University of Sydney submission in response to the Department of Innovation, Industry and Science's Legislative Proposal Paper: *Reform of the Space Activities Act 1998 and associated framework*, released 24 March 2017

Summary of the University of Sydney involvement with the Space Activities Act

The University of Sydney conducts extensive public-good research and education activities related to space that have brought it into contact with the Space Activities Act 1998 (Cth) and its administration.

For example, we conduct or wish to conduct research involving:

- the development of platforms, instruments, payloads, propulsion devices, and operating systems for small satellites ('cubesats' and 'tubesats') of less than 5kg mass, which we propose 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. For instance, in 2015 and 2016 we lodged separate bids to lead the 'ARC Training Centre for CubeSats, UAVs, and their Applications' under the ARC's Industrial Transformation Training Centres.

At the time these comments were prepared, the University's cubesat was packed in a deployer on board a United Launch Alliance Atlas V 401 rocket, ready for launch Orbital ATK's Cygnus™ spacecraft on the initial leg of its cargo resupply mission to the International Space Station (ISS). The rocket launched on Tuesday, April 18, from Space Launch Complex-41 at Cape Canaveral Air Force Station (1.00am Wednesday 19 April AEST). Our cubestat is now scheduled to be deployed from the ISS on 15 May 2017.

The University submitted an application under the Space Activities Act in 2013, and then in July 2016 applied for a declaration that it 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. This flight now looks unlikely to eventuate due to the increasing passage of time since we signed the agreement with IOS in 2013, and as we have not yet nominated a flight.

Our second application is for a declaration in respect of the launch of a 2-unit CubeSat with the Von Karman Institute for Fluid Dynamics ('QB50 Consortium'). The Minister issued us with an overseas launch certificate on 27 July 2016 in respect of the QB50 launch in the United States. The launch options specified in the application for the launch certificate were not available. For a range of reasons the launch options submitted in our application and listed in the overseas launch certificate did not eventuate. In January 2017 we applied to Civil Space to revoke the overseas launch certificate issued on 27 July

2016 and issue a new overseas launch certificate incorporating a list of new potential launch vehicle options. The revocation and issue of the new overseas launch certificate was undertaken in March 2017.

It is likely that we will prepare or submit further applications under the Space Activities Act in the coming years as we build on the research outcomes that the QB50 collaboration makes possible.

Feedback on proposals relating to structure, purpose and objects

We agree with the finding under clause 4.2 that the complex structure of the legislation creates inflexibility. This is illustrated by the fact that for the most part, the current legislation treats commercial and research activities in space in the same way, regardless of their risk profile.

Proposal		**Response**
4.2.1	That new (rather than amendments to existing) legislation be developed which provide a higher level of flexibility and responsiveness in meeting stakeholder needs and at the same time achieve desirable Government outcomes.	The University of Sydney strongly supports the proposal that new legislation is prepared to replace the Space Activities Act. Merely amending the current legislation, which was written 20 years ago and has an overarching focus on safety and compliance, would not deal adequately with research activities and would not sufficiently balance flexibility for stakeholder needs with the Government's desired policy outcomes. While in our view a tiered approach of an Act, subordinate instruments and supporting guidance material would work, it will be important that the Government provide written materials explaining how the various instruments work together. Implementing an appropriate education campaign focussed on the sector would also be very beneficial.
4.2.2	Subordinate instruments may deal with more operational issues such as, for example, the application process/requirements.	We agree this would be appropriate.
4.3.1	That the purpose of the legislation remains the same.	We support the proposal that the purpose of the legislation remain the same, provided it contains the necessary support for research activities without onerous administrative or insurance costs.
4.4.1	That the objects of the legislation be streamlined, to emphasise appropriately balancing risk and Australian benefit, including a focus on Australia's international obligations and the establishment of a system of regulation for those activities.	We support more appropriate balancing of the risk involved in space launch and benefit to Australia. Research always involves risk, but the benefits of space research will only be delivered if certain calculated risks are taken after appropriate consideration. Similarly, activities related to commercialisation carry risks, which must be balanced against national benefit. The legislation does require greater focus on Australia's international obligations [this could be clearer] and the establishment of a system of regulation for space activities [which could also be more transparent].

4.5.1	For the title of the new Act to be a variant on the Space Activities Act reflecting its purpose to regulate the launch and return of space objects. For example: Space Activities (Launches and Returns) Act.	We support a change in the title of the legislation to reflect its purpose more accurately. Our experience has been that the Act's current title has sometimes caused non-lawyers to misunderstand its purpose and scope.

Feedback on proposals relating to authorisations including payload licence, launch facility, Australian launch permit, requirements associated with launch from Australia, high altitude activities, accepted launch facilities and safety officers.

Proposal		**Response**
4.7.1	That introduction of a licence type to authorise payloads be considered.	We support the proposed introduction of a licence type to authorise payloads/space objects, which we assume will be defined in the forthcoming exposure draft to include instruments on satellites, satellite systems/hardware/software, and whole satellites themselves. This would correctly reflect the risk profile of Australian universities' research activities. Public universities and similar collaborators will use commercial or other vehicles to launch these objects into space or carry them to a launch station in space. It is therefore correct to focus the liability on the payload itself, rather than on the launch, over which universities and other stakeholders have no control. In this context, we also welcome the flexibility to licence the launch of payloads from Australia, from international or territorial waters, and from foreign jurisdictions.
4.7.2	That requirements currently outlined in the Space Activities Regulations 2001, which are more relevant to launch rather than establishment of a launch facility, be transferred to the proposed new 'Australian launch permit'.	This proposal would be most welcome. We agree that it is not appropriate to focus the legislation on requirements for an Australian launch facility. We fully support the phased approach to assessing applications for licences. Our recent experience has indicated that there is insufficient flexibility in the legislation. Adoption of a phased approach should provide greater flexibility, particularly taking into account that applicants for facilities and launch are different. Overall, a phased approach would have assisted us when our first Overseas Launch Certificate had to be revoked and replaced, as the anticipated commercial vehicles were not available. Regulatory requirements make it necessary to supply a significant amount of detail to support an application for a launch certificate. Our experience has been that those details are sometimes not available at the time of application for an overseas launch certificate. For example, if 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 applicant will be able to fulfil the requirements of the legislation at the point of lodging an application or once granted a licence.
4.7.3	That the launch facility licence provisions include sea launch platforms based in Australian territory; while an Australian launch permit (or variant of it) include a launch from Australian vehicles in flight or (potentially) from Australian airspace.	We support those additional options for launch, as we were going to participate in a sea launch and are participating in a launch from an orbiting station. However, we suggest that these proposed changes do not go far enough. Other options either need to be included, or a more generic description needs to be included, which allows for other technologies to be used to effect launch. In the last 18 months alone, there has been a significant advance in options by which payload can be launched, and we only see the options being widened further in the future.
4.7.4	That DIIS consider cases of potential return of Australian launched payloads (without a launch vehicle) to Australia.	The inclusion of a provision dealing with the potential for the return of Australian payload is supported. Returning rockets are now a reality, launch vehicles typically return to Earth (e.g., burning up on re-entry) at different times from the satellites released, and it would appear that returning payloads are is something that Australian universities and other organisations will consider. While we currently have no plans for research in this area, we are sure that it will be an area that will be explored by Australian universities and other research organisations in the future.
4.7.5	That the Flight Safety Code be retained, and refreshed in the future.	We recommend that a timeline is set for the refresh of the FSC, and for stakeholders to be given an opportunity to provide comments prior to such a refresh.
4.7.6	To retain a framework whereby designated and protected assets can be identified on an as needed basis. Suggestions in relation to identification of assets are requested.	We support the flexibility to identify assets on an as needed basis.
4.7.7	That consideration be given to the drafting of a new subordinate instrument, for 'high altitude' activities as described/specified in the subordinate instrument.	We support this proposal as it would provide clarity for high altitude activities. Lack of clarity can put significant obstacles in the way of good research. Note that high-altitude balloons, hybrid balloon – rocket systems, and UAVs should be considered as well as rockets.
4.7.8	For a list of 'standard' launch facilities to be prepared and made available (in either a subordinate instrument or elsewhere), to streamline the application process.	This proposal is welcomed and fully supported. It will substantially reduce the cost and effort of research and preparation of the application.
4.7.9	That the functions of the Launch Safety Officer and accident safety	This proposal is supported.

	investigator remain.	

Feedback on proposals relating to International obligations including debris mitigation, nuclear power sources, contamination, registration as well as liability and associated insurance requirements.

Proposal		Response
4.8.1	That consideration be given to the new Act including a high level statement committing applicants to consider the space environment. Detail on how this might be achieved may be provided in a subordinate instrument and/or guidance material. The ability for the Minister to provide exemption from this requirement is also proposed.	We support the inclusion of a high-level statement of commitment to consider the space environment, with details in a subordinate instrument with assistance provided in guidance material. Space debris is a significant emerging issue and it can interfere with research and commercial activities. The ability of the Minister to exempt organisations, such as research organisations, from the more onerous or costly requirements - particularly when those research activities have a low risk profile – is essential from our perspective.
4.8.2	That consideration be given to applicants being required to indicate the presence of both fissionable material and nuclear power sources.	We would be interested in further details on this proposal. In principle, restricting legitimate scientific research into the use of nuclear power sources could potentially result in a significant reduction in national benefit. The critical safeguard is that the research is conducted consistently with the United Nations Principles Relevant to the Use of Nuclear Power Sources in Outer Space.
4.8.3	Consideration be given to applicants having regard to the COSPAR Planetary Protection Policy, as appropriate.	At this stage we are not responsible for space vehicle launches, so are not directly affected by COSPAR. Nevertheless, we support the principles proposed for implementation under the new legislation – to promote planetary protection and limit the potential risk of contamination occurring.
4.8.4	That access arrangements to the domestic register be updated and streamlined.	The proposed easier access to information is supported. Improved access would also assist research activities.
4.8.5	To allow greater flexibility in relation to updating as need arises, that consideration be given to insurance and fees being located in a subordinate instrument.	While it has been a frequent comment that Australia's legislative requirements for insurance and financial cover are far more onerous than levels required by other nations, the Commonwealth's acknowledgement of this reality is helpful. These differences have been a disincentive to innovation and investment in Australia, and have unfortunately served as an obstacle to Australia's competitive participation in space research and other space activities. We recommend that the Commonwealth review all possible alternatives, including those operating internationally, and engage with stakeholders, before formulating a final proposal. In addition to considering scaled indemnity levels based on a risk assessment,

		we request that consideration is given to exempting public-good not-for-profit research organisations in respect of indemnity and financial requirements where the risk profile does not exceed a certain level. The Minister has recently granted exemptions to the three Australian QB50 participants, after assessing both the benefit to Australia and the risk of damage to person or property arising from the launch and deployment of the Australian payloads / satellites. As the Commonwealth is willing to exercise this discretion where risk is low and there is national benefit, it makes sense to include an exemption based on those two factors in the revised legislation This category could be usefully extended to start-ups and small commercial entities. Overseas governments extend assistance in this manner to their start-ups and small commercial entities. Furthermore, we do not see MPL as useful a tool in all circumstances. It is difficult to apply as different experts can approach the calculation differently.
4.8.6	That DIIS consider cases, including the likelihood of cases, where Australia may be responsible under the Outer Space Treaty, but not liable under the Liability Convention.	We fully support this proposal as it is an area of liability that has been overlooked. In most instances we will not launch from Australia so it is important to understand the risk of liability.

Feedback on proposals relating to fees and cost recovery, exemption, application process and guidance material.

Proposal		**Response**
4.9.1	That an appropriate charging model be developed.	Any charging model should incorporate minimal or nominal costs for public-good space research and the entities that conduct such research (e.g., public universities and government research organisations). Australia's government and legislation should recognise the need to substantially reduce the financial burdens that might be placed on public research organisations and activities, in comparison with commercial entities and activities. If Australia's universities sector had to participate in a true cost recovery program, this would be a major barrier to the conduct of research. It could result in universities, including the University of Sydney, having to withdraw from relevant fields of research, or conduct research through overseas research institutions subject to a less stringent regulatory regime. The disadvantage of this second option is that the overseas research institution will, in return for bearing the costs, take most of the benefits - particularly the research data. Minimising costs for public-good space research and associated entities could be

		usefully extended to start-ups and small commercial entities, as occurs already in some countries.
4.10.1	That exemption in entirety from each of the authorisations and in in addition, in relation to element/s associated with each authorisation, based on considerations including emergency, safety and liability be considered.	We fully support the Minister being able to provide an exemption from each of the authorisations, including overseas launch certificates and return to Australia of Australian space objects launched from overseas, and in relation to elements associated with each authorisation. We would like to see the legislation detail the various factors relating to emergency, safety, liability, and the indemnity and financial requirements which would be considered by the Minister. This will ensure there is greater clarity over the circumstances that would normally qualify for an exemption. We would also like to see a general exemption for research activities, once particular safety criteria are satisfied Universities would be interested in seeing such an exemption extended to university start-ups in the space sector involved in further development of the technology.
4.10.2	That the Australian Government be invited to be guided by the new legislation, as it considers appropriate. That the Government be invited to provide information consistent with that of a non- Government entity (as appropriate), when authorisation is in relation to a public/private partnership.	We agree with this proposal as a bare minimum to address the issue of government and civil activities. Currently there is a lack of clarity around the regulatory requirements that must be satisfied in respect of such activities. Our view is that the Australian Government should be obliged, as far as possible, to provide information consistent with a non-Government entity when authorisation is in relation to a public/private partnership, except when exempted by the Minister.
4.11.1	That the ability for the Minister to delegate his powers, be provided for in the new legislation.	We strongly support this proposal, based on our recent experience with the Department and its administration of the application process. Senior departmental officials have repeatedly demonstrated their ability to fully appreciate the nature of and risks associated with space research activities conducted by universities.
4.11.2	That provision be made in relation to payload and launch facility authorisations for establishing a phased application process.	We support a staged process. The possibility that the indemnity and financial requirements might be exempted for public-good and startup/small-commercial entities in certain situations should be reflected in the suggested 'early indicator criteria' for payload licence applications.
4.11.3	That DIIS continue its current practice of utilising information already provided by an applicant with their permission; while requesting additional information as	The University would support that proposal – legislating the current practices would be helpful in providing clarity.

	needed.	

20 April 2017