

Submission on developing the Aotearoa New Zealand Aerospace Strategy

Your name and organisation

Name	Sam Spector, PhD
Organisation (if applicable)	-I am one of the most heavily cited academics on the topic of space tourism. -I am currently a Visiting Assistant Professor at University of Montana, USA. -I was formerly at the University of Canterbury and University of Otago.

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 2:

The climate change implications associated with spacecraft launches are currently not well understood. Encouraging Aotearoa's development as a launch state may run counter to carbon neutrality goals. Mentions of sustainability in this document are generally vague, and the extent to which space travel developments are compatible with New Zealand's sustainability-related goals remains unclear. Further studies are required to tabulate and forecast emissions associated with the activities of companies such as Rocket Lab.

- M. Ross, M. Mills, D. Toohey, Potential climate impact of black carbon emitted by rockets, Geophysical Research Letters, 37 (24) (2010).
- M. Ross, P.M. Sheaffer, Radiative forcing caused by rocket engine emissions, Earth's Future, 2 (4) (2014) 177–196.
- M. Ross, J.A. Vedula, The policy and science of rocket emissions. Center for space policy and strategy, Aerospace Corporation (2018).

Outer space is not well regulated at the international level, with the Outer Space Treaty of 1967 still dictating many areas. This treaty is clearly lacking. For instance, no laws currently protect space heritage sites like the Moon landing area and Apollo astronaut footprints. No laws currently prohibit companies from mining celestial bodies. The Moon agreement of 1984 did attempt to enact a more stringent framework, but most of the countries currently active in the space sector (including the US and New Zealand) are not signatories to that later treaty.

The United States has taken things further by creating a 'Space Force' branch of the military and passing legislation that allows private companies unfettered access to space and the resources residing there (the U.S. Commercial Space Launch Competitiveness Act of 2015). This legislation explicitly aims to "Promote the right of United States citizens to engage in commercial exploration for and commercial recovery of space resources free from harmful interference."

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 6:

As shown by Rocket Lab to date, most careers in this field (particularly higher paid ones) will not contribute heavily to development in the regions but will instead be focused on major cities, potentially not even in New Zealand. Rocket Lab's submission to the Wairoa district council discussed how their Mahia launch site would contribute to regional development, but it is unclear if most of those benefits have come to fruition. The company does not encourage tourism to the region (though some tourists do travel to watch launches), and the majority of Rocket Lab jobs appear to be located in Auckland and overseas. Benefits for Māori, which were also discussed in the submission to Wairoa council, seem particularly meagre.

As alluded to in the previous section, it is unclear what is meant by the statement "Aerospace activities actively contribute towards improving our environment through reducing greenhouse gas emissions and enhancing sustainability across the New Zealand economy." Rocket Lab's launch of the Humanity Star – essentially a publicity stunt – demonstrates the need for a stronger regulatory framework to ensure launch emissions remain at sustainable levels and any emissions that are generated are for high-value missions rather than unnecessary stunts.

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?

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

Question 10:

I would like to see sustainability – both environmental and socio-cultural – explicitly mentioned in these pillars. Why not build the three pillars on the three pillars of sustainability? Ensuring space development is discussed in terms of economic, environment, and socio-cultural sustainability makes sense here.

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?

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

Question 12:

Militarization and surveillance could be mentioned here or elsewhere in this document. For example, Rocket Lab launching spy satellites for the US government from New Zealand soil has come under criticism. What laws, regulations, and policies are in place to ensure the peaceful use of outer space? Isn't it reasonable to expect the development of a stronger and more comprehensive legal framework by 2030?

When Rocket Lab was proposing the Mahia site, emissions were hardly mentioned in the environmental impact assessment. This clearly demonstrates a need for a stronger policy framework.

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:

Creation of a regulatory framework that ensure the sustainable use of outer space could include the following:

- Climate change mitigation strategies for the space sector.
- Socio-cultural sustainability solutions that will ensure Maori substantially and clearly benefit from space sector development.
- Socio-cultural sustainability solutions that ensure space development is peaceful and complies with New Zealand's nuclear-free legislation.