



## Submission to Space (Launches and Returns) Act 2018: consultation on draft rules

**Addressed to:**

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### Confidentiality

This submission does not need to be kept confidential and may be made public.

Thank you for the opportunity to provide feedback on the draft rules for the Space (Launches and Returns) Act 2018. We do so in our capacity as representatives of the Science Party where our aim is to improve quality of life and drive society towards the pursuit of knowledge for the benefit of all of humanity.

## Summary

The use of rules made by the Minister under legislative instrument, over the previously entrenched regulations, is a welcome, democratising step for participating in the Australian space sector. They are useful in furthering the objects of the amended Act, and present an opportunity to reduce complexity, remove unnecessary barriers to participation, and balance the need for sound, safe requirements with a pragmatic approach. Successful balancing will enable the Australian regime to rapidly adapt to changing circumstances, and position Australia well for the next phase of its development.

## Recommendations

- Define high powered rockets (*Space (Launches and Returns) (High Power Rocket) Rules 2019*, Part 2, section 5) by reference to the presence of a combination of factors, including the force of impulse, an active control system, and the intended aim of the activity.
- Condense the draft rules as far as practicable to avoid unnecessary duplication.

Direct responses to the questions raised in the Space (Launches and Returns) Act 2018: consultation on draft rules

### **(1) Does the definition [of High Powered Rocket] appropriately capture rockets that you consider should be assessed under the high power rocket definition?**

No. High Powered Rockets should be defined by reference to the presence of a combination of factors, including the force of impulse, an active control system, and the intended aim of the activity (including with respect to payload delivery and return).

The first of these factors, being the force of impulse, should be without the reference to *motors* currently proposed in the draft rules. Impulse may be achieved by alternate means, including chemical, electrothermal, ion, plasma, thermal fission, continuous fusion and pulsed fusion, and these should not be inadvertently precluded under the proposed definition.

The second factor, being the availability of an active control system, should be maintained under the proposed definition. The fitting of an active control system is indicative of an object likely to

have the properties of space-reaching rockets, given the crucial need for stabilisation at high altitudes and in space.

The third factor, being the intended aim of the activity, is consistent with historical Australian practice and international norms, as illustrated below. These factors are intended to be considered in aggregate and the presence or absence of one factor should not necessarily be dispositive.

#### Australian practice

- The now-repealed Space Activities Act 1998 defined a Launch Vehicle as *a vehicle that can carry a payload into or back from an area beyond the distance of 100 km above mean sea level*.<sup>1</sup> The use of 100 km above mean sea level is colloquially known as the Von Karman line<sup>2</sup> and is used as the threshold delineator between aerospace and outer space in a number of jurisdictions.<sup>3</sup> The defining characteristic of the object is its ability to carry a payload into or back from this threshold. This is, in some respects, a simpler approach than the version in the draft rules.
- The Australian-Canadian Working Papers focus on the nature of the activity, and not just the characteristics of the object in question.<sup>4</sup>
- The Space (Launches and Returns) Act 2019 defines a *space object* by reference to it going *into or coming back from an area beyond the distance of 100 km above mean sea level*.<sup>5</sup>

#### International norms

The Convention on International Liability for Damage Caused by Space Objects refers to *space objects launched into earth orbit and beyond*.<sup>6</sup> The concept of *space object* in this convention includes the launch vehicle itself as well as its components, and acknowledges the intended activity given both contemplated failed or unsuccessful launches.<sup>7</sup>

The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (“Outer Space Treaty”) refers to *objects launched into outer space*.<sup>8</sup>

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<sup>1</sup> *Space Activities Act 1998* (Cth)(repealed), section 8.

<sup>2</sup> Karman, T and Edson, L, *The Wind and Beyond* (1967), pp 343.

<sup>3</sup> McDowell, J, *The edge of space: Revisiting the Karman Line*, Acta Astronautica (Elsevier 2018), pp 669. Also see the definitions of *launch* and of *space object* in section 8 of the *Space (Launches and Returns) Act 2018* (Cth).

<sup>4</sup> [www.unoosa.org/pdf/limited/c2/AC105\\_C2\\_L042E.pdf](http://www.unoosa.org/pdf/limited/c2/AC105_C2_L042E.pdf).

<sup>5</sup> *Space (Launches and Returns) Act 2018* (Cth), subsection 8(1).

<sup>6</sup> *Convention on International Liability for Damage Caused by Space Objects*, United Nations General Assembly, entered into force 15 September 1976, Article II.

<sup>7</sup> *Convention on International Liability for Damage Caused by Space Objects*, United Nations General Assembly, entered into force 15 September 1976, Article I.

<sup>8</sup> *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, United Nations General Assembly, entered into force 10 October 1967, Article VIII.

The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space refers to *objects launched into outer space*.<sup>9</sup>

The use of the traditional space object definition under the Outer Space Treaty remains in use across a number of countries, including:

- Austria, under Austrian Federal Law on Authorisation of Space Activities and Establishment;<sup>10</sup>
- Belgium, under Loi du 17 septembre 2005 relative aux activités de lancement, d'opération de vol ou de guidage d'objets spatiaux;<sup>11</sup>
- The Netherlands, under the Rules Concerning Space Activities and the Establishment of a Registry Space Objects;<sup>12</sup>
- Kazakhstan, under the Law of the Republic of Kazakhstan on Space Activities;<sup>13</sup>
- South Korea, under its Space Development Promotion Act;<sup>14</sup> and
- India, under its proposed Space Activities Bill 2017.<sup>15</sup>

Similar approaches are taken by:

- the United States, which defines a space vehicle as *an object intended for launch, [or] launched...in outer space*;<sup>16</sup>
- Russia, which instead refers to space activity being *any activity immediately connected with operations to explore and use outer space* and including *piloted space missions*;<sup>17</sup> and
- France, which employs the concept of a space operation: *every activity consisting of launching or attempting to launch an object in outer space or controlling a space object during its stay in outer space...and, if necessary, that of controlling a space object upon its return to Earth*.<sup>18</sup>

There is utility in including an activity or intention-referencing criteria. There may be certain categories of objects which, while not achieving impulse by chemical means, should still be within the scope of the rules. The suggested change to the draft rules definition would ensure that, as technology and engineering scale with more sophisticated applications, the definition remains current.

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<sup>9</sup> *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space*, United Nations General Assembly, entered into force 3 December 1968, Article V.

<sup>10</sup> *Austrian Federal Law on the Authorisation of Space Activities and the Establishment of a National Space Registry 2011* (Austria), section 2.

<sup>11</sup> *Loi du 17 septembre 2005 relative aux activités de lancement, d'opération de vol ou de guidage d'objets spatiaux* (Belgium), Article III.

<sup>12</sup> *Rules Concerning Space Activities and the Establishment of a Registry of Space Objects 2006* (Netherlands), Section 12.

<sup>13</sup> *Law of the Republic of Kazakhstan on Space Activities 2012* (Kazakhstan), No. 528-IV.

<sup>14</sup> *Space Development Promotion Act 2005* (Republic of Korea) Article II.

<sup>15</sup> *Space Activities Bill 2017* (India), Chapter 1, Section 1(g).

<sup>16</sup> *Title 51, United States Code, National and Commercial Space Programs 2010* (United States), subsection 20138(a)(i).

<sup>17</sup> *Law of the Russian Federation "About Space Activity"* 1993, Decree No. 5663-1 (Russia), Article 2.1.

<sup>18</sup> *LOI n° 2008-518 du 3 juin 2008 relative aux opérations spatiales 2008* (France), Article 1.3.

**(2) Is the nominated level of complexity appropriate?**

Yes, subject to the above and subject to the following commentary. Without over-prescribing the draft rules definition, it should be dynamic enough to account for technological developments and industry advances, capturing objects propelled by alternate means of impulse, while taking into account the nature of the activity. The suggested change to the draft rules definition considers this, is not complex in its articulation, and would be better placed to capture the types of objects intended to be subject to the rules.

**(3) Is the nominated impulse level appropriate?**

Yes, an impulse greater than 889.600 Newton seconds is indicative of an object likely to reach escape velocity and/or engage in activities relating to space. As model or amateur rocketry increases in sophistication and technological development, it is possible that these may meet or exceed the impulse threshold. If this ever does occur, the suggested change to the draft rules definition would apply as the intent factor would be relevant. Where the intent factor is not met, but the other factors are present, the suggested change to the draft rules definition accounts for this and it may be the case that a civil aviation regime would more appropriately be applied.

**(4) Does this definition capture rockets that you consider do not need to be assessed under the High Power Rocket rules?**

No. Current model/amateur rocketry will not meet the definition as these are not capable of meeting or exceeding the impulse threshold in the draft rules definition and lack the intent factor in the suggested change to the draft rules definition. As above, the advent of technological capability permitted model or amateur rocketry to exceed current limitations would then see such rockets, where the intent factor is met, brought within the meaning of the suggested change to the draft rules definition.

**Additional feedback**

Yes. Redline edits to each of the draft rules reflect the following themes (in no particular order):

- information about the usual place of residence of the relevant individuals employed by an applicant organisation over the previous 10 years is not relevant, unless that usual place of residence is in a country other than Australia and the fact of such residence poses a credible national security risk
- the employment history and start date of the relevant individuals should be included in the qualifications and experience requirements and so does not need to be duplicated
- weapons should not be launched into outer space, nuclear or otherwise
- the United States Strategic Command Combined Space Operations Center is not an Australian government department or agency and should not be included in the list of relevant persons required to be notified

- notifications and information to be given to the Minister should, where not already specified as required within a nominated timeframe, be given as soon as is reasonably practicable
- an environmental plan approved under an alternate Australian regime, which is being used in lieu of an environmental approval plan under the General Rules, should still meet the specific requirements of the Act, given the relatively unique nature of space activities
- a transfer where the transferee assumes a holder's existing plan, should be required to provide the Minister the same information relating to its personnel as the original holder
- safety plans that address each potentially affected significant area of the population will necessarily encompass significant property assets, or alternately further guidance on identifying significant property assets should be provided
- reusable rockets and reusable launch vehicles should be provided for
- the concept of assets being available to meet financial or insurance liabilities should be further clarified as assets that are freely usable for this purpose or which can be readily liquidated for this purpose

Final comment on the form of all three sets of draft rules:

- there remains duplication in each class of permit, variation and transfer application which could be further condensed.