

Trailblazer Universities Program



University of
**Southern
Queensland**

Space National Manufacturing Priority

iLAuNCH

Innovative Launch, Automation, Novel Materials, Communication
and Hypersonics - *Accelerating Australian Space Manufacturing*

UniSQ successfully led a bid for funding in the Trailblazer Universities Program in the
Space National Manufacturing Priority.



What will iLAuNCH do?

iLAuNCH will:

- Provide research commercialisation for the Australian sovereign rocket launch manufacturing sector
- Accelerate the transformation of this 'early stage - low Technology Readiness Level (TRL)' sector to a launch ready manufacturing ecosystem with supporting supply chain
- Co-design with industry the pathways for industry skills development through school, Vocational Education and Training (VET) and tertiary education initiatives

Why iLAuNCH?

iLAuNCH will:

The Australian launch manufacturing sector – comprising the development of civil rockets, test capability and launch facilities - is essential for creating a sovereign Space Industry.

Without launch capability it is arguable whether sovereign space capability really exists as we would need to rely on launch facilities in other countries to place our products into space. Sovereign launch and associated facilities were viewed in the 2018 Space National Manufacturing Priority road map as “high risk activity” and therefore were considered as part of “Phase 3 - Delivering Success 2021-2028”.

Since 2018, there has been considerable progress in Australia's launch providers and launch facilities with three active commercial launch sites established and several others being proposed. Building a sovereign launch capability and its associated industrial and R&D ecosystem is critical to ensure the emerging payload technology manufacturers can access launch systems and capitalise on commercial opportunities, without competing with, or being dependent on, international space economies and launch facilities.

Australian launch and launch manufacturing companies are working on early stage and mid TRL technologies. iLAuNCH will support these companies to accelerate to higher TRL levels, build a complimentary supply chain and overcome commercialisation challenges. The development of the civil launch industry and associated supply chain is also of significant importance in supporting downstream activities in the related defence sector with sovereign guided weapon requirements.

Queensland is an ideal location for iLAuNCH. It has already attracted rocket design and manufacturing companies and has the R&D capability and industry research collaborations needed to transform the industry. Technology areas being addressed by iLAuNCH include:

- Additive manufacturing
- Automated composite manufacturing
- High temperature materials manufacturing
- High speed/pressure analysis and design
- Rocket fuel manufacturing
- Launch vehicle component design and testing
- Static rocket test rig manufacturing
- Launch site development

Creating the necessary technologies with industry partners will provide a manufacturing supply chain that is required to sustain this industry as it accelerates from mid TRL companies through to launch ready systems.



What does UniSQ provide?

UniSQ is ideally placed to deliver this step change in collaboration with its partners. UniSQ currently is Australia's only university with true end-to-end rocket manufacturing capability from design, to fuel manufacture, structural manufacture, test and launch capabilities. UniSQ has:

- Advanced rocket design programs
- 20kg batching laboratory for producing solid rocket fuel
- Advanced robotic composites processing for rocket motor casing manufacture
- Access to Australia's largest static rocket testing facility – 200kN horizontal & 1000kN vertical
- The longest duration hypersonic wind tunnel in Australia and is currently designing one of the largest hypersonic wind tunnels in the allied forces to test full size flight vehicles
- High temperature ceramic composite materials manufacturing
- Fire resistant launch pad geopolymer concrete
- Static test and launch diagnostic systems
- Airborne observation of rocket stage separation and rocket earth re-entry

UniSQ has already attracted a major international rocket manufacturer to Queensland, and in partnership with companies such as RTI and Southern Launch, UniSQ is able to demonstrate exemplar university/industry partnerships which have resulted in the establishment of commercial rocket testing facilities (Helidon Static Rocket Test Site) and launch support out of Whalers Way.

UniSQ is also working with industry partners to develop first stage design support for a major regional Space Manufacturing Precinct providing a home for rocket manufacturing. This includes anchor tenants, associated supply chain companies, energetics companies and shared testing facilities.

The creation of this Space Manufacturing Precinct is a keystone to building a sovereign rocket manufacturing industry. iLAUNCH will be a driving force behind the Space Manufacturing Precinct by working with the developer to map out the short term and long-term requirements and ensure rapid uptake and growth of the manufacturing supply chain. The precinct will provide iLAUNCH industry with a 'home' and testing capabilities delivered through iLAUNCH projects.

The launch manufacturing industry needs to be strongly aligned to the development of the "in Space" commodities (payload) it needs to accommodate. iLAUNCH will support the commercialisation of space components such as small satellites, communications arrays and optical wireless communications technologies developed at iLAUNCH partners Australian National University and the University of South Australia.

Commercialisation

This balanced research commercialisation portfolio allows iLAUNCH to complement the existing SmartSAT Co-operative Research Centre, which as already been able to demonstrate research and exploitation success with CubeSats, whilst building critical capacity in the currently untapped area of space launch research commercialisation. iLAUNCH will be established as a new centre of industry research, commercialisation and manufacturing activity located in South East Queensland with nodes in the other Australian space manufacturing hot-spots – South Australia and the Australian Capital Territory.

iLAUNCH will deliver a step-change in the way research and industry collaborate on translating research outcomes into commercial products through focussed sector specific commercialisation support. The commercialisation model will support key industry partners from project design, to project management and market entry. This suite of large research commercialisation projects will be complemented by a flexible model of engagement and support of the wider space industry ecosystem. This provides the Australian space industry sector maximum opportunity to engage with iLAUNCH and to obtain support in addressing product specific commercialisation challenges.

Skills Shortage

iLAUNCH will address the skills shortage in the space manufacturing sector by co-designing a series of micro-credential courses with its industry partners. UniSQ and the partner universities will also incorporate this material into elective undergraduate courses to provide graduates access to a minor in Space Technologies.

iLAUNCH has teamed up with advanced materials and manufacturing training centres to deliver tailored apprenticeships and training programs suited to the space manufacturing industry, with downstream benefits to the aerospace industry.

iLAUNCH will collaborate in programs such as the Re-engineering Australia (REA) Space in Schools program³ to inspire school children, in particular primary school children, and support the development of home-grown talent for trades, engineering and science for the space manufacturing sector.

Links

Trailblazer Universities Program

<https://www.dese.gov.au/trailblazer-universitiesprogram/resources/trailblazer-universities-programguidelines>

2018 Space National Manufacturing Priority Road Map

<https://www.industry.gov.au/sites/default/files/February%202021/document/space-nationalmanufacturing-priority-road-map.pdf>

REA Space in Schools Program

<https://rea.org.au/space-in-schools/>

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