

Submission on developing the Aotearoa New Zealand Aerospace Strategy

Your name and organisation

Name	Julie Zoller, Head of Global Regulatory Affairs
Organisation (if applicable)	Kuiper Systems LLC

Overview of the Aerospace Strategy

- Question 1:** Do the four areas above provide the right basis for the Aerospace Strategy?
- Question 2:** What are the critical factors that you see for aerospace sector development?
- Question 3:** How would an Aerospace Strategy help you?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

Question 1: Do the four areas above provide the right basis for the Aerospace Strategy?

Kuiper Systems LLC, a wholly owned subsidiary of Amazon.com Services LLC (collectively, "Amazon") agrees with the areas described in the strategy of the Ministry of Business Innovation & Employment ("MBIE"), which sets out a vision for the future and establishes a high-level pathway to achieving those goals. Amazon limits its comments here to the space-related aspects of the Aerospace Strategy.

Project Kuiper is an initiative to increase global broadband access through a constellation of satellites in low earth orbit (LEO). Its mission is to provide fast, affordable broadband to unserved and underserved communities around the world. Project Kuiper is built around the Kuiper System, a flexible, high-performance broadband network that combines satellites with customer terminals, gateway stations, and global networking and infrastructure. We are committed to working with public and private sector partners who share our commitment to bridging the digital divide. For example, Project Kuiper will provide backhaul solutions for wireless carriers to extend LTE and 5G service to new regions.

With regard to the Aerospace Strategy, Amazon particularly supports efforts to unlock and enable aerospace potential through a future-facing government, with strong considerations for future aerospace-enabled data, tools, and applications.

We also appreciate the emphasis on sustainable space activities. Space safety is a core tenet for Amazon, and Amazon is committed to operating safely and responsibly in space. To that end, Amazon has designed its satellites and system to prioritize space safety and to mitigate the creation of orbital debris. For example, Kuiper satellite orbits will be at low altitudes, between 590 and 630 km, which helps ensure the satellites can be deorbited quickly and reliably. Satellites will operate at three altitudes within that band with a tight orbital tolerance (+/- 9 km), avoiding overlap with other large LEO systems and providing additional safety. Post mission, Amazon plans for active deorbit of Kuiper

satellites within one year. Even in potential failure scenarios like loss of propulsion, Kuiper satellites are projected to deorbit from atmospheric drag within 10 years.

Kuiper satellites will also include propulsion systems, allowing Amazon to maneuver the satellites through deployment, mission, and post-mission deorbit. A combination of component design and shielding will help protect critical components, especially the battery and the propellant tanks, which are designed to leak rather than burst if impacted by small debris. Amazon's satellites will also include backup systems, such as independent solar panels and redundant flight computers, radios, and sensors to help preserve spacecraft functions in the event of small debris impact.

Question 2: What are the critical factors that you see for aerospace sector development?

Promoting, facilitating, and incentivizing innovation will continue to be important in encouraging growth in aerospace. In New Zealand, as in other countries and regions around the world, innovating through aerospace can help bridge the digital divide. Through its Kuiper System, Amazon will serve individual households, as well as schools, hospitals, businesses, and other organizations operating in locations without reliable broadband.

In this period of learning and rapid technological growth, an important focus of governments and international bodies should be on developing policy and regulatory environments that act as an enabler of both space safety and sustainability and a robust and innovative space sector. In part, with regard to space safety and sustainability, that means working with industry to arrive at shared protocols and practices for operations in space, with a particular focus on practices that enhance space sustainability and minimize conjunction risk. Civil authorities should play a key leadership role in bringing stakeholders together in a consensus-driven standards building process to arrive at common operational protocols. To that end, New Zealand can be a strong partner for space innovation and promotion.

Question 3: How would an Aerospace Strategy help you?

New Zealand's Aerospace Strategy should highlight the importance of a policy and regulatory environment that provides transparency, certainty, and predictability in order to spur development in the aerospace and related industries. Amazon supports the development of forward-looking and flexible policies that enable smart innovation and growth. The Aerospace Strategy can provide the industry, including non-geostationary orbit (NGSO) satellite operators, added confidence with regard to future space-related developments in New Zealand.

Amazon supports efforts of policymakers to work collaboratively with industry including, for example, the Action Plan's reference to a combined sector-government taskforce and regular public updates. With regard to space policy, we recognize the importance of policymakers working cooperatively with operators to develop operational frameworks and best practices.

On the whole, policies that enable growth and development in the aerospace industry can help the industry in its efforts to bridge the digital divide. Project Kuiper, for example, will serve individual households, as well as schools, hospitals, businesses, and other organizations operating in locations without reliable broadband. We are committed to working with public and private sector partners that share our commitment to bridging the digital divide.

Area One - A strategy for building our aerospace sector

- Question 4:** Is the 2030 Future State set out in a way that enables New Zealand to build on its existing advantages to develop a leading place in the global aerospace economy?
- Question 5:** Will the 2030 Future State support your ambitions for growth and participation in the sector?
- Question 6:** What barriers are there to optimising sector growth?
- Question 7:** How could the government and the sector work together to achieve the 2030 Future State?
- Question 8:** How can the Government enable Māori ambitions for the sector?

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Question 4: Is the 2030 Future State set out in a way that enables New Zealand to build on its existing advantages to develop a leading place in the global aerospace economy?

Amazon supports the focus of the 2030 Future State on job growth in aerospace, safety, and industry and international partnership. The Future State sets a strong foundation for the development of policies and strategies to facilitate innovation and growth in aerospace in New Zealand. In developing its vision and specific policies around the future of aerospace, New Zealand should ensure that its regulatory and policy environment, including in regard to spectrum planning and allocation, supports the 2030 Future State.

One area of high importance in facilitating growth in aerospace is strong policies that support workforce development. Given the projected growth of the industry around the world, building a skilled technical workforce to meet the current and future demands of a growing global aerospace industry will continue to be a pressing issue. Key to that workforce development are programs and policies that enhance diversity, equity and inclusion in the aerospace industry. Amazon and Project Kuiper, for instance, prioritize programs and partnerships to ensure inclusiveness within the space industry. We recently announced a partnership in joining the United States National Space Council's coalition to collaborate on initiatives to enhance STEM career pathways and pipelines into the space workforce. We also created Amazon Future Engineer, a childhood-to-career computer science education program designed to inspire and educate millions of students globally from underserved communities to pursue careers in computer science. Given the global nature of the aerospace industry, both industry and government-sponsored programs to train and equip a future high-skilled workforce are increasingly important and will help grow the industry in the near and long-term.

Question 5: Will the 2030 Future State support your ambitions for growth and participation in the sector?

Amazon supports MBIE's efforts on the 2030 Future State and supports ambitions for growth and participation in the sector. In particular, Amazon supports the Future State's focus on job growth in relation to the aerospace sector—as noted above—and the recognition of the importance both domestic and international entities will have in this space.

In addition to the policies currently included in the Future State, the policies could include steps to promote, facilitate, and incentivize innovation, including from the private sector. The Future State could also include a goal that New Zealand become a long-term partner for space innovation and promotion. In part, this should be through the adoption of informed policies that enable growth and

development, including with regard to ensuring continued spectrum access for satellite services. Further, in this period of learning and rapid technological growth, an important focus of governments, including New Zealand and international bodies, should be facilitating consensus-building and collaboration on aerospace policy and practice. Amazon supports a strong collaborative and transparent process around policy development in this space.

Question 6: What barriers are there to optimising sector growth?

Barriers to optimizing growth and development of the aerospace industry include an appropriately skilled workforce, and any limited or misaligned policies, particularly with regard to ensuring adequate spectrum for next-generation satellite systems. Long-term spectrum access is critical for ensuring the ability of satellite systems to operate and provide services that enable the digital transformation, technological innovation and economic growth of communities and businesses in New Zealand and around the world. Amazon supports efforts of policymakers to work collaboratively across government agencies, regulatory bodies and industry to promote an enabling regulatory and spectrum environment for satellite systems.

Question 7: How could the government and the sector work together to achieve the 2030 Future State?

Establishing a mechanism for strong collaboration between government and industry will be important to efforts to aid innovation and growth of the aerospace industry. For space-based services specifically, Amazon supports efforts to work with governments with common objectives and industry to establish best practices for the industry, particularly with regard to shared protocols for space operations. More broadly, Amazon supports efforts to include interested stakeholders—both domestic and international—in policy development, and encourages MBIE to develop partnerships with the private space sector, with the aim of working together to test new technologies, processes and operations. Amazon encourages MBIE to invest in SSA modernization to improve object tracking and make basic SSA data and related services available.

Question 8: How can the Government enable Māori ambitions for the sector?

Amazon supports the Government's aim of supporting Māori ambitions for the aerospace sector, both with regard to bridging geographical and economic elements of the digital divide and to digital skills development and participation in this high-value sector.

Area Two - Building strong foundations (Three Pillars)

Question 9: What do you think of the Three Pillars and do you think they will support the 2030 Future State?

Question 10: What else would you like to see in the Three Pillars?

Question 11: What actions and initiatives could the sector focus on to support the Three Pillars?

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Question 9: What do you think of the Three Pillars and do you think they will support the 2030 Future State?

Amazon supports MBIE's approach to the Three Pillars, particularly with regard to: ensuring that the space sector has access to essential infrastructure and investment and support for high-skilled jobs in the industry; supporting economic development related to aerospace and attracting innovators and investors; ensuring fit-for-purpose regulatory systems; and promoting the strong value of the aerospace industry. Amazon supports these efforts to, among other things, facilitate the systems and innovations that will help bring affordable connectivity to tens of millions of unserved and underserved people around the world. The benefits of space-based technologies—including for connectivity, navigation, mobility, communications and emergency response, among others—are significant.

Question 10: What else would you like to see in the Three Pillars?

In addition to the focus on participation in and direct impacts of the aerospace industry, the Three Pillars could also recognize the broader national development outcomes promoted by the new class of satellite-based services this industry enables. For example, the Three Pillars could identify key linkages with other elements of MBIE's policy agenda, such as regional development—by addressing the digital divide. The Pillars could also include regulatory reform to increase the use and availability of satellite solutions and could further recognize that the “downstream uses of aerospace technologies” represents an enabling environment for New Zealand's social and economic development agendas. To that end, there is a need for all-of-government alignment so as to ensure effective policy drivers and fit-for-purpose regulatory frameworks.

Question 11: What actions and initiatives could the sector focus on to support the Three Pillars?

Amazon supports efforts to engage and include industry in the development of policy in this area and encourages the establishment of a sector-government taskforce, as set out in the Action Plan section of the consultation document. Such a taskforce would benefit from including broad representation across industry actors, and would allow important input into implementation of the goals included in the Three Pillars.

Area Three - Goals for 2030

Question 12: What do you think of the Goals for 2030?

Question 13: Are the goals framed in a way that will enable New Zealand to build on its strengths and comparative advantages to achieve the 2030 Future State?

Question 14: What activities and milestones can help us achieve these Goals?

Question 15: Where do you see yourself in realising these Goals?

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Question 12: What do you think of the Goals for 2030?

Amazon supports the 2030 Goals' emphasis on sustainable space activities and recognition of the utility of space-enabled data, tools and applications. Additional goals could include a focus on innovation to support achieving the 2030 Future State.

Question 13: Are the goals framed in a way that will enable New Zealand to build on its strengths and comparative advantages to achieve the 2030 Future State?

Amazon supports the Goals' focus on important objectives, including space sustainability, human presence in space and data-driven decision-making. The Goals could further link to and enable all 2030 Future State outcomes, including through reference to innovation in the sector.

Question 14: What activities and milestones can help us achieve these Goals?

In addition to the discrete steps included in the Action Plan, MBIE could consider proposing phased reviews at intervals shorter than the proposed strategy refresh in five years' time, given the fast-developing nature of the aerospace sector.

Question 15: Where do you see yourself in realising these Goals?

Amazon supports the Goals' focus on space sustainability and on leveraging the tools and capacity made available through aerospace. Space safety is a core tenet for Amazon, and Amazon is committed to operating safely and responsibly in space. To that end, Amazon has designed its satellites and system to prioritize space safety and to mitigate the creation of orbital debris. Amazon looks forward to working with industry stakeholders and governments to arrive at shared protocols and practices for operations in space, with a particular focus on practices that enhance space sustainability and minimize conjunction risk. Civil authorities should play a key leadership role in bringing stakeholders together in a consensus-driven standards building process to arrive at common operational protocols. As an international stakeholder, Amazon urges particular focus in the Goals on working with international partners and industry.

Area Four - Pathway to the 2030 Future State

Question 16: What policies, ideas, actions, and/or initiatives would you like to see in the Action Plan to help achieve the ambitious 2030 Future State?

Question 17: What would be the benefits of these actions and how would they help grow the New Zealand aerospace sector?

Question 18: How would you like to be involved in the delivery of the Aerospace Strategy?

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Question 16: What policies, ideas, actions, and/or initiatives would you like to see in the Action Plan to help achieve the ambitious 2030 Future State?

Further details would provide additional certainty regarding the implementation of the Action Plan. For example, it would be helpful to understand how the 2030 Future State will intersect with the proposed New Zealand Space Policy, other space policies and existing regulation. It would also be useful to understand the proposed composition of the sector-government taskforce and more specifics about its ongoing role.

Question 17: What would be the benefits of these actions and how would they help grow the New Zealand aerospace sector?

Elements of the Action Plan—particularly the sector-government taskforce, regular reports on progress, and regularly refreshing the strategy—can leverage industry experience in the eventual implementation of the Aerospace Strategy. The innovative and responsive policy approaches noted in the Action plan could help to support and spur innovation and help grow the sector. Regular reviews of the proposed Strategy with space stakeholders, including international stakeholders, will help provide key insights on specific policies and will be important to the Strategy's implementation.

Question 18: How would you like to be involved in the delivery of the Aerospace Strategy?

Amazon would welcome the opportunity to be involved in future discussions with MBIE regarding the development of the proposed Strategy, including through the taskforce process referenced in the Action Plan, and in the development of best practices for space safety and sustainability.