



Defence FOI 231/22/23

DEFENCE INNOVATION REVIEW

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Foreword

Dear Minister Price,

Thank you for the opportunity to conduct this Review into the Defence innovation ecosystem. I would like to thank Chief Defence Scientist Tanya Munro, the Defence Secretariat, and the many other Defence stakeholders for the support and input they have provided. I would also like to thank s47E(d)

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The Review follows, and summarises the approach and methodologies used. s47C
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My very short summary of your terms of reference is that the Review should advise on how best the Defence innovation ecosystem can create an edge in technological capability for our war fighters. It must be at a tempo that matches the rapidly changing international climate of today's digital age, where the very nature of conflict has changed. Furthermore, how Australian industry's contribution to this goal can be optimised, with commercialisation best enabled.

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Again, thank you for this opportunity.

Regards,



David Peever

EXECUTIVE SUMMARY

Australia faces a rapidly evolving context in which Defence innovation is increasingly important. Our research reveals s33(a)(ii)

. This Review lays out detailed recommendations for achieving this, s47C

In the area of innovation, the Australian Defence Force has a solid foundation, and we can be proud of many recent endeavours, such as the Armidale-class patrol boat, LAND 17; the self-propelled howitzer; the integrated Battlefield Telecommunications Network (Project Currawong); and Loyal Wingman. We also benefit from a growing defence-innovation ecosystem of many agile, small and medium-size enterprises, a core group of global companies with access to international networks, world-class academic institutions, and publicly funded research agencies.

However, the global context is changing fast, s33(a)(ii). Australia faces an increasingly challenging defence environment, driven by three rapidly evolving, disruptive trends: a more complex and rapidly changing international climate; the changing character of warfare; and rapidly emerging new technologies. In addition, s33(a)(ii)

s33(a)(ii)

Globally, the development of new capabilities is the deciding factor for advanced armed forces when it comes to establishing military superiority s33(a)(ii)
s33(a)(ii)

The Minister for Defence Industry and Minister for Science and Technology has commissioned this independent Review s33(a)(ii)

Galvanising the Defence innovation ecosystem s33(a)(ii)

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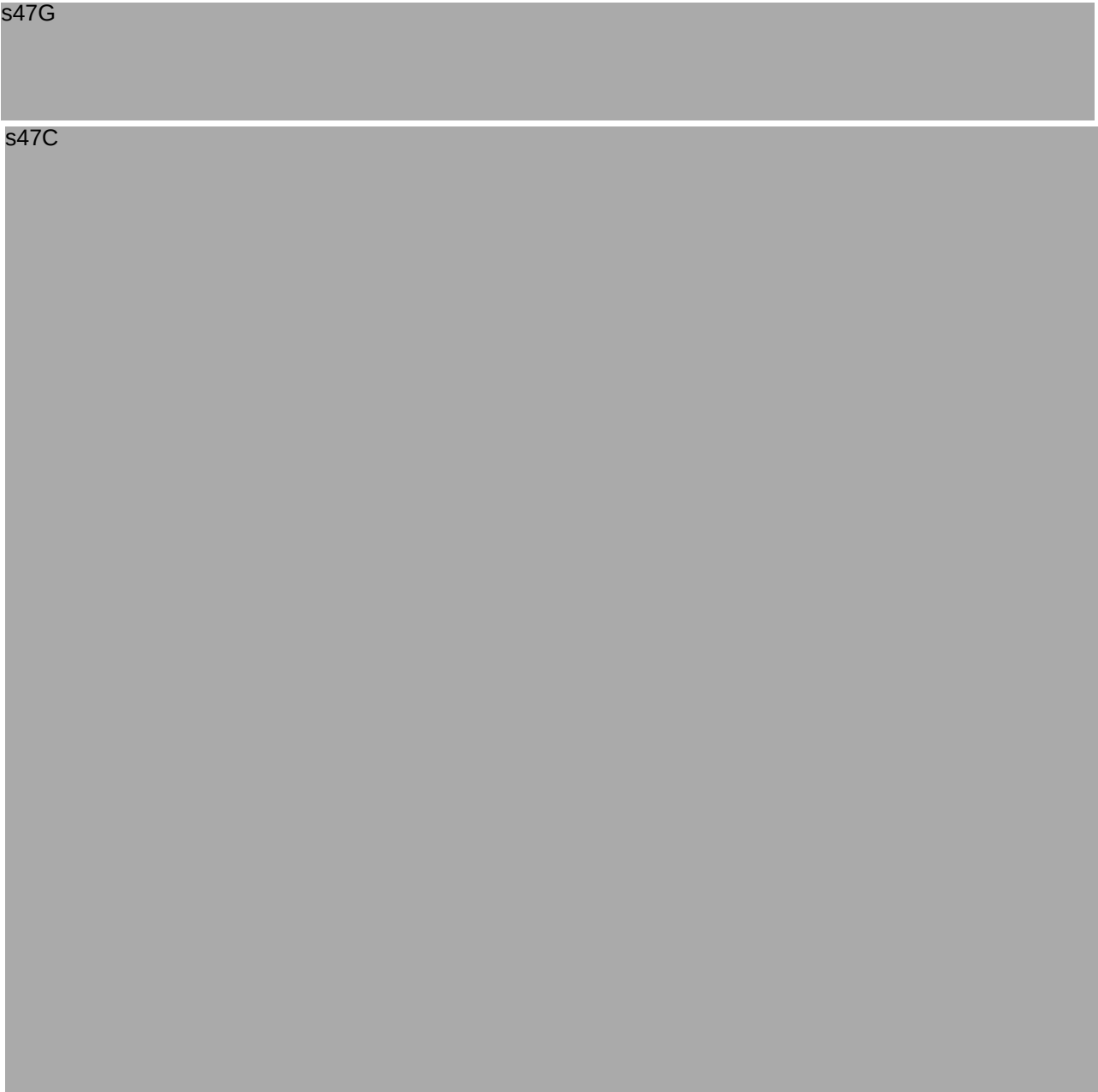
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Overall, s33(a)(ii)

Defence is designed, and has evolved, to do different things.

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s47C **key recommendations for Defence** s47C



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CHAPTER 1 – THE CASE FOR CHANGE IN THE DEFENCE INNOVATION ECOSYSTEM

A rapidly evolving strategic context

Australia today faces an increasingly dynamic and complex defence environment, resulting in an urgent need for faster innovation. Three trends are driving this changing strategic context: a more complex, rapidly changing international climate, the changing character of warfare (with increased threats), and rapidly emerging technologies.

s33(a)(ii)

The 2020 Force Structure Plan increased funding for innovation and capability acceleration programs to deliver innovative solutions for Defence capability, including through Australian industry. However, the world is changing rapidly, and Australia needs to be prepared to protect its interests and move quickly. Australia's Defence innovation ecosystem needs a much stronger sense of urgency to ensure well-harnessed innovation can deliver the right capabilities to our war fighters.

The recent AUKUS partnership has brought a new focus on innovative capabilities. s33(a)(ii)

The role of innovation in Defence

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s33(a)(iii), innovation which can benefit Defence tends to come from outside of Defence – largely from industry. However, s33(a)(ii)

s33(a)(iii)

s33(a)(iii)

s33(a)(ii)

It includes internationally recognised research institutions (such as the Defence Science and Technology Group, the Commonwealth Scientific and Industrial Research Organisation, and the Group of Eight universities), a developing start-up environment, a range of small and medium enterprises (SMEs) s33(a)(ii), and Australian offices of international defence Primes (such as BAE Systems, Boeing, and Thales). Australian Defence research has supported capabilities such as the Black Box flight recorder, the Nulka active-missile decoy and Jindalee Operational Radar Network (JORN), and expert advice has contributed to major Defence acquisitions (such as Joint Strike Fighter).

While Australia has historically delivered innovative Defence capabilities, s33(a)(ii)

The purpose of this Review into Defence innovation

The Hon Melissa Price MP, Minister for Defence Industry and Minister for Science and Technology, commissioned this Independent Review into the Defence innovation ecosystem – specifically Defence’s science, innovation, research and development programs, including their governance, frameworks, accountabilities, gaps and inefficiencies. The Review’s Terms of Reference are outlined in Annex A.

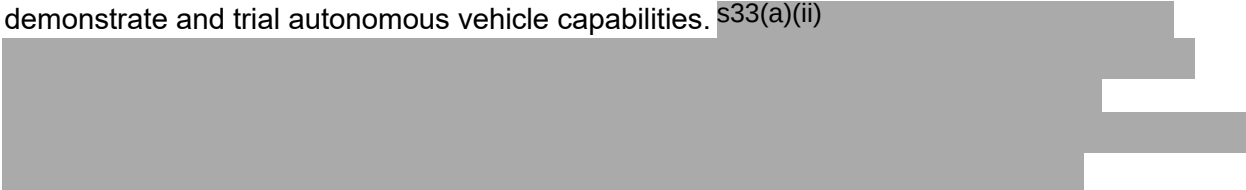
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Australia's Defence innovation ecosystem has delivered examples of innovation excellence and encourages world-leading innovation. Examples include gimbal-sensor technology for the unmanned aerial system program, and the flagship naval program Autonomous Warrior to demonstrate and trial autonomous vehicle capabilities. s33(a)(ii)



s47E(d)



has been endorsed by the Investment Committee for roll out across all innovation programs.

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Exhibit 7 Systems and documents required to generate the innovation portfolio

3 project management tools and systems

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28+ program documents and reports, 10 interviews

8
public
reports

Select examples:

- Defence Industry and Innovation Programs Annual Report
- 2020 Defence Strategic Update
- 2020 Force Structure Plan
- Lead the Way: Defence Transformation Strategy

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s47E(d)



Exhibit 8 Project funding for select technology areas

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Multiple digital tools and systems are used to manage innovation (Exhibit 9). s47E(d)



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The Benefits Management Framework aims to standardise metrics reported by innovation programs. It is currently used by the Defence Innovation Hub and Next Generation Technology Fund, and is in the process of being rolled out to other innovation programs. s47E(d)



s47E(d)



s47E(d)



s47E(d)



Similarly, academia focuses on publication as a measure of success. s47E(d)



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The Services innovation programs offer well-established and innovative examples of collaboration with industry and academic partners. s47E(d)



. Industry days, run as a collaboration between the Army and the Defence Innovation Hub, where a broad range of industry contributors are invited to showcase prototypes and concepts, are another prime example of such collaboration. s47C



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Individual programs within Defence have a clear sense of their mandate. For the Next Generation Tech Fund, this is a focus on early-stage research, and for the Defence Innovation Hub, it is investments in later-stage technologies. The mandate for Service-led programs is also clear, with a focus on developing capabilities for end users with the possibility of use in the short term.

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Defence is focused on attracting and retaining top research talent. The value proposition for employees within the Science and Technology space is the opportunity to work on complex, cutting-edge, and high-impact problems in the national interest. Opportunities for growth and

development include international postings, rotations into the Services, and sponsorship for further research.

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s33(a)(ii)



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CHAPTER 4 – IMPLEMENTATION

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it can deliver immediate impact for Defence and the broader innovation ecosystem.

Implementation approach

Given the rapidly evolving strategic context, s33(a)(ii)

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Critical elements for implementation success

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Five key elements will be critical for successful implementation:

Leaders who lead

This change needs to be led from the top. s47C

Many stakeholders have long-term vested interests in Defence innovation work, and so dedicated leadership energy will be essential to make the case for change, and the change leaders will need to be closely aligned.

Deep engagement and syndication with key stakeholders in Defence and beyond

As noted above, the recommendations contained within this report have yet to be socialised with Defence or broader ecosystem stakeholders. s47C

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ANNEX A – TERMS OF REFERENCE

Approach to Independent Review

The Terms of Reference for this Independent Review were to independently review and provide recommendations on:

- Governance, management (administration) and funding of all Defence-funded innovation programs across the Defence organisation. Particular focus should be given to the Next Generation Technologies Fund and the Defence Innovation Hub
- Defence organisational structure, governance, and funding of the Defence innovation ecosystem
- How the Defence innovation system can be adapted to create a greater link between academia and industry to solve Defence's unique capability challenges
- How to commercialise Defence-funded research and innovation more effectively, and stimulate Australian innovation for the development of mission-focused technology solutions that could give Defence a unique capability edge
- Development of a simplified suite of contractual arrangements to support rapid acquisition and transition from concept to capability
- Refinement, consolidation and streamlining of the research, innovation and technology development priorities and topics, with the aim of strengthening participation of Service Capability Managers to direct 'mission-set' specific innovation
- Transition between Defence and other department's innovation and manufacturing programs to support the continued development and commercialisation of technology that does not meet a direct Defence requirement

The findings and recommendations of this Review are evidence and fact-based, having been informed by extensive surveys underpinned by global best practices in innovation (across public-sector, aerospace and defence organisations), substantial interviews with a broad range of key constituents, and deep examinations of systems operating in other countries and sectors.

To fulfil the Terms of Reference, the Independent Review team have conducted stakeholder interviews, workshops, targeted expert engagement, and internal and external surveys.

ANNEX C – GLOSSARY

Term	Definition
Australian Defence Contract (ASDEFCON)	The suite of contracting documents allowing Defence to procure services from businesses and universities
Australian Defence Science & University Network (ADSUN)	State sponsored Defence research and innovation network to facilitate defence innovation
Benefits Management framework (BMF)	Standardised self-reported metrics used to measure innovation programs. In the process of scaling throughout the innovation system
Capability Acquisition and Sustainment Group (CASG)	Group responsible for acquiring, sustaining and disposing of physical capabilities for the Defence Force
Capability Acceleration Fund (CAF)	Program designed to bridge an innovation gap between early-stage research & development and acquisition. Due to begin in FY 24/25
Capability Life Cycle	The Capability Life Cycle provides Defence with an end-to-end process for capability development and delivery of capital projects, and associated through-life support, related to major capital equipment, infrastructure, enterprise enablers and information and communications technology
Consortia Model	A self-governing group of innovation partners who come together to focus on solving problems from the same Entity technology area
Cooperative Research Centre (CRC)	Research group aiming to bring together small to medium businesses, academia and publicly funded research agencies to research priority technologies for Defence capabilities
Customer Partnerships	Function of the Entity designed to communicate and build close relationships with the Services, industry, publicly funded research agencies and academia
Defence	The Australian Defence Force and/or Department of Defence
Defence Advanced Research Projects Agency (DARPA)	United States research centre focusing on early-stage innovation
Defence Capability Assessment Program (DCAP)	The process Defence uses to identify and prioritise capability needs for budget submission, conducted about a two-year cadence
Defence Innovation Hub	Innovation program belonging to the Strategy, Policy, and Industry (SP&I) Group
Diggerworks	Service innovation centre belonging to the Capability Acquisition and Sustainment Group
Innovation eXperimentation Group (IXG)	Service innovation centre belonging to Special Operations Command
Integrated Investment Plan (IIP)	The rolling budget which allows the Defence force structure and associated investments
Jericho21	Service innovation centre belonging to the Air Force

Next Generation Technology Fund (NGTF)	Innovation program belonging to the Defence Science and Technology Group
Office of Defence Industry Support (ODIS)	An office providing support to defence businesses by issuing capability building grants, business coaching and introductions to Defence. Formally known as the Centre for Defence Industry Capability
Other Transaction Authority (OTA)	Legal tool used by the United States innovation system to conduct research and development faster than would be possible with existing acquisition-style contracts
Primes	Companies capable of integrating defence product into a single system (such as Boeing, Raytheon)
Publicly Funded Research Agency (PFRA)	Federally funded institutes conducting research (such as Commonwealth Science and Industrial Research Organisation)
Robotic & Autonomous Systems Implementation and Coordination Office (RICO)	Service innovation centre belonging to the Army
Service innovation centres	The individual innovation centres operated by the Services (such as Warfare Innovation Navy, Robotic & Autonomous Systems Implementation and Coordination Office)
Sovereign Industrial Capability Priorities (SICP)	Priority list set by Strategy, Policy and Industry Group (SP&I) to guide defence-industry building
Small & Medium Enterprises (SME)	Companies who contribute an element of defence technology, often integrated into a Prime systems project
STaR Shots	Innovation priority list with a three-star sponsor guiding Defence Science and Technology research
Technology Readiness Level (TRL)	A scale providing an indication of technology maturing, ranging from 1 (theoretical) to 9 (fielded capability)
TRL 1-3	Research and establishment of proof of concept
TRL 4-6	Validation and verification of prototype
TRL 7-9	Integration of system, proven for full development
Venture Capital (VC)	A form of funding focused on early-stage businesses
Warfare Innovation Navy (WIN)	Service innovation centre belonging to the Navy

ANNEX E

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The Eight Essentials of Innovation

■ Comparison completed between internal and external survey



Aspire

Do you accept innovation-led capability as absolutely critical and do you have cascaded targets that reflect this?



Choose

Do you invest in a coherent, time-risk balanced portfolio of initiatives that are resourced to win?



Discover

Do you have actionable and differentiated organisational, market and technology insights that translate into capability advantage?



Evolve

Do you create new structures, methods, technologies, products, and services that provide robust and scalable capability impact?



Accelerate

Do you beat the competition with fast and effective development and launch of innovations?



Scale

Do you launch innovations in the relevant domains and segments at the right magnitude?



Extend

Do you win by creating and capitalising on external networks?



Mobilize

Are your people motivated, rewarded and organised to repeatedly innovate?

RECAP: Terms of Reference for the independent review into Defence Innovation

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- 2 Defence organisational structure, governance and funding of the Defence innovation ecosystem.

- 3 How the Defence innovation system be adapted to create a greater link between academia and industry to solve Defence's unique capability challenges.

- 4 How to more effectively commercialise Defence-funded research and innovation and stimulate Australian innovation for the development of mission focused technology solutions that could give Defence a unique capability edge.

- 5 Development of a simplified suite of contractual arrangements to support rapid acquisition and transition from concept-to-capability.

- 6 Refinement, consolidation and streamlining of the research, innovation and technology development priorities and topics with the aim to strengthen participation of Service Capability Managers to direct 'mission-set' specific innovation.

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