Australian Government
Defence

ASCA
Advanced Strategic
Capabilities Accelerator

ASCA - Emerging and Disruptive Technologies Opportunity Statements

1. Introduction

The Advanced Strategic Capabilities Accelerator (ASCA) connects and streamlines Defence innovation, science and technology systems, driving capability development and acquisition pathways.

ASCA takes a holistic approach to innovation; supporting the exploration of emerging and disruptive technologies, identifying innovations that can be rapidly adapted for military purposes and delivering asymmetric capabilities to Defence via Missions.

ASCA is currently calling for white paper proposals as part of its Emerging and Disruptive Technologies (EDT) program in the following areas:

- **Quantum Technologies**: Quantum enabled technologies in precision sensing, enhanced computational capability and secure communications which have the potential to provide capability advantage for Defence. (refer to Annex A to this SOW)

- **Synthetic Media/Disinformation:** Detecting and countering the effects of AI-powered technologies that blur the line of what's real through convincing and mass-scale fake video, imagery, audio and text. (refer to Annex B to this SOW)

2. Multi-Stage Process

Stage 1.1: Call for White Paper

The white paper template can be found as an attachment to the ATM and are to be 4 pages in total. The white paper should provide an approach for technology exploration which will deliver discovery, new knowledge, concepts or prototypes which take a tangible step towards progression of the technology to support the Australian Defence Force's (ADF's) future requirements. Responses should include a proposed program of work up to $3m over a duration of up to three years.

Stage 1.2: Evaluation Criteria

The evaluation criteria for the call for white paper process are as follows, not in any order of importance:

a. Potential to deliver asymmetry/game-changing advantage to the ADF
b. Alignment with Strategic Priorities
c. Capacity to deliver (including track record of delivery, access to specialist skills, capability and infrastructure and leverage from other programs, relationships and partnerships*)

Additional information can be found under clause 21 Proposal - Evaluation Criteria of the RFP Conditions.

Stage 1.3: Shortlisting Co-design

Project leads from a limited number of shortlisted white papers will be invited to participate in co-design workshops in **February/March 2024** together with Defence technology specialists and Military end users. These workshops will explore the proposed approach, asymmetric potential and develop detailed project plans. The anticipated time burden to participate in the design and planning stages is 2-3 days with some face-to-face participation required in Canberra. Travel and ancillary costs associated with participation in the co-design workshops will be supported by ASCA. Workshop participants may be required to sign a non-disclosure agreement. Some workshops may be restricted to personnel with the appropriate security clearances.

Stage 2.1: Subsequent Procurement Process – Limited Tender

Upon completion of the shortlisting phase, all detailed projects developed in the workshops will be assessed for funding through a competitive selection process. Workshop participation does **not** guarantee funding.

It is intended that only shortlisted respondents will be requested to submit tenders in response to the refined proposal through a Co-design process. The preferred tender to any subsequent procurement process will be selected on the basis of value for money.

Stage 2.2: Contract Arrangement

Respondents are advised that any subsequent procurement process will be governed by its own conditions of proposal, including a draft contract. In this process, it is proposed that the draft contract will be based on the Defence Science Partnerships (DSP 2.0) or Research Industry Contract v2.3 templates, modified as considered appropriate by the Commonwealth.

* Any existing connections with DSTG should be highlighted as part of the proposal

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Annex A

Quantum Technologies Overview

Quantum Technologies (QT) harness the unique properties of quantum mechanics to develop disruptive technologies for a large range of applications including precision sensing & imaging, powerful computational capability and secure communications networks. These technologies are diverse, complex and generally in the early stages of technical readiness with their true capabilities, limitations, most disruptive applications and associated counter-measures still being discovered.

The 2023 National Quantum strategy outlines Australia's vision for 2030 to be recognised as a leader of the global quantum industry. ASCA's Emerging and Disruptive Technologies Program will help to support this vision and growth of the quantum ecosystem through investment in R&D towards use cases that are of strategic importance to Defence and our nation. This includes shaping and guiding these technologies, as they develop to facilitate transition of technology concepts into capability for the war fighter.

To grow a quantum enabled ADF, Defence requires an understanding of the emerging and disruptive implications and applications of QT. It needs to grow knowledge readiness to capitalise on breakthroughs, manage strategic and operational risks, and develop new quantum enabled capabilities. This demands new ways of thinking about the employment and exploitation of this technology.

For this call-to-market, ASCA has identified the following opportunities for exploration where Defence could potentially achieve asymmetric advantage in all domains (air, land, sea, space and cyber) through the application of quantum technology:

Opportunity Statements for Quantum Technologies

QT1. **How might we** develop low size, weight and power wide band electromagnetic receivers **so that** Defence can increase signal detection sensitivity, reduce latency and avoid the requirements for multiple antennae systems, taking into account export controls, capacity to manufacture at scale and the ability to distribute and operate in all domains and across different platforms?

QT2. **How might we** develop persistent, highly sensitive, quantum assured sensors and sensing networks **so that** Defence can survey and perform surveillance and reconnaissance operations in complex terrain (i.e. underwater, subterranean, urban, littoral, jungle), **taking into account** domain specific requirements for size, weight, power, cost and manufacturing different deployment and endurance requirements.

QT3. **How might we** provide assured position, navigation and timing* in the absence of GPS for extended periods **so that** Defence can achieve an enhanced operating picture across all domains on crewed and un-crewed platforms**, taking into account** domain specific requirements for size, weight, power, cost and manufacturability, and interoperability between platforms.

QT4. **How might we** develop quantum sensors **so that** Defence can transfer information and track obscured targets in free space, at speed, over large distances under adverse environmental and lighting conditions **taking into account** domain specific requirements for size, weight, power, cost and manufacturability?

QT5. **How might we** accelerate the utility and scalability of quantum computing capability through R&D into data transfer between components, storage, qubit control and error correction **so that** Defence is positioned to realise the potential of quantum computing, **taking into account** limited access to specialist skills and quantum hardware along with uncertain development timelines?

QT6. **How might we** develop advanced software algorithms to solve complex real-time logistics, optimisation and coordination challenges **so that** Defence can respond to changing scenarios with enhanced speed and accuracy, **taking into account** the need to benchmark quantum computing hardware and software with classical approaches along with limited access to quantum computing hardware?

QT7. **How might we** develop machine learning algorithms operating on quantum computers to perform low-latency, more robust and secure image analysis and signal processing **so that Defence's** future autonomous Intelligence Surveillance and Reconnaissance (ISR) systems have enhanced resilience against spoofing and signal degradation, **taking into account** limited access to quantum hardware and sensitivities of ISR data for training machine learning?

QT8. **How might we** leverage civilian test facilities, capabilities and application development environments to trial emerging quantum sensing and computational technologies in realistic Defence use cases and environments **so that** Defence can assess feasibility, viability and interoperability, **taking into account** environmental, operational safety, security, export controls (ITAR) constraints?

Annex B

Synthetic Media/Disinformation Overview

The disruption resulting from disinformation campaigns has undermined democratic processes and institutions, exacerbated social division, driven polarisation, fractured community cohesion and incited discrimination, xenophobia, intolerance and violence. By feeding and amplifying fake news online, adversaries have bypassed the need for physical attack, choosing instead to directly target the bedrock of liberal democracies, our ability to perceive objective reality and our trust in the public officials and institutions whose role it is to safeguard our democracy. Taken to their extremes, these campaigns have the potential to fracture and fragment entire societies so that they no longer possess the collective will to resist an adversary's intentions. The aim is to change not only what people think, but also how they act.

The emergence of AI enabled deep-fakes are further complicating our ability to perceive reality and know truth. While still in their infancy, deep-fake technologies are not only widely proliferating, but increasing in sophistication. Their ability to simulate the appearance, sound, and movements of individuals pose obvious risks to the health of our society and national security, especially when their targets are leading public officials. Defence is assisting Australia's approach to defeating disinformation by enhancing the ability to detect disinformation campaigns and synthetic media running on a range of platforms and languages in near real-time. It aims to build capability in identifying and measuring the effects of information campaigns within multiple target audiences and build resilience to disinformation.

Areas of interest include:

- Algorithmic detection: automatic and near real-time detection of disinformation campaigns and synthetic media, underpinned by advances in AIML, natural language processing and identity technologies.
- Modelling spread and impact: identifying and disrupting the spread of disinformation through advances in network modelling and analysis.
- Resilience and counter-influence: identifying what makes individuals, communities and societies resilient to disinformation and countering disinformation messaging through advances in cognitive, psychological and socio-political modelling and analysis

For this call-to-market, ASCA has identified the following opportunities in countering disinformation campaigns and synthetic media:

Opportunity Statements for Synthetic Media & Disinformation

SM1. **How might we** improve our ability to identify, track and measure the effects of information campaigns that impact on Defence operations, functions and interests in near real-time, **so that** Defence can understand, anticipate and apply effort to shape the information environment to meet operational objectives and support whole of government outcomes, **taking into account** the extensive legislative and policy controls, particularly those relating to privacy, intelligence and communications, and Defence's legislated roles and authorities?

SM2. **How might we** improve our ability to monitor the veracity of publically available information sources **so that** Defence can make decisions and take action on the basis of accurate information and attributions, **taking into account** a sophisticated understanding of politics, policy, legislation and treaties (i.e. human rights).