

MAXAR
TECHNOLOGIES

Inquiry into job creation opportunities in Queensland arising from the establishment of an Australian Space Industry

October, 2018

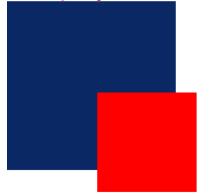


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About Maxar - The Power of 'X'



- A vertically integrated, new space economy company including segments across the value continuum for every moment leading up to and following launch
- We lead in satellite communications (building and operating), ground infrastructure, Earth observation, advanced analytics, insights from machine learning, next-generation propulsion, space robotics, on-orbit servicing, on-orbit assembly, and protection of space assets through cybersecurity, and monitoring of space systems
- By integrating our leading-edge capabilities, we provide innovative, cost-effective solutions, value for customers, and thus unlock the multiplier effect of our combined businesses



Case Study: MDA in Canada

Space capability built and enabled through Public and Private Sector innovation

300+

MDA satellite antennas, payloads, and electronics have flown on more than 300 space flight missions

MDA space robotics have been in use on the International Space Station (ISS) for 18 years



MDA personnel embedded at the Canadian Space Agency support all ISS robotics in real time

MDA space robotics were carried on 90 Space Shuttle missions

MDA sensors and robotics have been operational on Mars for 14 years

Over its 17-year life RADARSAT-1 collected 72 billion square kilometres of imagery, equal to 141 times the surface area of Earth

To date, RADARSAT-2 has collected an additional 72 billion square kilometres of Synthetic Aperture Radar imagery

MDATM

A MAXAR COMPANY

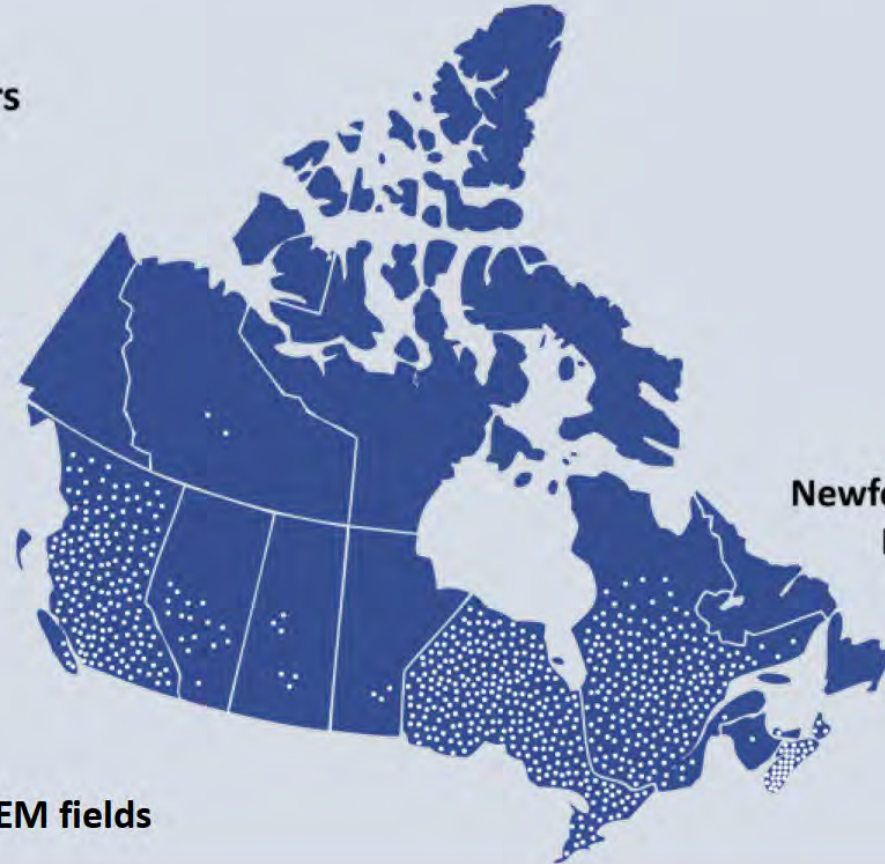


Case Study: Employment Leverage Coast to Coast

**714 Canadian suppliers
and subcontractors**

Yukon
Northwest Territories: 2
Nunavut

British Columbia: 171
Alberta: 16
Saskatchewan: 6
Manitoba: 3



Ontario: 269
Quebec: 209
New Brunswick: 1
Newfoundland and Labrador
Prince Edward Island: 1
Nova Scotia: 36

In addition to 1,900 direct jobs in STEM fields



Ambition: Replicate the Canadian Success Story



The objective:

Create high-technology jobs in nations with space ambitions by deploying Canadian expertise in robotics engineering, satellite missions, and ground systems



Growth in New Space Economy recognized internationally as an opportunity for STEM job creation

- Example: United Kingdom
- UK Space Agency Created in 2010
 - Objective to grow its share of global market to 10% by 2030
- Followed similar process to Australia
 - Creation of Space Innovation & Growth Strategy “Space Growth Action Plan”
 - Government response addressing recommendations¹
- These provide a framework for consideration of the Australian Space Industry Capability assessment and of the Australian Government’s response

The infographic consists of four blue boxes with white text and a central screenshot of a document. The top-left box states 'Worth £11.8bn to UK's GDP.' The top-right box states 'Capture 10% of global market'. The central screenshot shows the UK Space Agency logo and the title 'First National Space Policy shows how vital space is for the future - a critical infrastructure for the UK economy' with a URL 'gov.uk/government/new...'. The bottom-left box states 'Have Europe's first spaceport.' and the bottom-right box states 'Generate £40bn for UK economy by 2030.'

1) Government Response to the UK Space Innovation and Growth Strategy 2014 – 2030 Space Growth Action Plan APRIL 2014, <http://www.ukspace.org/wp-content/uploads/2014/05/Government-Response-Space-Growth-Action-Plan.pdf>



The Australian Opportunity

- A Thriving Multi-State New Space Economy



Federal Initiatives

- Agency Creation / Funding
- Research / CRC Funding
- Program Funding

+

State Initiatives

- Cluster Promotion
- Workforce Supply
- Economic Support

+

Industry Investment & Innovation

- Alignment with strategic opportunities
- Technology Development
- Program Capture & Execution
- Startup VC Funding

=

Accelerated STEM Employment

The Australian Context

Summary Assessment ¹	Implications for Queensland
No capacity in manufacture of large satellites	Unlikely to become competitive, particularly given weak global demand for commercial geosynchronous communications satellites
Manufacture of satellite sub-systems is an emerging capability	Opportunity to become part of global supply chain by focusing on differentiated capability e.g. robotics (elements of on-orbit servicing tool kits), advanced sensor development
Expertise in operations, telemetry, tracking and control	Opportunity to apply expertise to commercial earth observation ground station capability enabling economic development of other sectors e.g. mining & agriculture
No current launch capability	High capital investment. Multiple established and emerging capabilities, particular for smallsat launches
Advanced capabilities in astronomy	Space Situational Awareness is of growing importance. Current operational focus is in Western Australia
Strengths in space applications (agriculture, mining, logistics, aviation and communications sectors)	Opportunities for low-capital intensity growth with spin-off benefits to other sectors of the Queensland economy

1) Australian Space Industry Capability – A Review, Acil Allen Consulting.
https://www.industry.gov.au/sites/g/files/net3906/f/June%202018/document/extra/australian_space_industry_capability_-_a_review.pdf





Queensland Employment Growth Opportunities

Summary Assessment	Current Employment	3-year opportunity
Manufacture of satellite sub-systems is an emerging capability	The state's (aerospace) aircraft manufacturing and maintenance sector provides over 4,200 jobs across more than 300 enterprises ¹ . There is no material satellite sub-system design or manufacturing included in this.	The aerospace skillset provides a strong base to expand into satellite sub-systems and grow employment consistent with the 8% CAGR targeted for the Australian space sector.
Expertise in operations, telemetry, tracking and control	Existing Ground Stations that provide command and control of communications satellites are highly automated. Telemetry, tracking and control capability is typically delivered as part of the mission solution.	Creation of a commercial earth observation ground station capability will create a small number of direct employment opportunities but more importantly provide the base capability from which employment growth in Space Applications can be achieved.
No current launch capability	No employment at operational capability	TBD depending on ability to gain share of launch market from dominant and emerging players (orbit dependent)
Strengths in space applications (agriculture, mining, logistics, aviation and communications sectors)	Minimal current employment.	Significant opportunity of direct employment in space application / analytics fields as well as employment growth from sectors benefiting from efficiency gains. As the primary growth area, will likely drive employment growth in Australian space sector > 8% targeted CAGR.

1) Queensland Aerospace 10-year Roadmap and Action Plan, Department of State Development, Manufacturing, Infrastructure and Planning.





Recommendations

- 1. Recognize the capability assessment's use of the OECD definition of the "space economy" as the full range of activities and resources that create and provide benefits to human beings in the course of exploring, understanding, managing and utilizing space**
 - Specifically, significant opportunities are anticipated in techniques for at-scale generation and deployment of actionable insights from space-enabled data collection
- 2. Heed the national space industry strategy of giving importance to emerging frontiers where Australia can leapfrog into future areas of competitive advantage. Conversely be wary all all-encompassing labels of areas of competitive advantage that do not provide sufficient specificity to develop differentiated offerings.**



Recommendations

3. **Identify and invest in new commercial opportunities for space robotics and/or space sensor capability enabled through leveraging and extensions of capabilities in Queensland's aerospace sector.**
4. **Identify and invest in new commercial opportunities for earth observation enabled applications enabled by Queensland based reception and/or processing capability.**
5. **Identify and invest in new positioning, navigation & timing (PNT) opportunities for earth observation enabled applications enabled by Queensland based reception and/or processing capability.**
6. **Prioritize academic research that require cross-sector collaboration and that promote value in the space and end-use industries.**



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SOLUTIONS

We play at the nexus of the new space economy

Four companies at the intersection of what's new and what's possible. We do what no other single company can by delivering integrated space solutions to solve our customers most complex challenges