

Training Centre for Propulsion Systems and Launch Capabilities



An invitation

We seek the support of academia, industry and government partners to grow workforce talent through research and training in rocket technologies supporting Australian defence and space sectors. We invite you to engage with us.

The challenge

Without access to the technology and research needed to build and launch rockets in country, Australia is reliant on foreign countries for key guided weapons technologies and lacks the launch capabilities needed for access to space. To grow our sovereign strategic defence capability and to be a global competitor in space, Australia must become self-sufficient in propulsion and launch technologies, supported by a network of technical experts and researchers.

This strategic necessity is occurring in an economic climate that has created stiff competition for skills, especially from nationwide programs in renewable energy, nuclear submarines and housing construction. To be successful, the guided weapons and space industries must act collectively to help build the required workforce.

Our vision

We envision a future where Australia is a well-known developer of advanced rocket technology, with its own independent guided weapons manufacturing and a heavy launch capability in country. To support this vision, we propose combining resources from the defence, space and university sectors to contribute to mutually beneficial training and research.

Objectives

Realising this vision will require the expertise and capabilities of government, industry, and academia working together on the following objectives:

1. Building a research and training network within Australia in support of commercial and defence rocket propulsion and launch industries.
2. Developing novel IP and the associated modelling and simulation tools for manufacture, sustainment, mission planning and optimisation.
3. Establishing a critical mass of internationally recognised experts in rocket propulsion and launch technologies and a sustainable pipeline of graduates to support a rapidly growing industry.
4. Creating exciting career opportunities for talented STEM students, helping to overcome the brain-drain to international competitors.

These will be achieved through:

- **Fundamental research and research training** addressing the core scientific and engineering challenges involved in rocket propulsion and launch, in the following themes: (1) solid propulsion motors, (2) liquid, hybrid and novel propulsion systems, (3) advanced manufacturing and materials, (4) simulation, guidance, control and data-science, (5) systems engineering, (6) testing and evaluation, and (7) policy, sustainability, regulations and compliance.
- **Coursework and professional development** opportunities for students and industry partners to establish baseline knowledge and build specialist skills in key topics relevant to the industry.
- **Grand Challenge projects** to develop essential experiential training in rocket launch and flight testing, systems engineering, logistics, regulations and compliance, and project management.

Training centre concept

We are establishing a permanent and viable propulsion and launch training network to support Australia's sovereign guided weapons and access to space needs. The present proposal is the first large initiative in support of this vision, which will be a 5 year, \$10 million Australian Research Council (ARC) Industrial Transformation Training Centre. Our aim is to leverage \$5 million in industry and university cash plus in-kind contributions against up to \$5 million in ARC grant income.

The ARC program is explicitly designed to 'provide Higher Degree by Research (HDR) and postdoctoral training for industries vital to Australia's future'. Our training centre will link closely to undergraduate programs in aerospace engineering and related disciplines and will establish strong connections with student-led high-power rocketry teams.

All research students will be required to undertake up to 12 months of internship with industry sponsors ensuring an appropriate combination of fundamental and practical education and promoting talent retention with the partner organisations.

Benefits of being a partner

Industry partners will benefit from:

- access to a pool of graduates and early career researchers with deep domain-specific education, created through an appropriate mix of bachelor, master and PhD degree programs, and experiential training, through internships, rocketry teams and grand challenges.
- being part of a critical mass of invested people and organisations that has the capacity to influence government and industry on training in the propulsion and launch fields.
- being part of an initiative that fosters technical and policy creativity and a risk-taking entrepreneurial spirit.
- access to cutting-edge R&D that offers innovative solutions to critical challenges.
- access to the Australian Government's R&D Tax Incentive Scheme (pending eligibility).
- Foundation partners will have a guaranteed spot on the training centre advisory board with the ability to shape training activities and centre objectives.

What's required?

The ARC will award up to \$1 million in funding per year over 5 years (pending success in a competitive process). Partners make cash and/or in-kind contributions that, along with the ARC funds, are sufficient to support all the research projects and trainees.

To be involved, your organisation needs to provide:

- a cash contribution commensurate with its level of involvement. Contribution tiers are provided, but bespoke cash and in-kind contribution options can be discussed.
- an in-kind contribution of at least one technical expert as a 'partner investigator'.
- a formal letter of support.

Next steps

We are proposing a submission to the Industrial Transformation Research Program funding scheme with the following timeline:

- Aug. 2024** – Foundation Partner support letters
- Sep. 2024** – All Partner support letters
- Nov. 2024** – ARC proposal submission
- By Q4 2025** – funding outcomes announced
- Early 2026** – centre established, funding begins

Contact us

For more information about becoming an industry partner, please contact one of the leads from the University of Sydney, University of Queensland, RMIT University and Monash University:

Matthew Cleary m.cleary@sydney.edu.au
Kelisha Lyndon Kelisha.lyndon@sydney.edu.au
Vincent Wheatley v.wheatley@uq.edu.au
Adrian Pudsey adrian.pudsey@rmit.edu.au
Daniel Edgington-Mitchell Daniel.Mitchell@monash.edu

We look forward to hearing from you.



THE UNIVERSITY OF
SYDNEY



MONASH
University



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA



RMIT
UNIVERSITY

This initiative is supported by the Australian Rocket Systems Training Network (ARSTN). Register at: dsi.sydney.edu.au/research/defence/arptn/