11 October 2018

Committee Secretary
State Development, Natural Resources and Agricultural Industry Development Committee
Parliament House
George Street
Brisbane Qld 4000

Dear Madam/Sir

Inquiry into job creation opportunities in Queensland arising from the establishment of an Australian space industry

This is a submission to the inquiry by the State Development, Natural Resources and Agricultural Industry Development Committee to examine the opportunities to create jobs across Queensland, in particular regional Queensland, and promote existing supply chain capability from the establishment of an Australian space industry.

Summary

Queensland's goals in relation to the space industry should be:

1. To encourage the Australian Space Agency to establish as many of its operations as possible in Queensland, and in particular to encourage the establishment of launch facilities in Queensland;
2. To encourage businesses which seek to contribute to the space industry to establish as many of their operations as possible in Queensland; and
3. To facilitate the coordination of activities relating to the space industry, in particular coordination of activities between the Australian Space Industry, businesses supporting the space industry, and academic and research institutions, in Queensland.

The principal recommendations for achieving these goals are:

1. Establish regulatory approval systems, whether by amending or extending existing approval processes or establishing space industry specific approvals, to enable timely and efficient access to land to carry out activities relating to the space industry;
2. Establish policy settings (including providing of financial and tax incentives) to encourage the Australian Space Agency and businesses seeking to contribute to the space industry (whether directly or by provision of support services) to establish their operations in Queensland;
3. Encourage universities and research institutions to develop research programs relevant to the space industry and for the results of that research to be commercialised within Queensland;
4. Encourage universities and job training institutions to develop courses and degrees which will train a workforce that can work in the space industry;

5. Establish an office of the Space Industry Commissioner to encourage the development of a space industry in Queensland and to liaise between government agencies and space industry participants;
6. Building on Queensland's existing expertise in mining and the mining services sector to supply the raw materials needed for a space industry and, potentially, to support the emerging asteroid mining industry; and
7. Building on Queensland's existing expertise in energy production so as to create the chemical fuels needed for launch vehicles.

General Comments

The creation of the Australian Space Agency (**ASA**) represents an opportunity for Australia and Queensland.

The space industry has become a legitimate and feasible industry albeit one that is, in several respects, still in its early stages of development. The greatest opportunities in a new industry exist for the early adopters. In order to take advantage of such an industry, it is necessary for potential participants and the public to see it as a genuine option and it is necessary to change old habits and thinking to seize a new opportunity.

Whereas space exploration was once the sole province of national governments, the future of the space industry is likely to be shaped and built by the private sector. Governments will continue to play a significant role in a space industry, with the primary role of government changing from being the sole service provider to becoming that of an industry facilitator and (where necessary) regulator.

Queensland should embrace the opportunities afforded by a space industry generally and the ASA in particular because of the economic opportunities it would provide to Queensland, because of Queensland's favourable physical characteristics, because of the potential for scientific advancement which will have flow on effects to terrestrial endeavours and because a space industry carries with it a spirit of adventure.

A space industry will require, inter alia, land on which to carry out activities (including land for launch facilities, communication facilities and other infrastructure), research initiatives, natural resources and raw materials, manufacturing capabilities and transportation networks, all of which will need to be supported by a range of secondary service and related industries. These will, in turn, need to be nurtured and encouraged (at least in the early stages of its life cycle) through government initiatives and appropriate legislative regimes.

This submission addresses the criteria for the inquiry as follows:

a. The Australian Government's establishment of an Australian Space Agency on 1 July 2018

Issues considered here include:

- Land to be used by the Australian Space Agency or for the development of the space industry in Australia;

- Interrelationship between the Australian Space Agency and the Queensland Government and Departments;
- Interrelationship between the Australian Space Agency and Queensland businesses including educational institutions.

As an agency within the Commonwealth Government, the ASA will need to acquire the rights to use land for its operations. Those operations could potentially include launch facilities, office premises, research facilities, communication and tracking facilities and manufacturing facilities (whether those operations are carried out by the ASA directly or through its contractors, suppliers or agents). Some or all of these facilities will need to be linked through an appropriate transportation network which may include ports for the import or export of space industry materials and equipment.

It would benefit Queensland to secure as many of these facilities in Queensland as possible. Mechanisms or processes to encourage the location of these facilities in Queensland, whether developed outright by the ASA or by private industry for the purposes of the space industry, could include:

- If the land is not to be owned or compulsorily acquired by the Commonwealth of Australia, ensuring that there are attractive rental or property usage regimes, e.g. through the creation of special regions or areas for the space industry;
- Ensuring the existence of approval regimes which operate in a timely fashion to facilitate development needed for the space industry, potentially with space industry specific related approvals which may replace current approval regimes;
- Creation of State Development Areas or similar areas (close to transportation corridors) with regimes which facilitate space industry activities or which encourage development of space industry activities within those areas, i.e. encourage the establishment of hubs for cooperation between participants in the space industry; and
- Integrated and functional transportation systems to link development areas to launch facilities to manufacturing centres to port facilities.

It should also be noted that Queensland is endowed with many physical characteristics which are highly complementary to a space industry. These include:

- in the case of launch facilities, locations close to the equator to reduce the fuel necessary for launches; and
- also in the case of launch facilities, locations with better weather conditions than in other States and Territories which would improve the number of days available for launch windows;
- abundant resources for the generation of electricity for powering space industry facilities and infrastructure;
- energy related fuel resources which can supply the necessary chemical fuels for any launch vehicles; and

- suitable locations for ports for importing and exporting space industry materials and equipment.

The Queensland Government should:

- Review existing approval regimes relating to land use to identify additions or changes that may be necessary to facilitate the development of a space industry;
- Identify locations for space industry hubs, including launch facilities, communication and tracking facilities and research centres, having regard to the location of significant existing concentrations of space industry related participants;
- Encourage the development of space industry infrastructure in Queensland (in particular by reference to the favourable physical features of Queensland and Queensland's proximity to foreign markets); and
- Develop incentive schemes, whether financial, tax related or otherwise, for the creation of a space industry.

A dedicated agency or office should be established within the Queensland Government to facilitate communication and the relationship with the ASA and the relevant Commonwealth Government bodies.

Similarly a dedicated agency or office, similar to the successful Resources Commissioner, should be established within the Queensland Government to facilitate communication with private entities operating in or seeking to become a part of the Australian Space Industry as well as with academic institutions.

b. The space supply chain, which has been broadly categorised as, Space systems (including communication satellites), Ground systems, Applications and ancillary services, and End use (e.g. improved telecommunications, mapping and emergency management)

The space supply chain can be viewed in the terms above, i.e. space systems, ground systems, applications and ancillary services, and end use. Another way to look at the space supply chain is to consider it as a space technology supply chain being a progression from the science, to the application, to engineering, to manufacturing, to production and end use. The space technology supply chain carries with it the potential for a space industry and for applications in other non-space, terrestrial activities.

Queensland should look at, and seek to encourage the development of both the space supply chain and the space technology supply chain.

Queensland could develop the space technology supply chain by:

- Encouraging research into space technology in Queensland universities and higher education institutions (attracting scientific experts in the relevant fields and developing a critical mass of expertise based in Queensland), e.g. the scramjet project being developed at the University of Queensland and the cubesats that are currently being developed and built elsewhere;

- Encouraging scientific advancements in the space technology supply chain to be exploited in Queensland by establishing linkages between research institutions and local manufacturing or development organisations, including through financial, tax or other incentives; and
- Encouraging the existing energy industry in Queensland to develop the capacity to produce chemical fuels needed for launch vehicles.

It is likely the case that many Queensland enterprises aren't yet aware of the opportunities that exist for them in the space industry because many might consider that the space industry requires specialist expertise. However, it is the case that many of the everyday tasks of enterprises would also be beneficial to the space industry.

A task of the Queensland Government, and of any Space Industry Commissioner, should be to encourage existing Queensland businesses to investigate how they could contribute to a space industry. Manufacturers, precision engineering enterprises, transportation companies, fuel and chemical suppliers, resources companies, construction firms, telecommunication specialists and more could all play significant roles in any space industry but may need to be appraised of the new frontier on which their existing skills and expertise could be employed. Similarly service providers to all of these industries would be needed to support a move by these industries into a space industry.

Queensland has taken steps to facilitate and encourage the development of the mining industry and the mining services industry to leverage the existing State based expertise in this area. Similar lessons could be applied to the development of a space industry to leverage off any current success in the space sector and the related sectors.

A move to develop a space industry may therefore involve training of existing workers and education of new workers to ensure that they have the skills to contribute to these new fields.

d. Queensland's areas of competitive advantage in relation to identified capability which, at a high level, have been identified as communications, earth observations, position, navigation and timing

In addition to the existing areas of competitive advantage of Queensland already identified by the committee, being communications, earth observations, position, navigation and timing, there two other areas in which Queensland has competitive advantage which may support a space industry, namely Queensland's mining expertise and Queensland's energy production capabilities.

There is a good chance that at least part of the commercial exploitation of the space industry will be driven by a need for mineral resources. Indeed, enterprises are already in existence which seek to mine asteroids. Queensland could seek to leverage its expertise and existing competitive advantages in the mining sector and mining services sector to help to develop this aspect of the space industry. As an aspect of the space industry which is likely to be more economic in a shorter timeframe, investment in this aspect of the industry could be beneficial in terms of economic returns as well as creating flow on benefits to other aspects of the space industry.

Queensland's energy production capabilities could serve an Australian space industry in at least two ways. The first is that a space industry will require a large amount of energy for terrestrial operations, e.g. powering research facilities, launch facilities, manufacturing facilities, communications and

tracking facilities, and infrastructure. Queensland's abundant energy reserves and the broad range of energy generation options, can ensure that a reliable supply of energy is available to participants in the space industry.

The second advantage in Queensland's energy production capabilities is in relation to non-terrestrial energy supply. Launch vehicles currently, by necessity, rely upon the high energy content of chemical fuels. Queensland could seek to leverage off its existing energy expertise and its abundant mineral resources, to produce the fuels (or components of fuels) necessary for launch vehicles.

In relation to Queensland's geography, location is another aspect of competitive for Queensland. Launch facilities are best positioned closer to the equator for fuel efficiency reasons and Queensland is the mainland state or territory which lies closest to the equator. Locating launch facilities in Queensland may need additional facilities to support or protect the space industry. Queensland will need to be prepared to facilitate these supporting services.

Queensland's additional geographic advantage is that if the businesses that are to contribute to the space industry are developing products for export, Queensland is located closer to export markets than southern states, particularly closer to Asian markets. Conversely, if Australia needs to import products, e.g. technology or materials, from other nations, Queensland is closer to foreign markets thus facilitating imports. Queensland may also need to promote the development or expansion of one or more ports to enable import or export facilities for space products.

I would be pleased to discuss this submission further as needed.

Yours faithfully,

James Minchinton