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SIAA SUBMISSION TO SPACE ACTIVITIES ACT REVIEW

The Space Industry Association of Australia (formerly the Australian Space Industry Chamber of Commerce) is a national organisation formed to promote the growth of the Australian space industry. We speak with authority and credibility on behalf of our members on policy and commercial issues connected with the Australian space industry.

The SIAA takes a leading role in advising government on behalf of the space industry. We also provide a forum to promote networking and collaboration among members. Through meetings and events held in various Australian locations, we engage with our members to devise and communicate policies to support the development of the Australian space industry. We actively promote and facilitate commercial, industrial and research opportunities for our members nationally and internationally.

We also harness the skills and expertise of our membership to address issues of common concern to corporations, businesses and individuals involved in, or seeking to become involved in, the benefits of the space sector in Australia and internationally.

The SIAA welcomes the Australian Government's review of the Space Activities Act and is pleased to provide this submission on behalf of its members.

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Terms of Reference of Review

'The review of the Space Activities Act 1998 will examine the appropriateness and effectiveness of existing Australian civil space regulation, including whether the Space Activities Act 1998:

1. Supports innovation and the advancement of space technologies.
2. Promotes entrepreneurship and private investment in Australia, as well as opportunities for Australian firms to compete globally into the future.
3. Appropriately protects the Commonwealth against potential liability claims in relation to current and future civil space activities conducted in Australia or by Australians.
4. Adequately addresses emerging issues such as management of the space environment and technology advancement or convergence.
5. Appropriately aligns with other related Australian legislation and/or Australia's international obligations, removes unnecessary regulatory burden.
6. Provides the necessary authority to support Commonwealth led civil space activities (government only).'

Summary of Submission

1. Innovation in space technologies should be a key goal in the development of a national vision for the Australian space sector, but the Space Activities Act currently serves a different purpose. It cannot be said that the Act currently supports innovation in space technologies. (TOR 1)
2. The Australian Government has an ongoing role under international law to authorise and continually supervise the activities of non-governmental entities and it discharges this responsibility through the licensing provisions of the Space Activities Act. (TOR 3)
3. There is no uniform approach on the part of national legislatures in discharging this responsibility and Australia should use this review to create advantages for its local industrial players, balanced with its obligations in relation to public safety and protection of the public purse. (TOR1, TOR2 and TOR 5)
4. Effective legislation that supports Australian space innovation should be consistent with the following aims:
 - a. Satisfying Australia's obligations as a state party to the space treaties;
 - b. Providing a light-handed regulatory regime for the authorisation of space launch and return activities for which the Australian Government is responsible;
 - c. Ensuring that Australia is in step with international efforts to address environmental problems on Earth and debris and traffic problems in space;
 - d. Ensuring that emerging space enterprises are not discouraged or driven to other jurisdictions by unnecessary regulation and disproportionate financial indemnity obligations;
 - e. Providing a regulatory environment that attracts overseas interest in a variety of space activities, including commercial launch services; and
 - f. Being sufficiently flexible to cater for the impacts of future technological development and commercial opportunities. (TOR 3)
5. It is important for Australia to maintain the Space Activities Act licensing regime while at the same time ensuring that the administrative and financial burdens on Australian organisations are proportionate to the scale and cost of the launch or satellite activity to be licensed. (TOR1 and TOR 3)
6. It is of utmost importance that holders of existing and applicants for future Overseas Launch Certificates should not be disadvantaged by changes to the existing national regulatory regime, particularly in relation to the existing balance between the government's international liability obligations and the indemnity obligations to the government of OLC holders. (TOR1)
7. We are seeing in Australia the emergence of 'new space' companies and research institutes with plans to develop and launch a number of small satellites into low earth orbit and beyond (including for solar, lunar and asteroid exploration) at much lower cost

than was previously possible. Some of these players have expressed concerns about the current cost and complexity of obtaining Overseas Launch Certificates and the associated insurance/financial requirements. (TOR 4)

8. This review provides an opportunity to modify the rules and requirements and even to 'think outside the square' when it comes to the need to protect the Australian Government from claims under international law. Notwithstanding the increasing volume of space traffic in some orbits, liability under international law is based on proof of fault and the statistical chance of a successful claim against the Australian public purse remains very low. (TOR 3)
9. In many cases of an overseas launch, the Australian government will be indemnified by the launch provider or its government at least to the level required by the Act and the procedures required for the grant of an Overseas Launch Certificate are likely to be duplicated to a certain extent in the country of launch. In other cases, the size, purpose, orbital parameters and expected life of a satellite should all be taken into account in deciding whether to insist upon the insurance/financial requirements for the grant of an overseas launch certificate. In appropriate cases the insurance/financial requirements should be waived and the Act should contain guidance on the considerations to be taken into account in the exercise of the discretion. (TOR 3)
10. The regulatory regime for licensing launches from Australia should be reviewed and improved to take account of innovations in launch technologies and best practice in other jurisdictions. (TOR 3)
11. The essential role of the Australian Government in space activities is highlighted by this legislation, but its role in fostering space technologies and the Australian space sector in general goes well beyond the scope or purposes of the Space Activities Act regulatory regime. This is a dialogue that will continue to be the subject of representations from the SIAA and other interested parties. (TOR 3)

1 Introduction

The Space Industry Association of Australia was established in 1992 to promote and assist the development of a viable and self-sustaining space sector in Australia and to encourage, advocate for and promote education, research and development in space science in Australia. Our members include Australian satellite operators, global aerospace prime contractors, Australian owned companies, research institutes of Australian universities, scientists, engineers, consultants and students. As the peak space industry body in Australia we have been at the forefront of space policy formulation and debate in this country for over 20 years.¹

Previous SIAA submissions on the Space Activities Act include:

- Comments on Draft Launch Licensing Procedures - June 1999
- Submission to Department of Industry Science and Resources on Proposed Launch Safety & Insurance Regulations - 13 October 2000
- Submission to Department of Industry Science and Resources on Proposed Space Activities Regulations 2001 - 29 March 2001
- Submission to Department of Industry Science and Resources on Proposed Flight Safety Code and Maximum Probable Loss Methodology - 5 June 2001
- Submission to Senate Economics Legislation Committee on the Space Activities Amendment Bill 2002 - August 2002²

An approach to the Australian Government by the US company, Kistler Aerospace, to use Woomera for its experimental launches and returns and the emergence of other Australian proposals to establish commercial launch businesses eventually led to the enactment by Parliament of the Space Activities Act in 1998. The contribution of the SIAA (then called the Australian Space Industry Chamber of Commerce) to the formulation of the Act was specifically acknowledged in the parliamentary debate.³

It is important to note that the motivation for the Space Activities Act was not to support or promote innovation in space technologies, per se. Its primary purpose was to regulate launch activity from Australia and to establish a licensing system in order to facilitate the establishment of a new space

¹ During the consultation process for the Space Activities Act, the Department recognised the wide range of experience and industry knowledge resident within the SIAA members and actively incorporated SIAA into aspects of the legislative development process in order to take advantage of this expertise and use it to develop practical and effective legislation. In particular the Department and SIAA met several times to help the Department better understand the practical nature of the space industry and the types of space activities currently being conducted or planned worldwide. The SIAA was also invited to the briefing of the team assigned to draft the legislation to answer questions about the practical nature and operation of the space activities to better inform the drafters for their task. The SIAA was then invited to review the various versions of the draft legislation and also invited to provide advice to the Department on the practical effects of various proposed amendments introduced by non-government parties when the legislation came before the House and Senate. One example of the benefits of such collaboration in the legislative process is that an early draft of the legislation used phraseology which inadvertently and unintentionally precluded the return of space objects to Australia after the initial launch process. The SIAA alerted the Department to the implications of the phraseology and the text was amended to accurately reflect the Department's intentions. This enabled Australia to license the return of the Japanese Hayabusa mission to Woomera in 2010, making Australia a key part of this pioneering mission which returned the first non-Lunar space samples to Earth.

² Available at <http://www.spaceindustry.com.au/publications.php>

³ Senate Second Reading speech by Senator Kemp, Hansard, 12 November 1998, p. 149

sector activity. The catalyst was an opportunity to take advantage of a surge in worldwide demand for commercial communications satellite services in low earth orbit by using Australia's natural advantages for space launch – proximity to the equator, ability to launch over open ocean to minimise casualty risk, ability to launch to all key orbits from equatorial to polar orbits and large areas of flat, unpopulated terrain ideal for landing and recovery of reusable launch vehicles. The relevant launch proposals involved importing launch technology into Australia. Nevertheless, the establishment of a commercial launch services industry in this country was a worthwhile objective that would have had positive benefits for the Australian economy in terms of jobs and export income, had it been successful.

It is beyond the scope of this submission to comment on the reasons for the failure of the proponents in the late 1990's and the early 2000's to realise their plans, other than to say that each project faced different challenges and while these challenges were being addressed the surge in demand for LEO launches receded.⁴ Criticisms of the proponents and their commercial plans are occasionally heard, but the fact remains that they were the first wave of space entrepreneurs in this country, proposing ambitious projects involving considerable private capital and high risk. It is also interesting to note that the rocket systems at the core of two of the Australian projects (Zenit, Soyuz) achieved successful commercial operation after securing support and financial backing from other jurisdictions outside Australia.⁵ The relevance to this review is to note that Australia laid the foundations for ambitious entrepreneurial space projects almost 20 years ago and to argue that we should maintain those foundations.

The focus of political discussion leading to the enactment of the Space Activities Act was on the need to facilitate this emerging commercial launch industry in Australia.⁶ However the Act itself had three key outcomes:

1. A licensing regime to implement our international obligations to authorise and continually supervise the activities of our non-governmental entities.⁷
2. A safety regime to guard against launch accidents and to provide for statutory compensation for damage caused by launch activities to people or property in Australia.
3. A legislative scheme for the protection of the public purse by requiring the licensed actors to indemnify the Australian Government against its international obligations to other States under international law.

The full extent of the regulatory burden on the proponents became evident when the Space Activities Act Regulations were eventually formulated and implemented in 2001.

This submission is primarily concerned with the first and third outcomes.

⁴ See https://www.faa.gov/about/office_org/headquarters_offices/ast/media/Forecast_05-19-03.pdf

⁵ Zenit became Sea Launch under US jurisdiction after the US brokered a deal between American, Russian, Ukrainian and Norwegian companies and French support secured Soyuz for Arianespace and it is now launched from French Guiana.

⁶ Senate Second Reading speech by Senator Kemp, Hansard, 12 November 1998, p. 148

⁷ As required by Article VI of the Outer Space Treaty

2 The Regulation of Overseas Launches

In order to understand the context of our submissions on this topic, it is useful to review the interplay between Australia's international obligations and the current regulatory regime.

Australia's Treaty Obligations

In relation to the first outcome above, the Act implements certain obligations that the Australian Government has accepted under international space treaties. Australia is a party to the Outer Space Treaty and the Liability Convention. As a launching state, the Australian Government is liable under these treaties for damage done by a space object for which it is responsible. This includes a space object owned by a private entity incorporated in Australia. A launching state is a state which launches a space object, a state which procures the launch of a space object and a state whose territory or facility is used for the launch. A space object is defined to include its component parts as well as the launch vehicle and the parts of the launch vehicle. A launching state is strictly liable for damage done on earth or to aircraft in flight unless damage results from gross negligence or from acts or omissions done with intent to cause damage, by the third party state or its nationals. The launching state is liable for other damage to the extent of its fault or the fault of persons for whom it is responsible. The launching state is liable to pay compensation sufficient to restore the party suffering the damage to the condition which would have existed if the damage had not occurred. If there is more than one launching state, the liability is joint and several, meaning that either state can be required to pay the full amount of the claim. There is no time limit on the launching state's liability for third party damage.

Overseas launches

The regulatory scheme in the Act covers not only launches from Australian territory but also overseas launches (because of Australia's treaty obligations in relation to foreign launches). To date approvals granted under the Act have been mainly for overseas launches. This is the topic that is of primary concern to the current industry players due to its potential impact on innovation in the rapidly emerging small satellite field and our submissions concentrate on this field of industry activity.

The requirements for an overseas launch certificate (OLC) under section 35 of the Act are:

- the proposed certificate holder must have the ability to satisfy the insurance/financial requirements for each launch. (There is, however, power to waive this requirement having regard to the 'nature and purpose' of the space objects)
- the Minister must be satisfied that the probability of the launch causing substantial harm to public health or public safety or substantial harm to property is sufficiently low
- the Minister must be satisfied that there are no reasons relevant to Australia's national security, foreign policy or international obligations why the launch permit should not be granted.

There is currently no power to exempt an applicant for an OLC from these latter two requirements.

The second requirement is more appropriately determined by the authority giving permission for the launch in the country of launch and we suggest that the Act be amended to give power to waive this pre-condition for the grant of an OLC in appropriate circumstances.

Indemnities for the Australian Government

The Act passes on to the holder of the OLC, in certain circumstances, some of the financial risk to which the Australian Government is exposed under the space treaties. Following the practice in other space-faring jurisdictions, the indemnity is subject to a financial ceiling and only applies for certain limited periods. A responsible party is liable for damage caused by a space object during the liability period of 30 days from launch and during re-entry as defined in the Act.⁸ A responsible party includes any person who launches a space object from Australia or who returns a space object to Australia and any Australian national who launches a space object from outside Australia.⁹ A space object has a similar meaning to the definition in the Liability Convention and includes an object that is intended to go only some of the way towards or back from space, or which results from the separation of a payload from a launch vehicle after launch.¹⁰

Under the Act, the 'responsible party' is strictly liable for damage done on the earth or to aircraft in flight.¹¹ There is an exception to this principle where the damage results from either the gross negligence of a third party or from conduct intended to cause damage.¹² For damage done other than on the earth or to aircraft in flight, the responsible party is liable to the extent that the damage is due to the fault of the responsible party or a related party.¹³

Insurance/Financial Requirements

The rules for satisfying the insurance/financial requirements are set out in the Act and the Regulations made under the Act¹⁴, but in essence:

- The insurance requirements are satisfied for a launch authorised by an OLC if the Commonwealth is insured for an amount not less than the lesser of the amount of A\$750 million and the amount of the maximum probable loss (MPL) that may be incurred in respect of damage to third parties caused by the launch, 'against any liability of the Commonwealth, under the Liability Convention or otherwise under international law, to pay compensation for any damage to third parties that the launch causes.'
- The financial requirements are satisfied if the holder has shown direct financial responsibility for the launch for an amount not less than the amount that would otherwise have been applicable if the insurance requirements had been satisfied.

The OLC holder has the option of satisfying either the insurance requirements or the financial requirements.

⁸ Section 47 Space Activities Act

⁹ Section 8 Space Activities Act

¹⁰ Ibid.

¹¹ Section 67 Space Activities Act

¹² Ibid

¹³ Section 68 Space Activities Act

¹⁴ Space Activities Regulations 2001

The first step for the payload owner is to ensure that its legal liability for third party damage as a result of the launch and operation of the relevant satellite is protected by insurance or indemnities. In commercial launches this type of cover is usually provided as part of the launch contract by the launch provider. The space laws and policies of the launching country may also provide a level of comfort that third party damage claims will be covered either by the government of the launching country or by the launch provider (or in some cases, by both, depending on the amount of the claim).

Waiver of Insurance/Financial Requirements

Given this background, in what circumstances might the Minister (under authority delegated to the head of the Space Licensing and Safety Office (SLASO) in the Department of Industry, Innovation and Science) be persuaded to waive the insurance/financial requirements? The Act simply states that the Minister must be satisfied that 'having regard to the nature and purpose of the space object or space objects concerned, it is not necessary to insist that those insurance/financial requirements be satisfied'¹⁵.

According to SIAA's inquiries, there is no precedent for the waiver of the requirement that the holder of an OLC to satisfy the insurance/financial requirements for a particular overseas launch.¹⁶

There is no other guidance in the Act or the regulations as to the factors to be taken into account, but common sense suggests that the following considerations would be relevant:

- What indemnities have been given by the launch provider and/or the government of the launching state?
- Is the Australian government properly covered in relation to its treaty liabilities by these indemnities?
- Is the space object part of a commercial venture or a not-for-profit exercise?
- What is the size and what are the proposed orbital parameters of the space object?
- Is the space object to be launched for scientific or educational purposes?
- What will be the public benefit in terms of the knowledge gained or the techniques tested or demonstrated?
- Is there an advantage to the Australian Government or the Australian people from the launch sufficient to justify the additional financial risk (if any) to which the Australian Government would be exposed?

Suggested Revisions of the Overseas Launch Provisions of the Space Activities Act

There are no explicit and binding standards in relation to the general obligation to supervise the activities of non-governmental entities under international law and different countries have

¹⁵ Section 35(2)(a)(ii)

¹⁶ Commercial operators have only been granted OLCs for their new satellites after satisfying either the insurance or the financial requirements in Division 7 of the Act.

implemented the obligation in different ways.¹⁷ There is therefore scope for Australia to implement this general obligation as it best determines.¹⁸

Australia is one of the few countries to explicitly impose a licensing process involving the requirements described above for the launch of Australian space objects from outside Australian territory. This feature of the Australian system adds additional regulatory burden and cost compared with many other jurisdictions.

It is true that the risk of a claim against the Australian Government for damage caused by an Australian space object launched into orbit from another country is similar to the risk of a claim for an object launched into orbit from Australia. The difference is that the foreign state from whose territory the object is launched is also a launching state under the Outer Space Treaty and the Liability Convention and the other state will have an even greater interest in ensuring the safety of the launch and that appropriate indemnification by the provider of the launch service. Such an indemnity should automatically benefit all launching States. (If the provider of the launch service is, in effect, the government of the launching state, it would then be a question of considering what indemnities that government would be prepared to give to the Australian payload owner and the Australian Government).

In this scenario an argument can be made that the licensing of the launch should be left to the state of the location of the launch, thereby lightening the regulatory burden in Australia for the payload owner. The quid pro quo for removing the OLC regulatory burden would be a requirement for the payload owner to satisfy the Australian Government that 'there is an agreement or arrangement between Australia and the other launching State, or any of the other launching States, under which that State assumes liability, and indemnifies Australia, for any damage that the space object or objects may cause' as currently contemplated by section 35(3) of the Act. (This is currently not a requirement for the grant of an OLC but rather a matter that the Minister may take into account in deciding whether to grant an OLC.) Our submission is that if such an arrangement is in place the Act should relieve the applicant from the current requirements for the grant of an OLC.

Another possible approach is that for the purposes of the Act, a threshold test should be applied before the Australian Government regards itself as having the responsibilities of a procuring state under the space treaties and applies the licensing provisions of the Act. The threshold test could simply be based on the mass of the Australian payload or payload component compared with the total mass of the launch vehicle and all payloads. If that proportion is small enough, the Australian Government could assume that very small risk during the launch and the 30 day period following the launch. The space treaties do not prescribe any minimum size for a space object. However the owner of a small space object has no control over the launch or insertion into orbit. We argue that the smaller the object, the greater the regulatory burden under the current regime, the stronger the case is for regulatory relief. (A variant of this approach is to take account of whether or not the Australian payload is a primary payload. In most cases small payloads are secondary payloads. They are usually accommodated by the launch provider to earn some extra revenue by utilising the launch capability not needed for the much larger primary payload. The owner of the primary payload

¹⁷ See <http://www.oosa.unvienna.org/oosa/en/SpaceLaw/national/state-index.html>

¹⁸ See R Jakhu ed., *National Regulation of Space Activities* at p.9

procures the launch and determines the specifics of the launch including the orbital parameters. The owners of secondary payloads have little or no control over the launch.)

A third and related approach would be to argue that the additional financial risk to the Australian Government by not insisting on an indemnity during the 30 day liability period and for claims up to \$750 million or the MPL (whichever is the lower amount) in relation to a carefully defined category of small satellite launches is justified by the benefit to Australian science, educational or industry development endeavours and that the regulatory and financial burden of the OLC requirements is in danger of stifling a burgeoning high tech industry. The fact that there has never been an official claim made against a launching State under the Liability Convention supports an argument that the actual additional risk to Commonwealth finances is very small.

As mentioned above, in many cases the space laws and policies of the launching country may cover third party damage claims caused by a launch - covered either by the government of the launching country or by the launch provider (or in some cases, by both, depending on the amount of the claim). In these cases there should be no need for an Australian organisation to arrange separate coverage. To assist Australian industry the Australian Government could take a proactive role in identifying which countries providing launch services actually provide such coverage or indemnities that would cover Australia's obligations under the Outer Space Treaty and Liability Conventions. The Australian Government could then publish a list of the launching countries from which Australian satellite launches could take place without the need for an Overseas Launch Certificate - thus reducing the regulatory burden for Australian satellite operators. As a further step the Australian Government could develop bilateral arrangements with countries providing launch services to ensure that any Australian payloads launched from these countries benefit from any Government indemnities and ensuring that duplication of effort is abolished. The primary countries of interest at this time include: USA, France, Russia, Ukraine, Japan, India and China, with emerging countries of New Zealand, Brazil, Norway, Sweden and possibly the UK. Other countries can be assessed as they emerge as viable operators.

Summary

In summary, Australian satellite owners seeking to launch their payloads overseas face a regulatory burden that can be disproportionate to the size and cost of their projects and/or that duplicate approvals and indemnity arrangements that are also required in the country of launch. Changes to the Act and the Regulations can improve this situation:

(a) by leaving the licensing of the overseas launch to the country of launch where the government is satisfied that it will be properly indemnified and all launch safety issues have been adequately addressed; or

(b) by waiving the insurance/financial requirement for the liability periods under the Act in carefully defined situations and only insisting on indemnification where the public good and other considerations set out above are outweighed by the importance of protecting the public purse.

3 Launch Activities from Australia

This submission has been primarily focussed on the issues surrounding the Overseas Launch Certificate because this is the area of the most immediate concern to our members. However, the feasibility of conducting launch services from Australia is considered from time to time and there is an opportunity to create an environment in Australia which is conducive to major investments in launch facilities and services with the corresponding economic benefits. Many lessons have been learned from the projects of the late 1990's and early 2000's and the SIAA's corporate memory of the implementation of the Act and the Regulations during this period survives.

It is important to note that space technology is moving at a rapid pace and new versions of space launch activities are already in development. These include a wide range of variants on the theme of re-usable space vehicles including spacecraft that will take off and land at airports and others which use variants of hybrid vehicles or multiple vehicles to facilitate an air launch. There are also recent advances in novel propulsion technologies which, when fully developed and tested, may increase access to the launch market for a wider range of proponents.

The range of vehicles being developed by international companies planning to establish space tourism services is indicative of this new wave of launch platforms. It is important to note however that many space tourism ventures plan to use their spacecraft to launch satellites as well. The next stage beyond simple space tourism is fast transport of documents and packages between continents, for example document/package delivery from Sydney to London in two hours. This will be followed by passenger travel between continents as well. Satellite launch and fast intercontinental travel for documents, packages and passengers is the ultimate commercial payoff for such ventures.

Australia has many natural advantages for space launch activities including proximity to the equator, ability to launch over ocean to minimise casualty risk, ability to launch to all key orbits and large areas of flat, unpopulated terrain ideal for landing and recovery of reusable launch vehicles. This is why Australia continues to be considered by organisations looking to establish launch services.

The SIAA has consistently maintained that any regulatory framework for Australian space activities must:

- 1) Establish a constructive and supportive environment to attract and foster investment in Australian space activities
- 2) Ensure that any obligations imposed on business entities attempting space activities from Australia are clear, unambiguous, workable and free from arbitrary determinations
- 3) Be no more onerous for Australian participants than is the case in other space-faring nations.¹⁹

The current framework around the licensing of launch services from Australia falls short of these goals. The Space Activities Act Regulations and Flight Safety Code were designed for the traditional spaceport model. Aspects of the licensing and regulations surrounding launch activities from

¹⁹ See for example Comments on Draft Launch Licensing Procedures dated June 1999 at <http://www.spaceindustry.com.au/publications.php>

Australia impose a higher burden than those of other space-faring nations and are more likely to inhibit rather than enhance innovation and entrepreneurial ventures in launch services from Australia. They created practical implementation issues for the various launch proposals of the late 1990's and early 2000's and are not well suited to the faster pace of launch activities from the newer launch platforms.²⁰

The issues with the implementation of the Act and the Regulations, as they apply to Australian launch activities, are numerous and varied. They range from aspects that require significantly higher levels of reliability than in other jurisdictions, to effective limits on the number of launches per year based on the proscribed methodology, to the potential for certain flight paths and possibly launch sites to be rendered unusable if downstream commercial developments are given priority rights after launch operations have been established.²¹ All of these serve as significant disincentives for launch operators considering Australia as a base for their operations.

The full range of issues for potential launch operators contained within the current Space Activities Act and its regulations are too numerous and detailed to properly cover in this submission. The SIAA is available to engage with the Department in outlining and discussing these issues in detail and to provide further submissions on this topic. In particular, should this review lead to a decision to make legislative changes to the Space Activities Act on-shore launch licensing regime, the SIAA would seek a further opportunity to outline these issues to the Department so they can be addressed in any proposed changes to the legislation.

²⁰ SIAA is aware of at least one organisation that in the last few years seriously considered establishing a launch operation from Australia but decided the Australian regulatory requirements were too imposing and decided to locate its launch services elsewhere.

²¹ See <http://www.spaceindustry.com.au/Documents/fsc%20&%20mpl%20submission.pdf> for more detail.

4 Other topics

As stated in consultations concerning the revision of the Act, the Department views this as an opportunity to engage in a broader debate about the direction of Australian space endeavours. The SIAA welcomes such an approach as an opportunity to move Australia's participation in the global sector forward. While some aspects of space activity require legislative regulation, others may be more appropriately dealt with in the development of policies that are responsive to the changing commercial environment. Some areas for future consideration are outlined below.

(a) New tax incentives for space-related research and development and/or capital invested in space-related start-up ventures

The rapidly changing nature of the global space industry has seen the entry of a number of start-up companies and the early signs of an investor culture in Australia. As the level of private sector R&D activity increases the role of tax incentives and other industry development policies become more important. This is a topic that we would be happy to elaborate on in future submissions.

(b) Space Tourism

As overseas space tourism ventures move into an operational phase, there will be increasing interest in opportunities to use Australia as a place of launch and return. The USA has for many years had a regulatory framework to promote and support space tourism ventures in that country.²² Australia could encourage investment in this new activity by being ready, in consultation with industry and other interested parties, to regulate the safety and participant training and informed consent aspects of the activity, along the lines of the US approach.

(c) Off-earth mining

The last five years has seen a growth of interest and investment in off-earth mining ventures. Australians have been active participants in this, from both commercial and research perspectives, and an argument has been made that Australian expertise in remote area terrestrial mining is the basis for capacity building in this area. Recently the US Congress has legislated in relation to the recognition of proprietary interests in space resources.²³ This is another area in which Australian regulation may, at some time in the future, be needed.

²² http://www.ecfr.gov/cgi-bin/text-idx?SID=16cf96df97d9aed4654ba57a4bd5f251&mc=true&tpl=/ecfrbrowse/Title14/14cfr460_main_02.tpl

²³ See the US Code Chapter 513—Space Resource Commercial Exploration and Utilization:

'§ 51303. Asteroid resource and space resource rights

A United States citizen engaged in commercial recovery of an asteroid resource or a space resource under this chapter shall be entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use, and sell the asteroid resource or space resource obtained in accordance with applicable law, including the international obligations of the United States.'

5 General Comments on Innovation in the Space Sector and the Role of Government

Space is a global industry and is increasingly being recognised by many as an industry sector in which disruptive technologies are challenging the status quo and generate significant new commercial activities. The global space economy grew by 9.7%, reaching USD \$330 billion in 2014²⁴. The commercial space sector alone grew at a Compound Annual Growth Rate (CAGR) of 13.7% in the past 15 years, far outpacing the nearly 6% CAGR of government space expenditure, and it now constitutes 76% of the global space economy²⁵. A major area of growth and innovation is in small satellite technology, due to the development of increasingly capable payloads and lower design and manufacturing cost structures. Some jurisdictions have already reviewed or introduced legislation and regulatory frameworks to make their countries more attractive locations for entrepreneurs and innovators in the space domain. The USA leads the way in this regard, regularly updating its space legislation to ensure that it remains at the forefront of innovation and technology in space and that it has a regulatory framework that actively supports space activities and entrepreneurs. The UK is another country that has recently become very active in trying to attract space companies, entrepreneurs and innovators. Other countries around the world, such as Belgium and Austria, have recognised the potential of the small satellite revolution and enacted legislation that is aimed at providing a supportive environment that enables their indigenous companies to be active in this field.

Australia has significant space capabilities. A recent report by Asia Pacific Aerospace Consultants (APAC)²⁶ indicates that Australia has between 9,500 – 11,500 people directly employed in space activities, and which generates between AUD \$3 - 4 billion per annum and has capabilities in every major sector of space activity including satellite construction and operation. There are currently at least a dozen smallsat/cubesat/nanosats planned or under development in Australia. The industrial and research infrastructure for space exists in Australia but Australian space activities currently comprise only about 1% of global space activity. This is somewhat low compared to Australia's financial and intellectual capacity. Australia could do much more in space.

Innovation involves taking risks – a careful evaluation of the market and the management of calculated risks to achieve the reward. Creating a national culture of innovation also requires the government, in some circumstances, to take risks. Nothing will kill innovation faster than heavy-handed regulation. If the Australian Government is serious about developing innovation in the space sector in Australia it must also be prepared to accept some risks. Australia should be benchmarking its legislative and regulatory framework against the leading jurisdictions in the space field to ensure that the local regulatory framework for space activities is comparable to and if possible better than other jurisdictions. Creation of a favourable environment for space innovation is a necessary condition for space innovation to flourish. While a favourable environment is not by itself sufficient to guarantee success its absence, particularly if due to onerous regulation, will almost certainly guarantee failure.

²⁴ The Space Report 2015

²⁵ A Selective Review of Australian Space Capabilities, Asia Pacific Aerospace Consultants 2015

²⁶ Ibid

In summary, the review provides an opportunity to create a regulatory framework conducive to space innovation in Australia that can attract talent from all over the world (and attract Australians working in space overseas back to Australia). Some possible steps to create this improved space innovation environment are outlined in this submission. SIAA urges the Australian Government to take action to create a positive framework and environment for space activities in Australia so that Australian space companies, innovators and entrepreneurs are well placed to catch the emerging wave of space innovation.

6 Conclusion

The SIAA had a significant role in the development of the Space Activities Act. It is important legislation that establishes the framework and environment for space activities in Australia. It enhances Australia's status as a country of standing in the international space community.

We congratulate the Department for initiating this review. We stand ready to provide our expertise and the collective experience of our members to work with the Department in a collaborative manner to shape effective space activity legislation for the good of Australia.