



**Joint Standing Committee on Foreign Affairs, Defence
and Trade's (JSCFADT) inquiry into the
Defence Annual Report 2021-22 | Space Command
and Capability
Boeing Australia submission**



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Overview

With the recent formation of Australia's dedicated Defence Space Command, backed up with strong partnerships between Defence, allies and partners, industry, research organisations and other interested parties, Australia is well on the path to deliver a transformational change in an increasingly contested and dynamic space domain.

This submission is prepared for the Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT) – Defence subcommittee, and provides input from Boeing as it pertains to item 2: Space Command and capability. We have structured our response by outlining our capability in Australia, both generally and as it relates to space, before identifying a key recommendation for consideration to facilitate improved partnerships with industry as Defence Space Command evolves into its mission 'to prepare space power to secure Australia's interests in peace and war.'

Boeing in Australia

Boeing is one of the world's largest global aerospace manufacturers. As a leading global aerospace company with a significant space heritage, Boeing develops, manufactures and services commercial aeroplanes, defence products and space systems for customers in more than 150 countries. Our diverse team is committed to innovating for the future, leading sustainability, and cultivating a culture based on our company's core values of safety, quality and integrity.

In 2022, Boeing celebrated 95 years in Australia. With nearly 5,000 people in over 38 locations across the country, **our Australian presence is one of the largest outside of the continental United States**, and supports some of the largest and most complex programs for the Australian government and our commercial customers.

Collectively, the experience of Boeing in the United States and in Australia, benefits Australia's space sector through the transfer of knowledge and expertise to Australian industry, creating jobs and developing export opportunities for Australia's small and medium-sized businesses.

Boeing Australia in space

Boeing has been at the forefront of manned and unmanned space exploration since we started sending machines beyond earth's atmosphere in 1960. Collectively, our organisation holds more than six decades of knowledge in space-related research, development, testing, and mission assurance. Global space know-how, mature satellite design and a dedicated local industry team is behind our space capability as together we help to develop a sovereign space capability for Australia¹.

As part of a collaborative research and development portfolio, Boeing and the CSIRO have been furthering technology (including space technology) for more than 30 years. Boeing Research and Technology-Australia (BR&T-A) has partnered with the CSIRO, the Defence Science and Technology Group, NASA, Boeing Houston, academia, and small Australian businesses, leading breakthroughs in many diverse areas including space situational awareness, satellite on-board processing and machine learning, software for satellite

¹ Examples of some recent collaboration between Boeing and Australia in the space domain can be found at Annex A to this submission.



launch support and rocket testing, the design of the Starliner spacecraft virtual simulator for astronauts, design work for potential lunar rovers in connection with Houston, and antimicrobial materials. The latest antimicrobial research project was launched to the International Space Station in December 2020.

In March 2019, Boeing and the Australian Space Agency (ASA) signed a Statement of Strategic Intent and Cooperation to enhance the capability and competitiveness of Australian industry, and promote investment in space capabilities and high-tech jobs of the future. Our partnerships with Australian research and development organisations, innovative small and medium-sized enterprises, and the ASA, have given us extensive insights into the current landscape of the Australian space sector, reaffirming our commitment to building a thriving local industry. As testament to our research and development in space performed locally, Boeing Research and Technology - Australia (BR&T-A) won the Australian Space Award Research organization category in 2020 and in 2021.

Defence Space Command and capability

Defence Space Command was created to deliver the transformational change needed for an increasingly congested, contested and competitive space domain. Since its inception in January 2022, Defence Space Command has conducted strategic space planning, assisting in the development of an Australian space policy, and has been exploring a resilient and effective space architecture in close collaboration with Australia's allies and partners.

Boeing assesses that the formation of Defence Space Command has significantly unified effort within Australia's Department of Defence, the Australian Defence Force, and industry, regarding space programs' capability development, operations and developing the space workforce. Boeing notes the good working relationship between Defence Space Command and the ASA. For example, the release of the Space Power eManual has established a foundational Defence reference on the employment of space power, complementing and supporting all levels of Defence education and doctrine.

Managing space as a specific domain is new for Australia. All stakeholders – Defence Space Command, industry, government – are working closely to support the new agency. Particularly to ensure that Australia plays a measured role in space across regulatory and operational roles.

Boeing notes a broad cross-section of industry partnerships will be required to deliver and support Defence's space activities. Though nascent – as reflected in the new agency - Defence Space Command's initial industrial engagement strategy has been structured to establish 'early wins'. Boeing **recommends Defence Space Command's industry engagement strategy is widened and expanded** to take advantage of the significant experience and understanding which is resident and can be gained from further and deeper collaborative engagement with industry.

Our recommendation is based on some examples of the inconsistency of Defence Space Command's engagement with industry to date:

- A highly detailed but at arms-length satellite communications acquisition program;
- An insightful classified deep-dive with a range of industry participants on the proposed new space architecture;



- An open and innovative Space Situational Awareness acquisition strategy with extensive industry participant collaboration, but one which lacks underpinning clarity on the role of international partners and commercial data providers; and
- An intelligence, surveillance, and reconnaissance satellite communications program where Defence has apparently significantly changed its acquisition strategy from an Australian sovereign capability to that of a US-military sourced satellite. Yet has not provided an update to industry on the program in the last three years.

The *2020 Force Structure Plan* committed \$7 billion over the next decade to transition the Australian Defence Force from a consumer to a sovereign contributor in space. However, in general, **industry has limited visibility into Defence Space Command's capability needs and acquisition plans**, and is therefore unable to best focus our investments, the best technology, and our collective workforces most effectively to best support the government's significant investment into this critical domain.

Conclusion

With strong partnerships across industry, government, education institutions, research organisations, and other interested parties, Australia has substantial opportunities to capitalise on its long-term experience to contribute to the growth and critical importance of our space industry and expertise. **Chief among them is continuing the tight partnership with space Primes which can leverage Australia's advantages as opportunities arise.** One of the key ways to achieve this is through open and regular dialogue and engagement with industry. With our strong history and significant presence across Australia, our successful partnerships with Australia's world-leading research and development organisations, and our advanced manufacturing sectors and small and medium-sized enterprises, Boeing stands ready to further assist Defence Space Command and the Australian government to deliver to its full potential in the space domain both today and in the decades ahead.



Annex A: Boeing Australia's Space Portfolio

In March 2019, Boeing and the Australian Space Agency (ASA) signed a Statement of Strategic Intent and Cooperation to enhance the capability and competitiveness of Australian industry, and promote investment in space capabilities and high-tech jobs of the future for Australians. Some areas of collaboration with the ASA include:

- **Capability roadmaps and industry assessments** – Boeing has provided feedback on capability roadmaps through participation in technical advisory workshops. We have also held discussions with the ASA around Australian testing facilities and capability that can support and develop the Australian space industry, including formal input into a national survey assessing current industry capability.
- **Anti-contamination technology** – Over the past four years, Boeing Research and Technology- Australia (BR&T-A) has been developing an antimicrobial technology for space missions that could help ensure the health of crews and protect spacecraft systems from bacteria – and ultimately may help prevent interplanetary contamination from Earth-borne or another planet's microbes. This technology has recently been a research payload in orbit on the International Space Station and was developed with the University of Queensland as a Boeing partner. This work is in line with the Space Health and Life Sciences area highlighted by the ASA as a field in which Australia possesses unique expertise.
- **Software development** – BR&T-A has developed software currently used in the United States for rocket tests and satellite launches. In line with the ASA's support for a sovereign launch capacity, this software is now being explored for space technology developmental partnerships with Australian universities and start-ups.

Boeing Australia is continuing to make strategic research and development investments that support the ASA and the Australian Defence Force in their efforts to expand space-based and space-enabled capabilities. These include:

- Boeing and the CSIRO have been furthering technology (including space technology) for more than 34 years representing 190 joint projects and more than AU\$200 million in combined investment in aerospace development. In 2021, Boeing and CSIRO renewed a Joint Research Agreement committing to a combined investment of US\$35 million for research and development over five years. It includes research programs in the areas of Space Situational Awareness (SSA), Space Manufacturing and Materials, and On-Orbit Image Processing and Analytics.
 - 130 CSIRO staff are embedded in Boeing projects.
 - 215 projects have been undertaken over 34 years.
 - Joint agreement with Australian Space Agency to collaborate on space research and development.
- BR&T-A is renowned for its research and development in space including a virtual reality simulator for the CST-100 Starliner to replace physical simulator needs, microbial coatings, weather servers and remote rocket test/launch technology.
- Through its relationships with NASA and Boeing in Houston, BR&T-A has created several fully interactive simulation environments for research and development and training.
 - Using Australian technical and human factor expertise and are primarily focused on solving problems in ground-based simulation training, training in orbit, and physical spacecraft design which circumvents the need for physical mock-ups.