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# **Centre for Advanced Defence Research in Robotics and Autonomous Systems**

## Application for funding - Round 1

## 11 May 2022

Applications close 17:00 ACST on Tuesday 21 June 2022.

*Please contact Carolyn Ramsey at the University of Adelaide* [*carolyn.warren@adelaide.edu.au*](mailto:carolyn.warren@adelaide.edu.au) *with any questions.*

1. **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 objectives of the CADR RAS are:

1. to respond to Land Domains’ capability and operational research requirements in relation to robotics and autonomous systems (RAS);
2. to develop deep understanding of autonomy, including the ability to:
   1. develop Science, Technology, Engineering and Mathematics (STEM) activity for RAS Officers at the Australian Defence Force Academy (ADFA)
   2. develop and investigate multi-autonomous vehicle teaming
   3. develop human to machine interfacing with autonomy
   4. develop machine perception and appropriate associated planning activity;
3. to build prototype capabilities based on emerging research in the field of RAS; and
4. to translate evolving capability to operations.

This first funding round is seeking responses to **three (3) research questions**. Applicants may submit expressions of interest for one of more of the research questions.

**Project Funding**

There is a total funding pool of $1.8 million. A typical project is expected to be around $600,000, however we welcome proposals for any amount up to the funding cap.

Co-investment is permitted, but not required.

It is expected that the successful projects will be completed within 24 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 Round 1 Research Questions**

1. How does one ensure robust performance (e.g., within certain bounds/policy) of an (adaptive) autonomous system or system of such autonomous systems in spite of environmental uncertainty and deliberate attack?
2. How do members of a multi agent system (MAS) represent and communicate their capabilities, goals, and behavioural intent to one another and, considering this, create appropriate composite behavior (of the MAS), understanding the impact of their actions upon others?
3. How do agents in a multi-agent heterogenous system work together to fuse data and information about the world, contextual knowledge, and their own hypotheses and/or intentions to produce cohesive/coherent behavior in dynamic, disrupted contexts?
4. **Eligibility**

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

2.1 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.

2.2 Academics must hold a salaried University appointment for the expected duration of the grant – minimum 0.2FTE.

2.3 Applications may be from a single institution or multi-institutional.

**Assessment**

All awards are made at the discretion of the Steering Committee of the CADR RAS. Applications will be shortlisted by the CADR RAS Technical Committee with final sign off by the Steering Committee. The Committees comprise members from DSTG, The University of Adelaide, Trusted Autonomous Systems Defence CRC, Robotic & Autonomous Implementation & Coordination Office (RICO) and 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 regards 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.

We are generally looking for projects that are in the lower technology readiness level (TRL) range.

1. **Timeline**

Round one opens on 11 May 2022.

Applications close 17:00 ACST on Tuesday 21 June 2022.

We expect to announce the outcomes from the round by August 2022.

Applications are to be emailed to [carolyn.warren@adelaide.edu.au](mailto:carolyn.warren@adelaide.edu.au)

1. **Application form**

### 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

|  |
| --- |
|  |

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

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

### Projectdetails

|  |
| --- |
| 2.1 Which of the 3 CADR-RAS Research Questions does your project intend to answer?  (You can select more than one) |
| Choose an item.  Choose an item.  Choose an item. |
| 2.2 Title of Research Project: |
|  |
| 2.3 Background of Research Project:Max 150 words |
|  |
| 2.4 Aims of Research Project:Max 200 words |
|  |
| 2.5 Summary of Research Project:Max 300 words |
|  |
| 2.6 Total funding request: AU$ |
|  |
| 2.7 Proposed project start date: Click or tap to enter a date. |
|  |
| 2.8 Proposed project completion date: Click or tap to enter a date. |

### Project need

### 3.1 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

|  |
| --- |
|  |

### Research Program:

### 

### 4.1 Research Program

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

### 4.2 Deliverables

|  |  |  |  |
| --- | --- | --- | --- |
| **Deliverables (including reports) Timetable** | | | |
| **Report or other deliverable title** | **Description** | **Delivery format and delivery location** | **Delivery date** |
|  |  |  |  |
|  |  |  |  |

### What are the key risk areas for the project and how do you intend to mitigate these?

Max 200 words

|  |
| --- |
|  |

## Budget

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

## 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 Carolyn Ramsey, Centre Manager CADR-RAS at Carolyn.warren@adelaide.edu.au.