

Territory Space Industry 2020

**THE
TERRITORY**
BOUNDLESS POSSIBLE







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What is meant by the 'space industry'

The space industry plays an increasingly pivotal role in the efficient functioning of modern societies and their economic development.

The space industry has two key parts:

Upstream

Sending objects into space and space exploration.

Providers of technology. For example:

- satellite system developers and component and materials suppliers
- ground segment operators and suppliers
- researchers/consultants
- support products and services.



Downstream

Using 'upstream' technology and research.

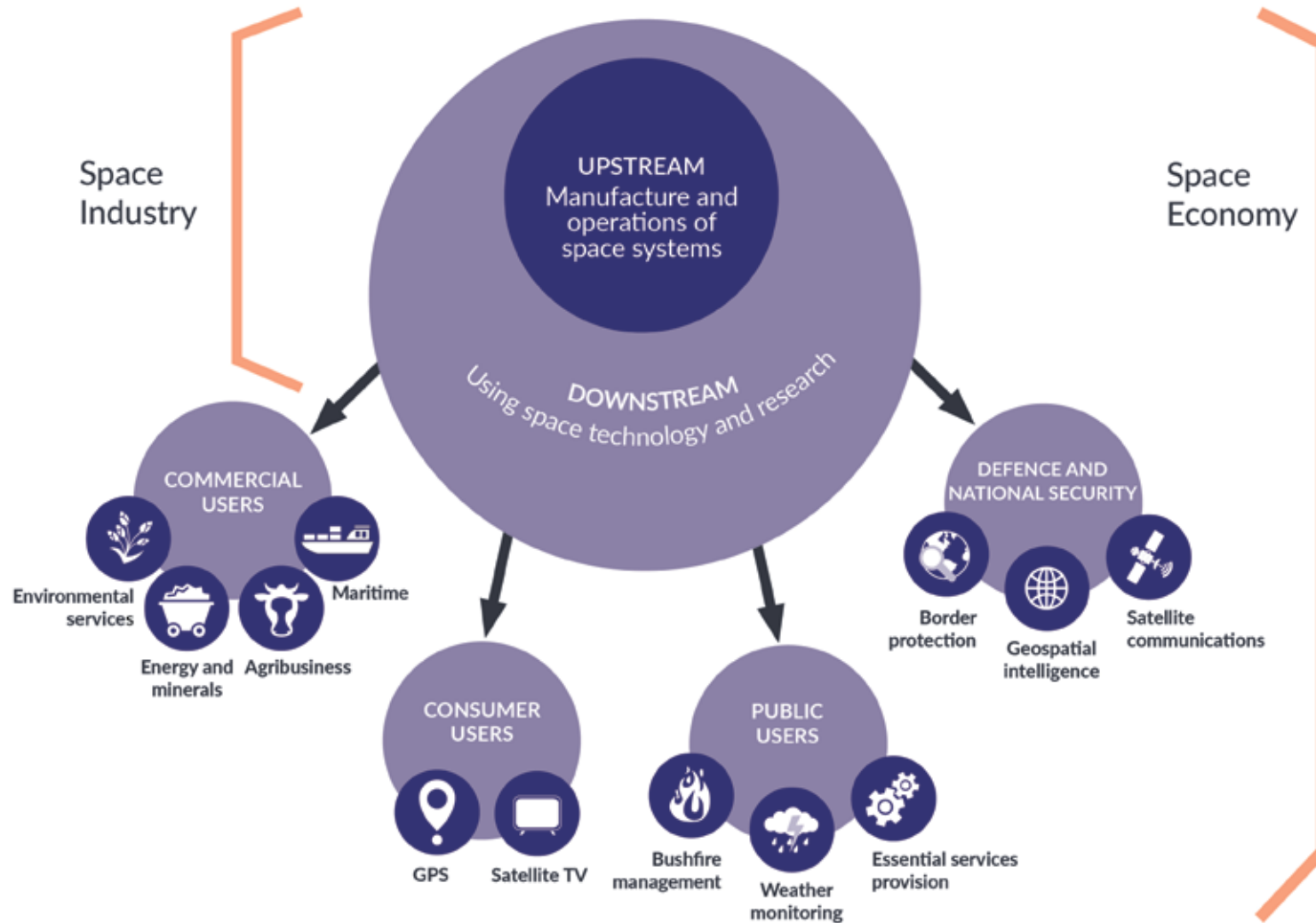
Exploitation of technology. For example:

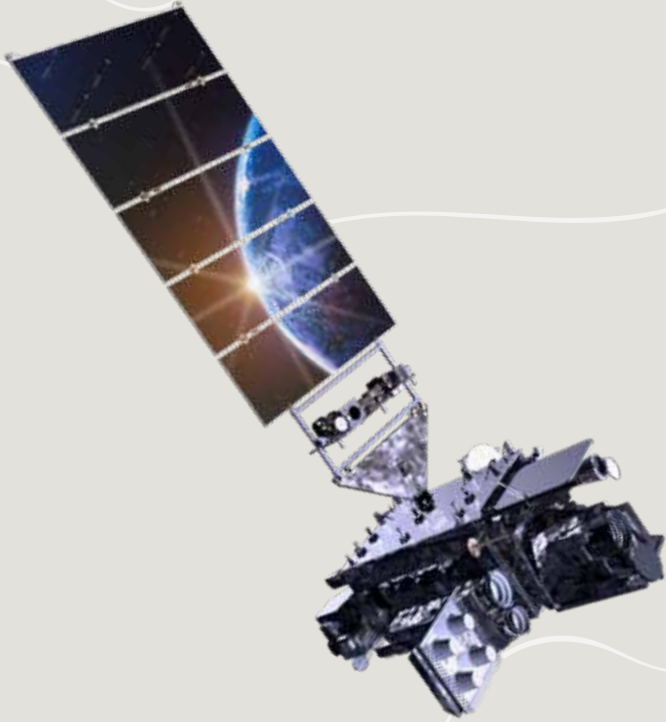
- satellite broadcast, communication and navigation providers
- earth observation providers
- equipment suppliers
- support product and services.

The space industry includes all organisations (or parts thereof) engaging in any space-related activity, including:

- Commercial organisations that earn revenue from the manufacture, launch and operation of satellites/spacecraft and from using signals and data supplied by satellites/spacecraft to develop valued-added applications (e.g. pay TV, mobile phone communications, earth observation).
- Non-commercial organisations that contribute space-specific research and expertise throughout the industry supply chain (often in partnership with commercial organisations). Examples include: civilian space agencies such as NASA, defence and national security agencies, universities and research institutes.

What is meant by the 'space economy'





Fast facts

Global space economy

- Global space industry worth approximately USD \$330 billion in 2016.
- It is expected to grow to USD \$1 trillion by 2030
- The global space economy revenue includes:
 - 39% from commercial space products and services
 - 37% from commercial infrastructure and support industries
 - 13% from the US government (USD \$44.57 billion – USD \$23.57 billion for national security and USD \$21 billion for civil space)
 - 10% from non-US government space budgets.
- Close to 50 nations have government space budgets, nine over USD \$1 billion including the United States of America, China, Europe (collectively), Russia, India, Japan, France, Germany, and Italy.
- NASA has over 17 500 employees.
- Organisations in nearly 60 countries have built and/or operated satellites launched into space; however, only 12 countries feature launch sites from which orbital launches take place.
- Around two thirds of the 400+ global investors in new space companies are in the United States. Of the non-US investors, 15% are in the UK, followed by Japan (11%), Israel and Canada (9% each), Spain (7%), and India and China (about 6% each).



GLOBAL SPACE ECONOMY

expected to grow to
USD \$1 trillion by 2030

Australian space economy

- Australia’s space industry already employs about 10 000 people and was worth AUD \$3.9 billion in 2015-2016 financial year.
- Australian Government estimates in the next 10 years our domestic space industry could grow to employ 20 000 people and be worth AUD \$12 billion.
- The Australian Space Agency was created on 1 July 2018 with funding of AUD \$41 million over four years.
- This includes AUD \$15 million towards partnering with international space agencies to enable Australian businesses to compete in the global space economy.
- Australian Government is investing more than AUD \$260 million to develop world-leading core satellite infrastructure and technologies.
- Space Industry Association of Australia identified 558 Australian-based organisations with space industry capabilities. The majority operate in the downstream part of the industry.
- Australian start-up companies and universities are developing and manufacturing nanosatellites or CubeSats.
- The space workforce is characterised as highly technical with long-term, high-wage, high-skill jobs.
- Australian investors are backing space start-ups such as Fleet and Gilmour Space Technologies.



THE AUSTRALIAN SPACE AGENCY

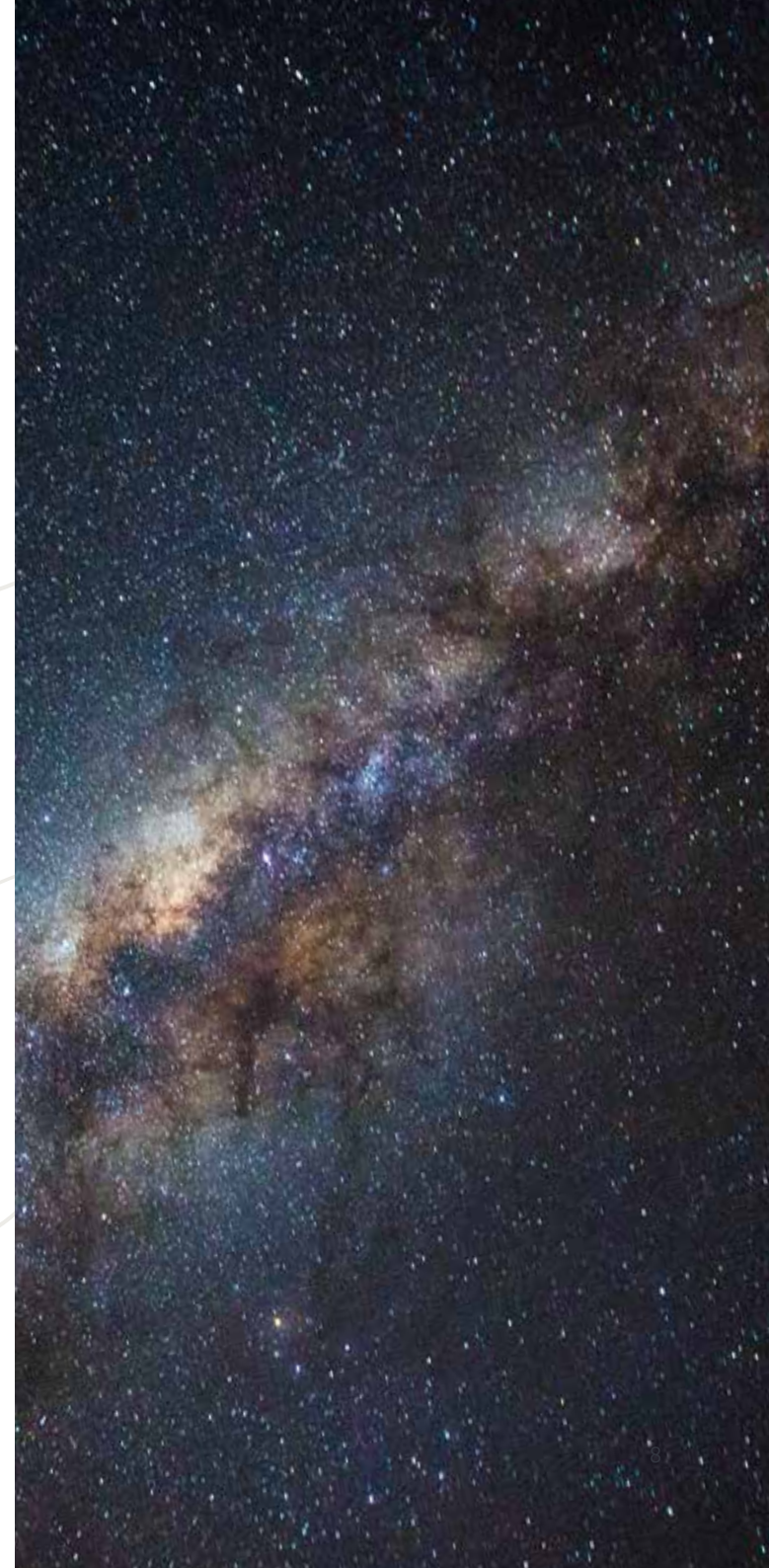
is investing
AUD \$15 million
towards partnering
with international
space agencies

The Territory space economy

- The Territory has a geographic advantage for launch sites due to its:
 - proximity to the equator (creating cost efficiencies for launch operators and their customers)
 - tectonic stability (low risk of earthquakes)
 - vicinity to the sea and low population (supporting safe and efficient launch and payload recovery).
- Private proponent Equatorial Launch Australia well progressed on plans to develop the Arnhem Space Centre near Nhulunbuy.
- Strong earth observation capability, undertaking world-leading rangeland mapping, fire monitoring, and grass mapping using data from the Landsat and Sentinel satellites.
- Existing space infrastructure: Alice Springs High Altitude Balloon Launch Facility; Jindalee Operational Radar Network; AuScope's VLBI Telescope in Katherine; Humpty Doo Transmitting Station; GeoScience Australia's Alice Springs ground station.
- Charles Darwin University's Advanced Manufacturing Alliance with SPEE3D has capacity to support the upstream space industry.
- Complements the Territory's existing defence, aerospace, agribusiness, energy, mining, tourism and land and marine management sectors.
- Industry is in the early stages of development with significant growth opportunities.
- The Space Industry Association of Australia identified 32 space industry businesses operating in the Territory, with three physically located in the Territory.



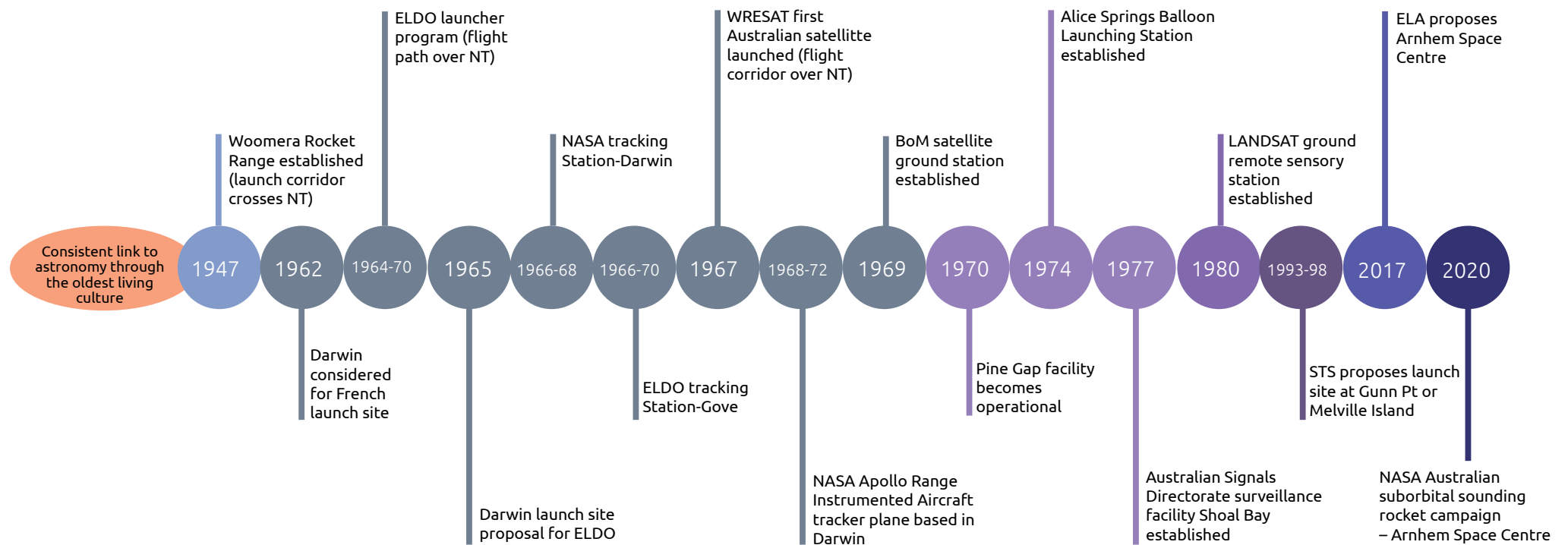
**32 SPACE
INDUSTRY
COMPANIES**
operating in
the Territory



The Territory's history in the space industry

The Territory has been involved in Australia's 'modern' space activity for nearly 60 years, with Aboriginal Traditional Owners practicing astronomy for more than 60 000 years.

Notable milestones over the past few decades include:





Geoscience Australia's Alice Springs Antenna plays a key role in supporting international satellite programs.

Photo © Commonwealth of Australia (Geoscience Australia) 2019

Territory Space Industry 2020 aims to:

1. **Grow** the Territory's space industry **capabilities**.
2. **Connect** Territory industry and businesses with the Australian and **global space economy**.
3. **Support the Territory economy** to become **'space-enabled'** and benefit from advances in the space sector that will lead to growth, jobs and innovation.





Demand development

Market opportunities

Innovations, policy positions and market disruptions that will influence demand for the Territory space industry include:

- a fast-growing and fiercely competitive commercial sector
- falling launch costs
- escalation of demand for space-related technologies
- innovative technology solutions (e.g. reusable rockets; mass produced satellites; cube, micro and nanosatellites)
- increased interest from private funding sources in the sector
- early interest from commercial sector on new markets such as human spaceflight and resource mining
- enhanced Defence interest in Australia having sovereign capabilities in space
- increased Australian government investment in the space industry, including: creation of the Australian Space Agency; passing of the *Space Activities (Launches and Returns) Act 2018*; investment in satellite technology to enhance GPS accuracy; and partnering with international space agencies on strategic projects.

Market development can also be shaped around the Territory's:

- geographic advantage for launch sites
- MoU with ACT and SA to collaboratively grow the Australian space economy
- strong trade connections with countries also interested in the space economy, including Japan
- demonstrated capacity to develop emerging industries and host niche high-tech strategic operations.

Supply development

Competitive advantages and supply gaps

Priority focus 'supply development' areas for the Territory Government will include:

- evaluation of the 'enablers for growth' of Australia's space industry as identified by the CSIRO
- analysis of capabilities and gaps
- enhanced understanding of supply chains
- increased investment promotion
- investigating partnership opportunities with research and innovation providers.

Space industry proponents' supply-oriented focus is likely to concentrate on:

- workforce development
- infrastructure development
- investment attraction
- research and development.

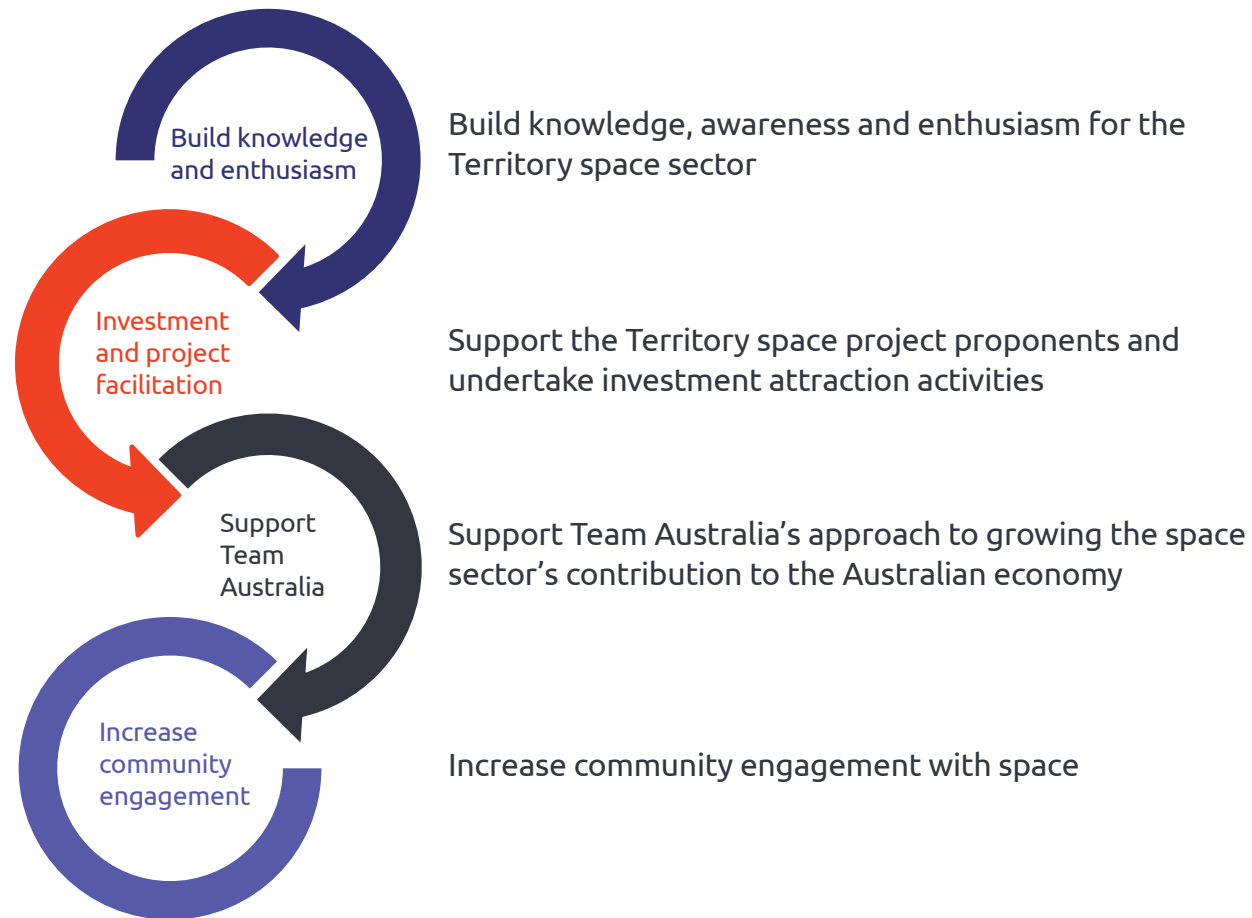




Geoscience Australia and the Centre for Appropriate Technology worked together to apply local Arrernte artist Roseanne Kemarre Ellisa's design to the Alice Springs antenna.

Photo: © Commonwealth of Australia (Geoscience Australia) 2019

Territory Space Industry 2020 - four key focus areas



Focus area 1 2019-2020 action plan



Build knowledge, awareness and enthusiasm for the Territory space sector

- 1 Prepare material to explain the space ecosystem and its links to key industry sectors to a variety of audiences.
- 2 Map existing Territory space industry capabilities and identify national capability gaps that may present opportunities for the Territory.
- 3 Continue strengthening existing relationships with key stakeholders including: the Australian Space Agency, Charles Darwin University, CSIRO, Geoscience Australia, Austrade, Department of Defence, Darwin Innovation Hub and InnovationNT to share knowledge about, and consider partnerships in, space-related initiatives.
- 4 Partner with the Space Industry Association of Australia (SIAA) to host space industry forums in the Territory.
- 5 Establish a network of 'space enthusiasts' across the Territory Government and in key industry sectors.

Focus area 2 2019-2020 action plan



Support the Territory space project proponents and undertake investment attraction activities

- 1 Support Equatorial Launch Australia (ELA) to establish the Arnhem Space Centre.
- 2 Provide project facilitation services for proponents considering investing in the Territory.
- 3 Develop industry diversification and investment attraction strategies focused on filling capability gaps or industry growth opportunities.
- 4 Work with Department of Defence and national security agencies to promote the Territory's capabilities to host space-related facilities.
- 5 Support industry in expanding their knowledge of legislation and policy matters relevant for space-related projects.
- 6 Participate, as part of Team Australia, in key events domestically (e.g: Avalon Aerospace exhibition) and internationally (e.g: International Astronautical Congress).
- 7 Promote investment and partnership opportunities in the Territory space economy through international trade missions.

Focus area 3 2019-2020 action plan



Support the Team Australia approach to growing the space sectors contribution to the Australian economy

- 1 Work collaboratively with the Australian Space Agency to implement the recommendations of the Review of Australia's Space Industry Capability.
- 2 Maintain strong relationships with the MoU partners and other jurisdictions to build Australia's space capabilities and promote these to the world.
- 3 Advocate for the establishment of an Australian Space Agency 'space node' in Darwin.
- 4 Actively contribute to legislative and policy matters relevant to the space economy.
- 5 Advocate for the Australian Space Agency to maintain a focus on space as an 'enabler' for innovation and growth of other industry sectors.

Focus area 4 2019-2020 action plan

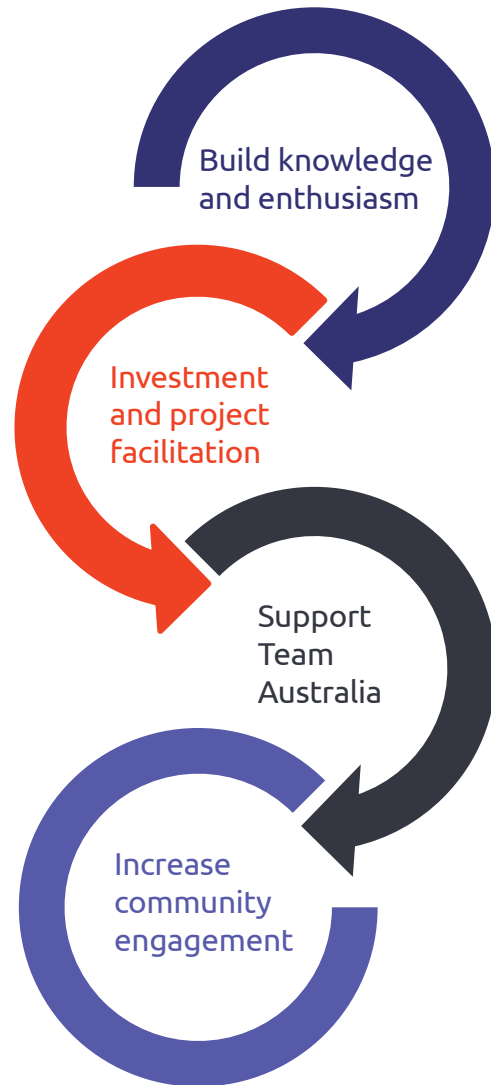


Increase community engagement with space

- 1 Work with Department of Education to grow opportunities to focus on space in Territory schools.
- 2 Support projects that connect Aboriginal traditional knowledge of space and the solar system.
- 3 Partner with others on initiatives that promote an increased interest in astronomy, space and space-enabled technology.

Measuring success

Accomplishments 2018



Build knowledge and enthusiasm

- Held Territory Space Forums in Darwin and Nhulunbuy in partnership with the Space Industry Association of Australia
- Spoke at the Building the Territory event, and the Australian Strategic Policy Institute’s ‘Building Australia’s Strategy for Space’ conference

Investment and project facilitation

- Chief Minister met with the Japanese Aerospace Exploration Agency (JAXA) and National Aeronautics and Space Administration (NASA)
- Hosted site visit to Nhulunbuy for Boeing, Nova Systems, Equatorial Launch Australia, the Australian Space Agency and Space Industry Association of Australia
- Submission made to Senate Inquiry on Space Act Amendments Bill and draft Cost Recovery Implementation Statement
- Participated in the International Astronautical Congress in Bremen, nurturing interest from potential investors
- Partnership with Black Sky Aerospace for their test commercial launch

Support Team Australia

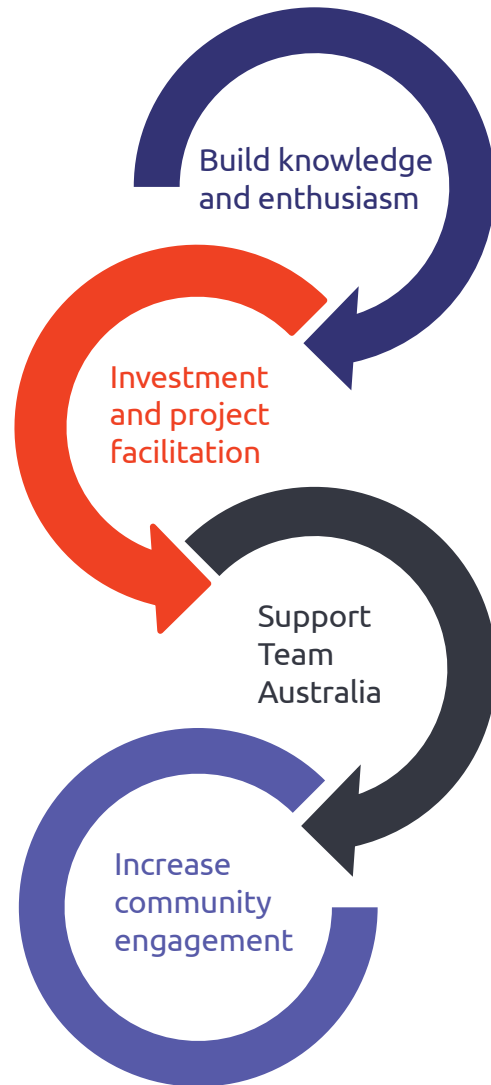
- Chief Minister advocated for the Australian Space Agency headquarters or a “space node” to be located in Darwin
- Provided assistance and support for the Australian Space Agency’s consultative forum in Darwin
- Active participant in State and Territory Space Coordination Meetings

Increase community engagement

- Gumatj presented at 2018 Aerospace Futures conference
- Participated in ‘Advancing our Territory in Space’ Science at Sunset event

Measuring success

Target achievements 2019-2020



Build knowledge and enthusiasm

- Territory industry capabilities mapped and national capability gaps identified
- Industry events well attended and achieve above satisfactory rating
- Strong relationships and networks established

Investment and project facilitation

- Arnhem Space Centre undertakes test launch
- New investment leads established from attendance at space events
- Space meetings incorporated into at least one international trade mission

Support Team Australia

- Active participation on relevant Australian Space Agency working groups
- At least three collaborative projects undertaken with MoU partners
- An Australian Space Agency 'space node' established in Darwin
- MoU signed between the Territory Government and Australian Space Agency

Increase community engagement

- At least two partnership initiatives undertaken to promote increased interest in space
- Space information forums held in East Arnhem Aboriginal communities in partnership with Gumatj

References

Territory Space Industry 2020 has been developed with reference to the following strategic documents:

1. Review of Australia's Space Industry Capability - Report from the Expert Reference Group, March 2018
2. Australian Government Response to the Review of Australia's Space Industry Capability
3. Australian Space Agency Charter and Key Focus Areas
4. CSIRO's Space Roadmap, 2018
5. Northern Territory Business Innovation Strategy
6. Memorandum of Understanding between the NT, SA and ACT on space industry collaboration
7. White Papers endorsed by the Space Industry Association of Australia
8. Northern Territory International Engagement, Trade and Investment Strategic Plan 2018 to 2021
9. Northern Territory Defence and National Security Strategy 2018
10. Digital Territory Strategy



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