

Australia's Niche Space Industry Capability



Australian Government
Department of Innovation
Industry, Science and Research

Executive Summary

Due to Australia's growing dependence on space systems, the Australian Government is looking to develop a clear understanding of its interests and objectives in space; its existing and emerging opportunities; areas of leverage and competitive advantage; and how best to prepare to meet future challenges effectively.

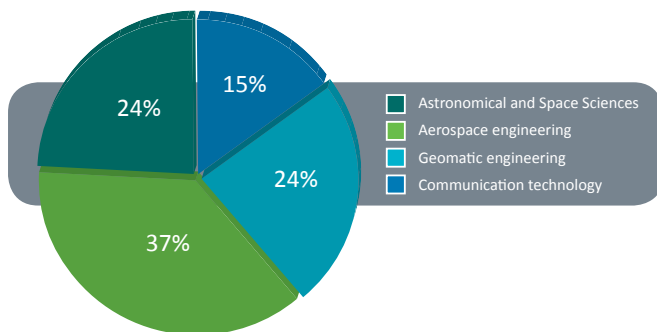
The Department therefore released a Request for Tender for the provision of consultancy services on Australia's domestic space capabilities.

Astronomy has not been considered as part of this study, however it was useful to consider the synergies between astronomy and space science.

Australia has maintained a good research and development (R&D) reputation internationally across a wide range of areas. In regards to space related research and development Australia demonstrates it does have capability in the four areas examined under this report.

Australian Research and Development Capability

Research organisations undertaking astronomical and space science research



Australia has clear strengths in the areas of astronomical and space sciences and geomatic engineering and to a lesser extent communications technology research.

In regards to direct applicability to a space industry, space sciences would only make an approximate 12% contribution. This conclusion can be drawn if research into planetary science, astronomy etc. are excluded on the basis that they contribute to the general body of scientific knowledge and do not contribute to the space industry directly.

It could also be concluded that aerospace engineering appears to be the leading capability, which in fact is one of the strengths of Australian research and development; however caution should be used in drawing any significant inferences about this capability as it relates to the space industry.

Advanced materials research can make a significant contribution to the space industry, and Australia does possess considerable capability in this area. However there was no significantly advanced material research being conducted with a specific focus on a space related activity or project identified.

The only identified area of aerospace engineering research that may have applicability to the space industry is in the area of hypersonic flight. In this area Australia can be considered one of the world leaders. Hypersonic flight capability can be applied to the flight dynamics of space vehicles as they exit or re-enter the atmosphere.

The two areas of research, which do have direct applicability to the space industry, are the areas of communications technology and geomatic engineering.

While communications technology research includes a large cross section of disciplines and areas, Australia has conducted innovative research and development in the area of satellite communications technology. Much of this research is focussed on improving signal processing and improving the performance of mobile satellite systems, particularly for defence applications, which has lead to some significant breakthroughs.

Geomatic engineering research would have to be regarded as the area that is focussed on space related applications. Nearly all of the research is devoted to downstream space industry applications focusing on improving the acquisition of satellite data, analysis and applications. There are also many areas of secondary research that have spun out of geomatic engineering. While these would be too many to list in this report it is sufficient to say that geomatic engineering research is being applied to areas ranging from health to rainforest ecology and sustainability.

In this regard geomatic engineering research should be considered as one of Australia's niche space industry research capabilities.

In the context of space related capability the commercial sector demonstrates that it does have capabilities in a wide range of categories. However there is no doubt that the Australian space industry is very small when compared with other industries within the Australian economy. In this respect the demonstrated capability within the space industry is equally small and is contained within a small number of organisations. While not a specific consideration of this study, capacity within the Australian economy is small.

Upstream capabilities

Sector	Space systems primes/integrators	Space subsystems supplier	Space component and material suppliers	Ground segment prime	Ground segment subsystem and equipment suppliers	Contract research, design and consultancy companies
Demonstrated Capability	X	X	✓	✓	✓	✓
	X No significant capability	X No significant capability	✓ Demonstrated capability	✓ Demonstrated capability	✓ Demonstrated capability	✓ Demonstrated capability

Australia's upstream capability is very limited in that it has no or very limited capability in the areas of space system integrators, subsystem supply, ground segment prime and ground segment subsystem and equipment suppliers. While there is demonstrated capability in the areas of component and material suppliers and contract research, design and consultancy there is only a very small representation of these capabilities within the Australian market.

Downstream capabilities

Sector	Satellite broadcast service providers	Satellites communication service providers	EO value adding	Satellite navigation service providers	Satellite operators	User equipment suppliers	Financial and insurance services (Ancillary services)
Demonstrated Capability	✓	✓	✓	✓	✓	✓	✓
	✓ Demonstrated capability	✓ Demonstrated capability	✓ Demonstrated capability	✓ Demonstrated capability	✓ Demonstrated capability	✓ Demonstrated capability	✓ Demonstrated capability

Within the downstream sector Australia has demonstrated capabilities across all the assessment criteria. However on average most capabilities are demonstrated by less than 12% of organisations. In the area of satellite procurement and operation only Optus demonstrates this capability.

Commercial market capability summary

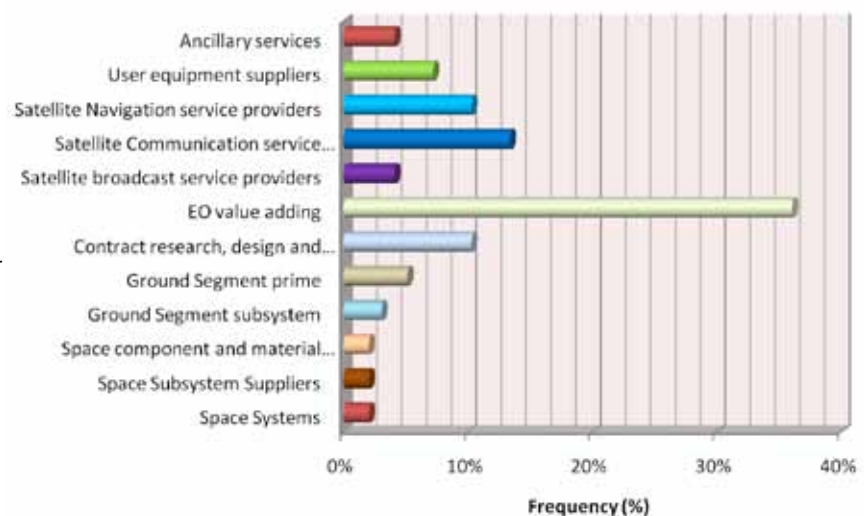
The strongest of the observed capabilities is in the area of Earth Observation value adding. Specifically within the Earth Observation category, Australia demonstrates that is strongest in the area of Geospatial Information Systems, Earth Observation data integration and analysis. This is driven by the demand within the Australian economy. Whether it is for resources, water and environmental management, agriculture, social infrastructure, weather or defence, the demand for spatial data and analysis is very high.

The next strongest capabilities exist in the areas of satellite navigation services, satellite communication service providers, contract research, design and consultancy, ground facility management and ground segment subsystems, specifically in the area of telemetry, tracking and control.

A telling statistic is the proportion of organisations within downstream sector and the distribution of direct and latent capabilities. While organisations do have space related capability, significant numbers of Australian companies apply their capabilities to industries other than space. It can be inferred that within the commercial segment of the market there is a tendency to use space industry outputs rather than contribute to such things as space vehicles, launchers etc.

Feedback from workshops conducted with organisations with an interest in space also supports this notion where participants, almost unanimously, indicated that Australia has upstream space related capability but there are very few opportunities for it to be applied. Hence in the interests of commercial viability, businesses are operating in other industry areas.

If a niche space industry capability is to be determined by whether or not it constitutes a special area of demand for a product or service and the strength of that capability, then the area of Earth observation or remote sensing would meet these criteria.



It is difficult not to recognize the valuable, and sometimes world leading contributions other capabilities within the Australian market, such as electronics, propulsion, hypersonics and the potential contribution of advanced materials, make to the space industry. However these areas contribute, at this point time, only a small amount to the critical mass necessary for a viable space industry.

Satellite communications is by far the second strongest capability with supporting research and development but does not demonstrate the same level of strength as Earth observation.

Therefore, on balance, Earth observation can be considered as Australia's niche space industry capability as it has a strong capability within the commercial sector, which is supported by a strong, well-established research and development sector.