Response ID ANON-54SS-Z5PC-H

Submitted to **Review of the Space Activities Act 1998**
Submitted on **2016-04-29 17:05:28**

General overview

1 Additional background information is provided in the drop down items below.

Privacy and Use of Information Statement

1 Do you agree to the privacy collection statement?

Yes, I agree

Personal information

1 Are you responding as an individual or on behalf of an organisation?

Organisation

2 Your contact details

Enter your name:
Aislinn Batstone

Telephone/mobile number including country and area code:
0293515884

***Email address:**
aislinn.batstone@sydney.edu.au

3 What is the name of your organisation?

Enter your organisation name (indicate NA if not applicable):
The University of Sydney

4 In what state, territory or region are you based?

New South Wales

If internationally based, what country are you based in?. E.g. New Zealand or Holland :
NSW

5 Which of the following sectors best reflects who you are representing? (select all that apply)

University

If 'Other', please indicate your sector:

6 What is the size of your organisation?

Large business (200 or more employees)

7 What is your involvement in the space industry?

provide a summary of your/your organisations involvment in the space industry (max 300 words):
The University wishes to conduct research involving:
• development of platforms and operating systems for small satellites (CubeSats and ‘tubesats’) of less than 5kg mass, which it proposes to launch via commercial launch providers,
• scientific observations of Earth and its atmosphere, ionosphere, and magnetosphere, plus the Sun, using such satellites deployed in low-Earth orbits,
• scientific observations of the space environment from small satellites in low Earth orbit, and
• training of students in capabilities relating to these and related matters. The University has recently lodged a bid to lead the ‘ARC Training Centre for CubeSats and their Applications’.

In addition, the University is a founding member of the entity Delta-V, intended to develop Space Industry 2.0 for Australia.

8 What are you interests in civil space? (select all that apply)

Domestic launch operations, International launch operations, Satellite operations, Satellite design, Satellite testing, Satellite manufacturing, Space sciences, Space education/STEM, Space situational awareness, Position, Navigation and Timing services, Earth observation from space services, Small satellites, Ground systems, Research and development, Other

If 'Other' was selected please specify:
specifySpace engineering, space hardware / instrument design and provision.

9 Have you submitted an application under the Space Activities Act?

Yes

If you have made an application please provide a summary description of the activtiy (max 250 words):
The University submitted applications in 2013 and 2016 for a declaration that the University is a scientific and educational institution under section 8A of the Space Activities Act 1998. The first application related to the launch of a tubesat with Interorbital Systems Corporation of Mojave Spaceport, California. The University has not yet nominated a flight and the increasing passage of time since the University signed the agreement with IOS in 2013 makes this flight unlikely. The second application is for a declaration in respect of the launch of a 2-unit CubeSat with Von Karman Institute for Fluid Dynamics ('QB50 Consortium'). The University will soon lodge an application for an overseas launch certificate in respect of the QB50 launch.

10 Do you intend to prepare or submit an application under the Space Activities Act in the next two years?

Yes

If you have made or plan to make an application please provide a summary description of the activity (max 250 words):
The University is a participant in the 'QB50 Project' (see 9 above, being an FP7 Project funded by the European Union) which will involve the overseas launch of multiple small satellites ('CubeSats') as a coordinated scientific exercise.
The University intends to apply for an overseas launch certificate to transport a CubeSat and its payload on a rocket in 2016 for delivery to the International Space Station, and subsequent release into space.

The University is also leading an application for an 'ARC Training Centre for CubeSats and their Applications', in partnership with UNSW and multiple commercial and government partners, which will involve multiple payloads and satellites for launch, plus an ANU-led ARC proposal (ANU-USydney-UNSW) to build and fly a 3-unit CubeSat. Applications will be necessary for all of these activities.

Terms of Reference 1

1 Please rate your agreement to the following statements:

TOR1_1. Agreement to statements - The government recognises space technologies as being an important contributor to Australia's innovative future:
Agree

TOR1_1. Agreement to statements - The public recognises space technologies as being an important contributor to Australia's innovative future:
Disagree

TOR1_1. Agreement to statements - The Australian space industry recognises space technologies as being an important contributor to Australia's innovative future:
Agree

2 How can space technologies contribute to Australia's innovative future?

Enter your response (max 300 words):
Australian universities are establishing a research capability to design and construct instrumentation, spacecraft systems equipment, and small satellites which can be launched and operated in space. Australian universities also have world-recognized expertise and capabilities in space science, both the science of space and the science which can be done with data obtained from space assets. This research and associated capabilities are important in multiple ways for Australia. Examples include: thrusters for spacecraft propulsion and pointing that are much smaller and efficient than the current state-of-the-art, advanced satellite communication systems; novel imaging instruments for Earth observations (e.g., better characterizing the atmosphere, observing agricultural / environmental / security conditions and natural disasters, exploring for minerals …); using GPS data for remote moisture and sea state observations; observing space weather events and better predicting them to prevent / mitigate future disasters for human technological systems), and more. Current research focus in Australia can be expanded to address a far wider range of space-related issues that require a solution. Many opportunities present themselves:
(a) Development of intellectual property which can be licensed to other manufacturers around the world;
(b) Establishment of Australia as a site for development and provision of tangible and intangible space-related technologies, operating systems in orbit, and associated services, and as a locus for manufacturing and exporting those technologies;
(c) Providing research, training and employment opportunities for successive generations of STEM (engineers, chemists, physicists, mathematicians, scientists and communications technicians) researchers and employees who can build on existing capacity for research and innovation;
(d) Adapting solutions to solve other terrestrial problems – technological solutions can often solve secondary technical problems, while novel Earth observation, GPS, and other space asset-derived data can often be used to solve the problem of immediate interest and then many others.

3 Provide an example of where Australia's existing space-related regulation has impacted upon the pursuit of an innovative idea:

Enter your response (max 300 words):
The University has two examples where space-related regulation impacted on the University's ability to conduct research in space.

An opportunity arose in 2011 to launch a University payload carrying research instrumentation to provide data which would have been useful from a research perspective and beneficial to organisations seeking to manufacture instrumentation for use in space. The University was deterred from pursuing the project by the cost of insurance and/or the requirement to meet the financial obligations associated with liability for the flight.
The second situation relates to our current attempt to apply the legislation to a two stage delivery to the International Space Station. The current suite of Australian legislation has made the University's ability to participate in space research very time-consuming and uncertain, on the basis that:
(1) If the University has to pay for insurance, it will not be able to proceed with the flight and launch. The University as a publicly-funded institution would not be able to underwrite liability for the flight as its funds are allocated to other activities;
(2) Regulatory requirements make it necessary to supply a significant amount of detail for a launch certificate. Those details are sometimes not available to the University at the time of application for an overseas launch certificate – the consortium leader has contracted out the flight operations, and the choice of vehicle and the time of the flight will be selected by the flight provider. This creates significant uncertainty as to whether or not the University will be able to fulfil the requirements of the legislation in making application or be granted a licence;
(3) Each Application for a Declaration under section 8A of the Space Activities Act and each application for a space activity licence requires the University to reiterate large amounts of fundamental information and data on each occasion, much of which has remain unchanged since the last application. While the University understands that it is important for the Commonwealth to have all necessary information in order to verify the standing of the organisation and assess risk, repetition of information is time consuming for the Commonwealth and the University. It would be beneficial if there was a registration system whereby the University could create and update an online profile which contained all the relevant organisational information and the risk profile associated with relevant space activities.

Terms of Reference 2

1 Please rate your agreement to the following statements:

TOR2_1. Agreement to statements: - Space regulation provides investment certainty for my space-related business activities:
Strongly disagree

TOR2_1. Agreement to statements: - Space regulation should be limited to ensuring the responsible use of space by Australians:
Strongly disagree

TOR2_1. Agreement to statements: - Space regulation should include proactive elements that may help facilitate entrepreneurship and private investment:
Agree

2 Provide an example where Australia's space regulation has limited your capacity or inclination to invest in commercial space activities:

Enter your response (max 300 words):
The University has not participated yet in commercial space activities. It is, however, a partner in the entity Delta-V, which seeks to develop Space Industry 2.0 for Australia but has not yet carried out any externally-contracted commercial activities. The University has attempted to seek out commercial providers to provide flight opportunities to carry research payloads and satellites into orbit. Those costs are quite significant. Once added to any obligatory costs of insurance, it is impossible in most circumstances for the University to take advantage of launch opportunities.

3 How could Australia's space regulation proactively facilitate entrepreneurship and private investment?

Enter your response (max 300 words):
One method of fostering entrepreneurship and private investment is for the Commonwealth to rethink imposition of responsibility for liability. The legislation imposes a one-size-fits-all approach, with the possibility of Ministerial discretion, but a more structured approach for responsibility for underwriting liability could be implemented.
This could be done in a number of ways: the legislation could grant an exemption from insurance or financial responsibility for specific activities, particularly those which are regarded as lower risk (noting that nothing is 'no risk' in space or anywhere else, but that risk for example for small spacecraft released at high altitude is very low). Thresholds for insurance and financial responsibility could be provided for specific types of activities or organisations, having regard to the nature of the risk and the size and revenue and operating margins of the launching organization. Specifically, insurance and other associated financial burdens could be waived for start-ups and other small companies, as well as for public-good entities. An alternative to waiving cash payments for startups and small companies would be for government to take a small shareholding, as routinely done by venture capitalists. This will encourage innovation while also preserving an opportunity for substantial future financial and public-good benefits for Australia.
The legislation needs to better address the needs of University and other public-good entities requiring access to space, rather than focusing only on commercial entities. Pure research projects and other public good projects (e.g. ones that give Earth observation data to all but large commercial entities for free, like NASA, ESA, JAXA projects such as the US longrunning Landsat program) need to have adequate access to space without undue financial hardship. The Government should take a different approach to insurance and other regulatory costs for University and other public good space projects, ideally by removing these costs.

Terms of Reference 3

1 Please rate your agreement to the following statements:

TOR3_1. Agreement to statements - The government has a responsibility to protect taxpayers' money against liability generated by private space-related activities:
Neither agree or disagree

TOR3_1. Agreement to statements - It is appropriate for public monies to be used to underwrite private sector risk for space activities:
Agree

2 What contribution can space technologies make to Australia's overall economic prosperity?

Enter your response (max 300 words):
Australia is building a significant cohort of researchers in space technology from all STEM backgrounds who are able to advance Australia's research efforts in this area. This involves collaboration with other research and commercial organisations around the world. Important potential benefits attach:
(1) Increased roles in space research and space technologies will allow Australian research organisations to collect valuable data about the Earth's atmosphere, oceans, land, and sub-surface features and space weather which will allow crucial scientific, environmental, and economic problems to be solved, natural disasters monitored, and provide Earth observation, GPS-related, and other public-good data to Australia's government, industry, and society, as well as humankind more generally;
(2) An educated and trained Australian STEM workforce relevant to space activity will both increase Australia's STEM capability overall, particularly in areas that rely on space systems for data, and deliver flow on effects to other technologies and industries, and to multiple areas of government;
(3) Enhancement of Australia's advanced scientific, technical and manufacturing skills will increase opportunities in Australia to carry out manufacturing and services related to space in Australia, as well as licencing foreign space technology providers ;
(4) The expertise and technical capability will create the opportunity to be involved in joint ventures with larger international players in the space industry, as well as with foreign governments and with foreign public-good organisations.

3 What might be the net benefit to the Australian people of the Government taking a greater share of the financial risk arising from space activities?

Enter your response (max 300 words):
From the University's perspective, the current cost of participating in space research is close to prohibitive. Absorption by the Commonwealth of some of the risk (e.g., by waiving the insurance requirements and reducing the regulatory burdens) would give greater financial certainty to the University and allow it to participate in more research projects. The cost of participating in such projects is reducing overall, quite quickly, except for the cost of meeting regulatory requirements, including the cost of insurance.
Data and capabilities generated by the University will significantly advance not only the University's own activities, but also those of the international scientific and technological communities, national and international space industries, and government units in Australia and elsewhere that use the public good and commercial outcomes. This will be done in various ways, including via access to the new research results, to new instruments, spacecraft systems, and other space hardware, and to data collected by the University from its space missions, as well as via sales when appropriate. The University will be able to resolve technical problems relating to various space activities and, importantly, contribute to increased safety in space and on the ground related to Earth observation and space weather matters.

Terms of Reference 4

1 Please rate your agreement to the following statement:

TOR4_1. Agreement to statements - Recent changes in technology and its impact on how space is accessed necessitates changes to Australian space regulation:
Strongly disagree

2 What emerging space technologies or practices should the Government consider in reviewing the Act?

Enter your response (max 300 words):
Space technologies and practices are developing at a very fast rate, as evidenced by the growing number of new market entrants: witness SpaceX and OrbitalATK. Given the pace of development, the University is of the view that changes to the legislation should not be limited by regard to technologies currently emerging, as the pace of development indicates that new technologies and practices not currently envisaged will soon emerge to take their place. That said, the University is of the view that the following technologies or practices should be taken into account:
• The removal of cost as a barrier to space travel and research. Under current circumstances the regulatory costs prospectively equal or outweigh the costs of development and launch, and act as a deterrent to developing strong and sustainable Australian space industry and public good sectors;
• Public good research into space science, technology, and data should be encouraged and have a reduced regulatory burden, especially by waiving the insurance requirements and streamlining the Declaration phase;
• The emergence of smaller satellites and miniaturised instrumentation;
• The ability to use/adapt standardised commercial off-the-shelf (COTS) components in new ways to create instrumentation;
• The trend for research launches to be collaborative in nature, involving multiple jurisdictions with different local legislative regimes, with different allocations of liability and differing interpretations of obligations under space conventions meaning that members of collaborations have different obligations creating 'uneven playing fields';
• Space objects being released into orbit from space vehicles other than rockets (eg from the International Space Station);
• Emerging capabilities that will make it possible for rockets such as the SpaceX Falcon 9 to return to Earth, perhaps changing the future risk profile of certain payloads, research and otherwise, and reducing launch costs.

3 Considering your answer to Q2, above, what impact might regulating specific emerging technologies have on Australia's space capability?

Enter your response (max 300 words):
The current operation of Australia's legislative regime may mean certain technologies are not developed in Australia at all and are pursued instead in other places which impose fewer barriers to entry. This would be a significant loss of opportunity to develop a real, sustainable, space industry sector in Australia and to train future generations of engineers, physicists, scientists, data analysts, manufacturers, and other users (both in industry and the university and government sectors) who would develop their skills in space research, industry, and related areas of government and society.

4 What alternative mechanisms, other than regulation, could the Government utilise to manage the potential impact of these technologies?

Enter your response (max 300 words):
The Government could consider granting exemptions from particular requirements, such as financial and insurance requirements to particular types of organisations, such as Article 4(4) of the Austrian Outer Space Act. The Government could also consider accreditation of particular types of organisations, or specific appropriate organisations, that wish to pursue a role in space, such that they would not be repeatedly required to review or reiterate de novo, generic capabilities, activities and revisions to their technologies with the Commonwealth for each advance in space activity.
For example, the University, having once received a Ministerial Declaration under section 8A of the Act as a scientific and educational organisation, might reasonably continue to hold such status until any such time as its organisational purpose is materially redefined. The information about the risks associated with specific anticipated space activities could be dealt with in an application for a space activity permit rather than the Declaration. At the moment, the University perceives a significant repetition of information about specific missions in both the application for a Declaration and application for a licence.
Additionally, it would be beneficial if there was a registration system whereby the University could create and update an online profile which contained all the relevant organisational information and the risk profile associated with forthcoming space activities. This could be updated by the registrant/applicant and make it easier for the Commonwealth to access the most up to date information.

Terms of Reference 5

1 Have you been required to deal with any of the following agencies regarding the regulation of a space-related activity? (select all that apply):

Department of Industry, Innovation and Science, Civil Aviation Safety Authority, Australian Communications and Media Authority

If 'Other' was selected please specify:

2 Have you been required to deal with more than one of these agencies with regard to the regulation of a single space-related activity?

Yes

Please provide additional comment (max 150 words):

3 What areas of alignment, if any, do you think exist between Australia's space-related legislation?

Enter your response (max 300 words):
In the University's experience, there is an alignment between the Space Activities Act 1998 and the Radiocommunications Act 1992 as the University is able to transmit from a satellite to a base station operated from its campus. While they have different regulatory requirements, and there is scope for them to be administered together, the specialized nature of radiocommunications make separate administration possibly less effective than the current regime.

4 What risks, if any, are associated with having streamlined processes between Australia's space-related legislation?

Enter your response (max 300 words):
The risk is less in streamlining than in possible loss of resources. Currently it is not clear that civil space matters are adequately resourced in Government. There may be an argument for Australia establishing a suitably resourced civilian Space Agency. Combining those capabilities in one department or agency is likely to increase the level of technical knowledge available to applicants – but only if it is adequately resourced.

Other comments

1 Are there any other issues that you think should be considered in the context of the review?

Enter your response (max 800 words):
The Universities appreciate the opportunity to be protected from the usual application fees by being declared to be scientific and research organisations. However, as noted above, this University is of the view that the Declaration under section 8A should have greater longevity, optimally until any such time as its organisational purpose is materially redefined, or at the least, to cover a range of activities that take place over a prescribed period, e.g. a five year period, rather than applying for a declaration in respect of each individual activity. If the latter approach were to be adopted, it would be reasonable for 're-accrediting' agencies to have access to a streamlined reaccreditation process.

It is the University's view that the current Act and Review over-emphasise commercial space matters and do not adequately address the needs of public-good space research and entities (e.g., Universities and government units). Public-good research is a major component of the space programs and legislation of most other nations. For instance, NASA, ESA, and JAXA focus on both public-good research and commercial research, with the public-good research having comparable budgets and much larger public visibility than commercial research. Arguably Australia's government and legislation should have a similar view; at least the legislation should be more evenhanded between commercial and public-good research matters but also recognize that public good research should have the insurance and regulatory burdens reduced compared with commercial space activities.