QDSA-DIN Quantum Sensing Grant 2026

Guidelines

1. Background and Purpose

1.1 The QDSA-DIN Quantum Sensing Grant is designed to strengthen national collaboration and enhance research and development capabilities within Australia's defence sector. Jointly delivered by the Queensland Defence Science Alliance (QDSA) and the NSW Defence Innovation Network (DIN), the program promotes cross-institutional and cross-state partnerships by connecting researchers from QDSA and DIN member universities to co-develop innovative solutions aligned with Defence's Innovation, Science and Technology (IS&T) priority areas.

1.2 The grant supports multi-disciplinary teams to undertake early-stage research at Technology Readiness Levels (TRL) 2 to 5, over a period of 12 to 18 months. The program aims to validate the scientific and technical potential of novel concepts, helping bridge the gap between fundamental research and practical defence applications. Projects are expected to generate promising outcomes that position them for further investment and development beyond the grant's completion.

2. About the Grant

2.1. The Quantum Sensing Grant supports multi-disciplinary collaborations between academics from QDSA and DIN member universities, industry and other Australian universities to accelerate the translation of technologies into Defence capability.

2.2. Applicants should scope project proposals only within the problem statement published in the call for proposals.

2.3. The funding scheme is administered by the Queensland Defence Science Alliance and the Defence Innovation Network.

3. Funding

3.1. $400,000 is available to support R&D projects aligned with the published topics.

3.2. QDSA and DIN will support one project with eligible costs to a maximum of $400,000 scoped for 12–18 months. The project budget will be assessed on merit, and the panel reserves the right to amend project funding.

3.3. To ensure equitable collaboration, funding must be evenly distributed between QDSA and DIN member institutions. For example, a project awarded $400,000 must allocate $200,000 to QDSA-affiliated partners and $200,000 to DIN-affiliated partners.

4. Eligibility

4.1. Proposals must demonstrate multi-disciplinary and multi-institutional collaboration. Projects must be led by a QDSA or DIN member university with substantive inputs from at minimum one QDSA member university and one DIN member university, as listed in section 4.9.

4.2. DIN encourages the participation of diverse project teams in the funding program. Gender, culture, and career seniority diversity of project teams are strongly encouraged.

4.3. Project teams must consist of academics only from Queensland, Northern Territory, New South Wales and Australian Capital Territory who are members of QDSA or DIN.

4.4. Accordingly, projects involving industry partners and/or publicly funded research agencies should only rely on contributions from key personnel in exceptional circumstances and where the capability is absent from QDSA or DIN member universities. The contributions of such institutions will be governed by terms consistent with those governing QDSA and DIN member institutions.

4.5. Industry involvement and co-funding are strongly encouraged but are not necessary for a successful proposal. Similarly, strong connections with the Defence Science and Technology Group or the Australian Defence Force are favourable.

4.6. The lead organisation must submit the application on behalf of all project partners. Applicants are required to nominate a lead university in each participating state, responsible for managing the grant within their respective network.

4.7. All proposals must be approved and supported by each university participating in the project. Researchers must connect with the university coordinators listed in section 4.9 to receive support letters for their applications.

4.8. Eligible lead organisations

Queensland Defence Science Alliance (Queensland and the Northern Territory)

- Charles Darwin University / Ksenia Sawczak
- Griffith University / Tori Brown
- James Cook University / Mick Reilly
- University of Queensland / Mike Brennan
- University of Southern Queensland / Hunter Walkenhorst
- University of the Sunshine Coast / Adrian McCallum

Defence Innovation Network (New South Wales and the Australian Capital Territory)

- Australian National University / ANU Defence Institute
- Charles Sturt University / Dr Arif Khan
- Macquarie University / Matt van Breugel
- University of New South Wales / Joshua Sherman
- University of Newcastle / Bret Barton
- University of Sydney / Nicole Makoviney
- University of Wollongong / Ryah Perkiss
- University of Technology Sydney / Thomas Leoni
- Western Sydney University / WSU Business Services

4.9. Eligible individuals*

4.9.1. All project participants must be Australian Citizens.

4.9.2. Individual researchers must be affiliated with a QDSA or DIN University Member.

4.9.3. It should be noted; participating researchers must pass due diligence checks.

4.10. Eligible industry partners**

4.10.1. QDSA and DIN strongly encourage industry participation in these university-led projects.

4.10.2. To be eligible, industry partners must have an Australian Business Number (ABN) and must be registered as a company (individuals, partnerships and trusts do not qualify as industry partners) and have a physical presence in Australia.

4.10.3. Employees of the industry partner associated with the project will be subjected to the same restrictions as listed in clauses 4.10 and 5 and any other conditions imposed by the Defence.

4.10.4. IP arrangements with industry partners must be such that the IP and manufacturing or production of any good flowing from the project remain in Australia.

4.10.5. Allied defence organisations may be eligible to participate and will be considered case-by-case.

** Note: Universities can decline support for researchers where there is a risk that researchers might be involved in activities of security concern. These concerns could include, but are not limited to involvement in, or support or advocacy of, any act of espionage, foreign interference, attacks on Australia's Defence system, or serious threats to Australia's territorial or border integrity; or any employment or service, whether compensated or voluntary, with the government of a foreign country, or any foreign national, organisation or other entity. Universities are required to promptly disclose any information regarding such concerns to QDSA and DIN who reserve the right to deny or terminate the participation of researchers in the program.*

*** Note: Eligibility criteria and final security requirements for each project will be determined in consultation with Defence but will, at a minimum, include the specified criteria above.*

5. Obligations Of Project Partners

5.1 All project participants must agree to terms that restrict access to the R&D data and other Intellectual Property (IP) to the nominated team members to conduct the project work.

5.2 Any additional team members must be approved by QDSA and DIN and must agree to any and all terms contained in the primary contract between the parties.

5.3 Develop Intellectual Property (IP) and manufacturing or production capabilities that will benefit Australia.

5.4 All participants must assign or have assigned IP to the Institution either by virtue of employment contracts or by separate agreements.

5.5 Participants must keep their involvement in the Initiative confidential unless advised otherwise. In line with Defence guidelines, the identities of successful teams may not be made public. Any announcements of successes will be only general.

6. Use of Funds

6.1. Funding from the QDSA and DIN will take the form of a cash contribution following the execution of multi-institutional funding agreements between participating organisations.

6.2. The funding will be paid to the lead organisation. The Leading organisation is responsible for distributing the funds to Collaborating organisations.

6.3. Funds must be used to support the research project described in the application directly and can include the following items:

6.3.1. ***Direct salary costs*** for employees working on the project, including chief investigators, early career researchers, research assistants etc. Where chief investigator salaries are claimed, this must be specifically justified and is subject to approval. It is preferred that the funds are used for research associates and –fellows working directly on the project rather than CI salaries.

6.3.2. ***On-cost salary expenses*** up to a maximum of 30% of direct salary costs and consistent with the university policies. On-costs must be itemised in the application and can only include the following items: superannuation, payroll tax, payroll tax on superannuation, workers' compensation, long service leave, and maternity leave. Universities must submit their on-cost salary expenses itemised by each category as an attachment to the application form, demonstrating compliance with this directive.

6.3.3. ***Equipment, software, material and consumables*** essential for the project. Funding will not be provided for equipment and consumables for general use or already held by the university.

6.3.4. ***Travel costs*** essential to the project for the employees working on the project.

6.3.5. ***Stipends or top-ups for HDR students*** **working on the project**. However, given the term of the projects (12-18 months), budget line items for PhD stipends must be specifically justified and are subject to approval.

6.4. Budget items that are NOT supported by the funding and should NOT be requested in the budget include:

6.4.1. ***Infrastructure*** *(overhead) costs* related to the general operations of the university shared among projects and functions

6.4.2. ***Costs*** *not directly related to the project,* including but not limited to conference fees, workshop expenses, entertainment costs, professional membership fees, professional development courses, visas, relocation costs, insurance and other indirect costs

6.5. Applicants must itemise all expenses in the budget section of the grant application. Grant funds must be spent in accordance with the budget, and any requests for variations must be made in writing to the QDSA or DIN and approved in advance.

6.6. The funding committee reserves the right to tailor funding support according to what it believes is required to deliver the project.

7. Assessment Criteria

7.1. Applications will be assessed against information and evidence provided in relation to the following selection criteria. Applicants should also take note of the instructions and guidance to reviewers below.

7.1.1. **Alignment** Project proposals should be aligned with the Grant Theme and Topics outlined in ANNEX A: Innovation Grant Theme and Topics, which were drawn from the Defence IS&T Priorities, National Defence Strategy, Integrated Investment Program, and wide consultation with Defence stakeholders.
Applications should demonstrate this by:

7.1.1.1. listing the Innovation Grant Topics that the project will focus on.

7.1.1.2. describing how some or all of the challenges will be addressed for each Topic.

7.1.2. **Collaboration** Breadth of the research team, comprising staff from multiple institutions. Collaboration across more than one member university is required. Successful applicants must demonstrate collaboration across Queensland QDSA member universities and DIN member universities, and optionally across Northern Territory QDSA member universities.

Collaboration builds resilience and depth to a research proposal and addresses the intent of the program to support cross-disciplinary research and build academic and industry communities.

Applications should demonstrate this by describing:

7.1.2.1. any other ADSUN university staff on the research team, preferable from more than one QDSA or DIN member university.

7.1.2.2. any industry partner as part of the research team, preferably Queensland or New South Wales based.

7.1.2.3. any engagement of support from Defence, such as from the Defence Science and Technology Group or uniformed Defence member (where Protected Identity constraints allow).

7.1.2.4. Unique roles and responsibilities the team members will bring to the project

7.1.3. **Feasibility** assesses the ability of your proposed team, funding, and schedule to achieve the scope of the proposed project. It is not an assessment of the research topic per se, but rather in the confidence in achieving the project outcomes.

Applications should demonstrate this by describing:

7.1.3.1. the experience of the collaborators and their track record in achieving successful research outcomes.

7.1.3.2. mitigating factors to reduce the perceived technical risks.

7.1.3.3. previous risk-mitigation measures which have been conducted to mature the Technology Readiness Level to date.

7.1.3.4. any access requirements for specialist resources, platforms, infrastructure, equipment, or personnel and how this will be enabled.

7.1.3.5. any approvals (ethics, security clearances) required for this project and how they will be obtained.

7.1.3.6. a development timeline with broad expected milestones.

7.1.4. **Effectiveness and impact** are subjective assessments which consider how your application enhances ADF operational capability, secures strategic advantage, growth of sovereign industry capability, or economic development for Queensland and New South Wales.

Applications should demonstrate this by describing:

7.1.4.1. anticipated project outcomes.

7.1.4.2. how the project addresses priority areas for Defence, as outlined in current strategic guidance released by Defence or related agency.

7.1.4.3. how the project addresses sovereign industry capability needs.

7.1.4.4. how the project and collaboration partners will influence the change.

7.1.4.5. the relevance of the Defence endorsement, or previous Defence engagement which supports your project

7.1.5. **Funding Requested and Co-investment** Perceived value for money the proposal brings to Defence with reference to quantum of the dollars requested against the outcomes likely to be achieved.

Applications should describe:

7.1.5.1. any co-contributions in cash or in-kind from team members.

7.1.5.2. any co-investment from a Defence industry partner. Co-investments from multiple organisations which exceed the funding requested are favourable, as are in-kind contributions.

7.1.5.3. a budget which provides a breakdown of costs and expenses by State of origin, including where the funds are coming from, how they'll be used and any criteria for future contributions. Please refer to the Use of Funds section for more information on eligible and ineligible expenses.

8. Application Process

8.1. Applicants must develop their proposals in response to the topics defined within Annex A of these Guidelines.

8.2. **Completed application must be submitted by 5 pm (AEST), 20 July 2026 using the form at https://qdsa.au/**

8.3. QDSA and DIN can connect researchers looking for collaborators on request before the application closing date.

8.4. Points of clarification related to this RFP can be directed to info@qdsa.au .QDSA and DIN will respond as quickly as possible.

9. Selection Process

9.1. Applications that have conformed to the application process requirements and are deemed to be within the scope of the call will be subjected to a competitive review process. Peer reviewers, including DSTG experts, provide their recommendations to the ADSUN Technical Review Panel.

9.2. The ADSUN Technical Review Panel will consist of selected representatives from QDSA and DIN, as well as subject matter experts from DSTG, and any additional co-opted members as deemed appropriate.

9.3. The QDSA Governance Board and DIN Steering Committee (or their delegates) will approve the funding of the successful project(s) based on recommendations of the ADSUN Technical Review Panel.

9.4. All applicants will be informed of the outcome of their applications and whether or not they are successful.

9.5. The indicative timeline for the selection process is outlined below and may be adjusted as necessary.

12 June 2026	Call for proposals is published
17 June 2026	Information webinar
20 July 2026	Proposals due date
16 – 30 August 2026	Assessment process
07 September 2026	Results announced
January 2027	Project start

10. Funding Agreement, Reporting Requirements & Acknowledgement

10.1. Successful applicants who accept a grant offer must enter into a grant agreement. The agreement will specify the obligations and accountabilities of the recipient project. Each network will be responsible for executing funding agreements with its respective member universities.

10.2. Intellectual Property (IP) generated through the project will be owned by the participating organisations, in accordance with their internal negotiations and collaborative agreements. All participating universities must sign the Defence IP Deed, which grants Defence rights to access and use the project IP.

10.3. Where an industry partner is involved in the project, the lead university will be responsible for negotiating and executing any necessary agreements with the industry party on behalf of the project team.

10.4. Projects must not start until agreements are fully executed.

10.5. The lead organisations will be required to provide a final report to each network within two months of the project's end date.

10.6. Final and mid-term reports consist of a Technical Report and Financial acquittal. The lead organisation submits the financial acquittal for the project as a whole, including the financial acquittal of Collaborating organisations.

10.7. Following project completion, the team will also be required to organise a demonstration or presentation of the developed capability to the networks and their defence and industry stakeholders. This event will serve as an opportunity to showcase project outcomes and explore pathways for further collaboration or transition.

10.8. All expenditures must be in accordance with the project description and broad structure of the proposed project cost detailed in the proposal. The Lead organisation must retain the evidence of the expenditure.

10.9. All changes to the project timeline, staffing, costs or roll-over of the funds must be justified and approved in writing by the respective network.

10.10. Any material or research findings published in respect of the Joint ADSUN Innovation Grant must include an acknowledgement in the form: *"We thank the Queensland Defence Science Alliance and the Defence Innovation Network for financial support of this project funded by the joint ADSUN Innovation Grant."*

ANNEX A: Innovation Grant Theme and Topics

Theme: Quantum Sensing for Extreme Environments

Proposed projects will investigate sensor performance and optimisation under harsh conditions. They are expected to conclude with a field demonstration.

Topics/Context

Operational environments would include hot, humid and dusty climates as well as those with large temperature variations. Systems would also be expected to operate effectively under high acceleration/large g-forces. At the same time, desirable characteristics include robustness, low size, weight, power and cost (SWaP-C) and high availability.

The Topics relate to potential Defence applications which include:

1. Autonomous systems
2. Undersea navigation
3. Subsurface detection
4. Hypersonic vehicles
5. Radio Frequency sensing

Each is discussed in further detail below, with a list of challenges faced to provide context.

A.1. Autonomous Systems (Air, Land, Sea and Undersea)

Autonomous defence platforms rely heavily on GPS, inertial measurement units (IMUs), RF sensors, cameras and lidar for navigation, positioning and situational awareness. These systems face several challenges:

- **GPS denial or degradation** due to jamming, spoofing or operating in environments where GPS is unavailable (indoors, underground, underwater).
- **Error drift** in conventional IMUs over time, particularly during long-duration missions without external updates.
- **Environmental degradation**, including vibration, shock, temperature extremes and electromagnetic interference, which reduce sensor accuracy and reliability.
- **Limited perception in complex or obscured environments**, such as dust, smoke, foliage, or underwater.
- **Trade-offs between sensitivity, bandwidth, size, weight, power and cost (SWaP-C)**.

Quantum sensors, including atom-interferometry-based inertial sensors and quantum magnetometers, can significantly enhance autonomous system capability by providing ultra-low-drift navigation that maintains accurate localisation over extended periods without reliance on GPS. Their inherently passive operation reduces detectability and

vulnerability to jamming or electronic attack, while atomic reference standards enable improved robustness under high vibration, shock and acceleration when appropriately engineered. Additionally, quantum sensing can exploit subtle gravitational or magnetic anomalies for terrain-referenced navigation, improving situational awareness and resilience in complex or obscured environments such as dust, foliage or underwater settings.

A.2. 2. Undersea Navigation

Undersea operations present one of the most severe sensing environments:

- **GPS signals do not penetrate water**, forcing reliance on dead-reckoning, acoustic navigation aids or surfacing for position updates.
- **Acoustic systems are bandwidth-limited**, vulnerable to interference, and risk revealing platform location.
- **Navigation uncertainty accumulates rapidly**, particularly for long-range submarines and autonomous underwater vehicles (AUVs).
- **Harsh conditions**, including pressure, salinity, temperature gradients and biofouling, degrade sensor performance.

Quantum sensing offers benefits for undersea navigation by enabling non-acoustic, non-RF localisation methods that operate effectively in GPS-denied environments. Quantum inertial navigation systems based on cold atoms provide long-duration, drift-resistant navigation without external updates, significantly reducing accumulated position error during extended missions. When combined with quantum gravimeters and magnetometers, platforms can perform map-matching against known gravitational or magnetic fields, reducing reliance on active emissions or surfacing. This enhances stealth, survivability and mission endurance for submarines and autonomous underwater vehicles operating in maritime environments.

A.3. Subsurface Detection

Detecting underground or buried structures (tunnels, bunkers, cables, mines) is difficult because:

- **Conventional radar and seismic methods** have limited penetration depth and resolution, depending strongly on soil composition and moisture.
- **High false-alarm rates** arise from environmental clutter and geological variability.
- **Operational constraints** such as urban environments, noise and access limitations reduce effectiveness.
- **Slow survey times** limit tactical responsiveness.

Quantum sensing introduces new passive detection modalities for subsurface threats by enabling the measurement of extremely small variations in gravity and magnetic fields. Quantum gravimeters can detect density anomalies associated with tunnels, voids or buried infrastructure, while high-sensitivity quantum magnetometers can identify ferrous objects or soil disturbances that are difficult to resolve using conventional radar or seismic approaches. Because these sensors operate passively, they are well suited to covert operation in urban or complex environments, and their potential integration onto mobile or airborne platforms allows faster surveys and greater operational flexibility for counter-tunnelling, base protection and border security missions.

A.4. Hypersonic Vehicles

Hypersonic platforms experience some of the most extreme operational conditions:

- **Very high temperatures**, plasma formation and thermal gradients that degrade conventional electronics and sensors.
- **High g-forces and vibration**, challenging inertial sensors and structural integrity.
- **Communications blackout** due to ionised plasma, limiting external navigation updates.
- **Precision guidance requirements** at extreme speed and manoeuvrability.

In hypersonic flight regimes, quantum sensing can address critical navigation and guidance challenges by providing high-precision inertial measurements based on atomic references that retain accuracy under extreme acceleration, vibration and radiation exposure. These sensors offer navigation independent of external signals, reducing vulnerability during communication blackout events caused by ionised plasma. Improved inertial accuracy directly supports guidance, control and manoeuvrability at extreme speeds, while the potential to integrate quantum sensing elements with advanced materials and thermal protection systems aligns with future hypersonic vehicle architectures operating in severe thermal and mechanical environments.

A.5. Radio Frequency (RF) Sensing

RF sensing underpins radar, electronic support and spectrum awareness, but faces:

- **Electromagnetic congestion**, making signal discrimination increasingly difficult.
- **Low-probability-of-intercept (LPI) and low-observable systems**, reducing detectability using conventional receivers.
- **Susceptibility to jamming and spoofing**.

Quantum-enabled RF sensors, such as Rydberg-atom-based receivers, can substantially enhance spectrum awareness and electronic warfare capability by offering exceptional sensitivity to weak or distant RF signals across broad frequency ranges using a single sensor architecture. Their intrinsic calibration, traceable to atomic properties, provides improved accuracy and long-term stability compared with conventional receivers, particularly in electromagnetically congested environments. These attributes support detection of low-probability-of-intercept and low-observable emitters, increase resilience to jamming and spoofing, and enable smaller, lower-power sensor designs suitable for deployment on constrained platforms.

Summary

Across all listed Defence applications, quantum sensing addresses fundamental limitations of classical sensors by offering:

- Higher precision and stability
- Passive, emissions-free operation
- Resilience to jamming and spoofing
- Improved performance in harsh, contested and denied environments

These attributes align strongly with Defence needs and make quantum sensing a compelling enabler for future Australian Defence capabilities under the ADSUN Innovation Grant theme.