



Australian Government

Defence

ACCELERATING ASYMMETRIC ADVANTAGE

DELIVERING MORE, TOGETHER

DEFENCE INNOVATION, SCIENCE AND TECHNOLOGY
STRATEGY

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ACCELERATING ASYMM

Vision

Australia's Defence Innovation, Science and Technology Ecosystem accelerates the delivery of asymmetric capabilities and drives focused strategic research into the next generation of advanced capabilities.

Mission

Create capability advantage for *National Defence* through innovation, science and technology.



Australian Government
Defence



STRATEGIC ADVANTAGE

SYSTEM



ANTICIPATING
THE FUTURE



EXPERIMENTATION



INTEGRATED
ECOSYSTEM



MISSION
DRIVEN

Lines of Effort

Long Range
Fires



Information
Warfare



Strategic Objectives



CONTRIBUTE TO THE STRATEGY OF DENIAL



GENERATE ASYMMETRIC ADVANTAGE



ACCELERATE INNOVATIVE SOLUTIONS
INTO CAPABILITY



GROW OUR DEFENCE IS&T ECOSYSTEM
THROUGH STRATEGIC PARTNERSHIPS

The **Defence IS&T Ecosystem** encompasses broader stakeholders, such as industry, universities, research organisations and other Government agencies/departments. It will be shaped by Defence and Government strategic priorities.

The **Defence IS&T Enterprise** encompasses all IS&T elements within the Department of Defence, including all Groups and Services, as well as Portfolio Agencies such as the Australian Signals Directorate and Australian Submarine Agency.

Defence acknowledges the Traditional Custodians of Country throughout Australia. Defence recognises their continuing connection to traditional lands and waters and would like to pay respect to their Elders both past and present.

Defence would also like to pay respect to the Aboriginal and Torres Strait Islander people who have contributed to the defence of Australia in times of peace and war.



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Message from the Deputy Prime Minister Minister for Defence



The Defence innovation, science and technology ecosystem is central to the defence of Australia.

The Government's 2024 National Defence Strategy is guiding the significant and urgent changes required to transform the Australian Defence Force (ADF) into an integrated, focused force designed to address Australia's most significant strategic risks. A central element of the National Defence Strategy is the requirement for Defence to introduce next-generation technologies as soon as possible to enhance the ADF's ability to deter a potential adversary from projecting force against Australia.

Accelerating Asymmetric Advantage – Delivering More, Together is Defence's strategy to ensure its innovation, science and technology ecosystem is working to deliver the transformational capabilities the ADF needs and to deliver them at the speed set out in the National Defence Strategy.

We must ensure we have the people working in the Defence innovation, science and technology ecosystem to support the defence of Australia. Defence's innovation teams – the Advanced Strategic Capabilities Accelerator (ASCA), the Defence Science and Technology Group (DSTG), Warfare Innovation Navy, Robotics and Autonomous Systems Implementation and Coordination Office, Jericho Disruptive Innovation, and Innovation and Experimentation Group – must foster collaboration, accelerate technology development and enhance defence capability. Defence's innovations systems must partner with industry and academia to focus on rapidly pulling through disruptive technologies that deliver game changing capabilities.

It is vital that we also work closely with our trusted international partners to rapidly develop and introduce technologically advanced military capabilities into service that will help to deter conflict before it begins. This includes working closely with our AUKUS partners the United States and the United Kingdom to help deliver concrete capability to the warfighter. Science and technology collaboration with other Five Eyes partner nations will also allow Australia to develop new leading edge capabilities.

This is an ambitious strategy that will secure the future of Australia's defence and help us protect the peace and security of our region.

THE HON RICHARD MARLES MP

DEPUTY PRIME MINISTER

MINISTER FOR DEFENCE

Message from the Chief Defence Scientist



Throughout history, innovation and technology has been a defining influence on the outcome of conflict between powers. Often, it has been the advent of new capabilities or the novel use of existing technology that countered the tactics of an opposing force or provided a formidable deterrent to de-escalate tensions.

In this modern era, technology continues to shape the battlespace and Defence's Innovation, Science and Technology Ecosystem is tasked with creating asymmetric advantage and accelerating innovation into capability.

While the benefits of a more technology-enabled world are many, in the current geostrategic environment we are seeing intense competition between major powers in relation to technology and gaining technological advantage.

The dual advantages that Australia once enjoyed – geography and a ten-year window of warning time – no longer apply in the age of information warfare and strategic ambiguity. Science and technology erodes distance and time.

In practical terms, this means Defence Innovation, Science and Technology (IS&T) is critical to shape and influence the options we have available to support the mission of *National Defence*. An IS&T-enabled Australian Defence Force (ADF) helps us to deter any actions that could lead to conflict, military coercion or direct action against Australia or our interests.

Within the context of the *2024 National Defence Strategy* (NDS) and the AUKUS agreement, the role of Defence IS&T has never been more important in helping shape our national calculus.

Accelerating Asymmetric Advantage – Delivering More, Together is a response to the contemporary challenges we face as a nation. More than that, it is a call to action on how Defence's IS&T Ecosystem must be more integrated, effective and efficient to deliver asymmetric advantage for the ADF.

Time and again our IS&T expertise has proven to be indispensable in the defence of our nation. We must capitalise on over a century of IS&T support to Defence capability so that our Ecosystem is more responsive to an increasingly demanding environment and contributes to *National Defence*.

This Strategy outlines our ten-year vision for a Defence IS&T Ecosystem defined by greater clarity, coherence and coordination; supported by practical and pragmatic initiatives designed to strengthen our networks and partnerships. It will be updated every two years to align with the biennial NDS cycle.

Building this vision will take commitment and courage. We will need to make difficult decisions around our IS&T investments, and balance long-term efforts with immediate capability needs.

Our people are fundamental to the success of this Strategy. The Defence IS&T Enterprise is more than the application of scientific and engineering processes: it comprises the creativity, passion and dedication of the broad Defence workforce.

Collaboration is the key that unlocks the potential of our IS&T Ecosystem, and will be vital to the success of this Strategy.

I am proud to be part of this journey with you.

PROFESSOR TANYA MONRO AC
CHIEF DEFENCE SCIENTIST

Overview

In 2020 Defence released *More, together: Defence Science and Technology Strategy 2030 (More, together)* that articulated the core elements of Defence's science and technology capabilities, their contribution to the Defence mission, and a vision for a more integrated and collaborative Ecosystem.

More, together set the scene for curating an Ecosystem focused on the warfighter and drawing on the collective expertise of Defence, research organisations, industry and our international partners to build capability advantage for the ADF.

With the release of the NDS and the Government's *National Defence IS&T priorities*, along with the establishment of AUKUS, *Accelerating Asymmetric Advantage – Delivering More, Together* builds on the strong foundations of *More, together*. It requires a new generation of initiatives focused on accelerating asymmetric advantage in a deteriorating strategic environment.

Generating asymmetric advantage is essential for our national Strategy of Denial. Being able to rapidly pull through innovation into capability is central to the vision and objectives of the Defence IS&T Strategy.

To drive the Defence IS&T Ecosystem, this Strategy incorporates innovation as a key element to integrate advances in science and technology with applications for the ADF. This will supercharge our Ecosystem preparing it for the next generation of capability.

Innovation, Science and Technology

Defence Innovation, Science and Technology encapsulates Defence's research and development efforts. It is the creation of new knowledge and the use of existing knowledge in new ways to generate novel concepts, methodologies, inventions and understanding. It encompasses a broad spectrum of science, from maths and physics through to social, behavioural and systems analysis; basic and applied research; and innovation and technology development.

This Strategy articulates the collaborative and coordinated effort that will be required across our Ecosystem to meet Government's strategic Defence IS&T priorities, Defence's long-term objectives, and the ADF's immediate operational requirements.

Four strategic objectives guide our approach:



1. Contribute to the Strategy of Denial



2. Generate asymmetric advantage



3. Accelerate innovative solutions into capability



4. Grow our Defence IS&T Ecosystem through strategic partnerships

To coordinate effort across the IS&T Ecosystem, four strategic Lines of Effort (LoE) describe how we will *Focus* on emerging technologies with the potential to address the strategic risks Australia faces, *Scale* our integrated Ecosystem to harness our capacity and capability in defence of our strategic interests, and create meaningful *Impact* through mission-driven capability. Our strategic objectives will be achieved through action across these LoE: 'Anticipating the Future', 'Experimentation', 'Integrated Ecosystem' and 'Mission Driven'.

People and partnerships underpin the success of our Strategy. To succeed, we must leverage our existing deep knowledge and expertise, while investing in and growing our base. IS&T has never been so important to our economic and national security, so we need to amplify our skills and align them to the most significant challenges and Defence priorities. Our partnerships are vital – we cannot do this in isolation. Clear and meaningful partnerships with universities, research organisations, industry (traditional and non-traditional) and across Government, domestically and internationally, will support the successful delivery of this Strategy.



1. Our Challenge

Australia faces its most challenging strategic circumstances since the Second World War, and increasing major power competition in the Indo-Pacific is a key driver in this. A range of other security risks, including accelerating climate change, deteriorating social cohesion, growing economic disparity, grey-zone activities and rapid technological advancements, are compounding factors.

Consequently, the NDS notes that we no longer enjoy the advantages of a ten-year window of strategic warning time for conflict, and although major conflict is not inevitable, this new reality is making the pursuit of Australia's interests more challenging. The Government's Defence strategies, capability plans and resources now include a focus on responding to the threat of conflict and the prospect of coercion.

Delivering on *National Defence* includes ensuring that Australia's research and innovation sector supports the most pressing defence and security priorities to accelerate the delivery of next generation capabilities to the ADF. As a middle power Australia must seek military advantage in innovative ways. Developing asymmetric advantage is one way to do this. We seek to deter conflict but also have the capacity to respond through the Strategy of Denial.

To achieve our objectives we need to generate asymmetric advantage so that the cost of seeking to work against Australia is assessed as too great by a potential adversary. That is, they decline to embrace conflict because the cost they would bear outweighs the benefit they seek to gain.

As a result, the Defence IS&T Ecosystem must be able to focus on short-term missions to address immediate capability requirements as well as thematic research and development that can provide longer-term capability advantage.

2. Our Response – Accelerating Asymmetric Advantage

The NDS and *2024 Integrated Investment Program* (IIP) highlight the centrality of IS&T to Defence's ability to meet its mission objectives. The NDS has also adopted the concept of minimum viable capability, to accelerate the acquisition of new capabilities into service faster, underpinned by the lowest acceptable mission performance in the required time.

Our IS&T Ecosystem must be calibrated to this changed strategic environment. In response, our focus must be on rapidly pulling through emerging and disruptive technologies and accelerating delivery of minimum viable capability. Our research and development must be tailored to meet the challenges of today and tomorrow and be driven by clear priority setting and demand signals from Defence.

The NDS and IIP articulated six priorities where IS&T will have the biggest impact for Defence through delivering accelerated asymmetric capabilities.



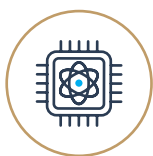
Hypersonics: Long-range strike capabilities to hold an adversary further from our shores and earlier than conventional methods.



Directed Energy: High-energy beams such as lasers and microwaves, and counter/protective systems provide a range of multi-domain capabilities from deterrence and target degradation to defeat military threats.



Trusted Autonomy: Secure and resilient capabilities enabled by artificial intelligence and machine learning models that perform in complex environments to enhance Defence capability. They combine the capacity to track and intercept targets with the ability for rapid, supervised decision-making.



Quantum Technology: Exploit the principles of quantum mechanics and have the potential to impact Defence capability through enhancing secured communication, timing and synchronisation.



Information Warfare: Development of advanced cyber, electromagnetic spectrum technologies and information processing approaches for new concepts, algorithms and architectures to deny, deter, degrade or deceive an adversary.



Long-Range Fires: Precision technologies for land and land-to-sea missile systems will keep a potential adversary further from our shores.

This Strategy places a necessary focus on the IS&T and partnerships that will deliver enhanced military capability at the earliest opportunity but recognises we must also stay at the scientific and technological edge to ensure we future proof Defence for the next generation of advanced capabilities.



Foundational to our ability to succeed are three key drivers. We need focus and scale to have the biggest impact:



Focus: We will focus on emerging technologies with the potential to address the strategic risks Australia faces, prioritised with areas of research and development that align with the NDS, and that will deliver enhanced military capability.



Scale: We will leverage our integrated Ecosystem, including our partnerships domestically and internationally, to harness capability and build capacity in defence of our strategic interests.



Impact: Through a mature research network and accelerated delivery mechanisms we will provide an asymmetric capability edge to the ADF and contribute to our Strategy of Denial through deterrence.



AUKUS

In September 2021, Australia, the United Kingdom and the United States established an enhanced defence and security partnership – AUKUS – to promote a free and open Indo-Pacific that is secure and stable into the future. Building on long-standing relationships to enable deeper cooperation on a range of security and defence capabilities, AUKUS fosters a paradigm shift in thinking to focus on common challenges that will deliver the most impactful deterrence. Australia, the UK and US are achieving this by aligning our capability priorities, amplifying our collective strengths, and accelerating capability acquisition for shared strategic benefit.



Phoebe: Digital Twin of the C2 Network

The Agile Command and Control (C2) STaR Shot has contributed over several years to the development of an effective, productive, adaptive, and supportable Joint C2 capability that is able to meet the challenges of future contested and concurrent operations. One of the Agile C2 STaR Shots' key deliverables is PHOEBE (named after the Greek Goddess of intellect and prophecy), a prototype to aid planning and execution funded by the now concluded Rapid Prototype Initiative.

Phoebe is a sovereign, digital visualisation and rapid synchronisation platform that has been developed through long-standing DSTG effort, close integration with selected ADF subject matter experts, an agile partnership with industry, and support from Joint Operations Command. PHOEBE is an operable plan-to-execute digital twin of the C2 networked force. It combines advanced database, plan visualisation and force representation design with targeted modelling and simulation, and live or near-live data feeds from distributed assets.

The prototype is designed to share forward planning outputs across ADF C2 nodes enabling synchronous planning cycles across the Integrated Force, and capitalises on familiar interfaces and user processes to improve user acceptance and its potential application across the ADF's wider C2 network. It is a sovereign product and has the potential to significantly improve the ADF's ability to command and control complex operations.

The Enduring Value of Research and Development

Research and Development, and Science and Technology are inextricably linked. The generation of knowledge is achieved through rigorous observation and experimentation, which is used in the creation of the next generation of capabilities.

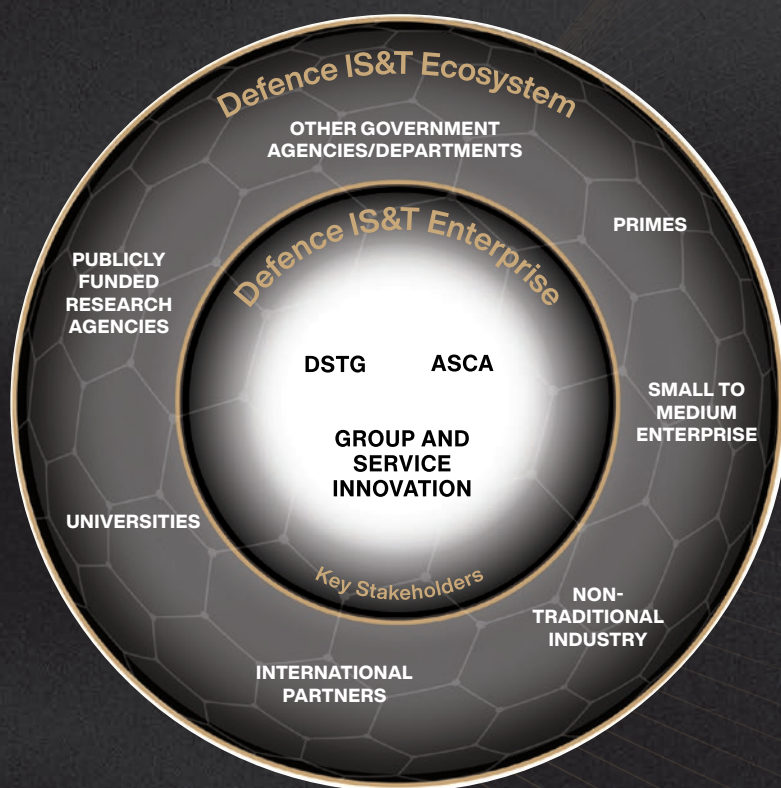
The delivery of these advanced capabilities often represents the culmination of many years or even decades of research and experimentation across multiple scientific disciplines. Without the sustained investment in research and development, our capacity to generate new knowledge and see it translated into capabilities for future generations of warfighters is at risk, leading to a technological disparity in capabilities over the long-term.

By continually refining how current problems can be solved using the latest knowledge, we are able to support future innovations. The military application of explosives and projectiles have been known for millennia; however, the enduring investment in research and development in fields such as fluid dynamics and chemical engineering has supported their evolution into the missiles and warheads of today.

There is also the need to continue the exploration of new areas of research to meet future challenges. For example, research in the late 1960s and 1970s in free-piston shock tunnels of body shapes of re-entry vehicles and changes in flow patterns due to dissociation thermochemistry, led to research on scramjet engines at high velocities, which was leveraged to commence hypersonic research within Defence.

The **Defence IS&T Ecosystem** encompasses all stakeholders, such as industry, universities, research organisations, other Government agencies and departments and international partners. It will be shaped by Defence and Government strategic priorities.

The **Defence IS&T Enterprise** encompasses all IS&T elements within the Department of Defence, including all Groups and Services, as well as Portfolio Agencies such as the Australian Signals Directorate and Australian Submarine Agency.



3. Our Pathway

To create capability advantage for the ADF through IS&T, the constituent parts of our broader Ecosystem and Enterprise must work together and towards a common purpose. The pathway to realise our response relies on the Defence Enterprise working closely with the broader Ecosystem in order to achieve the vision and mission of the Defence IS&T Strategy. The vision and mission will be guided by high level Strategic Objectives and supported by six guiding principles (Annex 1) that provide the foundation for how we will achieve our strategic goals and objectives.

Vision: Australia's Defence Innovation Science and Technology Ecosystem accelerates the delivery of asymmetric capabilities and drives focused strategic research into the next generation of advanced capabilities.

This vision empowers a collaborative, integrated Defence IS&T Ecosystem focused on delivering high impact asymmetric capabilities in anticipation of emerging threats and delivering deterrence. Innovative solutions are accelerated into capability and priority research future proofs Defence for the next generation of advanced capabilities.

Mission: Create capability advantage for *National Defence* through innovation, Science and Technology.

Defence IS&T is a potent force-multiplier. By drawing on over a century of experience of providing support to the ADF, the Defence IS&T Ecosystem will create enduring and resilient capability advantage for defence of the nation.

3.1. Our Strategic Objectives

To achieve our vision and mission, four strategic objectives guide our approach, with four strategic LoE to provide focused outcomes for the IS&T Ecosystem and Enterprise.



Strategic Objective One: Contribute to the Strategy of Denial

The NDS outlines our national Strategy of Denial. A critical element is to ensure the ADF is able to draw rapidly on the Defence IS&T Ecosystem, including international partners, to generate capability, capacity and enhanced interoperability providing collective deterrence.

An integrated defence force enabled by IS&T acts as a powerful deterrent by demonstrating how advanced or asymmetric capabilities can undercut an adversary's real or perceived strengths. It can increase the range and lethality of the ADF, increase the options available to Defence, and focus Defence's preparedness and mobilisation efforts, thereby strengthening Australia's national resilience.

This includes creating strategic and asymmetric effects with the ADF, assessing planned investments for their asymmetric potential and designing future force options that enable asymmetric advantage and cost imposition.



Strategic Objective Two: Generate asymmetric advantage

Asymmetric advantage refers to military capabilities that pit strength against weakness, at times in a non-traditional or unconventional manner and that disrupt a potential adversary's decision calculus. Countering, eliminating or enduring asymmetric advantage imposes disproportionate costs, and in some cases, there may be no effective response.

Asymmetry can take on many forms, including asymmetry of intent, environment, resources, socio-normative factors, technology, methods and organisation. These different types of asymmetry can combine to produce disproportionate and compounding effects. Understanding the classes of asymmetry provides a useful framework for developing novel solutions to deliver advantage across the domains associated with modern warfare. It can also yield insights into the most effective levers of national power that could complicate an adversary's decision calculus.



Strategic Objective Three: Accelerate innovative solutions into capability

Defence will identify the most pressing problems and apply targeted IS&T solutions. We will reduce barriers (policy, regulatory, cultural) that inhibit our ability to rapidly pull through innovation, and work collaboratively across Defence, whole-of-government, industry, universities and research organisations to focus our efforts on faster delivery of capability to the warfighter (supporting the development of the **Objective Integrated Force**).

To ensure Defence has capabilities that remain a potent deterrent requires ongoing spiral development enhancements. This will occur through establishing clear pathways for partnerships with industry, universities and research organisations, and enhancing knowledge sharing with our international partners. Principles of digital engineering will be used to accelerate the development and delivery of integrated asymmetric capabilities, including through the use of High Performance Computing to test and validate concepts. The importance of digital engineering is highlighted through the *Defence Digital Engineering Strategy*.

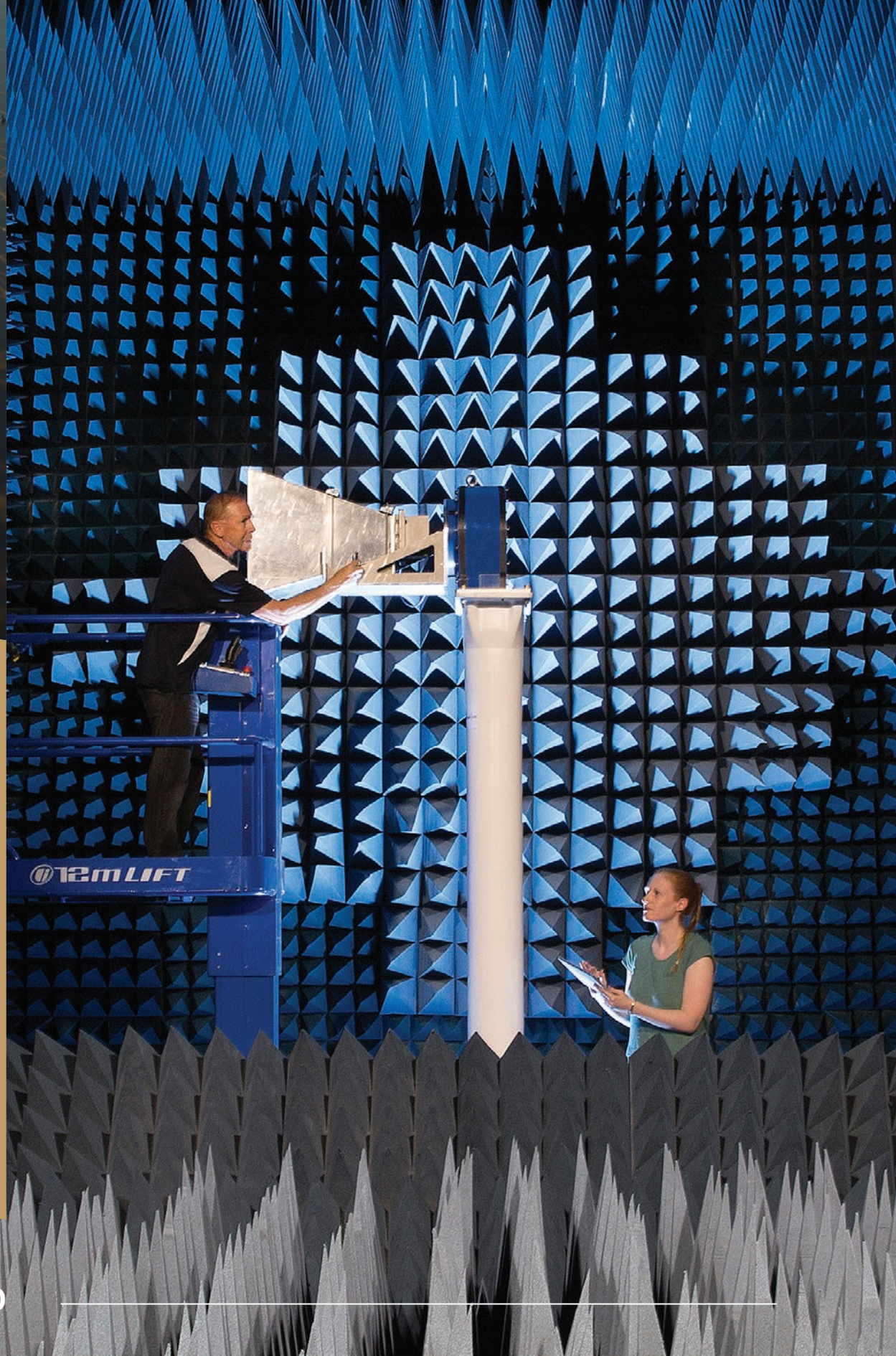


Strategic Objective Four: Grow our Defence IS&T Ecosystem through strategic partnerships

Defence's approach to IS&T harnesses domestic and international science and technology to build resilience, longevity and impact.

National Defence is an endeavour that cannot be undertaken by Defence in isolation but must be pursued as a collaborative and cooperative effort across the entire national support base, including the exploitation of dual-use technologies.

We will use all elements of our IS&T Ecosystem – from deep scientific and engineering expertise to transformative partnerships with industry, universities and research organisations – to stay ahead of our adversaries and build asymmetric advantage at scale for the ADF.



3.2. Strategic Lines of Effort

Our strategic LoE are the ways Defence will achieve our mission of creating capability advantage for *National Defence* through IS&T. These LoE will work in harmony to ensure an integrated, secure IS&T Ecosystem.

1. Anticipating the Future



Defence must remain on the cutting-edge of technological innovation to deliver asymmetric advantage to the ADF. The NDS states that the greatest gains in military effectiveness in the coming decades will be generated by better integrating existing and emerging technologies. Technology foresight activities – informed by developments in the IS&T landscape – will allow Defence to identify emerging trends that might have significant deterrence and asymmetric warfighting effects.

Anticipating trends and assessing likely impact and opportunities provides a sound analytical basis to target investment in emerging and disruptive technologies, and identify the next generation of asymmetric capabilities.

Intelligence foresight can also identify opportunities where we can apply our vast IS&T expertise. Australia's sources of strategic advantage – our creativity, open society, and sovereign enablers – will be leveraged as part of a more integrated IS&T Ecosystem.

Action 1.1: Defence, with the IS&T Ecosystem, will explore the potential impacts of emerging and asymmetric technologies to identify how they can be used and countered by Defence.

Action 1.2: Defence will leverage industrial intelligence capabilities to grow our understanding of industry's capacity and capability to contribute to innovation and asymmetric advantage.

Action 1.3: Defence will strengthen how intelligence assessments and technology foresight on emerging and disruptive technologies will influence Defence IS&T directions.

2. Experimentation



Experimentation supports innovation and transformation through the application of modelling, simulation and analysis, trials, testing and wargaming.

Defence's experimentation is a continuum. Initiated through ADF-led activities designed to understand and test future concepts and ideas through wargaming, which will identify where IS&T can have the greatest impact. Culminating with demonstrating prototypes via a process of iteration and continual learning and improvement. A deep understanding and application of scientific and engineering principles and knowledge spans this continuum.

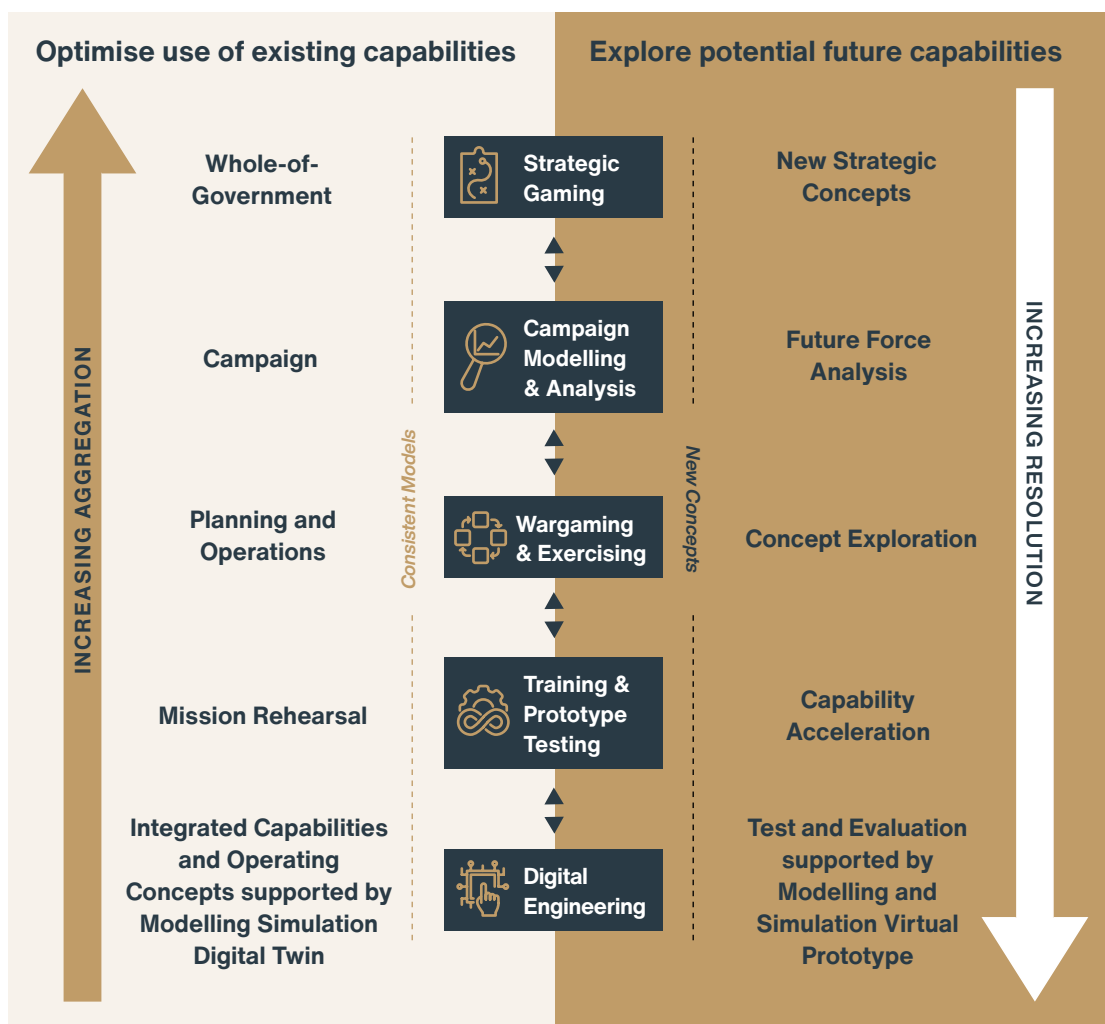
With rapidly developing threats moving at the speed of technology, Defence will create a more comprehensive approach for its experimentation processes. This approach will synthesise Defence's regular experimentation and testing cycle with emergent threats, including being able to identify paths for accelerating the delivery of promising capabilities.

Action 2.1: Defence will integrate its experimentation and test and evaluation processes to identify IS&T opportunities with the greatest potential to mitigate strategic risk, deliver asymmetric advantage, and accelerate through the experimentation continuum.

Action 2.2: Defence will communicate its needs, including through classified briefings, to trusted partners in industry, universities and research organisations to leverage sovereign innovation and identify opportunities for accelerated delivery.

Action 2.3: Defence will enhance opportunities for ADF personnel to train on emerging technologies and operating concepts through coordinated and integrated process of spiral improvement to iterate and deliver capability more quickly.

Experimentation Continuum





Advanced Rocket Motor Technology

Established in 2021, the Advanced Rocket Motor Technology Demonstrator (ARMTD) Program aims to create and demonstrate an exemplar, largely Australian, industry network able to produce advanced military-relevant rocket motors.

A key element of ARMTD is transitioning the cutting-edge expertise and S&T in DSTG into industry across relevant areas such as state-of-the-art solid rocket motors and those technologies that are enablers for high performance missions associated with high-speed weapons and long-range strike.

DSTG has developed the world-leading Aerospace Performance Optimisation Genetic Evolution Environment (APOGEE) toolset to enable mission specific design of high-performance propulsion systems. This toolset combines robust multi-objective genetic algorithms, pseudo-spectral trajectory optimisation and high-fidelity engineering modules – validated by extensive DSTG in-house development and test expertise – to design entire propulsion systems, including solid rockets, ramjets and the like, with a focus on the specific mission performance required by the ADF and allied partners.

APOGEE enables both the rapid exploration of what is possible for new missile system with new technologies and quantification of the impact of new sub-system technologies on mission performance metrics such as payload to target, maximum/minimum system range and terminal engagement conditions.

The transition of DSTG expertise and S&T to the ARMTD industry network is growing capability that accelerates and helps de-risk rocket motor build-to-print, while APOGEE provides a demonstrated pathway for build-to-specification or wholly sovereign rocket motor development and manufacture.

Phase 2 of the Program culminating in a static fire demonstration of the wholly Australian designed and manufactured Kooniba-Rising (K-R) class advanced rocket motor was demonstrated at Woomera in September 2023 and represents the largest military-relevant solid rocket motor designed and produced in Australia to date.

3. Integrated Ecosystem



An integrated Ecosystem is essential for responding to Defence IS&T priorities identified by Government. Defence will build on existing, enduring and strong relationships with universities, research organisations and industry to foster greater collaboration, cooperation and trusted partnerships for mutual benefit.

Through this Strategy, the NDS and the IIP, the provision of clear policy direction and demand signals will better enable the IS&T Ecosystem to contribute directly to ADF missions, and help generate a deterrent effect through the development and application of asymmetric capabilities.

Partnerships will be deepened by formalising classified briefings with industry and research organisations to give greater context to the challenges and Defence requirements. Current mechanisms for supporting and encouraging collaboration across the Ecosystem will be evolved, and opportunities to build and leverage national infrastructure will be explored.

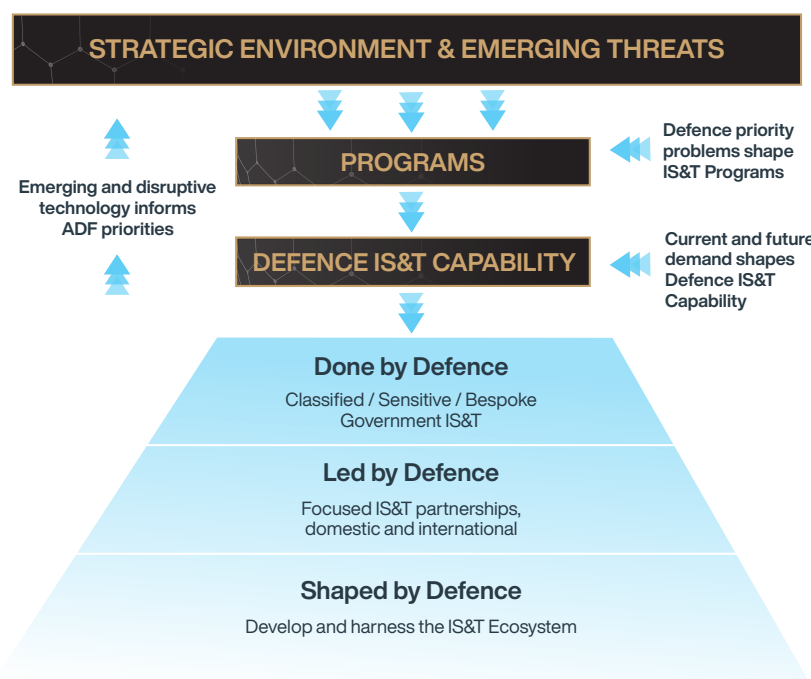
There is a requirement for an ongoing supply of Defence IS&T professionals into the future. Collaborative efforts across the Ecosystem are needed to grow and nurture Australia's science, technology, engineering and mathematics (STEM) talent pool to meet this demand.

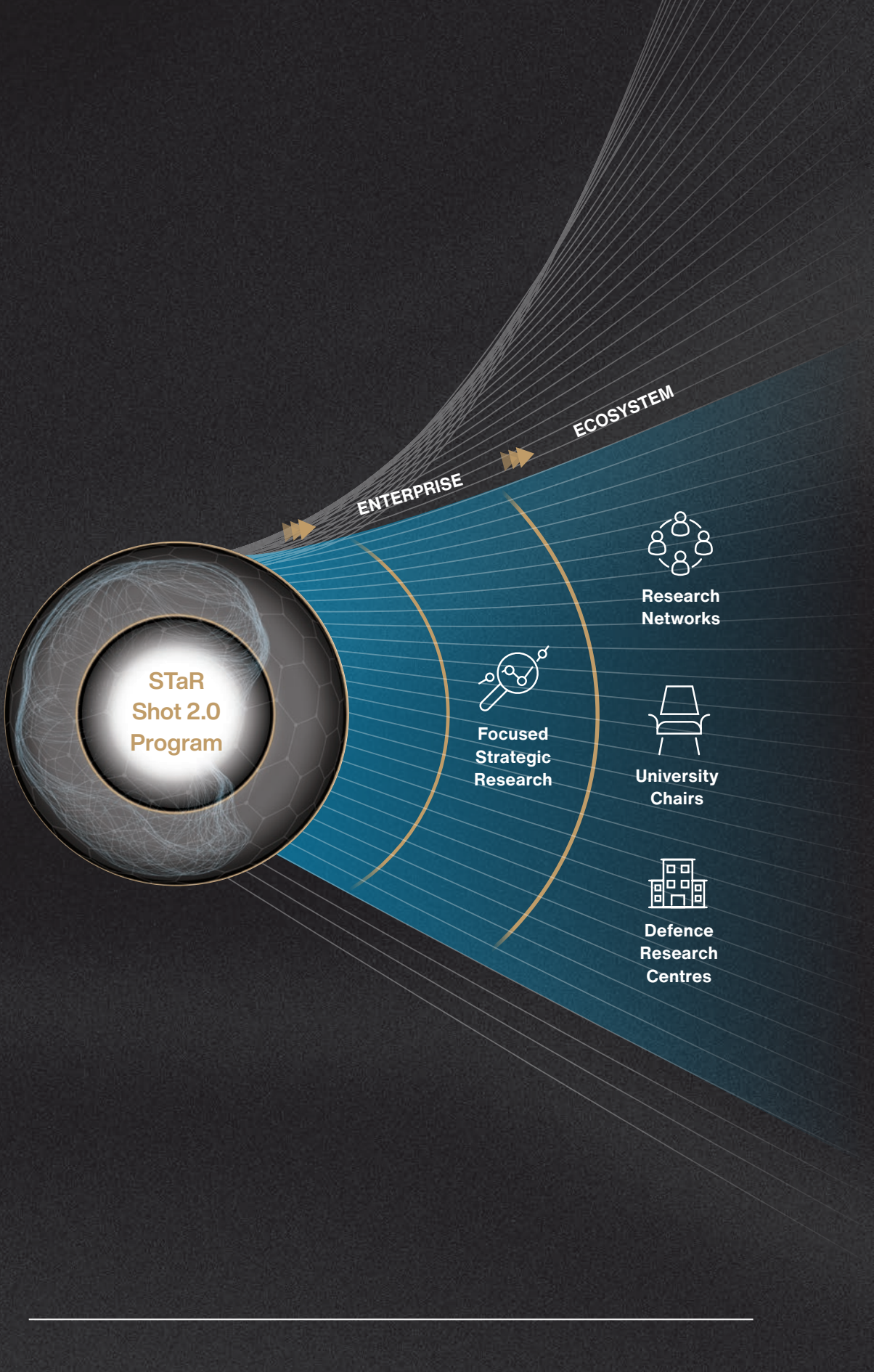
Action 3.1: Defence will strengthen and grow strategic partnerships across the IS&T Ecosystem to bring together innovators and sovereign capabilities, and better coordinate activity against strategic priorities.

Action 3.2: Defence will evolve the Defence Science Partnering (DSP) agreement to enable faster partnering, incorporate multiple parties (including industry) and appropriate management of security to deliver Defence's IS&T priorities.

Action 3.3: Defence will better communicate Defence IS&T priorities and coordinate activities across the nation to strengthen pathways to capability impact.

Action 3.4: Defence will work with our partners to ensure best practice for secure research and development facilities and develop appropriate security protocols, including enhanced personnel, physical and information and communication technology (ICT) security, so that we can protect our people and our information.





4. Mission Driven



The NDS states IS&T should focus on emerging technologies with the potential to address strategic risks and the prioritisation of research to deliver enhanced military capability at the earliest opportunity. In response, Defence will create enduring, mission driven impact through the IS&T Ecosystem by harnessing the entirety of Australia's research spectrum, with IS&T activities being scaled to the appropriate size to deliver impactful outcomes for the ADF.

The delivery of short-term, targeted missions that rapidly pull-through innovative technologies into new capability are addressed through the Advanced Strategic Capabilities Accelerator (ASCA's) Mission program. Missions carried out through ASCA respond to strategically-directed Defence priorities that align with Defence policy and strategy, which have been endorsed by the Vice Chief of the Defence Force and will typically be limited to a three-year duration, developing minimum viable capabilities for the ADF.

Science, Technology and Research (STaR) Shot 2.0 Program

The Science, Technology and Research (STaR) Shot 2.0 Program will inspire and mobilise the Defence IS&T Ecosystem in response to Defence's most challenging and strategically important problems that require Innovation, Science and Technology investment for significant capability advantage. The Program's ten-year time horizon will support the **Future Integrated Force** by harnessing and developing emerging and disruptive technologies and their applications. The STaR Shot 2.0 Program will better position Defence to avoid or deliberately create strategic surprise or disruption.

Individual STaR Shots are designed to provide thought-leadership and clear signals to all elements of the IS&T Ecosystem, supporting the focus on high priority themes and scaling IS&T activities to the appropriate size driven by need to generate impactful outcomes. They will be co-designed with military end-users from the outset to ensure they are aligned with Defence's strategic priorities and will be defined by specific capability goals. To provide flexibility for activities to scale to the required size, IS&T activities will operate across the integrated research spectrum.

This encompasses:

- Early-stage concept exploration.
- Building Research Networks to align expertise across the broader Ecosystem.
- Establishing dedicated University Chairs to champion and grow research capability.
- Creating scale and focus.
- Focused strategic research to build Enterprise capabilities.

Scale and focus will be created through Defence Research Centres (DRCs). These will be established in partnership with universities and industry to tackle thematic missions on a large scale. DRCs will bring universities and industry together in a secure research environment and grow our national research and development base, ensuring there are appropriate safeguards in place for our data, systems and intellectual property.

Enduring investment in focused strategic research undertaken within Defence will help to maintain the effectiveness of existing capabilities and lead to future capability advantages from emerging technologies.

Focused strategic research links deep scientific expertise with military applications to explore new technological concepts, build critical mass, and undertake sensitive research needing to be done by Defence, particularly for the **Future Integrated Force**. These strategic investments develop the understanding of how technology can be integrated and used within a Defence context, its limitations and how it can be countered.

Action 4.1: In response to Defence priorities, ASCA will articulate problem statements that facilitate partnering with industry and research organisations to accelerate capability delivery.

Action 4.2: Defence will strengthen its approach to long-term research through the STaR Shot 2.0 Program and ensure alignment with Defence priorities and provide thought-leadership.

Action 4.3: Defence will develop Defence Research Centres in partnership with research organisations, universities and industry to focus on enduring themes aligned with *National Defence* priorities.

Action 4.4: Defence will invest in focused strategic research that develops the understanding of emerging technologies and how they could be integrated, used and countered in a Defence context.

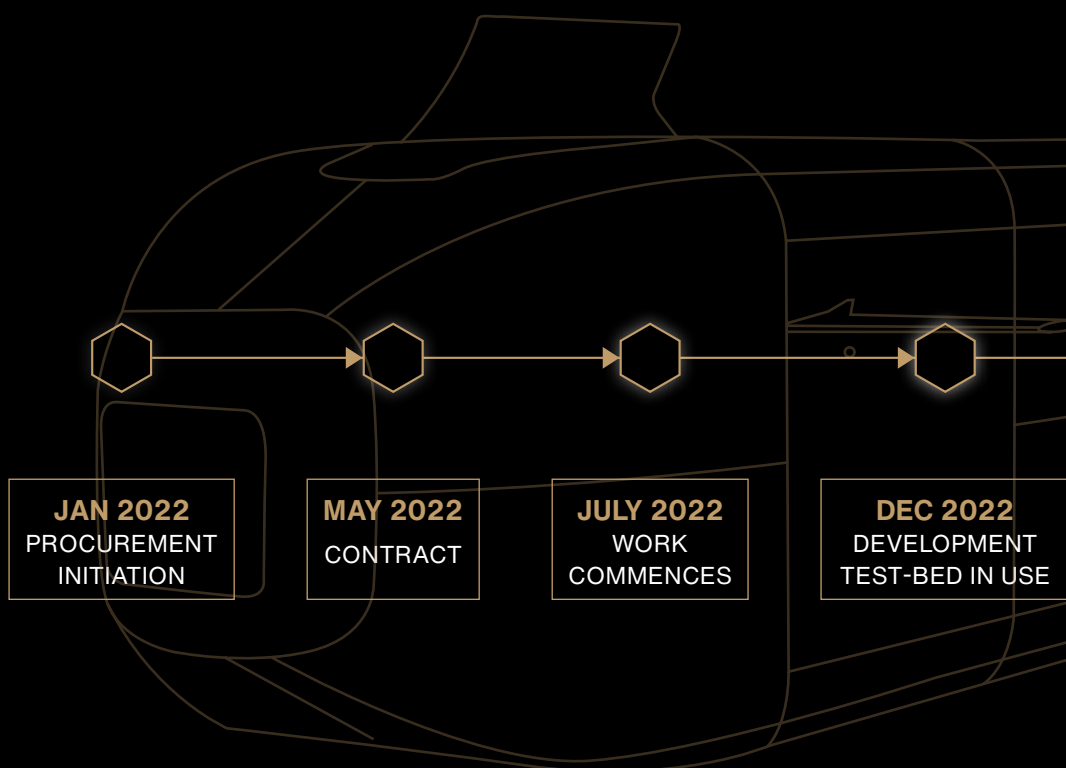
Principles of a Defence Research Centre

- Focus on enduring thematic areas that are complex and require interdisciplinary teams to deliver next generation capabilities for the Australian warfighter.
- Facilitate collaboration across the broader IS&T Ecosystem – involving participation from Defence, across Government, research organisations, industry and universities.
- Each DRC will be headquartered at a single university campus, with the ability to distribute elements across other locations – hub and spoke model – with staff from Defence, industry and universities.
- Adopt and maintain a security posture and framework that is commensurate with the risk and sensitivity of the specific theme.
- Have a common governance model, including branding and communications to ensure all DRC's operate as part of a coherent, collective *National Defence* enterprise.
- A five-year term with comprehensive review in the fourth year to consider continuation.
- Formalised mechanisms to support on- and off-boarding of collaborations / partnering as appropriate.
- Established through a competitive 'expression of interest' and evaluation process.
- Co-design and co-investment with university and industry partners underpins DRCs.
- Each DRC will also explore the potential to deliver dual-use outcomes for sectors beyond Defence as a mechanism to support their sustainability.

Ghost Shark

DSTG:

Defence scientists provide leading edge insights with a clear understanding of the Defence context.

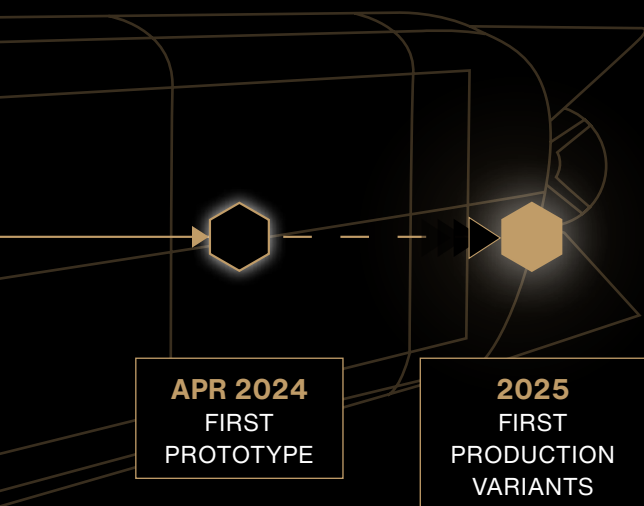


ANDURIL AUSTRALIA:

Combining leading edge commercial manufacturing practices with deep Defence expertise to achieve rapid acceleration of delivery. This includes early creation and testing of the first Ghost Shark which has been critical for rapid learning and iteration. Anduril Australia robotics specialists and 42 Australian companies are involved in the development.

RAN:

Navy personnel provide the strategic and operational expertise that determine the expected mission outcomes to achieve success in the field.

**ASCA:**

Mission approach to partner with industry and universities focusing on rapidly pulling through disruptive technologies into capabilities to meet Defence's most pressing needs.

Achieving innovation to capability – at speed

The partnering of Defence capability with industry experience has quickly brought an innovative concept to life. Within the first year of a three-year mission timeframe a development test-bed has been introduced to support rapid innovation. In the second year a prototype has been unveiled with two more to be completed in the final year of the mission, each iteration building on the learnings of earlier prototypes.

The mission has been a collaboration of Navy expertise, Defence science and industry manufacturing, which, underpinned by ASCA is rapidly advancing testing and development. ASCA missions are focused on Defence partnerships with industry and universities that are pulling disruptive technologies into capabilities that meet Defence's most pressing needs.

The ability to drive innovation from a Defence need through to a capability that can be deployed and operated quickly in the field is the foundation for innovation achieving asymmetric advantage.

Portable Optical Atomic Clocks

Atomic clocks provide highly accurate, independent and assured timing signals in GPS-denied environments. They outperform timing derived from GPS by many orders of magnitude.

DSTG's Quantum Assured Position Navigated Timing STaR Shot has, for the first time in Australia, demonstrated the ability of quantum systems to operate in a military environment.

Under the STaR Shot, development of advanced optical atomic clocks technology created by the University of Adelaide was accelerated and the resulting world-first portable, autonomous atomic clocks were successfully tested at the 2022 Rim of the Pacific (RIMPAC) exercise aboard HMNZS Aotearoa.

The work included strategic partnerships with the US Air Force Research Laboratory (AFRL) and Defence Science and Technology Laboratory (Dstl), UK, in particular. Joint testing of atomic clocks by AFRL, Dstl and DSTG provided additional insights into clock performance and benchmarking.

Regular commercial clocks have poor performance on board due to ships' movement, but the Australian quantum clocks showed none of those effects. Measuring time by movements of atoms or molecules means quantum clocks provide the same time anywhere in the universe.

The team working on the portable atomic clocks recently won the National Measurement Institute's *Measurement Impact Award* for measurement-related achievements demonstrating real-world impact.



3.3. Our Enterprise

Defence Science and Technology Group

For 50 years, DSTG has been the core Defence IS&T capability. While the group's history stretches back to 1908, in 1974 the disparate elements of Defence research and development were combined to form the Defence Science and Technology Organisation, the forerunner to the versatile and dynamic DSTG of today.

DSTG undertakes applied, directed science and technology research delivering scientific advice and innovative solutions for Defence. This research, often sensitive or classified, provides unique decision-making opportunities and capabilities for Government.

Increasingly, DSTG explores and pushes the application of asymmetric and non-kinetic effects to defend Australia's interests and dissuade a potential adversary from escalating tensions. DSTG puts Australian innovation in the hands of our ADF and often, through this work, has brought it to the community at large and changed the lives of Australians.

Through its deep scientific expertise, engagement with national and international partners and position within Defence, DSTG delivers IS&T solutions to enhance and transform the ADF. DSTG supports operations and preparedness, provides expert advice and integration for acquisition and sustainment of capabilities, and assesses emerging and disruptive technologies that can support the Defence mission or may signal a future threat. Applying DSTG expertise to acquisition decisions helps ensure Defence is an informed buyer and mitigates technology risk.

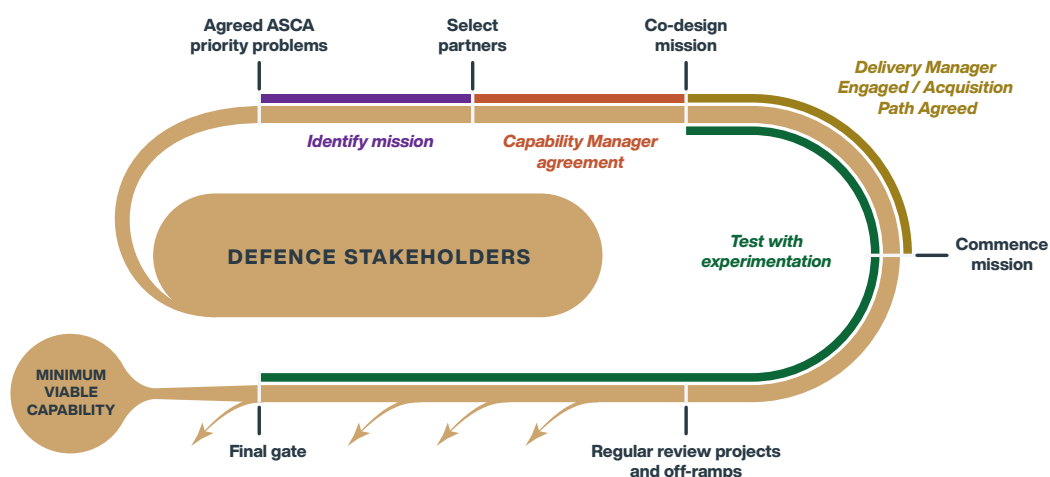
DSTG also provides deep subject matter expertise to inform ASCA's mission design and emerging and disruptive technology directions.

Advanced Strategic Capabilities Accelerator

ASCA is key to bridging longitudinal scientific research and accelerating innovative technologies to minimum viable capability. ASCA itself does not innovate or develop capability but takes a strategically directed mission-based approach, to pull asymmetric innovations into capabilities, with identified transition pathways into acquisition. ASCA works across the Department to ensure alignment with Defence priorities and maximise success.

ASCA connects and streamlines the Defence innovation enterprise by focusing on defined missions, solving the most relevant and urgent capability problems, and taking a more flexible and agile approach to procurement. Through this, ASCA drives capability development and acquisition pathways at speed, more effectively harnessing and coordinating the innovation ecosystem. ASCA comprises three programs:

- Missions are focused on rapidly pulling through disruptive technologies into capabilities that will meet Defence's most pressing needs.
- Innovation Incubation identifies and supports opportunities to partner with Australian industry and universities to rapidly adapt, test and acquire new or commercial technology for military purposes.
- Emerging and Disruptive Technologies shapes and nurtures critical research and development capability aligned with Defence priorities over a three to five year horizon.



Groups and Services

Groups and Services undertake and participate in a wide range of IS&T related activities in support of the development and delivery of advanced capabilities for the warfighter, including through strategic advice, policy and intelligence-driven insights, and targeting of investment in priority areas for Australian industry.

The Services, as the end-users of capabilities, are the beneficiaries of advanced capabilities developed throughout the broader Defence IS&T Enterprise and play a key role in providing insights to support enhancement of these capabilities. Each of the Services (Navy, Army and Air Force) also manages a smaller-scale, warfighter-centric innovation area, with responsibility for warfare innovation, partnering to gain science and technology expertise, capability management and delivery.

Defence's internal governance framework will be bolstered through the creation of a Defence IS&T Enterprise Committee to provide strategic direction on the health, management, governance and activities of the Defence IS&T Enterprise, including guidance on strategic priorities for Defence IS&T and coordination of IS&T activities.

In-Theatre 3D Printing

Sailors from Fleet Support Unit (FSU) are leveraging 3D printing and related technology to provide support to obsolescence issues and improve supply chain resilience.

Used in combination with subtractive manufacturing processes, additive manufacturing is showing potential for new methods to fashion spare parts and improve production processes onboard and dockside.

By working with the developers of 3D printing technology, Navy Engineering and Authorised Materiel Seaworthiness Delivery Organisation's, FSU's technicians are aiming to provide a world-class response to the ADF's needs in-theatre and at home.

4. Our Critical Foundations

As highlighted in the NDS, comprehensive **partnerships** with industry, universities, research organisations and international partners, highly skilled **people** and access to necessary **infrastructure** are essential for successful delivery of advanced capabilities to the ADF. All of these need to be supported by a robust **security** framework to protect our people and our capabilities.

Partnerships

As highlighted in the *Defence Industry Development Strategy*, Australian industry, universities, research organisations and trusted partners are essential for Defence to rapidly pull through disruptive technologies that can deliver game changing capabilities. Our partnerships also provide a sovereign research and development base which supports future capability to address Defence's strategic priorities.

Defence already engages in a number of ways with both industry, universities and research organisations but we recognise the need to engage much more strongly and deeply, and to encourage greater collaboration across our Ecosystem to tackle our hardest challenges. We will continue our partnerships with industry, universities and research organisations, and ASCA will continue its close engagement through its three programs: Missions; Innovation Incubation; and Emerging and Disruptive Technologies. We will also focus on strengthening collaboration:

- The Australian Defence Science and Universities Network (ADSUN) currently connects Defence with State governments, universities and the industrial base within each state. Emphasis will be placed on maturing ADSUN into a highly visible and effective national mechanism, fostering and nurturing partnerships between Defence and universities, States and Territories, and industry with a particular focus on enabling the participation of small and medium enterprises (SMEs).
- DRCs will be thematic centres of excellence, bringing together a critical mass of talent and resources to collaborate on critical, longer-term Defence challenges, supporting the development of the **Future Integrated Force**.
- More context will be given about the challenges faced and the capabilities needed by the ADF through more regular classified briefings aiming to realise the full benefits of deep collaboration.

Australia's international partners will be critical over the next decade in building asymmetric advantage. Agreements such as AUKUS – especially access to advanced capabilities under Pillar II – are particularly important. More broadly, Defence's partnerships through existing Five Eyes intelligence and security arrangements and bilateral and multilateral agreements all provide a significant role in our ability to develop and deliver advanced military capabilities that provide effective warfighting and deterrent applications. We will continue to build on these partnerships as we further integrate our IS&T Ecosystem so that we can rapidly pull through innovative and asymmetric technologies.

Significantly, Australia's own innovative research and development infrastructure is itself a source of competitive advantage. Our technical expertise and experience is highly valued and sought after and Defence will work closely with our most trusted partners to realise the full benefits of deep collaboration and joint capability development.

AUKUS Innovation Challenge Series

The AUKUS Innovation Challenge Series is a new trilateral mechanism to enable governments, industry, and academia to co-design solutions to operational problems and provide visibility of the best solutions across our three countries.

The first Innovation Challenge, released in March 2024 and focused on electronic warfare, is being delivered by ASCA in Australia, the Defense Innovation Unit in the US, and Defence and Security Accelerator in the UK. The Challenge seeks to leverage electromagnetic spectrum technologies and capabilities that could provide a competitive advantage to electromagnetic targeting and protect from adversary electromagnetic targeting capabilities. ASCA received and assessed submissions from Australian tenders and outcomes were shared between the AUKUS partners. Successful tenderers were supported to develop detailed project plans and participated in co-design workshops with Defence stakeholders to ensure their plans addressed Defence specific electronic warfare needs. This process also provided a comprehensive scan of Australian industry's electronic warfare capabilities.

STEM skills – assuring a future of innovators, scientists and technologists

Defence's strategic approach to address the increasing demand for STEM skills includes a focus on accessing a broad talent pool representing the diversity of the Australian community. This includes developing the career pathways for women and indigenous Australians into STEM careers.

Defence's NAVIGATE Program is one example of building a more resilient and sustainable IS&T workforce by increasing female participation in STEM. Bolstering female representation at mid-to-senior levels and increasing diversity allows greater innovation to solve future challenges for Defence.

The Program enables STEM professionals from the broader S&T ecosystem to transition into the complex area of Defence Innovation, Science and Technology.

It also gives participants the opportunity to work with our partners in industry and universities, both in Australia and around the world.

The NAVIGATE Program ensures we are enabling the best talent from across our community to realise their full potential, and helps build long-term resilience and sustainability in our STEM workforce.



People

People are at the centre of an effective Defence IS&T Enterprise. A highly skilled and diverse workforce is crucial to delivering capability, especially when automation, globalisation and advances in technology are transforming skill requirements. Australia faces a growing demand for workers with appropriate STEM qualifications and skills. This is particularly applicable for Defence to achieve its mission. The 2023 *Jobs and Skills* report by Jobs and Skills Australia highlighted Professional, Scientific and Technical Services is projected to grow by 233,600 to 2033.

There is a focus across Government to address the barriers that make it difficult to start STEM careers, and thrive and stay in STEM roles. This was supported by The Pathway to Diversity in STEM Review, which examined ways to increase the diversity and inclusion in the Australian STEM sector.

Defence places a premium on attracting and supporting a diverse STEM talent pool to ensure that it has the right workforce to meet today's priorities and respond to future challenges. The *Defence Culture Blueprint* creates the conditions for a Defence Enterprise culture that drives and sustains performance in an increasingly complex strategic environment to achieve the Defence Mission. The *Defence Industry Development Strategy* also recognises the benefits secondments provide in helping to increase the technical expertise and industrial experience in support of the Defence mission.

The Australian Government is implementing targeted initiatives in employment, education, skilling and industry development that will assist in supporting the Defence IS&T Ecosystem, including dedicated Commonwealth supported university places and apprenticeships to increase the number of graduates in key fields to support AUKUS priorities. National STEM engagement programs such as Women in STEM and STEM professionals in schools are encouraging greater take up and attainment of STEM qualifications.

Defence specific programs such as the Women in STEM Scholarships and Industry Experience Placement Program support the development of Defence specific skills.

Through Defence's focus on developing an integrated IS&T Ecosystem, Defence will seek to proactively partner and work with all stakeholders across industry, universities and research organisations to ensure that we are able to collectively support the development of a highly skilled, STEM qualified workforce.



Air Launched Delivery Drone

The accuracy with which tactical defence and disaster relief payloads are delivered is set to be revolutionised thanks to the cutting-edge work of a team in the Jericho Disruption Innovation Program at RAAF Base Edinburgh.

The team is currently fine-tuning a technology that will allow air drops of communications or relief supplies to be delivered with pinpoint accuracy on both land and at sea.

The Air Launched Delivery Drone or 'Aladdin' will open up limitless opportunities for assistance in the field of battle or Defence exercises, as well as the complex and challenging area of search and rescue, and disaster relief. While the current focus of Aladdin is on Defence tactical resupply, it could greatly enhance search-and-rescue operations in this region and in the delivery of humanitarian aid during emergencies.

Infrastructure

It is critical our STEM professionals have access to world-class digital and physical research infrastructure. Defence stands to benefit from physical and digital research infrastructure that enables the IS&T Ecosystem to collaborate through the sharing of knowledge and ideas, and the pooling of resources to pursue common goals and overcome resourcing constraints.

Defence will augment and adapt existing facilities where available through targeted investment to develop multi-level secure, modular and reconfigurable research laboratories that can be used for Defence purposes or collaboration where appropriate. To accelerate the transition of emerging and disruptive technologies, Defence will create the ability to rapidly prototype technologies and conduct trials and experiments to demonstrate capability. A multi-level secure research ICT network will underpin the physical infrastructure.

An increased emphasis needs to be placed on developing new, and leveraging existing, partnerships to create opportunities for co-investment and shared access in high cost research infrastructure. This collaboration is essential to support the development of key research infrastructure and will promote opportunities for novel discoveries and rapid translation of research outcomes.

Human-Machine Integration

Army is exploring how Human-Machine Integration (HMI) of AI-enabled and autonomous systems will generate mass and scalable effects as well as reduce risk to Australian soldiers in the land domain.

A recent demonstration at Puckapunyal brought together a range of AI-enabled and autonomous systems, including drone swarms, optionally crewed combat vehicles, and uncrewed support vehicles. Operating under the control of an Army combat team commander, robotic vehicles made first-contact with an enemy force to clear the way and offer protection to advancing soldiers and crewed systems. Once cleared, a convoy of autonomous, crewed and uncrewed support vehicles arrived for the back loading of casualties and resupply.

Future Army activities and exercises will continue to explore how HMI, leveraging AI and autonomy technologies, will enhance Army capabilities' scale, speed and survivability. These technologies have the potential to change the way Army trains and fights, improve decision-making, generate mass and scalable effects, as well as reduce risk to Australian soldiers.



Security

The highly classified and sensitive nature of research supporting advanced capabilities for the ADF is a continuing risk for foreign interference and espionage activities. Uncompromised Defence IS&T is critical to ensuring the country's operational capability and technological edge. Defence applies a consistent and rigorous security approach to all external IS&T activities and through our partnerships with industry, universities and research organisations, encourage external partners to establish and maintain robust security frameworks and measures.

All stakeholders operating within the Defence IS&T Ecosystem have a responsibility to protect information and intellectual property generated through IS&T activities, regardless of where the activities take place. The requirements for security within the Defence context have evolved beyond physical, personnel and assets, to consider the emerging risks associated with cyber and information. Each part of this Ecosystem contributes to, and has a role to play, in ensuring the IS&T security of Defence and our nation. Through existing mechanisms, Defence will support the Ecosystem to identify security risks and to understand and apply security controls across the domains of governance, personnel security, physical security, and information and cyber security.

Defence will strengthen engagement with the broader IS&T Ecosystem to provide clearer guidance, greater awareness and support to appropriately cleared organisations to assist their understanding of and response to the current threat environment.

Collectively these actions are vital in ensuring entities wishing to participate in Defence projects, contracts and tenders possess appropriate protection mechanisms to safeguard the information being generated and shared as part of Defence IS&T activities.

5. A more integrated, effective and efficient IS&T Ecosystem

By 2034, accelerated end-to-end processes from initial incubation of ideas through research to demonstration and capability acquisition, delivery and sustainment will be our business as usual.

Through our integrated IS&T Ecosystem, intelligence and science-led insights allow us to adapt quickly to changes in our strategic circumstances and meet the threats posed by emerging and disruptive technologies.

Defence-wide experimentation activities in close collaboration with trusted partners across industry, universities, research organisations and international partners shape the way emerging and disruptive technologies are employed by our warfighters and support the adoption of advanced capabilities.

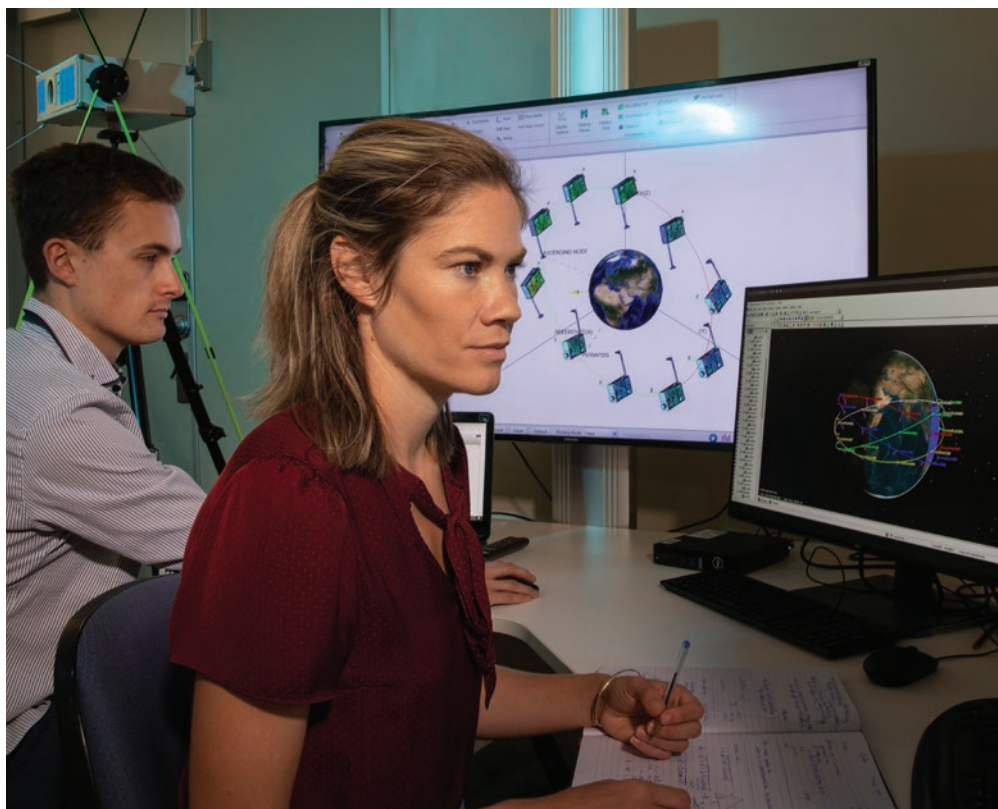
Our mature Defence IS&T Enterprise articulates clear strategic priorities and a roadmap for investment aligned with Government direction, ensuring our efforts are coordinated and outcomes focused. ASCA missions deliver rapid pull through of innovative technologies into advanced capabilities in response to our strategic priorities.

Across Australia, mission driven DRCs serve as beacons of excellence, accelerating cutting-edge research and development and generating opportunities for asymmetric capability development in the immediate and longer term. These centres enhance the long-term capacity and capability of the broader IS&T Ecosystem, supporting the growth and resilience of our national research and development base, and allowing Defence to enhance preparedness and realise our Strategy of Denial.

Through our collaborative efforts, Defence IS&T embraces risk: taking more when there are clear payoffs from emerging opportunities, and sharing more with partners when mutually beneficial.

Security is paramount, with IS&T systems, processes, policies and procedures strengthened so that our people, sensitive research, data, and intellectual property are protected and can leverage, and be leveraged by, our trusted international partners.

Our people provide the foundation for the success of our ten-year vision. We invest in the skills we need for the future and implement flexible and innovative workforce strategies to attract and retain the talent we need. We work seamlessly across industry, research organisations and our international partners to leverage diversity of expertise and experience, maintaining a culture of transparency, information sharing, collaboration and trust.



Annex 1.

The vision of Accelerating Asymmetric Advantage is supported by six guiding principles that provide the foundation for how we will achieve our strategic goals and objectives. They are essential to all IS&T efforts across Defence.

Defence IS&T is a strategic asset

In our current strategic environment, the contributions of Defence's IS&T Ecosystem are a force multiplier for the ADF and contribute directly to our Strategy of Denial through deterrence.

Defence IS&T is a highly valuable capability that brings both immediate and long-term application, and its Ecosystem will be curated as a strategic asset to achieve maximum focus, scale and impact.

Defence IS&T is mission driven

Defence's IS&T Ecosystem is shaped by our most difficult strategic challenges. It must be postured and calibrated to focus on emerging technologies with the potential to address the strategic risks Australia faces, and that will deliver enhanced military capability at the earliest opportunity.

Defence IS&T operates at the speed of strategic relevance

The primary role of Defence's IS&T Ecosystem is to generate capability advantage and warfighting effects for the ADF. It must be adaptive to changes in our strategic circumstances, and support the rapid introduction of a minimum viable capability when necessary and appropriate.

Guiding Principles

Defence IS&T is secure by design

As a strategic asset, Defence's IS&T is valuable commodity. We need to maintain a competitive advantage through positive control of our data and knowledge. A robust culture of security and accountability underpins the integrity of our strategic IS&T infrastructure, research, and people.

Defence IS&T embraces risk

The collapse of strategic warning time means that existing processes for evaluating risk are no longer fit for purpose: we do not have the luxury of time.

We must focus efforts on IS&T activities that maximise impact through focus and scale, and be prepared to discontinue activities that are unlikely to deliver against ADF objectives. Similarly, we must embrace risks for high-impact initiatives that have the potential to deliver asymmetric advantage.

Defence IS&T is built on partnerships

The effectiveness and efficiency of Defence's IS&T Ecosystem requires ongoing transfer of knowledge, capacity and capability across all Groups and Services, with industry and research organisations, and with our valued international partners. We will be coordinated, consultative and collegiate in our ways of working.

Annex 2.

Acceleration: The process through which capabilities and technologies can be delivered into the hands of the warfighter faster, through having a shared understanding of the problem with military personnel, committing to deliver minimum viable capability in the short to medium term and having a partnered approach with defence industry where risk is genuinely shared.

Asymmetry: Any type of advantage that can be used against an adversary. Asymmetry does not exclusively mean specific capabilities, and can include: intent; environment; technology; methods; organisation; resources; and culture. In a military context, 'asymmetric advantage' refers to military capabilities that pit strength against weakness, at times in a non-traditional or unconventional manner, and that disrupt a potential adversary's decision calculus. Countering, eliminating or enduring asymmetric advantage imposes disproportionate costs, and in some cases there may be no effective response.

Capability: The power to achieve a desired operational effect in a nominated environment within a specified time, and to sustain that effect for a designated period. In a military context, capability is achieved by developing a force structure appropriately prepared for a range of military operations.

Data: Facts represented as text, numbers, graphics, images, sound or video. Data is the raw material used to represent information.

Deterrence: The use of the military and other elements of national power to discourage or restrain a potential adversary from taking unwanted actions. It involves having in place measures and responses that change a potential adversary's risk assessment and therefore decision-making calculus.

Dual-use: Capabilities that can be applied for civil or military use.

Enhanced Force-in-Being: Now until 2025 – the Enhanced Force-in-Being will focus on immediate enhancements that can be made to the current force.

Future Integrated Force: 2031 and beyond – the Future Integrated Force will see the delivery of an ADF that is fit for purpose across all domains and enablers.

Glossary

Innovation: For the purposes of capability management, a process by which Defence identifies and creates opportunities to improve capability outcomes or achieve a capability edge, by exploring, developing and delivering new concepts, processes techniques, or ideas.

Minimum Viable Capability: A capability (inclusive of fundamental inputs to capability) that can successfully achieve the lowest acceptable level of the directed effect in the required time, able to be acquired, introduced into service and sustained effectively.

Objective Integrated Force: 2026 to 2030 – the Objective Integrated Force will see the accelerated acquisition of critical capabilities.

Research and Development: Research and development comprise creative and systematic work undertaken in order to increase knowledge – including technology, sciences, culture and society – and to engineer new applications. Research and development covers four types of activity:

- **Basic research** is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view.
- **Applied research** is original investigation undertaken in order to acquire new knowledge that is directed primarily towards a specific, practical aim or objective.
- **Experimental development** is systematic work, drawing on knowledge gained from research and practical experience and producing additional knowledge, which is directed to producing new products or processes or to improving existing products or processes.
- **Strategic basic research** is experimental and theoretical work undertaken to acquire new knowledge directed into specified broad areas in the expectation of practical discoveries. It provides the broad base of knowledge necessary for the solution of recognised practical problems.

Spiral Development: An iterative approach to development where each iteration (a spiral) produces a robust working version that is released for use and user evaluation. The first version is the baseline spiral with each subsequent spiral building on the previous spiral and producing a new version with increased functionality. This model is useful for systems with well-defined problems such as modelling and simulating software, autonomy and other platform upgrades.

Accelerating Asymmetric Advantage

Delivering More, Together

VISION

Australia's Defence Innovation Science and Technology accelerates the delivery of asymmetric capabilities and drives focused strategic research into the next generation of advanced capabilities.

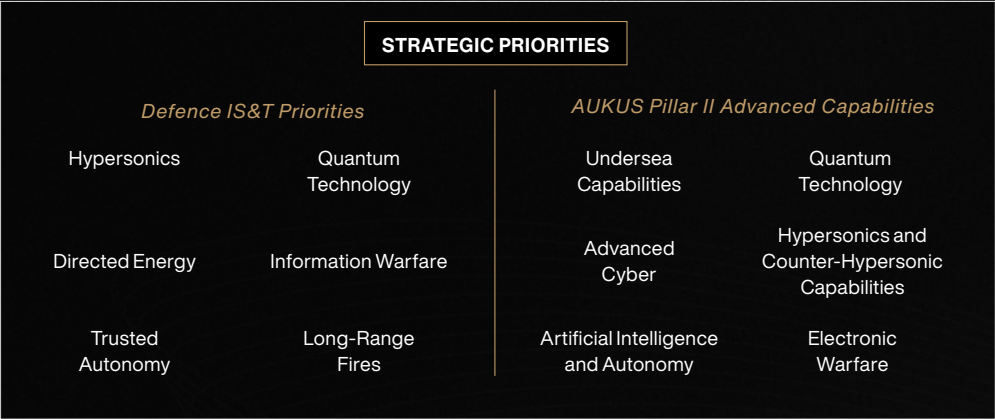
MISSION

Create capability advantage for *National Defence* through innovation, science and technology.

APPROACH

Our people are our most important and valued resource. Stakeholders across the Defence IS&T Ecosystem will **focus** on high priority problems, partnering in a secure manner to increase **scale** in order to deliver **impact** to *National Defence*.





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| <ul style="list-style-type: none"> • Harnesses key international partnerships (both bilateral and multilateral) to develop and deliver capabilities aligned with shared strategic priorities. • Demand signals clearly articulated to all stakeholders to ensure an integrated Defence IS&T Ecosystem. • Partnerships to build and leverage national shared infrastructure. • Increases opportunities to grow and nurture the Australian STEM talent pool, to ensure a supply of Defence IS&T professionals into the future. | <ul style="list-style-type: none"> • Mission driven IS&T activities will be scaled to the appropriate size to deliver impactful outcomes for the warfighter. • International partnerships will be enhanced for capability impact. • Accelerate capability development and support procurement reform and sovereign industrial capacity. |
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Australian Government
Defence