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**Regulating for Disruption: A Case Study of the Outer Space
Law Reform**

LAWS 526: Law Reform and Policy
Submitted for the LLB(hons) Degree

Faculty of Law

2017

Abstract

Technology is changing the world faster than ever before, and many conventional industries are at risk of being disrupted. If New Zealand want be successful in a changing environment it needs to be prepared to facilitate more innovative and technologically intensive industries. This paper considers the law reform process that has sought to develop a framework for a commercial launch industry in New Zealand. By using this process as a case study some broader insight is provided into how effective New Zealand's law reform process is at regulating for disruption. This paper begins by telling the story of Rocket Lab and Peter Beck in order to demonstrate why this reform was necessary. It then considers several discrete elements of the law reform process such as: the framing of the outer space reform, the incorporation of bilateral and multilateral treaties, regulation through contract and integration of the outer space reform within New Zealand's environmental law framework. This paper discusses some of the unique and innovative approaches that characterise this reform. It also criticises are few elements of New Zealand's law reform process and considers how they can be improved.

Key Words

Rocket Lab, Outer Space and High-altitude Activities Act, law reform, disruption.

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I Introduction

The world is changing faster than it ever has before. In the last twenty years the internet and mobile phone have fundamentally altered the way we live and work. In 2017 a new kind of change is on its way. Whole industries risk being disrupted as technology continues to improve exponentially. Taxi drivers will be replaced by self-driving cars, accountants will be replaced by software and even lawyers may not be immune. For small countries such as New Zealand, it is integral that the government does not sit back and watch as they fall behind in a changing world. The government and public service has a crucial role to play in enabling companies and citizens to act as disruptors rather than being disrupted. Innovation often requires regulation. Sometimes regulation must legitimise innovation. The government's role becomes that of a facilitator: what actions should they take in order give ambitious individuals the best opportunity to deliver on their vision?

This paper takes the form of a case study into the law reform process that has sought to create a legal framework for a commercial rocket launch industry in New Zealand. It will begin by telling the story of Peter Beck, Rocket Lab and the Outer Space and High-altitude Activities Act. Next, this paper will consider the relationship between this reform and the Government's 'Business Growth Agenda' and how this relationship may have impacted on the reforms success. Third, this paper will trace the progress of the Technology Safeguards Agreement between New Zealand and the United States through parliament. Fourth, the approach New Zealand took to ensuring compliance with its international obligations regarding peace and insurance will be considered. Next, the unique use of contract as a proxy for legislation will be analysed. Finally, this paper will consider the incorporation of the outer reform within New Zealand's environmental law framework.

This discussion concludes that New Zealand is well positioned to become a disruptive force in the future. New Zealand's law reform process has demonstrated itself to be adept at dealing with the complex and multifaceted challenges that this kind of law reform produces, while still protection the public's legitimate interests. This paper will highlight exactly why the outer space law reform has been successful and consider what lessons or

innovations can be applied to similar reform exercises in the future. This paper will also seek to provide some insights into what aspects of New Zealand's law reform process are not functioning as well as they should and how they may be improved or re-organised.

II Background

In order to properly discuss the law reform process that has sought to develop a framework for a commercial rocket launch industry in New Zealand (the outer space reform) some background is needed. This section will begin by briefly describing the early history of space flight and the international law that was developed soon after. Second, the commercial space industry in which New Zealand seeks to participate will be discussed. Third, this section will highlight why the outer space reform became necessary by telling the story of Peter Beck and Rocket Lab. Finally, the Outer Space and High-altitude Activities Act 2017, the primary tool for regulating the launch industry in New Zealand, will be summarised.

A The History of Space and Space Law

Humans have always been inspired by the promise of outer space. Long ago the Egyptians, Greeks and Romans looked up at the night sky and believed their gods to be looking back down at them. Long before New Zealand contemplated sending rockets into space Māori told stories about how the sun, the moon and then stars came to be.¹

But it was not until the early 1960s that humanity managed to extend its reach into outer space. The Russian Cosmonaut Yuri Gagarin entered the Vostok spacecraft on 12 April 1961 and was launched into orbit, leaving a world gripped by Cold War behind him. In response, the United States' President John F Kennedy set the goal of landing a man on the moon within a decade.² Only eight years later Neil Armstrong achieved this goal in the Apollo 11 spacecraft, taking his famous "a giant step for mankind".

¹ Te Ara "The Family of Light" (12 June 2016) Te Ara < www.teara.govt.nz>.

² Aerospace "A brief history of space exploration" Aerospace <www.aerospace.org>.

These developments were accompanied by the realisation that no law existed governing activities beyond our planet. In the twelve years following 1967, the United Nations General Assembly developed the five main multilateral agreements on the use of outer space:

- The 1967 Outer Space Treaty;³
- The 1968 Rescue Agreement;⁴
- The 1972 Liability Convention;⁵
- The 1975 Registration Convention;⁶ and
- The 1979 Moon Agreement.⁷

These treaties still provide the most extensive sources of space law.

B The Commercial Space Industry

However, following this initial period of rapid innovation and inspiration, humanities progress in outer space slowed. Launching a rocket is prohibitively expensive and, up until recently, there was little more to be gained from rocketry than scientific research and reconnaissance. The public agencies that dominated the early space race found themselves with little reason to innovate.

³ Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies 610 UNTS 205 (opened for signature 27 January 1967, entered into force 10 October 1967) [“the Outer Space Treaty”].

⁴ Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space 672 UNTS 119 (opened for signature 22 April 1968, entered into force 3 December 1968) [“the Rescue Agreement”].

⁵ Convention on International Liability for Damage Caused by Space Objects 961 UNTS 187 (opened for signature 29 March 1972, entered into force 1 September 1972) [“the Liability Convention”].

⁶ Convention on Registration of Objects Launched into Outer Space 1023 UNTS 15 (opened for signature 14 January 1975, entered into force 15 September 1976) [“the Registration Convention”].

⁷ Agreement Governing the Activities of States on the Moon and Other Celestial Bodies 1363 UNTS 3 (opened for signature 18 December 1979, entered into force 11 July 1984) [“the Moon Agreement”].

Over the last ten years this has changed. Satellite technology has begun to play an increasingly prominent role in business and in the way people live their lives. We rely on satellites for global positioning, mapping, weather predictions and much more. In the future, better tools for processing the data that satellites produce will further expand the scope of commercial applications.⁸

This has created an incentive for new, private firms to enter the launch market. Most prominent in this movement has been Elon Musk's company Space X which has sought to reimagine the way in which launch services are provided. Their Falcon 9 rocket is able to deliver a payload into orbit and then land vertically back on its launch pad, allowing a significant portion of the vehicle to be reused.⁹ Space X have demonstrated that the commercial launch industry is ready to be disrupted, and their innovation has been rewarded with a US\$2.6 billion contract for the resupply of the International Space Station.¹⁰

The 2015 Space Report found that the global space economy was worth \$330 billion worldwide, having doubled in size over the previous decade.¹¹ The outer space reform will seek to facilitate New Zealand's carving out of a portion of this industry, as it continues to grow in the future.

⁸ See for example Alex Brokaw "This startup uses machine learning and satellite imagery to predict crop yields" (August 4 2016) Verge <<https://www.theverge.com/2016/8/4/12369494/descartes-artificial-intelligence-crop-predictions-usda>>.

⁹ Space X "Falcon 9" SpaceX <<http://www.spacex.com/falcon9>>.

¹⁰ Nasa "NASA Awards International Space Station Cargo Transport Contracts" (15 Jan 2016) Nasa <<https://www.nasa.gov/press-release/nasa-awards-international-space-station-cargo-transport-contracts>>.

¹¹ Space Foundation "The Space Report 2015 Key Findings" (18 July 2015) Space Foundation <<https://www.spacefoundation.org/media/news-briefs/space-report-2015-pdf-now-available>>.

C Peter Beck and Rocket Lab

The outer space reform cannot be discussed without talking about Peter Beck and his company Rocket Lab. It is rare for a major piece of law reform to be so deeply tied to the activities and ambitions of one person.

1 Peter Beck and Rocket Lab's beginning

Peter Beck was born in 1977 in Invercargill.¹² His whole family had a love of machines; when in high school Beck tore an old Mini apart, fitted it with a turbo charger and then built it back up again. Beck never formally studied.¹³ He instead opted to take up a tool making apprenticeship at Fisher & Paykel where he was able to work with top of the line machinery and materials.¹⁴ Beck learnt what he needed to know about engineering and business on the job; he describes himself as “more the doer than the reader”.¹⁵

In 2006 Beck set up Rocket Lab and acquired \$150 million of investment from Warehouse founder Sir Stephen Tindall through his K1W1 fund and other vehicles.¹⁶ Their first major success came in late 2009 with the launch of the Atea-1 rocket from Great Mercury Island; the first fully private launch into outer space from the Southern Hemisphere.¹⁷ What was extraordinary about the Atea-1 was its size. An article published on the New Zealand website Newshub highlighted that: “The NASA space shuttle Endeavour weighs

¹² Chris Keall “10 things about Rocket Lab (27 May 2017) National Business Review <<https://www.nbr.co.nz/article/10-things-about-rocket-lab-ck-203485>>.

¹³ Keall, above n 12.

¹⁴ Grant Bradley “The Rocket Man: Who is Peter Beck?” (May 25 2017) NZ Herald <http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=11862427>.

¹⁵ Jennifer Black “Kiwi rocket scientist Peter Beck on the Space Economy” (1 December 2016) AcuityMag <<https://www.acuitymag.com/business/kiwi-rocket-scientist-peter-beck-on-the-space-economy>>.

¹⁶ Keall, above n 12.

¹⁷ Tracey Cooper “NZ's first space rocket launches” (December 6 2009) Stuff <<http://www.stuff.co.nz/national/3108525/NZs-first-space-rocket-launches/>>.

2,000,000kg, the ATEA-1 just 60kg”.¹⁸ While the New Zealand media may not have been impressed, the small scale of the Atea-1 is exactly what made it remarkable.

Rocket Lab leveraged this success into conversations with some of the major players in the rocket industry. They contracted with the likes of NASA and the Defense Advanced Research Project Agency (DARPA), an agency charged with keeping the United States of America on the forefront of technology.¹⁹ Rocket Lab provided these agencies with engineering modelling, propulsion mechanisms and other advanced rocket systems.²⁰ Since 2012 Rocket Lab have set their sights on something bigger: the development of their own fully functional commercial launch vehicle.

2 *Rocket Lab’s competitive advantage*

Rocket Lab’s product is the Electron, a small launch vehicle that they hope will disrupt the market for the launch of small satellites. The Electron towers just 17m high and its maximum payload is less than 250kg.²¹ Rocket Lab anticipate the cost of a single launch can be kept below USD\$5m.²² By comparison, Space X’s Falcon 9 is 70m tall and can carry a 22,800kg payload. Launching the Falcon 9 costs a standard price of USD\$62m.²³ This difference between the Electron and the Falcon 9 reflects the different service they will provide. Rocket Lab want to provide cheap launches to low Earth orbit while Space X is focused on greater orbits and bigger payloads, with the goal to eventually facilitate the colonisation of Mars.

¹⁸ Simon Shepherd “New Zealand joins the space with ATEA-1 rocket” (20 November 2011) Newshub <<http://www.newshub.co.nz/technology/new-zealand-joins-the-space-race-with-atea1-rocket-2009112018>>.

¹⁹ Keall, above n 12.

²⁰ 90 Seconds Media “Spark Speaker Video – Peter Beck” (6 May 2012) YouTube <<https://www.youtube.com/watch?v=8ZMSG386dQw>>.

²¹ Rocket Lab “Electron” RocketLabUSA <<https://www.rocketlabusa.com/electron/>>.

²² Black, above n 15.

²³ Black, above n 15.

Alongside the use of a small scale, disposable launch vehicle; Rocket Lab have come up with several innovations that they hope will provide a competitive advantage. Their Rutherford Engine is 3-d printed and the Electron Rocket's body is made out of carbon fibre.²⁴ The entire rocket is built in house, allowing them to avoid inefficiencies created by long and complex supply chains.²⁵ All these steps are designed to facilitate mass manufacture.

Peter Beck has also highlighted several strategic advantages that New Zealand has a launch site. In a televised interview he described his search for an appropriate launching site:²⁶

We had to find somewhere on the planet that was a small island nation in the middle of nowhere, that had desolate air traffic and marine and shipping. That was friendly, with a stable government and all those kinds of things. There is really only one country on the planet that met all our requirements and that was New Zealand.

Perhaps most important has been Rocket Lab's ability to develop their own launching site in Mahia. After facing significant difficulties in gaining a consent for the launch of rockets in their preferred location, Kaitorete Spit in Christchurch, they shifted their focus up North.²⁷ The Wairoa District Council approved Rocket Lab's proposal, and a consent was granted soon after.²⁸ Rocket Lab are licensed to launch every 72 hours for the next 30 years from their location in Mahia.²⁹ Beck has described their ownership of this location as

²⁴ Rocket Lab, above n 21.

²⁵ Black, above n 15.

²⁶ Paul Henry "Why Rocket Lab picked New Zealand" (1 July 2015) YouTube <<https://www.youtube.com/watch?v=tj-dGr1KCAo>>.

²⁷ Martin Van Beynen "Canty's Birdlings Flat on the back burner for Rocket Lab launch" (22 November 2015) Stuff <<http://www.stuff.co.nz/business/73935090/kaitorete-spit-on-the-back-burner-for-rocket-lab-launch>>.

²⁸ Radio New Zealand "Rocket Lab to move launch site to North Island" (23 November 2016) RNZ <<http://www.radionz.co.nz/news/national/290355/rocket-lab-to-move-launch-site-to-north-island>>.

²⁹ Application by Rocket Lab Limited to Wairoa District Council "Decision Report – Non Notified Consent – RM1500016" Obtained under Local Government Official Information and Meetings Act 1987 Request to Wairoa District Council).

“phenomenally important” for cost reduction as the beginning price for a single launch at other sites around the world is upwards of a million dollars.³⁰

The ownership of their own site is also what makes Rocket Lab truly unique. No fully private company has ever launched a rocket into orbit from a privately-owned launch site. Space X launches from NASA’s site at Camp Canaveral. Europe’s major commercial launch operator, Arianespace, uses the European Space Agency’s launch site in French Guiana. Rocket Lab will launch from their own site, just an hour and halves drive out of Gisborne.

D Outer Space and High-altitude Activities Act

Two years after the need for a regulatory framework for launch activities was raised Parliament passed the Outer Space and High-altitude Activities Act (the Outer Space Act) 2017.³¹ The Act uses a licensing and permit regime to regulate launches from New Zealand and launches by New Zealand nationals overseas.³² It requires persons launching vehicles intended to travel into space to be licensed and those launching a payload on the licensee’s vehicle to obtain a permit.³³ In order to obtain a license, the Minister must be confident that applicant is technically capable of conducting a safe launch, that they have taken all reasonable steps to manage risks to public safety and that the launch is compliant with New Zealand’s international obligations.³⁴ Even if all these requirements a license may still be declined if the Minister is satisfied that the launch is not in the public interest or the applicant is not a fit and proper person.³⁵

³⁰ Black, above n 15.

³¹ The Outer Space and High-altitude Activities Act 2017.

³² For a more detailed summary see Ollie Neas “Sky no limit for Outer Space Act” (25 July 2017) Chapman Tripp <<https://www.chapmantripp.com/publications/new-outer-space-act-the-sky-no-longer-the-limit>>.

³³ See ss 7 and 15.

³⁴ Section 9(1); the applicant must also have an orbital debris mitigation plan and they must meet any other prescribed requirements.

³⁵ Section 9(2).

One public servant who worked on the Outer Space Act commented that in a lot of ways it is just a ‘bog standard licensing regime’. However, by taking a permissive the Act’s flexibility and durability are ensured in what may be a fast-changing industry. In December 2016, when the Outer Space Bill was still working its way through Parliament, Peter Beck stated that the government had “done everything exactly right”.³⁶ While this paper criticises certain aspects of the reform process, the author considers Outer Space Act to be a good example of the kind of law making that will allow New Zealand to be a hub of innovation and disruption.

III Framing Law Reform and the Business Growth Agenda

No law reform occurs in a vacuum. Each individual piece of reform can be considered in relation to a broader government agenda. The nature of this relationship may have a significant impact on the success and failure of specific reform process. If New Zealand it to be successful in facilitating an innovative and disruptive economy, the law reform required to achieve this aim must be fitted into a broader narrative of government policy.

This section considers the relationship between the outer space reform the National Government’s ‘Business Growth Agenda’(BGA). It is rare to find a government document that refers to the outer space reform without claiming that it is a product or consequence of the BGA.³⁷ At times this feels more like a political sloganeering than highlighting a high-level plan. However, this paper considers the BGA to be a key to the outer space reform’s success. Arguable, the BGA provided broader reform framework within which the outer space reform could occur. But more importantly the BGA provided a narrative to which the outer space reform could attach and a platform upon which it could be held up. This facilitated a degree of government buy in that ensured the outer space reform would be successful.

³⁶ Black, above n 15.

³⁷ See for example Steven Joyce “NZ gears up for the global space economy” (14 June 2016) National <<https://www.national.org.nz/news/2016-06-14-nz-gears-up-for-the-global-space-economy>>.

This section will begin by discussing the BGA and how it has been developed. It will then consider the direct relationship between the BGA and the outer space reform, as discussed in several government reports. Third, this section will discuss the importance of the way a piece of law reform is framed and how this can be important to the law reforms success. This section concludes that the BGA a valuable tool for ensuring disruptive and innovative industries are facilitated in New Zealand.

A The Business Growth Agenda

The BGA was developed in 2012 as a new micro-economic reform programme designed to “support businesses to grow and thrive in the aftermath of the Global Financial Crisis, and to build a more productive and competitive economy”.³⁸ The initial Cabinet Paper on the BGA lists the four strategic priorities designed to drive the Government’s policy agenda of the following three years:³⁹

- a) Responsibility managing the Government’s finances;
- b) Building a more productive economy;
- c) Delivering better public services within tight financial restraints; and
- d) Rebuilding Christchurch.

In order to deliver on these four headings, the Governments proposed to organise the BGA under six key inputs where legal and regulatory reform would be delivered to ensure microeconomic settings were optimal:⁴⁰

- 1) Capital markets.
- 2) Innovation.
- 3) Skilled and safe workplaces.

³⁸“Business Growth Agenda” (20 July 2017) Ministry of Business, Innovation and Employment <<http://www.mbie.govt.nz/info-services/business/business-growth-agenda>>.

³⁹ Cabinet Paper “The Government’s Business Growth Agenda” (1 March 2012) at [7].

⁴⁰At [23].

- 4) Resources.
- 5) Infrastructure.
- 6) Export markets.

Underneath that was a 120-point list of discrete goals aimed at achieving increases in business growth and productivity. The list referred to goals ranging from the development of a network of super computers to reducing levies for employers and the self-employed.⁴¹

B The BGA's Direct Relationship to Rocket Lab

Since the initial cabinet paper, the Ministry for Business, Innovation and Employment has published three major reports on the progress and direction of the BGA, as well as a report looking forward to 2025. While Rocket Lab is only mentioned in the most recent 2017 report, this series creates a narrative in which the outer space reform needs to be understood.

The 2013 report highlights progress that has been made under the category of 'Building Innovation' that contributed both directly and indirectly to the success of Rocket Lab and the facilitation of a rocket industry in New Zealand. Firstly, Callaghan Innovation replaced the Industrial Research Institute and was incorporated under the Crown Entities Act.⁴² Callaghan Institute was given a mandate to focus on firms in the high value manufacturing sector and provided with \$166.6 million of funding over a period of four years.⁴³ In 2013 Rocket Lab was awarded a Callaghan Innovation Growth Grant. Peter Beck described this grant as being critical in:⁴⁴

⁴¹ See Annex 1: Point 23 and 39.

⁴² The Ministry for Business, Innovation and Employment *The Business Growth Agenda Progress Report 2013* (MBIE, June 2013) at 36.

⁴³ Above, n 42, at 36.

⁴⁴ Callaghan Innovation "Rocket Lab" (25 July 2017) <<https://www.callaghaninnovation.govt.nz/annual-report-2016/rocket-lab>>.

allowing us to invest significant capital, time and expertise into developing all our systems in-house. The innovations that resulted mean that we now have a vehicle with an unprecedented low price, which is highly manufacturable.

In particular, a Callaghan Student Grant enabled Rocket Lab to support three aerospace students at the University of Canterbury to further their studies and complete specialised PhDs.⁴⁵

The 2017 report discusses the establishment of the New Zealand Space Agency and the regulation of a space industry in New Zealand as an example of how the New Zealand Government is building innovation. The Space Agency is stated as:⁴⁶

enabling New Zealand to participate in the global space economy and demonstrates how our regulatory settings are agile and enabling us to innovate, diversify and compete in complex new markets.

The report also discusses the ability of space industry to develop New Zealand's knowledge based economy by allowing New Zealand businesses to take advantage of the added connectivity that a space industry can provide.⁴⁷

Finally, a brief report on New Zealand's Investment Attraction Strategy highlights how the BGA promoted international investment of the character that Rocket Lab was able to attract.⁴⁸ When the report was written in 2015 New Zealand was ranked second in the World Bank's Ease of Doing Business rankings.⁴⁹ New Zealand placed first in the 2017 rankings. New Zealand also ranked first in the World Bank's rankings of countries'

⁴⁵ Callaghan Innovation, above n 44.

⁴⁶ The Ministry for Business, Innovation and Employment *Business Growth Agenda: 2017 Refresh Report* (MBIE, June 2017) at 6.

⁴⁷ At 6.

⁴⁸ The Ministry for Business, Innovation and Employment *Business Growth Agenda: New Zealand welcomes investment* (MBIE, June 2015).

⁴⁹ The Ministry for Business, Innovation and Employment, above n 48.

protection of investors and first equal in the Transparency International Corruption Index.⁵⁰ New Zealand's success in these global ranking is in part a product of the Government's BGA and is considered to be connected with our ability to attract overseas investment. As well as strengthening Rocket Lab's ability to attract foreign investment, New Zealand's excellent reputation will ensure any foreign companies with to contract with Rocket Lab for launch services can be confident that they can trust New Zealand as a good place for doing business.

C The Importance of Framing Law Reform

This discussion indicates some direct relationship between the BGA and the development of an environment in which innovation can thrive. However, this paper considers that the most important aspect of the relationship between the BGA and the outer space reform relates to the creation of a framework or narrative in which the reform could be understood and promoted. This ensured a significant degree of government buy in which in turn ensured the law reform would be successful.

In his announcement of the outer space reform then Minister for Science and Innovation stated that:⁵¹

Providing a modern regulatory environment that responds to innovation and enables high-tech industries is a crucial part of building a diversified high value economy. The emerging New Zealand-based space economy aligns with the innovation stream of our Business Growth Agenda in developing New Zealand as a hub for high-value, R&D-intensive businesses.

⁵⁰ The World Bank "Economy Rankings" (April 2017) Doing Business <<http://www.doingbusiness.org/rankings>> and Transparency International "Corruption Perceptions Index 2016" (January 2017) <https://www.transparency.org/news/feature/corruption_perceptions_index_2016>.

⁵¹ Scoop Media "NZ gears up for the global space economy" (Press Release, 14 June 2016).

There is no evidence to suggest that Peter Beck would not have made plans to launch rockets in New Zealand and that this reform would not have occurred if it was not for the National Government's BGA. But this quote demonstrates how the BGA provided a platform upon which the outer space reform could be held up. The Steven Joyce could point to the reform as an example of the government delivering on the promise of a high value, high-tech economy.

As this paper goes through the different aspect of the outer space reform it quickly becomes clear just how challenging and complex a project it was. But the Government's commitment never wavered. The outer space reform never seemed to lack resources and the public servants who worked on the reform were invariably experienced and highly competent. All potential issues were considered and addressed. It is for these reasons that the outer space reform has been so successful.

In the future, industries seeking to emulate Rocket Lab's successful collaboration with the government should consider how the reform they need can be framed. If it can be attached to a broader agenda and made an example of that agenda's goals, then success is much more likely. In the context of disruptive and innovative industries the BGA will continue to provide a valuable tool to those seeking to disrupt. If nothing else, the BGA provides a narrative in which disruptive reform can be placed.

IV The Technology Safeguards Agreement

The line between civilian and military technology is beginning to blur. Rockets, drones and artificial intelligence are all examples of 'dual use' technology: while they have many innocent commercial and civilian application they can easily be appropriated for military purposes. The import and export of dual use technologies are the subject of a complex domestic and international regulatory framework.⁵² In order to facilitate the trade of these technologies, technology safeguard agreements are used to allow the exporting nation a

⁵² For more detail on dual use technology and export controls see MC Mineiro Space Technology Export Controls and International Cooperation in Outer Space (Springer, New York, 2012) at 6.

degree of extra-jurisdictional control over the technology they export. In order for Rocket Lab to import satellites manufactured in the United States of America (US) the New Zealand Government had to negotiate a bilateral technology safeguard agreement (TSA) with the US Government.⁵³

The TSA is strict and prescriptive and needs to be complied with in its entirety if New Zealand is to import US satellites for launch in New Zealand. This section considers the process that led to its incorporation into the Outer Space Act, and the challenges that this raised. In particular, this section focuses on the various mechanisms that exist in New Zealand's law reform process that allow for deliberation on international treaties. In the future it may be increasingly common for disruptive and technologically intensive industries to be facilitated by agreements similar to the TSA. It is important, therefore, that the process New Zealand uses to consider international agreements is effective in incorporating those agreements while still protecting the public interest.

This discussion will begin by summarising the purpose and effect of the TSA. It will then consider the role and value of National Interest Analyses and Parliamentary Treaty Examination as part of New Zealand's process for considering international treaties. Finally, this section will discuss how the incorporation of the TSA changed as the Outer Space Bill went through Parliament. This discussion calls into question the value of Parliamentary scrutiny within the context of New Zealand's executive dominated treaty making process. This paper considers that Parliament's focus should be shifted away from treaty examination and greater focus should be given to the best method of treaty incorporation.

A The Technology Safeguards Agreement

The TSA is a comprehensive and prescriptive agreement that contains ten articles detailing the circumstances in which US technology can be exported to, and launched from New

⁵³ Agreement between the Government of New Zealand and the Government of the United States of America on Technology Safeguards Associated with United States Participation in Space Launches from New Zealand, New Zealand-United States of America A.15A (signed June 2016).

Zealand. The Agreement's primary function is to protect the US's security interests, as reflected in article one.⁵⁴

The purpose of this Agreement is to preclude unauthorized access to or transfer of technologies associated with the launching from New Zealand of:

- a. U.S. Launch Vehicles;
- b. U.S. Spacecraft by means of U.S. Launch Vehicles;
- c. Foreign Spacecraft by means of U.S. Launch Vehicles; and
- d. N.Z. Spacecraft by means of U.S. Launch Vehicles.

This purpose is achieved primarily through the operative provisions in articles three to five which govern: the control of US launches vehicles, spacecraft and technical data;⁵⁵ the disclosure of US information to New Zealand citizens;⁵⁶ and access to the US's equipment.⁵⁷ As an example, art 3(3) requires that: "For each Launch Activity, the Parties shall appoint an entity to oversee the exchange of Technical Data between N.Z. Representatives and non-New Zealand entities involved in that Launch Activity".

The interests of New Zealand are scarcely reflected in the TSA. Article 3(4) states that:

It is the intention of the Government of the United States of America, assuming consistency with U. S. laws, regulations, policies, and the provisions of this Agreement, to approve the export and import licenses necessary to conduct Launch Activities.

This may be read as signalling support for co-operation between the US and New Zealand. Practically though, it simply requires the US to abide by their own rules. This is illustrative of New Zealand's bargaining position in the negotiation of the TSA. New Zealand required some form of TSA in order to develop a rocket industry. In return, the US get little more than some assurances around the maintenance of their international security and a potential

⁵⁴ Article 1.

⁵⁵ Article 4.

⁵⁶ Article 5.

⁵⁷ Article 6.

new launch location. Inevitably, the entirety of the US's bottom line will be reflected the TSA and many components will not have been negotiable.

Given this, it is difficult to apply any normative judgements as to whether or not the TSA was a successful element of the law reform required to regulate New Zealand's space industry. Not much more can be said other than that the Ministry of Foreign Affairs were successful in delivering an agreement upon which the possibility of New Zealand's rocket industry hinged.

B The TSA in the Domestic Law-Making Process

National Interest Analyses and Parliamentary Treat Examination are both processes developed in the late 1990s following a report by the Clerk of the House and Representatives and the Law Commission.⁵⁸ The purpose of these processes was to provide greater parliamentary scrutiny and deliberation in the context of an executive dominated treaty negotiation process.⁵⁹ The executive's ability to take on international obligations without recourse to parliament raises issues in the context of constitutional arrangements that make parliament supreme. This section will go through how this process functions and consider whether it is serving this purpose, with particular focus on the treatment of the TSA.

1 National Interest Analysis

The process governing the use of National Interest Analyses (NIAs) is described in both the Standing Orders and Cabinet Manual. Standing Order 397(1)(d) requires "any major bilateral treaty of particular significance" to be presented to the House.⁶⁰ The Cabinet Manual clarifies that "The Minister of Foreign Affairs determines whether a bilateral treaty

⁵⁸ David McGee "Treaties and the House of Representatives: paper prepared for the Standing Orders Committee by the Clerk of the House of Representatives" in Standing Orders Committee 'Report of the Standing Orders Committee on its review of the operation of the standing orders' [1993-6].

⁵⁹ Law Commission *The Treaty Making Process Reform and the Role of Parliament* (NZLC E31AG, 1997) at 2.

⁶⁰ Standing Orders of the House of Representatives 2014, SO 397(1)(d).

amounts to a major bilateral treaty of particular significance”.⁶¹ The contents of what must be included in the NIA are also listed in the Standing Orders.⁶²

The NIA of the TSA emphasises the strategic importance of space and the growing nature of the space economy.⁶³ It lists several key advantages of allowing the TSA to enter into force in New Zealand, all of which are extensions of its facilitation of a commercial space industry. These include the possibility that Rocket Lab could add between \$400 million and \$1,150 million to the economy over a period of twenty years, building New Zealand’s capacity and expertise in space activities, applying associated advanced technology to downstream applications, attracting foreign research and leveraging reputational benefits.⁶⁴

The disadvantages are considered to be very limited as New Zealand retains the ability to prevent launches if they are found to be in conflict with our law and policy under art 3(7) of the TSA.⁶⁵ However, some disadvantage is stated to subsist in the overhead costs that are generated by the obligations to ensure the security of US technology.⁶⁶ This is achieved through the oversight, monitoring and implementation of technology transfer control plans which will place a burden on public officials.⁶⁷

The NIA process provides a detailed and succinct summary of the effect of a treaty. However, the degree to which it allows for greater scrutiny of executive action is limited. NIAs are produced by the Ministry of Foreign Affairs and Trade (MFAT) who also act for the government in treaty negotiations. It is difficult for Parliament to independently scrutinise treaties when their primary source of information comes from a member of the

⁶¹ Cabinet Office *Cabinet Manual 2017* at [7.124].

⁶² Standing Order 398.

⁶³ National Interest Analysis “Technology Safeguards Agreement” (27 May 2016) at 1.

⁶⁴ At 4.

⁶⁵ At 5.

⁶⁶ At 5.

⁶⁷ At 5.

executive who worked closely alongside the government at an earlier stage in the treaty making process. MFAT's report inevitably reflects the Government's position on a treaty; in the context of the TSA this is evidenced by the repeated references to the Government's 'Business Growth Agenda'.⁶⁸

In order for Parliament to properly scrutinise treaties entered into by the Executive, the independence of their advice needs to be improved. This could be achieved with, for example, a dedicated Parliamentary Office for Treaty Scrutiny. However, as discussed in the next section, this paper considers that even this significant reform would achieve little to address deeper issues within the Parliamentary Treaty Examination process.

2 *Parliamentary Treaty Examination*

A key purpose NIA is to facilitate consultation and deliberation during the Parliamentary Treaty Examination (PTE) process.⁶⁹ After a treaty is deemed to be of significance it is presented to the House and then referred to the Committee for Foreign Affairs, Defence and Trade alongside MFAT's NIA.⁷⁰ The Committee then has a minimum of 15 days to consider the treaty and offer any recommendations that it sees fit.⁷¹ If the Committee chooses they can seek public submissions on a treaty as well as having the advice of relevant government departments.⁷²

The TSA was referred to the Committee for Foreign Affairs, Defence and Trade on 14 June 2016 and they met between 15 June and 18 August 2016 to discuss it.⁷³ Public submissions

⁶⁸ At 3.

⁶⁹ SO 400(2).

⁷⁰ Cabinet Office, above n 61, at [7.128].

⁷¹ At [7.129].

⁷² At [7.130].

⁷³ Foreign Affairs, Defence and Trade Committee *International treaty examination of the Agreement between the Government of New Zealand and the Government of the United States of America on Technology Safeguards Associated with United States Participation in Space Launches from New Zealand* (20 July 2016) at 2.

were called for with a closing date of 20 July 2016 and none were received.⁷⁴ The Committee heard evidence from MFAT and the Ministry of Business, Innovation and Employment.⁷⁵ After two months of deliberation it is difficult to discern what the Committee added to the law reform process that led to the TSA being implemented in New Zealand. Their recommendation was as follows:⁷⁶

The Foreign Affairs, Defence and Trade Committee has conducted the international treaty examination of the Agreement between the Government of New Zealand and the Government of the United States of America on Technology Safeguards Associated with United States Participation in Space Launches from New Zealand, and recommends that the House take note of its report.

The report then contains a two-page summary of the purpose of the TSA as well as a concise explanation of the benefits that it will have for New Zealand and the measures required for its implementation. This content mirrors the advice given by MFAT in their NIA which is then attached as an appendix to the report.⁷⁷

It is difficult to see how this report can be considered to effective parliamentary scrutiny. This is discussed by Campbell McLauchlan in his book *Foreign Relations Law*:⁷⁸

... in practice, the Committee does not appear to have achieved significant dialogue with the Government about its treaty programme. Analysis of all the of the Committee's treaty examination in the decade 1 July 2002 to 28 June 2011 reveals that only two out of 110 reports addressed recommendation to the Government that required a government response.

⁷⁴ At 4.

⁷⁵ At 4.

⁷⁶ At 3.

⁷⁷ The National Interest Analysis must be appended to reports by select committees on treaties pursuant to SO 400(3).

⁷⁸ C McLachlan *Foreign Relations Law* (Cambridge University Press, Cambridge, 2014) at 170.

It is difficult to see the PTE process as being able to play a deliberative role in the treaty making process. International treaties are by their nature complex documents; only skilled experts are able to effectively navigate and interpret them. The Committee is able to hear advice from the public and certain ministries, but the value of such advice seems limited. As discussed earlier, advice from government officials will inevitably reflect the government's position on the treaty. Public submissions are infrequent. It must be kept in mind that the PTE process does not occur until after the international agreement that it seeks to scrutinise has been entered into. Why would members of the public prepare a submission on a treaty when the terms are already fixed? The members of the committee are therefore left to fend for themselves. Given the time constraints that Members of Parliament face it is difficult to see them generating significant and substantive input.

More fundamentally though, New Zealand's constitutional arrangements significantly limit the useful input that Parliament can have. The Executive Government negotiates treaties but they can only do this because they command a majority in the House of Representatives. Parliament implicitly provides them with a mandate to carry out this role. Little justification can be found for requiring Parliament's support through a separate process that has no legal or practical consequences. Moreover, an inevitable government majority on the Committee for Foreign Affairs, Defence and Trade ensures that the chances of the Committee derogating from the government's position on a treaty is slim.

This paper considers that the current PTE process is failing to achieve its purpose. The way that the process has been set up, alongside the constitutional arrangement in which they operate, prevents PTE from providing any effective scrutiny. It is difficult to see why the process should continue under its current settings. This paper considers that abolishing the PTE process and continuing the practice of having NIA's tabled in the House of Representatives would make no material difference to the level of Parliamentary scrutiny that currently exists. The NIA provides a valuable summary of the important aspects of a treaty, and is sufficient to keep Parliament informed.

C The TSA in the Outer Space Bill

While the value of PTE may be limited, Parliament also has a role in deliberating over the manner in which treaties are given effect to. In this part, the manner in which the TSA was incorporated in the Outer Space High-altitude Activity Bill will be considered with particular focus on the incorporation of ‘debris protection areas’. This section concludes that Parliament is significantly more effective at working on legislation than treaties. In the context of the TSA, Parliament was able to identify and soften the effect of the TSA’s prescriptive requirements in order to best protect the public interest.

The major concern relating to the incorporation of the TSA raised during the select committee process concerned the ability of the relevant Minister to declare a ‘debris protection area’ if the minister is satisfied that there has been an accident involving a space object on the site.⁷⁹ The need for this ability arose directly out of article 8(3) of the TSA which states that:⁸⁰

The Government of New Zealand shall ensure that a “debris recovery site” for the storage of identified U.S. Launch Vehicle, U.S. Spacecraft, Related Equipment, and/or components or debris thereof, which is subject to the provisions of Article VI, is located at launch facilities in 23 New Zealand and/or another location agreed to by the Parties. Access to any such location shall be controlled as provided in Article VI of this Agreement, as appropriate.

Significant complications arose out of the reference to the ‘components or debris thereof’. Effectively, this required the New Zealand Government to strictly limit access to the site of a launch failure. The way this requirement was incorporated changed as the Bill went through the House.

In the original Bill., after a debris protection area was declared, cl 65(3)(a) stated that:⁸¹

⁷⁹ Outer Space and High-Altitude Activities Bill 2016 (179-1), cl 65(1).

⁸⁰ Above, n 53.

⁸¹ Outer Space and High-Altitude Activities Bill 2016 (179-1), cl 65(3)(a).

No person may, without the permission of an enforcement officer or other authorised person, take any photograph, make any sketch, plan, model, or note, or otherwise record any image of, or study, any launch vehicle, payload, component of a launch vehicle or payload, related equipment, or other debris that the person knows or ought to know is in a debris protection area.

Any party who in breach of this clause would be “liable on conviction to imprisonment for a term not exceeding 3 months or to a fine not exceeding \$2,000, or both”.⁸² In the first reading one Member of Parliament commented that this provision could be breached if they represented a crashed rocket in interpretive dance.⁸³

Given the broad restriction in cl 65(3)(a) and the strict sanctions for its breach, the Media Freedom Committee was critical of the lack of detail around how cl 65 could be invoked.⁸⁴ Their submission stated that:⁸⁵

Space vehicle launch failures or space debris landing anywhere in New Zealand is news and the public will expect the news media, as their eyes and ears, to provide coverage of such an occurrence, more so if there is damage, injury or loss of life.

As it stood, the Bill created a potentially arbitrary barrier for news organisations to properly inform the New Zealand public on any incidents related to the launching of rockets.

This issue was addressed in the select committee’s report which recommended:⁸⁶

⁸² Clause 76(3).

⁸³ (18 October 2016) 717 at 14340.

⁸⁴ Media Freedom Committee “Submission by the NZ Media Freedom Committee on the Outer Space and High-altitude Activities Bill”.

⁸⁵ At 2.

⁸⁶ Foreign Affairs, Defence and Trade Committee *Outer Space and High-altitude Activities Bill* (21 April 2017) at 7.

amending clause 65(1) to provide that the Minister may only declare a debris protection area if satisfied that doing so is necessary to comply with any international agreement relating to the protection of space technology. This amendment would narrow the scope of the clause and make it clearer in what circumstances a debris protection area may be declared. It would also make it clear that the bill would not prevent the public or media from viewing or taking photographs of space launches or reporting outside the debris protection area.

This recommendation was given effect to in the Outer Space Act.⁸⁷

The change did not solve all possible issues. The fines for taking photos or recording information from within a debris recovery area remain in place.⁸⁸ It is arguable that the Act does still compromise the ability of journalists to properly report on any failed launches in a manner that breaches the right to freedom of expression contained in the New Zealand Bill of Rights Act 1991.⁸⁹ An article appeared in the major New Zealand news website Stuff describing these restriction as ‘Draconian’.⁹⁰

However, Parliament’s hands were effectively tied. The TSA had already been assented to and needed to be fully implemented in order to facilitate the import of any rocket technology from the US. Moreover, even if these concerns related to the media’s ability to report on rocket failures had been raised prior agreeing to the TSA it is doubtful that progress could have been made. Debris protection areas play a key role in ensuring the US’s exported technology is secured. Article 8(3) was likely non-negotiable.

⁸⁷ See s 64(1).

⁸⁸ S 76(3).

⁸⁹ See New Zealand Bill of Rights Act 1990 s 14.

⁹⁰ Chris Hutching “Draconian restrictions in new Outer Space Act” (30 July 2017) Stuff <<https://www.stuff.co.nz/business/94950966/draconian-restrictions-in-new-outer-space-act>>.

D Parliament's Relationship to the Treaty Making Process

This paper considers that Parliament was ultimately successful in implementing the obligations under the TSA in a manner that best protected the public interest. However, there is nothing to suggest that the PTE process contributed to this success. It may be appropriate to reflect on what is the role that Parliament plays in considering international treaties.

If agreements similar to the TSA are to become more common in the future there seems to be little value in having them considered prior to incorporation. Parliament's most valuable contribution is in considering how treaties can be given effect to while best protecting the reasonable interests of the New Zealand public. New Zealand may be better served if Parliament's resources are shifted away from treaty examination and more focus is given to working on the best method of incorporation.

V The Peaceful Use of Space

Disruptive industries will often be the subject of fierce international competition. One of New Zealand's key advantages in this competition extends from its good reputation in the international community. However, how this reputation can be leveraged in order to provide an advantage to New Zealand's innovators is not necessarily clear. This section will carefully analyse the approach taken to the incorporation of peace in the outer space reform in order to demonstrate how a good reputation can facilitate a more permissive and business friendly regulatory approach.

This discussion will begin by highlighting New Zealand's obligations under The Outer Space Treaty and then discuss how these were initially incorporated in the outer space bill. Next, the concerns raised by Venture Southland in the select committee discussed and the final approach to peace in the Outer Space Act will be detailed. Finally, this section will articulate how this approach can be understood as leveraging New Zealand's good international reputation to deliver a regulatory environment that better facilitates disruption.

A The Outer Space Treaty

In light of the cold-war context in which the major space treaties were negotiated, ensuring the peaceful use of space was a key concern. In the early 1960s both the Russia and US had been investigating ways in which orbital satellites could be used to launch nuclear and chemical weapons.⁹¹ The Outer Space Treaty was the first international agreement on the use of space, and it most clearly articulates the world's commitment to the peaceful. Article 3 of the Treaty states that:⁹²

States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international co-operation and understanding.

Article 4 then prohibits Parties to the Treaty from placing weapons of mass destruction in orbit and developing any military bases in space.⁹³

New Zealand ratified the Outer Space Treaty in 1968 but it lay dormant up until the development of the Outer Space Act. Its implementation within New Zealand's regulatory regime for space launches was identified early as a key concern.⁹⁴

B Implementation of the Outer Space Treaty and Venture Southland's Submission

1 Initial Implementation of the Outer Space Treaty

Initially, cl 3(b) stated one of the purposes of the Outer Space Bill to be the implementation of "certain international obligations of New Zealand relating to space activities and space

⁹¹ See for example William Broad "Star Wars Traced to Eisenhower Era" (28 October 1986) *The New York Times* <<http://www.nytimes.com/1986/10/28/science/star-wars-traced-to-eisenhower-era.html>>.

⁹² Above, n 3, art 3.

⁹³ Article 4.

⁹⁴ Cabinet Paper "A regulatory regime to enable space launches from New Zealand" (December 2015) at 8.

technology”.⁹⁵ Each licensing clause also contained a provision that allowed the Minister to add any conditions that “manage New Zealand’s potential liability under international law (including under the Liability Convention and the Outer Space Treaty).”⁹⁶ Clause 77 then provided specific penalties for non-compliance with the Outer Space Treaty.⁹⁷ This was a very practical approach to incorporating the Outer Space Treaty. Compliance is effectively ensured by these provisions. However, there is no broader statement of New Zealand’s commitment to the peaceful use of space or the principles of the Outer Space Treaty.

2 *Venture Southland’s Submission*

Venture Southland, a public agency responsible for the Southland region’s economic growth, raised some concerns about this approach in their submission to the Foreign Affairs, Defence and Trade Committee.⁹⁸ Venture Southland has a role in implementing an agreement between the Government of New Zealand and the European Space Agency for the provision of telemetry and tracking services.⁹⁹ Under this agreement the European Space Agency gifted Venture Southland a facility that is now used to monitor the passage of the Agency’s satellites as they travel over the Southern Hemisphere.¹⁰⁰ Venture Southland’s submission pointed out two key advantages of incorporating a strong commitment to the peaceful purposes of outer space.

The first advantage related to Venture Southland’s security.¹⁰¹ As a small public agency, they do not have the resources to fully secure their largely unmanned facility with security guards or cameras. A key plank of their approach to security is to promote their facilities as serving peaceful purposes and reassure the public that they are not being used for

⁹⁵ Outer Space and High-Altitude Activities Bill 2016 (179-1), cl 3(b).

⁹⁶ See for example cl 34(d).

⁹⁷ Outer Space and High-Altitude Activities Bill 2016 (179-1), cl 77.

⁹⁸ Venture Southland “Submission: Outer Space and High-altitude Activities Bill”.

⁹⁹ Venture Southland, above n 98, at 2.

¹⁰⁰ At 2.

¹⁰¹ At 2.

surveillance or military ends.¹⁰² Despite this though, they continue to hear of conspiracy theories directed at the work that they conduct and it would only take one irrational actor to undermine their operation.¹⁰³ A strong government commitment to the peaceful uses of outer space would make it easier to quell these rumours.

Second, Venture Southland values its contract with the European Space Agency and may seek to expand their telemetry services in the future. They already have some experience working with Rocket Lab.¹⁰⁴ In promoting themselves as a space service provider, it is in Venture Southland's interest to be able to demonstrate that they are operating in a regulatory framework that is committed to the peaceful use of space.¹⁰⁵

However, these concerns need to be balanced against the reality of the space industry. As discussed earlier, space technology has a 'dual use' character. If Rocket Lab is contracting with a company that wants to launch a satellite in order track and monitor ships they need to be mindful that the same technology could guide inter-continental ballistic missiles. Even if the satellite belongs to a reputable private company, Rocket Lab cannot be entirely confident that it will not be appropriated for military purposes. This considered, categorically stating in the Outer Space Act that New Zealand will not license the launch of any equipment capable of serving a non-peaceful purpose would be effectively impossible to comply with.

C The Compromise within the Outer Space Act

In order to balance these competing interests, a compromise was reached within the Bill as it came out of Select Committee.¹⁰⁶ Section 3(c) now expressly implements the obligations in the Outer Space Treaty not to:¹⁰⁷

¹⁰² At 3.

¹⁰³ At 3.

¹⁰⁴ At 2.

¹⁰⁵ At 3.

¹⁰⁶ See Outer Space and High-altitude Activities Bill 2016 (179-2) (Select Committee Report) at 2.

¹⁰⁷ These obligations are stated in art 4 of the Outer Space Treaty, above n 3.

- (i) place in orbit around the Earth any objects carrying nuclear weapons or weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner:
- (ii) establish military bases, installations, or fortifications on celestial bodies:
- (iii) test any type of weapons or conduct manoeuvres on celestial bodies.

Ostensibly, the legal effect of this sub-section does not differ from the previous general statement in the Bill's purpose provision that the legislation will implement New Zealand's international obligations. However, stating this commitment directly provides groups such as Venture Southland with a mechanism for demonstrating New Zealand's commitment to the peaceful use of space as promulgated by the Outer Space Treaty.

Still, during the third reading Green Party Member Gareth Hughes acknowledged that the approach to peace in the Act was a significant improvement over the original Bill, but wished it had gone further. He described how the Green Party "were pushing incredibly hard for an explicit purpose clause for the peaceful uses of space, we were not able to get that through".¹⁰⁸ While this intention may have been noble, this paper considers that the Act struck an appropriate balance.

D Leveraging New Zealand's Good Reputation

In publications on the prospects of New Zealand's space industry New Zealand's reputation as "a good international citizen" is referenced.¹⁰⁹ The 2017 global peace index placed New Zealand second, behind only Iceland.¹¹⁰ However, the relationship between New Zealand's good reputation and New Zealand's prospects as in the rocket industry requires some abstraction. This relationship can be understood in a general way, whereby New Zealand's

¹⁰⁸ (4 July 2017) 723 NZPD 19189.

¹⁰⁹ See for example, James Greenland "New Outer Space laws and Space Agency announced" (22 June 2016) Law Society <<https://www.lawsociety.org.nz/news-and-communications/latest-news/news/new-outer-space-laws-and-space-agency-announced>>.

¹¹⁰ Institute for Economics and Peace *Global Peace Index 2017* (Visions of Humanity, June 2017) at 10.

good reputation creates confidence in businesses who are seeking to invest in New Zealand or purchase a service based there. However, this paper contemplates another way in which this relationship can be understood.

Paradoxically, New Zealand's good international reputation has been used to facilitate a more permissive approach to incorporating a commitment to the peaceful use of space. New Zealand does not need to be prescriptive and direct in stating that its space industry will be used for purely peaceful purposes; it goes without saying that New Zealand will not be shooting down satellites or launching nuclear weapons. Taking a more flexible approach to the incorporation of peaceful purposes still signals to the world that New Zealand intends to act in accordance with its international obligations. At the same time though, this approach ensures that Rocket Lab and other innovators do not face any tedious or unnecessary barriers.

Disruptive and innovative industries will often be the subject of fierce international competition. New Zealand's good international reputation allows for the provision of a more permissive approach to the incorporation of international obligations. New Zealand does not need to go above and beyond or make grand, legislative statements about world peace. It is implicit that New Zealand cares about things. In the future, it will be interesting to see if New Zealand's good reputation can be leveraged in a comparable manner in the context of other disruptive reform projects.

VI Insurance, Indemnity and the Deference of Expertise

In the context of growing but highly complicated industries, new entrants face a major barrier due to their lack of institutional knowledge and experience. Effectively overcoming this gap is integral to facilitating modern and disruptive industries. This section will discuss how New Zealand overcame this challenge with regard to the indemnity requirements arising out of The Convention on the International Liability for Damage Cause by Space Objects (The Liability Convention).¹¹¹ This discussion will first highlight the challenges

¹¹¹ The Liability Convention, above, n 5.

that arising out of the Convention. Next, this section will consider how New Zealand's policy makers learnt from mistakes made overseas in order to deliver a flexible indemnity regime. Finally, this section will consider how a lack of institutional knowledge was obviated through deference to overseas licensing regimes.

A The Liability Convention

Consequences arising out of The Liability Convention are perhaps the main reason why government's need to carefully regulate commercial launch operators in their jurisdiction. The Convention places strict liability for terrestrial damage caused by rocket launches upon the state that launched them.¹¹² Effectively, this means that the New Zealand Government would be strictly liable under international law if one of Rocket Lab's rockets was to, for example, collide with a ship, plane or oil rig. This approach reflects the structure of the space industry in 1972, when the Liability Convention was agreed to. At the time, space activities were exclusively conducted by government agencies, and commercial launch operators were beyond contemplation.

Because of the approach taken by the Liability Convention, governments need to be careful in ensuring that any space launch that occurs in their jurisdiction is effectively insured against the damage that it may cause. However, if these indemnity requirements are too strict they may place significant compliance costs on launch operators and thereby stymie that jurisdiction as a forum for space activity.

B Managing Liability: Lessons from Australia

In regulating novel industries, it is important to consider the approaches taken in other jurisdictions in order to move closer towards best practice. This is particularly true in the context of outer space: very few nations have a regime for the regulation of launch vehicles and those that do often have their roots in legislation passed in the 1970s. Australia's

¹¹² Article 2.

legislative regime was identified early on as providing an example from which New Zealand could learn.¹¹³

Australia's equivalent of the Outer Space Act is the Space Activities Act 1998.¹¹⁴ The prescriptive approach taken to indemnity in the Australian Act has created significant costs for companies seeking to enter the launch industry. Section 48(3) of the Act requires the total insurance for any launch to be for an amount not less than \$750 million or the maximum probable loss that may be incurred in respect of damage to third parties as determined by the method set out in regulations. This maximum probable loss is defined as the maximum magnitude of loss that there is less than a 'threshold probability' of occurring.¹¹⁵

The Space Industry Association of Australia has stated that "The risk and liability assumptions that underpin the Act in its current form are acting as a brake on the development of a viable Australian space industry".¹¹⁶ The Australian Act contemplated an industry focused on large launch vehicles carrying large payloads, but this is not how the industry has developed.¹¹⁷ Because of this, the Australian Government is now working on reforming its regulatory framework to bring it closer into line with modern developments.¹¹⁸ New Zealand's law makers recognised these problems within the Australian regime and ensured New Zealand took a more flexible approach.

¹¹³ Regulatory Impact Statement "Outer Space and High-altitude Activities Bill: Agency Disclosure Statement" (June 2016) at 2.

¹¹⁴ Space Activities Act 1998.

¹¹⁵ S 48(3)(a).

¹¹⁶ Brett Biddington *Space: Unlocking Imagination, Fostering Innovation and Strengthening Security* (Space Industry Association, October 2015) at 1.

¹¹⁷ Biddington, above n 116, at 5.

¹¹⁸ Department of Industry, Innovation and Science *Reform of the Space Activities Act 1998 and associated framework: Legislative Proposals Paper* (Australian Government, March 2017).

C New Zealand's Approach

Conditions on indemnity are considered in relation to each license that can be obtained under the Outer Space Act. In relation to a launch license, s 10 states that: “A launch licence must also contain conditions specifying (including in any manner prescribed by regulations) the type and amount of insurance that the licensee must hold.” This provision is mirrored for each other license available under the Act.¹¹⁹ Section 88(6) then provides for regulations to be made “prescribing a method or methods by which the requirements as to the type and amount of insurance to be held by a licensee or permit holder may be calculated”. By placing indemnity requirements in a subordinate instrument, regulators are allowed to be more flexible and future innovations or changes in the industry are able to be more easily accommodated.

The Outer Space and High-altitude Activities (Licences and Permits) Regulations 2017 that have been promulgated under s 88 of the Outer Space Act do not comment on the insurance requirements for licenses and permits.¹²⁰ This reflects the lack of institutional knowledge about the details of what insurance requirements should look like in this area. Any prescriptive requirements may create an unnecessary compliance burden thereby compromising the competitiveness of New Zealand as a launching state. Of course, this is subject to change as regulatory experience will allow for more detail to be added in a manner that reflects industry practice.

D Deferring Licensing Requirements

This, of course, raises the issue of how New Zealand is to ensure launch operators have the appropriate indemnity. In order to get around New Zealand's lack of institutional experience, the Outer Space Act developed a novel approach to licensing that effectively allows for deference to foreign jurisdictions. Section 51 of the Outer Space Act states:

¹¹⁹ See ss 10, 18, 34 and 41.

¹²⁰ The Outer Space and High-altitude Activities (Licences and Permits) Regulations 2017.

The Minister may treat a licence, permit, or other authorisation that concerns a matter relevant to the Minister's decision and that was granted, or is likely to be granted, to an applicant or other person in a country other than New Zealand as satisfying some or all of the criteria for granting a launch licence

This is a catch-all provision that is enabled by the approach taken to licensing in other jurisdictions. In order for foreign companies to launch pay-loads in New Zealand they will generally require both their pay-load, and the New Zealand launch vehicle they intend to use, to be licensed by their state. For example, if a company incorporated in the United States wishes to launch a satellite on the Electron Rocket, Rocket Lab will have to get their launch vehicle licensed by the United States Federal Aviation Administration (FAA).

1 The FAA's Licensing Regime

The FAA, through its Office of Commercial Space Transportation, first licensed a commercial rocket launch in 1989.¹²¹ The insurance requirements for a commercial launch are set out in the commercial space and transportation regulations. Insurance is required on the basis of the FAA's determination of maximum probable loss with the proviso that it will not exceed \$500 million or "The maximum liability insurance available on the world market at a reasonable cost, as determined by the FAA".¹²² The regulations also refer to nine terms and conditions of coverage that must be complied with.¹²³

The method used for determining the 'maximum probable loss' is not articulated within the regulations. However, given the US's presence in the space industry since its conception, they do not suffer from the same lack of institutional knowledge as New Zealand does. In this context, allowing for deference to the US's requirements does not compromise the integrity of New Zealand's scheme while allowing the licensing process to be streamlined.

¹²¹ Federal Aviation Administration *Origins of the Commercial Space Industry* (Office of Commercial Space Transportation, 2015) at 3.

¹²² United States Code of Federal Regulations, Title 14, s 440(9).

¹²³ United States Code of Federal Regulations, Title 14, s 440(13).

2 *Advantages and Concerns*

Section 51 does significant work in overcoming the challenges created by New Zealand's late entry into outer space. It will allow for a transition period as the newly formed New Zealand Space Agency gains the experience it needs to act autonomously. In the future, a similar approach may be applied in other law reform exercises if New Zealand companies continue to attempt to disrupt complex and entrenched industries like Rocket Lab has.

However, it does raise some concerns over New Zealand's ability to regulate its own industry. If the practice of deferring to the FAA's licensing decisions continues, the institutional expertise required to regulate the rocket industry may be slow to develop. Problems may arise if a New Zealand company wants to use a New Zealand rocket in order to launch its satellite into space. In these circumstances the New Zealand Space Agency would have no other licensing regime to defer to. It will be important to follow the way in which the regulations promulgated under the Outer Space Act change in the future to see if risks being an issue.

VII Regulation Through Contract

In order to disrupt an industry, you need to act quickly. The commercial launch industry is changing quickly and several companies are planning to enter the market in the near future.¹²⁴ In order for Rocket Lab to gain a significant market share, they need to demonstrate their product as soon as possible. However, this need for fast action is in conflict with the legislative process. Work began on the Outer Space Bill in late 2015 but it will not come into effect until December 2017. It was necessary, therefore, for the New Government to find an intermediate instrument through which they could regulate Rocket Lab.

This section discusses the unique use of contract law as a proxy for legislation during the outer space reform. This discussion will begin by considering why the contract was

¹²⁴ For example see Mitsubishi Heavy Industries and United Launch Alliance.

necessary and what it achieves. Second, this section will question why legislation was necessary if a similar level of control could be facilitated by a contract and discusses the advantages that legislation may have in this context. Finally, this section will the value of this kind of contract as a law reform tool.

A The Contract: Why is it necessary and what does it do?

On the 16th of September 2016 Rocket Lab entered into a contract with the New Zealand Government that would allow to them to launch their rockets in a legislative vacuum (the Contract).¹²⁵ Effectively, the agreement provided a mechanism through which the New Zealand Government could ensure its compliance with various obligations arising out of bilateral and multilateral treaties. In particular, the Government needed a mechanism through which it could ensure it was indemnified against liability arising out a rocket launch as discussed above.

Why Rocket Lab required the agreement is a more puzzling question. Assuming they have the appropriate resource consents, there is no New Zealand statute that prohibits the launching of rockets.¹²⁶ When Rocket Lab launched the Atea-1 in 2009 it was not the subject of any regulations, although the Government was notified.¹²⁷

The answer to this question is likely pragmatic rather than legal. Rocket Lab would not exist without government support. Apart from getting research grants through Callaghan Innovation, Rocket Lab required the government to negotiate the TSA and ratify the international framework in order to operate with legitimacy. In this context, launching a

¹²⁵ Agreement between Her Majesty the Queen in right of New Zealand acting by and through the Minister of Economic Development (Government) AND Rocket Lab Limited a company Incorporated in New Zealand AND Rocket Lab USA Inc, a corporation based in Los Angeles, United States of America (16 September 2016) (Obtained under Official Information Act 1982 Request to the Ministry of Foreign Affairs and Trade).

¹²⁶ There is some very limited regulation of model rockets in Part 101 of the Civil Aviation Rules but these are focused at ensuring they do not interfere with other vehicles in airspace.

¹²⁷ 90 Seconds Media, above n 20.

rocket without asking for the consent of a government that had already demonstrated its support would have been absurd.

The Contract itself is a complicated document with a series of background provisions and seventeen substantive sections of agreed terms including an extensive interpretation provision similar to what you would expect from a legislative instrument. The purpose of the Contract is stated in s 1.1:

The parties agree that the purpose of this Agreement is to provide the authorisation, powers and authorities necessary to enable the Government to ensure Launches are in New Zealand's national interests and are not contrary to New Zealand's national interests are not contrary to New Zealand's national security interests, and meet its obligations under international agreements or arrangements and the Technology Safeguard Agreement. Rocket Lab New Zealand and Rocket Lab United States acknowledge that the government into the Technology Safeguard Agreement on this basis.

The main approach to regulating Rocket Lab under the contract is effectively an early iteration of the approach taken under s 51 of the Outer Space Act, as discussed in the previous section. Rocket Lab is able to undertake launch activities in New Zealand so long as the Agreement remains in force and so long as they hold all necessary licences, approvals, authorisations and consents required under US law and policy.¹²⁸ At the same time, the New Zealand government maintains the right to suspend a launch if it considers it to be in conflict with international law or New Zealand's national security interests.¹²⁹

B Why legislate over a functional contract?

The use of a contract in this manner raises the question as to why the rigorous process that lead to the development of the Outer Space Act was necessary in the first place. Arguably, the Contract, along with a few brief sets of regulations, would have been sufficient to

¹²⁸ At [3.2].

¹²⁹ At [3.5].

regulate Rocket Lab until they have demonstrated that they will be successful. In context of complex and expensive law reform it is important to ask: was it necessary?

This part will consider several arguments that suggest why legislation may be preferable to a contract. This includes even treatment of all potential participants in the rocket industry, increased transparency and democratic legitimacy. While these arguments have some merit, this paper is sceptical as to whether they justify the development of the Outer Space Act prior to Rocket Lab demonstrating its success. This paper considers that the real reason why the legislation was developed in the timeframe that it was may be more related to the positive narrative that could be built around it.

1 Even treatment

Legislation allows for even treatment of all parties who may seek to operate within it. If regulation by contract was allowed to operate over the long term, New Zealand's public could rightly be aggrieved by the special rights given to Rocket Lab.

Generally, contracts between the government and the private sector are for the provision of public services. While there is no issue of consideration in the Contract, it cannot be said that they are providing a public service. The long term economic benefits that a space industry may provide are significantly more remote than, for example, the building of a road or the development of a Ministry's digital architecture. In exchange, Rocket Lab gets the benefit of all the government labour that goes into its regulation. If another New Zealand firm wished to compete with Rocket Lab, or at least participate in the same industry, they would face a significant barrier to entry.

However, it is hard to see Rocket Lab facing domestic competition anytime in the near future. The capital and expertise that is required to launch a rocket is significant. Moreover, if a company did decide to launch a rocket there would be nothing to prevent it from negotiating their own contract with the government.

2 *Transparency*

The use of legislation provides a significantly more transparent depiction of New Zealand's regulatory approach to the outer space industry. In the context of modern and technologically sophisticated industries, a legislative instrument is valuable as a tool for demonstrating to the global community that they are serious and open about their industry.

The legislation allows any company that wishes to use Rocket Lab's services to examine and judge New Zealand's particularised regulatory approach. They can then make an informed decision about whether they want their satellite to be launched under this regime. Moreover, the Outer Space Act demonstrates, if somewhat indirectly, that New Zealand is committed to the peaceful use of space and it is a regime where the public authorities will only license a launch vehicle if they are confident it is safe.¹³⁰

However, comparing the Contract with the Outer Space Act finds that they both operate in a similar way. Under both instruments regulators will mostly defer to foreign licensing regimes in the immediate future. The legislation is easier to read and more directly articulates New Zealand's approach, but it is difficult to justify a massive reform effort on this basis.

3 *Legitimacy*

Perhaps the strongest argument in favour of legislation is that it confers a degree of democratic legitimacy on the industry that it regulates. Theoretically, legislation can be seen as a manifestation of the public's desire to promote and confine an industry in the manner that it sees fit. While this perspective is probably far from the reality, especially in the context of technical legislation like the Outer Space Act, it may be important in certain circumstance.

¹³⁰ See Outer Space High-altitude Activities Act 2017, s 9.

Rocket launches come with a degree of risk. In 2003 a Brazilian launch vehicle intended to deliver two satellites into orbit exploded on its launch pad, killing 21 people.¹³¹ If such a disaster occurred at a time when Rocket Lab were being regulated by a private agreement, serious questions could be raised about failure of such regulations to go through a proper process.

On the other hand, the public does not need unnecessary legislation. A launch tragedy like the one that occurred in Brazil is unlikely and there is any number of corners in New Zealand's legal landscape that could have benefitted from the attention that was given to the outer space reform. Again, it is necessary to ask, was this really worth the time and expense?

4 *Legislative Excitement*

It is difficult to find an entirely convincing argument to justify developing the Outer Space Act prior to Rocket Lab being able to demonstrate that they will be successful. This paper considers the most likely reason for the Government's assiduity in conducting this reform is more connected to the excitement the reform has generated. During the Outer Space Bill's first reading, Labour MP David Clark poked fun at the Government's enthusiasm for Rocket Lab: "It's often said these days in Mahia that Steven Joyce is seen there more often than John Key is seen outside Richie McCaw's dressing room - that's how central it is to his programme".¹³²

The Outer Space Act is exciting. It provides politicians with something innovative and inspiring to talk about. It allowed Steven Joyce to talk about the success of the Government's 'Business Growth Agenda'. But more than that, it is exciting for all New Zealanders to see that their country is preparing its entry into the space economy. This may be the real reason why the Contract was not allowed to subsist.

¹³¹ Space Daily "Brazilian Rocket Explodes on Pad: Many Dead" (23 August 2003) Space Daily <<http://www.spacedaily.com/news/rocketscience-03zu.html>>.

¹³² (18 October 2016) 717 at 14333.

C The use of Contract in the Future

The use of contract as a proxy for legislation may continue to have applications in the future. As the world continues to change at an accelerating rate, it may not always be possible to develop legislation quickly enough to keep up with innovation. Contract law provides a fast solution that can ensure companies seeking to disrupt the status quo have a regulatory environment in which they can operate.

In certain circumstance, contract law may even provide a durable solution for individual businesses operating in niche markets. However, legislation has a number of advantages. Perhaps most importantly, the public nature of legislation creates a sense of excitement about New Zealand's capacity to innovate. It creates a degree of buy in that cannot be achieved with a private agreement between private parties. It is this quality of legislation that makes it the superior tool for facilitating the success of whatever exciting industry it may regulate.

VIII Integrating with New Zealand's Environmental Law Framework

Science and scientific analysis is providing the evidence underpinning law reform with increasing frequency. In order to regulate complex and disruptive industries it is important that the law reform process can effectively facilitate the relationship between science and policy. This section discusses the use of science in regulating the environmental effects of rocket launches and integrating the outer space reform into New Zealand's environmental law frame. This discussion will highlight the importance of correctly setting the scope of scientific analysis in order to avoid problems downstream in the law reform process.

This section will begin with a discussion of the environmental impact of rocket launches more generally, and consider how these impacts are managed within New Zealand's legal framework. It will then go through a detailed analysis of the development of regulations within the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012. This will begin by considering the ecological risk assessments of the impact of rocket launches within New Zealand's exclusive economic zone. It will then discuss how these assessments were used to inform the regulation making process. This section will conclude

with a discussion of the challenges raised by using scientific analysis as an evidence base for law reform and consider how these challenges can be better dealt with in the future.

A The Environmental Impact of Rocket Launches

Potential adverse effects on the environment arising out of launch operations in New Zealand was raised as an issue by the very first Cabinet Paper discussing the Outer Space reform.¹³³ The Cabinet Paper stated the concern that once the legislation was in the public domain, publicity could shift from focusing on the potential benefits to economic development and focus on the potential environmental effects.¹³⁴

The major environmental concerns that are raised by the launching of rockets are related to the storage of hazardous chemicals and the initial launch discharge. In New Zealand, these issues are primarily controlled by the Resource Management Act 1991 and the Hazardous Substances and New Organisms Act 1996. The Resource Management Act in particular defers the management of these issues to local councils through the use of a consenting process.¹³⁵ In reporting their decision to grant consent to Rocket Lab to construct and operate a launch facility in Mahia, the Wairoa District Council stated that “an assessment of the actual and potential effects on the environment of allowing the activity indicates that no significant adverse environmental effects are likely”.¹³⁶ Resource consent was then granted with a series of conditions relating to fire management, earthworks and the containment of hazardous substances.¹³⁷

While these may be the major environmental concerns another potential issue is raised by the discharge of jettisoned material in the ocean. Large to medium sized launch vehicles

¹³³ Above, n 94, at [26].

¹³⁴ At [84].

¹³⁵ S 104.

¹³⁶ Wairoa District Council, above n 29, at [4.2].

¹³⁷ Application by Rocket Lab Limited to Wairoa District Council “Notice of decision on resource consent application – RM1500016” at 2 (Obtained under Local Government Official Information and Meetings Act 1987 Request to Wairoa District Council).

use two or more stages in order to deliver their payload into orbit.¹³⁸ The first stage is generally the heaviest part of the vehicle as it contains the largest engines as well as the largest fuel and oxidizer tanks.¹³⁹ Once this fuel is spent, the first stage is detached and the following stage continues to accelerate the vehicle into orbit. The Electron Rocket uses two stages. The first stage will, once jettisoned, crash into New Zealand's exclusive economic zone.

New Zealand's exclusive economic zone (EEZ) extends from 12 to 200 miles offshore and covers an area 20 times greater than New Zealand's land mass.¹⁴⁰ While states do not have full sovereignty over their exclusive economic zones, they do have rights and responsibilities relating to how they are used.¹⁴¹ These obligations are ratified in the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (The EEZ Act).¹⁴² The environmental effect of jettisoned rocket material constitutes a discharge under the Act and is therefore the subject of regulation.¹⁴³

B Ecological Risk Assessment

In order to inform a decision on the appropriate manner in which the discharge of rocket material over the EEZ should be regulated the Ministry for the Environment requested the National Institute of Water and Atmospheric Research (NIWA) to undertake two Ecological Risk Assessments (ERAs). These assessments considered the effect of jettisoned material on marine ecosystems. The first was published in August 2016 and

¹³⁸ Encyclopaedia Britannica "How a Launch Vehicle Works" Britannica <<https://www.britannica.com/topic/launch-vehicle/How-a-launch-vehicle-works>>.

¹³⁹ Encyclopaedia Britannica, above n 138.

¹⁴⁰ Environmental Protection Agency "About the Exclusive Economic Zone and Continental Shelf" <http://www.epa.govt.nz/EEZ/about_eez/Pages/default.aspx>.

¹⁴¹ United Nations Convention on the Law of the Sea 1833 UNTS 3 (Opened for Signature 10 December 1982, entered into force 16 November 1994), art 56.

¹⁴² See s 11.

¹⁴³ See s 4.

focused on a debris area over which the Electron rocket would fly directly.¹⁴⁴ The second was published in April 2017 and focused on a wider area of the EEZ as well the Extended Continental Shelf.¹⁴⁵

1 NIWA's Analysis

Both reports were prepared by a large team of experienced scientists at NIWA and contain extensive analyses of the potential impacts that jettisoned rocket material may have on many components of marine ecosystems within the EEZ. The first ERA considered seven distinct threats arising out of rocket launches:¹⁴⁶

- 1) Direct strike causing mortality;
- 2) Noise disturbance;
- 3) Toxic contaminants;
- 4) Ingestion of debris;
- 5) Smothering of seafloor organisms, preventing normal feeding and/or respiration;
- 6) Provision of biota attachment site; and
- 7) Floating debris.

The consequences of each of these threats being realised was then considered with regard to five different ecosystem components. This allowed NIWA to rank the consequences of each threat on each ecosystem component on a scale of 1 (remote) to 6 (likely).¹⁴⁷ This score is then multiplied by a similar score denoting the likelihood that a given consequence

¹⁴⁴ National Institute of Water and Atmospheric Research *Marine Ecological Risk Assessment of the cumulative impact of Electron Rocket launches* (Ministry for the Environment, Ecological Impact Assessment, August 2016).

¹⁴⁵ National Institute of Water and Atmospheric Research *Ecological Risk Assessment of the impact of debris from space launches on the marine environment* (Ministry for the Environment, Ecological Impact Assessment, April 2017) at 8.

¹⁴⁶ At 9.

¹⁴⁷ At 11.

would occur. This lead to a final score that expresses the actual risk created by each potential consequence on each ecosystem component.¹⁴⁸

The second ERA concluded that the risk created by a single launch was negligible, largely due to the limited impact that any consequences would have on ecosystem components.¹⁴⁹ However, while the second ERA focused particularly on the risk related to a single launch it is stated that at 100 launches the risk could be moderate and with 1000 launches the risk could become high. This was considered to depend on whether the “repeated launches prove to affect the same general area, or if debris is more widely scattered across larger areas of the EEZ”.¹⁵⁰

2 *Limitations*

NIWA’s ERAs make up a comprehensive and robust analysis of the impacts of successful rocket launches to the environment within the EEZ. Their approach reflects the movement towards ecosystem based managed in modern environmental legislation like the EEZ Act.¹⁵¹ This approach recognises that ecosystems are complex and interconnected such that considering individual species and threats is insufficient.

However, while the quality of NIWA’s scientific analysis is unquestionable, the value of the two ERAs is limited by the exclusion of relevant considerations from the scope of the analysis. First, the analysis does not assess cumulative impacts related to the launching of rockets over the EEZ. These are considered to be an important consideration for any risk assessment of activities covering large areas over the EEZ. This would have required a consideration of additive or interactive processes from multiple impacts such as numerous rocket launches, different industries such as fisheries and environmental changes.¹⁵²

¹⁴⁸ At 13.

¹⁴⁹ At 52.

¹⁵⁰ At 6.

¹⁵¹ See, for example, s 33(3)(d).

¹⁵² See discussion of limitations in *Ecological Risk Assessment of the impact of debris from space launches on the marine environment*, above n 145, at 57.

Second, the analysis only considered the consequents extending from successful launches. This meant that the impact of, for example, large amounts rocket fuel being discharged by a mid-air rocket failure, was not considered.¹⁵³

History tells us that failed rocket launches are inevitable in any space program and, as such, an analysis of the effects of a failed launch may be important to consider. The failure to consider these effects could lead to problems downstream in the reform process, as discussed later in this section.

C Regulating the Deposit of Jettisoned Rocket Material

The two ERAs provided the evidence base for the development of a regulatory approach under the EEZ Act. The purpose of the Act is to “to promote the sustainable management of the natural resources of the exclusive economic zone and the continental shelf”.¹⁵⁴ However, the Act is flexible in that it provides for a number of mechanisms through which this can be achieved.

Before a particular kind of discharge is classified under the EEZ Act it is considered to be a discretionary activity and therefore requires a fully notified marine consent from the Environmental Protection Agency.¹⁵⁵ This process can take up to 140 working days and costs between \$350,000 and \$1,200,000 as it is designed to enable consideration of activities that have potential significant and ongoing adverse effects.¹⁵⁶ In order to develop an approach that would create a more limited burden on Rocket Lab, a Regulatory Impact Statement was prepared by the Ministry for the Environment to consider alternative approaches that could be taken.¹⁵⁷

¹⁵³ At 10.

¹⁵⁴ S 10.

¹⁵⁵ Section 36(1)(c) and s 36(2).

¹⁵⁶ Regulatory Impact Statement “Regulation of deposit of jettisoned material from space vehicle launches under the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012” (August 2017).

¹⁵⁷ Above, n 156.

The regulatory impact statement provides three different options for regulating material jettisoned by space craft under the EEZ Act:¹⁵⁸

- a) Status quo: the activity is a fully notified discretionary activity requiring a marine consent from the EPA. Rocket Lab would apply for a marine consent and this would cost them somewhere between \$350,000-\$1,200,000 and take up to 140 working days (roughly seven months).
- b) Discretionary non-notified activity: a marine consent is still required but regulations prescribe the activity as being non-notified. Rocket Lab would apply for a marine consent and this would cost them about \$350,000 and take up to 60 working days (roughly three months), after regulations have been put in place.
- c) Permitted Activity: regulations prescribe the activity as being permitted. The proposed regulations would enable Rocket Lab to undertake weekly launches on specific trajectories of their rocket for a total of 100 launches. The regulations also expire after five years. The regulations do not enable other companies to launch or other types of rockets or launches from other sites.

The regulatory impact statement then considered these three options in light of NIWA's ERA and the amount each option would cost the Crown.¹⁵⁹ The ecological risk was considered to be very low in each case.¹⁶⁰ Other impacts that were considered, such as sustainable management and cost-effectiveness, were estimated to be about even across each option.¹⁶¹ The only point of difference was the economic impact. Under option C, the space vehicle industry could contribute between \$600 and \$1,550 million dollars to New

¹⁵⁸ At [21].

¹⁵⁹ At [30].

¹⁶⁰ At [24].

¹⁶¹ At [30].

Zealand's economy over twenty years.¹⁶² The status quo was considered to put this at risk by creating delays in the delivery of contracted satellites and undermining Rocket Lab's competitive advantage by creating additional compliance costs.¹⁶³

The regulatory impact statement concluded by recommending that the development of regulations for the discharge of jettisoned material was the best approach to take. This recommendation is currently being given affect to following a round of public consultation. This can be noted as another example of the New Zealand Government's determination to minimise the compliance costs Rocket Lab faces.

D Developing Regulations under the EEZ Act

Due to the previously discussed limitations of NIWA's ERAs there is a risk that regulations developed concerning the discharge of jettisoned material will not be compliant with the scheme of the EEZ Act. This part will consider the mandatory considerations that the Minister must take into account under the EEZ Act and raise some concerns about the ability of NIWA's ERAs to allow the Act to be complied with. This will be used to facilitate a discussion of the challenges raised by scientifically driven law reform and how they can be better overcome in the future.

1 Mandatory Considerations Under the EEZ Act

Section 34A states that the responsible Minister must take in to account a number of matters described in s 33(3) when considering regulations related to discharges and dumping. Included in this is "any effects on the environment or existing interests of allowing an activity with or without a marine consent".¹⁶⁴

Section 6 of the EEZ provides several categories that are included in the meaning of effect. Included in this is "any cumulative effect that arises over time or in combination with other

¹⁶² At [36].

¹⁶³ At [36].

¹⁶⁴ 33(3)(a).

effects”¹⁶⁵ and “any potential effect of low probability that has a high potential impact.”¹⁶⁶ Pursuant to s 33(3) the Minister must take in to account these kinds of effects when creating regulation under the EEZ to the extent that they are relevant. NIWA’s ERA did not consider cumulative effects and it did not consider the impact the consequences of a rocket failing over the EEZ. Had the latter been considered it may have been found to be a potential effect of low probability with high consequences. Because of this, the Ministry for the Environment, acting on behalf of the responsible Minister, face a significant information gaps that may hinder their ability to take into account all the matters that must be considered under the EEZ Act. This may raise an issue of legitimacy if regulations are promulgated.

2 *Issues in Scientifically Driven Law Reform*

These issues are connected to the specific challenges that exist in scientifically driven law reform. Scientific analysis frequently has to occur at the start of the regulatory development process as it provides the evidence base upon which all the following policy decisions are made. If the scientific analysis does not consider factors that the law requires consideration of it may be difficult to recognise this oversight until the final stage of the regulatory development process.

Twelve PhD scientists have already spent approximately six months considering issues related to jettisoned rocket material within the EEZ. It seems absurd that they may have to return to the issue in order to consider the impact of a failed launch. If this is required, then it will add major delays as well as significant expense to regulatory development process.

This raises the question: why was the environmental impact of a failed launch not considered? It is unlikely this was a conscious decision due to its potential to undermine the development of an efficient EEZ regulations. The Minister’s discretion under the EEZ Act is broad, even if the mandatory considerations are prescriptive. Had NIWA considered the impact of a launch failure over the EEZ to be significant, the Minister could still have

¹⁶⁵ S 6(1)(d).

¹⁶⁶ S 6(1)(e).

decided to place only limited regulatory requirements in this area, especially considering the unlikelihood of such an occurrence.

The most likely reason that the Ministry for the Environment did not include the impact of a launch failure within the scope of NIWA's analysis is that the inclusion of such considerations was not considered necessary. It seems as though, at the early stage in which the scope of the ERAs was being developed, the EEZ Act's broad definition of effect was not considered.

3 Averting these problems in the future

Going forward, an increasing amount of law reform is likely to be driven by scientific assessment. This is especially true in the context of new and technologically sophisticated industries for which the evidence base relating to their scientific impact may be in its infancy. In order to obviate problems of the type discussed above it is important that the scope of scientific analysis is designed to directly correlate with legislative requirements. The legislation should be considered and analysed prior to the scientific analysis being direct.

Furthermore, increasingly complicated law reform projects will mean more people with a broader range of skill sets have to work together on the same problem. This will require scientists, policy makers, politicians and lawyers improve the way that they work and communicate with each other.

However, the problems in the development of regulations under the EEZ Act may be illustrative of a different kind of challenge that exists in exciting and disruptive law reform. The small problems risk getting swept up by the bigger picture. The Outer Space Act has been held up as a shining example of New Zealand's capacity for innovation and the Government's 'Business Growth Agenda'. This has been valuable in promoting a sense of dedication and commitment to its development. Regulating the environmental effects of rocket launches did not attract the same level of attention. The EEZ Act is not new and exciting. But it is still important. In the context of disruptive law reform an added measure

of carefulness may be required to ensure the little problems are dealt with properly along with the big ones.

IX Conclusion

Long before Pākehā arrived in New Zealand, Mahia Peninsula was used by local Iwi as a place to light signal fires.¹⁶⁷ A smoke signal by day and bright fires by night allowed Māori to communicate across vast distances.¹⁶⁸ It seems appropriate that, a few hundred years later, such a site should be used to launch rockets into orbit. The Electron is a new signal. It is a manifestation of New Zealand's intention to take the lead in a changing world and to disrupt a growing industry.

Whether or not Rocket Lab are successful remains to be seen. Rockets science is hard. The Electron may not live up to expectations or the market for the launch of small satellites might crumble. But regardless of whether or not they succeed, New Zealanders can be proud to live in a country where someone with the vision to build and launch rockets is able to do so. The Outer Space Act ensures that Rocket Lab face no unnecessary barriers to success.

This paper has canvassed a variety of aspects of the outer space reform. It has told the story of Peter Beck and the commercial launch industry. It has talked about the 'Business Growth Agenda' that provided a frame in which the reform could be understood and a platform upon which it can be held up. It has traced the passage of the Technology Safeguards Agreement through parliament and has discussed New Zealand's approach to complying with the Outer Space Treaty and the Liability Convention. This paper has analysed the unique use of a contract as proxy for legislation and it has considered the integration of the space economy into New Zealand's environmental law framework.

¹⁶⁷ Application by Rocket Lab Limited to Wairoa District Council above, n 29, at [4.2].

¹⁶⁸ Rōpata Taylor "Te Whanake" (22 February 2017) Nrait <<http://www.nrait.co.nz/our-owners/te-whanake/tag/motueka>>.

Through discussion of these issues New Zealand's law reform process has been found to be innovative in its approach to dealing with disruptive law reform. The public servants who worked on the outer space reform were pragmatic and flexible in dealing with the broad variety of issues that were raised by the outer space reform. The Government and the House of Representative were determined and deliberative in developing the Outer Space Act and careful in their protection of the public interest. New Zealand sits in the middle of the Pacific Ocean ready to overcome any barrier to becoming a disruptive force in the space industry and in the 21st century.

Word Count: 14168 excluding abstract, table of contents, footnotes and bibliography.

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