zealand Government or a local body?**	
	Yes	
	No	

28	**CONFIDENTIAL: Please select the approximate range of capital investment for Space and Advanced Aviation related activities that your organisation incurred in FY24 in New Zealand.**	
	Zero to less than $50,000	
	$50,000 to less than $200,000	
	$200,000 to less than $2 million	
	$2 million to less than $5 million	
	$5 million to less than $10 million	
	$10 million or more	

29	**CONFIDENTIAL: Please select the approximate range of Research and Development spending for Space**	

	and Advanced Aviation related activities that your organisation incurred in FY24 in New Zealand.	
	Zero to less than $50,000	
	$50,000 to less than $200,000	
	$200,000 to less than $2 million	
	$2 million to less than $5 million	
	$5 million to less than $10 million	
	$10 million or more	

30	**CONFIDENTIAL: What is your expected growth of your business over the next 2-3 years? Please provide your response as a percentage.**	
	0% or negative growth	
	1% to less than 10%	
	10% to less than 25%	
	25% to less than 50%	
	Over 50%	

31	**Do you have any additional comments? For example, any comments on the barriers to growth in the Space or Advanced Aviation sectors, or comments on enablers for future growth**	[Free Text]

Appendix E. Input-Output modelling

Input-Output tables account for the intermediate flows between industries. These tables measure the direct economic activity of every industry in the economy at the national level. Additionally, these tables allow intermediate inputs to be examined further by their source. Detailed intermediate flows may be used to derive the total change in economic activity associated with a given direct change in activity for a given industry.

A widely used measure of the spill-over of activity from one industry to another is captured by the ratio of the total to direct change in economic activity. The resulting estimate is typically referred to as the 'multiplier'. A multiplier greater than one implies some indirect activity, with higher multipliers indicating relatively larger indirect and total activity flowing from a given level of direct activity.

Value added approach
There are several commonly used measures of economic activity, each of which represent a different aspect of an industry's economic contribution.

Value added measures the value of production (i.e. goods and services) generated by the entity's factors of production (i.e. labour and capital), as measured by the income to those factors of production. The sum of value added across all entities within the economy equals gross domestic product. Given the relationship with GDP, the value added measure may be thought of as the increased contribution to welfare.

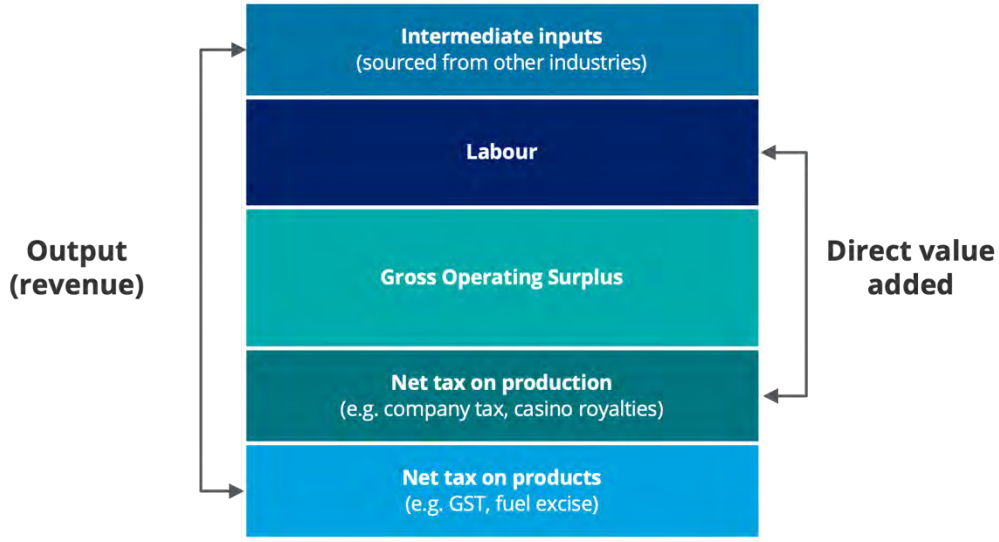
Value added is the sum of:

- Gross operating surplus (GOS)
- Tax on production less subsidies provided for production[38]
- Labour income.

The accounting framework (Figure 21) is used to evaluate economic activity, along with the components that comprise output. Output is the sum of value added and the value of intermediate inputs used by the firm. Net taxes on products are not included in value added but are included in GDP.

The value of intermediate inputs may also be calculated directly by summing up expenses related to non-primary factor inputs.

Figure 21: Economic activity accounting framework



Source: Deloitte Access Economics.

Contribution studies generally outline employment generated by an entity or industry. Employment is a fundamentally different measure of activity to those above. It measures the number of workers that are employed by the entity or industry, rather than the value of the workers' production.

Direct and indirect contributions

Direct economic contribution is a representation of the flow of resources from labour and capital within the sector of the economy in question.

Indirect contribution measures the demand for goods and services produced in other sectors as a result of demand generated by the sector in question. Indirect economic contribution is estimated via an input-output (IO) framework using the Statistics New Zealand 2013 IO tables. The industry classification used for IO tables is based on the Australian and New Zealand Standard Industrial Classification (ANZSIC), with 106 sectors in the modelling framework.

The total economic contribution to the economy is the sum of the direct and indirect economic contributions.

Limitations of Economic Contribution Studies

While describing the geographic origin of production inputs may be a guide to a firm's linkages with the local economy, it should be recognised that these are the type of normal industry linkages that characterise all economic activities.

Unless there is unused capacity in the economy (such as unemployed labour), there may not be a robust relationship between a firm's economic contribution as measured by value added (or other static aggregates) and the welfare or living standard of the community. Indeed, the use of labour and capital by an industry comes at an opportunity cost, as it may reduce the amount of resources available to allocate to other sectors within the economy.

In a fundamental sense, economic contribution studies are simply historical accounting exercises. No 'what-if', or counterfactual inferences – such as 'what would happen to living standards if the firm disappeared?' – should be drawn from them.

The analysis used in this report relies on a national IO table modelling framework, and there are some limitations to consider. The IO framework and the derivation of the multipliers also assume that relevant economic activity takes

place within an unconstrained environment. That is, an increase in economic activity in one area of the economy does not increase prices and subsequently crowd out economic activity in another area of the economy. As a result, the modelled total and indirect contribution may be regarded as an upper-bound estimate of the contribution made by the supply of intermediate inputs.

Estimating the economic contribution of Space and Advanced Aviation Independently

IO modelling was used to account for the intermediate flows between industries. Input-output tables are used to measure the direct economic activity of each industry in the economy at the national level, and for intermediate inputs to be examined by their source. These intermediate flows were then used to derive the total change in economic activity associated with the Space and Advanced Aviation sectors in 2024.

The economic contribution calculated for the Space sector and the Advanced Aviation sector in this report cannot be summed to calculate a combined economic contribution for the Space and Advanced Aviation sectors. This is because there is significant interdependence between the Space and Advanced Aviation sectors. Organisations that work in either Space or Advanced Aviation may produce goods or services that are eventually used by the other sector. This means that this production would be counted twice; once in the first sectors direct contribution and a second time in the second sectors indirect contribution. As a result, combining the two sectors would give an overestimate of the total size of the sectors.

The analysis in this report relies on a national IO table modelling framework, as a result there are some limitations to consider. The IO framework and derivation of the multipliers assume that relevant economic activity takes place within an unconstrained environment. That is, an increase in economic activity in one area of the economy does not increases prices and subsequently crowd out economic activity in another area of the economy. As a result, the modelled total and indirect contribution may be regarded as an upper bound estimate of the contribution made by the supply of intermediate inputs.

Limitations of our work

General use restriction

This report is prepared solely for the use of the Ministry of Business, Innovation and Employment. This report is not intended to and should not be used or relied upon by anyone else and we accept no duty of care to any other person or entity. The report has been prepared for the purpose of set out in the contract (Consultancy Services Order) dated 22 November 2024. You should not refer to or use our name or the advice for any other purpose.

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Endnotes

[1] OECD, *Main Science and Technology Indicators* (2025) <https://www.oecd.org/en/data/datasets/main-science-and-technology-indicators.html>

[2] World Bank Group, Exports of goods and services (% of GDP) – New Zealand (2025) < https://data.worldbank.org/indicator/NE.EXP.GNFS.ZS?locations=NZ>

[3] The government expenditure is a conservative estimate based on information provided to Deloitte Access Economics by the New Zealand Space Agency. There are gaps in this data for areas such as defence related spending due to confidentiality concerns.

[4] Space Foundation estimates 2019 global Space economy to be $423.8 billion (Space Foundation, 2020). The 2024 NovaSpace report estimates the 2024 Space Economy to be $596 billion. Giving an estimated global growth of 40.6%.

[5] Space Foundation, *Global Space Economy Grows in 2019 to $423.8 Billion, The Space Report 2020 Q2 Analysis Shows* (2020) <https://www.spacefoundation.org/2020/07/30/global-space-economy-grows-in-2019-to-423-8-billion-the-space-report-2020-q2-analysis-shows/> and Novaspace, *Highlights of the 2024 Space Economy* (2025) <https://nova.space/in-the-loop/highlights-of-the-2024-space-economy/#:~:text=The%20space%20economy%20is%20projected,early%20or%20late%2Dstage%20investments.>

[6] Statistics New Zealand, Gross Domestic Product (2025) <https://www.stats.govt.nz/indicators/gross-domestic-product-gdp/>

[7] We note the drones benefit study focused on the potential benefits of drones over the next 25 years. It focused on potential scenarios. This study focuses on the wider Advanced Aviation sector and is a snapshot in time in what the sector looks like today. In saying that, the Drones benefit study found that the estimated annual turnover for drone-based companies were $162 million to $194 million per annum which seems to be consistent with this report.

[8] The New Zealand Space Agency is set up within the Ministry of Business Innovation and Employment.

[9] OECD, *OECD Handbook on Measuring the Space Economy* (2012) <https://doi.org/10.1787/9789264169166-en.>

[10] Civil Aviation Authority, *Emerging Technologies Programme* (n.d.) <https://www.aviation.govt.nz/licensing-and-certification/emerging-technologies-programme/>

[11] World Economic Forum, *Space: The $1.8 Trillion Opportunity for Global Economic Growth* (2024) <https://www.weforum.org/publications/space-the-1-8-trillion-opportunity-for-global-economic-growth/>

[12] Future Timeline; Australian Strategic Policy Institute

[13] Forbes, *There are 10,000 active satellites in Orbit* (2024) <https://www.forbes.com/sites/ericmack/2024/07/19/theres-now-10000-active-satellites-in-orbit-most-belong-to-elon-musk/> and Aviation Week, *Burgeoning Satellite Industry Paving Way To $1 Trillion Space Economy* (2021) <https://aviationweek.com/aerospace/program-management/burgeoning-satellite-industry-paving-way-1-trillion-space-economy#:~:text=Credit:%20Source:%20COMPSOC,%2Dorbiting%20(GEO)%20spacecraft>

[14] Commerce Commission, *2023 Telecommunications Monitoring Report* (2023) (including data from 2019 to 2024) <https://comcom.govt.nz/__data/assets/pdf_file/0033/361959/2023-Telecommunications-Monitoring-Report-15-August-2024.pdf>

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