**Application for research funding**

**Autonomy, Artificial Intelligence and Quantum Technology Applications for Modernisation of the RAE Equipment Fleet over Horizons 1, 2 and 3**

Applications close 17:00 ACST on Monday 30th September 2024.

*Please contact Gregory Davis at the Centre for Advanced Defence Research -* *cadr\_ras@adelaide.edu.au* *with any questions.*

**Introduction**

The Centre for Advanced Defence Research in Robotics and Autonomous Systems (CADR-RAS) was established at the University of Adelaide in June 2021 with funding from the Defence Science and Technology Group (DSTG). The Centre is part of DSTG’s [Defence Science Partnerships Program](https://www.dst.defence.gov.au/partner-with-us/university).

The main focus of the Centre is to provide a streamlined contracting mechanism for defence work in the RAS space. The Centre adds value through enabling oversight of defence RAS research across Australia and so encouraging collaboration and reduced overlap.

The objectives of the CADR-RAS are:

1. Address the needs of the defence, focusing on robotics and autonomous systems.
2. Gain a profound understanding of autonomy, including:
	1. Creating STEM programs in robotics and autonomous systems for defence personal.
	2. Exploring multi-vehicle teamwork among autonomous machines.
	3. Developing interfaces between humans and autonomous systems
	4. Enhancing machine perception and planning.
3. Create prototype capabilities based on cutting-edge research.
4. Put emerging capabilities into practical use in real operations.

**Project Funding**

There is $160,000 allocated for this project. Co-investment is permitted, but not required.

It is expected that the successful projects will be completed within 12 months of the funds being awarded.

In preparing your application, you may like to read:

* [ADF Concept for Robotics](https://defence.gov.au/vcdf/forceexploration/_Master/docs/ADF-Concept-Robotics.pdf)
* [ARMY RAS strategy](https://researchcentre.army.gov.au/sites/default/files/2020-03/robototic_autonomous_systems_strategy.pdf)

**CADR-RAS Research Study**

**Conduct a technology / literature / market survey to understand how Robotics and Autonomy Systems (RAS), & Artificial Intelligence (AI), can be used to modernise and enhance the capabilities currently held and being introduced into service under L8120 Engineer Support Platforms.**

**Background for the Research Project**

From conducting high intensity war fighting to providing Humanitarian Assistance and Disaster Relief (HADR), the Australian Defence Force (ADF) is required to undertake activities to lift and move stores; clear, repair and construct critical infrastructure such as airfields, roads and ports, and shape terrain in order to enable joint land combat and increase the survivability and sustainability of the force.

Project LAND 8120 will replace the ADF fleet of Class C (earthmoving) and Class D (material handling) vehicles, collectively known as Engineer Support Platforms. These platforms are employed in Australia and deployed overseas on operations spanning the full spectrum of conflict as well as Defence Assistance to the Civil Community (DACC).

This CADR-RAS project is a technology/literature/market survey to understand how Robotics and Autonomy Systems (RAS), Artificial Intelligence (AI) can be used to modernise and enhance the capabilities currently introduced into service via L8120, and how this modernisation can be achieved and implemented across Horizons 1, 2 and 3.

The intent of this project is to work with technology subject matter experts both within and without the Department of Defence, Original Equipment Manufacturers, and equipment operators and managers, to understand the current state of the art of autonomous engineer vehicles and what RAS-AI technologies could be implemented in near, medium and long term (Horizons 1, 2 and 3)

**Aims of Research Project**

The aims of this CADR-RAS project are to document the current state of the art of autonomous engineer vehicles and what RAS-AI technologies could be implemented in near, medium and long term (Horizons 1, 2 and 3) IOT:

1. Deliver engineer effects autonomously at a variety of scales (ie individual vehicles performing simple tasks v teams of engineer vehicles operating cooperatively but autonomously such as the excavation of complex battle positions), across a variety of environmental conditions, (such as, but not limited to, soil types and lighting conditions)
2. Reduce any requirement to put Engineer vehicle operators in harm’s way

The CADR-RAS project should differentiate the feasibility and opportunities involved of autonomous technologies being implemented in the different classes of vehicles, including of Class C (earthmoving) and Class D (material handling) vehicles.

**Eligibility**

To be eligible to apply for this grant you must meet the following conditions:

1. Applications are open to academics from universities who are signatories to the [Defence Science Partnerships Program](https://www.dst.defence.gov.au/partner-with-us/university) (DSP) 2.0.
2. Academics must hold a salaried University appointment for the expected duration of the grant – minimum 0.2FTE.
3. Applications may be from a single institution or multi-institutional.

**Assessment**

Awarding of the contract is made at the discretion of the CADR-RAS and the DSTG Program Science and Technology Director, with oversight from the CADR-RAS Technical Committee and Steering Committee. The Committees comprise members from DSTG, The University of Adelaide, Robotic & Autonomous Implementation & Coordination Office (RICO) (The Australian Army).

In responding to these questions, applicants should seek to address real world applicability of the solutions posed and discuss any assumptions and how they may influence implementation and performance in a real system. For example, if an assumption is made in regard to immediate access to information from a set of agents, then a discussion around the robustness of the approach when confronted with network latency and how this may be addressed would be prudent.

**Timeline**

The funding call opens on 9:00 ACST Friday 23rd August 2024

Applications close 17:00 ACST on Monday 30th September 2024.

We expect to announce the outcomes from the call by week commencing 21st October 2024.

Applications are to be emailed to *cadr\_ras@adelaide.edu.au*

## Applicant details

### Applicant details (lead institution)

|  |  |
| --- | --- |
| Name: |  |
| Lead institution: |  |
| Email address: |  |
| Phone number: |  |

### Does the application have support of your university?

|  |  |
| --- | --- |
| [ ]  Yes | [ ]  No |

*(Please provide a letter of support from a senior university representative e.g. Head of School, Dean, Centre Director)*

### Are you submitting this application in conjunction with another institution?

|  |  |
| --- | --- |
| [ ]  Yes | [ ]  No |

If yes, please list the name of the Institution and the value the collaboration brings to the project

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### Has this project been prepared in conjunction with a Defence Science and Technology Group (DSTG) researcher?

|  |  |
| --- | --- |
| [ ]  Yes | [ ]  No |
| If yes, name of DSTG researcher |  |

### Have any researchers for this project conducted research for Defence Science and Technology Group (DSTG) or the Australian Defence Force?

|  |  |
| --- | --- |
| [ ]  Yes | [ ]  No |

If yes, please list the name(s) of the Defence project Lead.

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## Project details

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|  |
| 2.1 Proposed / preferred project start date: Click or tap to enter a date. |
|  |
| 2.2 Proposed project completion date: Click or tap to enter a date. |

## Project need

### Please describe the research need.

### You *may* want to into account:

* Similar works being conducted in the academic community.
* What is new in the approach and why it will be successful?
* Real world applicability.
* How solutions influence implementation and performance in a real system.
* Any assumptions.

Max 300 words

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## Research Program

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| --- |
| **Research Program** |
| **Role or task** | **Where task is to be carried out** | **When task is to be completed** | **Comments (eg Required Specifications, performance indicators)** |
|  |  |  |  |
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## Deliverables

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| --- |
| **Deliverables (including reports) Timetable** |
| **Report or other deliverable title** | **Description** | **Delivery format and delivery location** | **Delivery date** |
|  |  |  |  |
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### What are the key risk areas for the project and how do you intend to mitigate these?

Max 200 words

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## Budget

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| --- | --- | --- |
| **Budget Item** |  | **Amount in AUD (exclusive of GST)** |
| 1. Salaries for University research staff: |  |  |
|  |  |  |
| 2. University infrastructure costs: |  |  |
|  |  |  |
| 3. Material/consumables: |  |  |
|  |  |  |
| 4. Travel: |  |  |
|  |  |  |
| 5. Other: |  |  |
|  |  |  |
| Total funding requested |  |  |

## Key Persons

Please include a Curriculum Vitae (CV) no longer than 2 pages for the proposed Chief Investigator of the project.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Position at University** | **Task/Role** | **Time commitment to project (%)** |
|  |  |  |  |
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## Letter of support

Please provide a letter of support from a referee with no direct financial interest in this project. Referees should comment on the applicant’s ability to deliver the project, the need for the project and the proposed methodology.

## Submission checklist

Please ensure that in addition to this form you attach:

[ ]  Letter of support from a senior representative from your university.

[ ]  2-page CV of Chief Investigator.

[ ]  1 letter of support.

Please submit your final application to Gregory Davis, Centre Manager CADR-RAS at *cadr\_ras@adelaide.edu.au*