



Australian Government



# DEFENCE INDUSTRY & INNOVATION



## Programs update report 2017

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**DEFENCE INNOVATION HUB**

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**CENTRE FOR DEFENCE INDUSTRY CAPABILITY**

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**NEXT GENERATION TECHNOLOGIES FUND**

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**Australian Government**

# Defence Industry and Innovation programs update report 2017





# DEFENCE INDUSTRY & INNOVATION



Enhancing Defence capability through Australian industry growth and innovation

# Foreword



The Australian Government, in which I am privileged to serve as the Minister for Defence Industry, has placed innovation and research investment at the forefront of the national jobs and growth agenda. The Prime Minister,

the Hon Malcolm Turnbull MP, is committed to driving growth through innovation, ensuring Australia's prosperity and security now and into the future. The Turnbull Government's \$1.6 billion investment in programs to drive growth in the defence industry and innovation sector will provide our troops with the latest in innovative defence technologies and ensure we are well-equipped to meet emerging regional and global threats.

I am pleased to report on the progress Defence has made in establishing a single innovation pipeline that is agile, integrated across Defence, aligned closely with strategic requirements, and maximises the value of Government investment. The programs actively encourage collaboration across industry and research institutions to deliver innovative solutions for Defence capability and are providing opportunities for Australian business, regardless of size, to contribute to Australia's defence capability.

Within the Defence innovation system, the Next Gen Tech Fund has established major initiatives across the national research community which are addressing Defence science and technology priorities. Through new collaborative frameworks, the Next Gen Tech Fund has supported more than 100 research activities with industry, university and publically-funded research agency partners in its first year and committed to spend more than \$110 million on multiple large-scale research programs in the coming years, ensuring outcomes are focussed, mission relevant, and meet the unique demands of the Australian Defence Force.

The Defence Innovation Hub provides an opportunity for businesses of all sizes and research organisations to put forward innovative ideas, make connections, and collaborate in developing their technology from concept through to introduction into service. I am pleased to report on the Hub's success in awarding more than \$53.5 million in innovation contracts throughout its first year of operation. The Hub has successfully introduced new contracting frameworks and intellectual property policies, removing many of the barriers to doing business with Defence.

The CDIC is the cornerstone of the Government's strategy for resetting the Defence-industry partnership. It is transforming the Defence and industry relationship, and funding defence industry development, providing critical skilling and export initiatives. CDIC advisors have assisted over 380 businesses seeking advice about innovation opportunities with Defence. The services the CDIC provides allows Australian companies of all sizes to grow and better meet Defence's needs. The Government's commitment to growing a sovereign, competitive, and efficient Australian defence industry recognises Australian industry's crucial contribution to enhancing and sustaining the capabilities our defence force requires.

The National Innovation and Science Agenda is built on several key pillars, including Government as an exemplar. I am pleased to report on the Department of Defence's progress in driving innovation with these initiatives, and congratulate the Department of Defence on adopting a culture of continuous improvement. I welcome this report on their achievements over the first 12 months of operation and look forward to their continued success.

**The Hon Christopher Pyne, MP**  
Minister for Defence Industry

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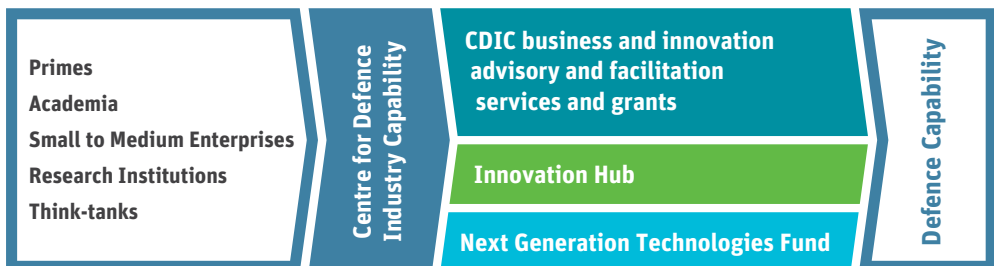
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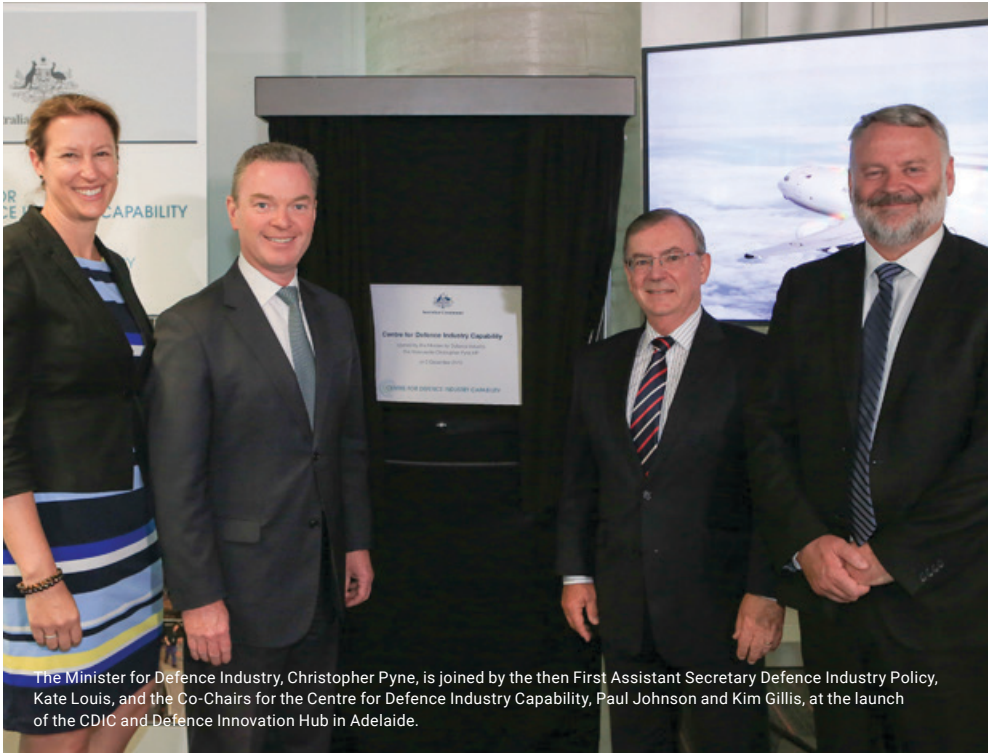
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# Overview

Launched in February 2016, the *Defence Industry Policy Statement* set out the Australian Government's commitment to transform the Defence relationship with industry and the national research community. The Government is investing \$1.6 billion in three new initiatives, which will build Defence capability, as well as the capability and capacity of Australian industry and the innovation sector to support Defence. The Centre for Defence Industry Capability (CDIC) provides funding and support to Defence industry development, skilling and export initiatives. Two new signature Defence innovation programs, the Next Generation Technologies Fund and the Defence Innovation Hub are delivering a new strategy-led approach to Defence innovation.

Together, these three initiatives are helping drive Defence capability, by investing in Australia's defence industry and innovation sector, and lowering barriers to doing business and innovating with Defence. They support the Government's defence industry policy agenda that is being enhanced through initiatives such as the first Defence Export Strategy released on 29 January 2018, the first Defence Industrial Capability Plan scheduled for release in the first half of 2018 and the strengthened Australian Industry Capability Program. Together, these initiatives are about implementing a robust defence industry and innovation system that provides the best capability for the Australian Defence Force, maximises Australian industry and innovation in support of defence capability, and better plans, guides, and assists Australian businesses and researchers to meet our defence capability needs.





The Minister for Defence Industry, Christopher Pyne, is joined by the then First Assistant Secretary Defence Industry Policy, Kate Louis, and the Co-Chairs for the Centre for Defence Industry Capability, Paul Johnson and Kim Gillis, at the launch of the CDIC and Defence Innovation Hub in Adelaide.

On 5 December 2016, the Minister for Defence Industry, the Hon Christopher Pyne MP, officially launched the CDIC and the Defence Innovation Hub in Adelaide. The day marked a significant step in resetting the Defence and industry relationship. On 16 March 2017, the new Defence innovation system achieved another major milestone, with the launch of the Next Generation Technologies Fund.

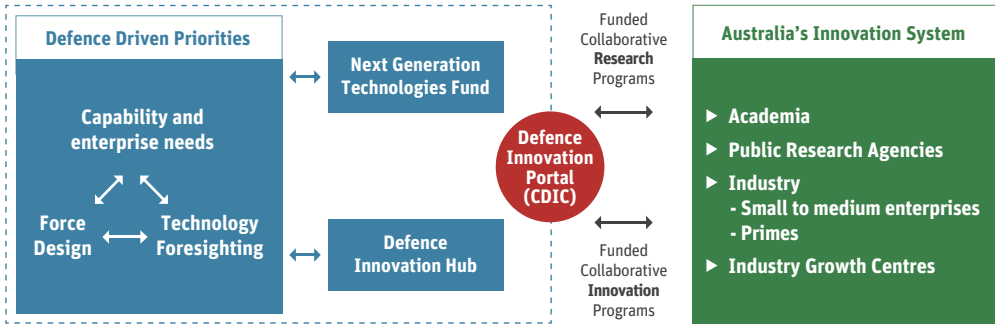
Defence’s new approach to innovation is driven by the new Force Design process and involves rigorous governance and oversight of funding recommendations, linking innovation investment to capability priorities.

## Next Generation Technologies Fund

With an investment of around \$730 million over the decade to 2025–26, the Next Generation Technologies Fund is a forward-looking program focusing on research and development in emerging and future technologies to develop game-changing capabilities for Defence.

The Next Generation Technologies Fund accepts proposals from universities, research agencies and industry that have a particular emphasis on scientific research and assists

PRINCIPAL ELEMENTS OF DEFENCE INNOVATION



in turning early ideas into innovation concepts with the potential to deliver game-changing capabilities for the 'future force after next'. Innovative technologies and concepts researched under the Next Generation Technologies Fund will be further explored and realised into capability through the Defence Innovation Hub.

## Defence Innovation Hub

Funded at around \$640 million over the decade to 2025–26 FY, the Defence Innovation Hub accepts proposals that are ready to enter the engineering and development stages of the innovation process from concept exploration and technology demonstration, through to prototyping and integrated capability demonstration and evaluation.

The Defence Innovation Hub enables Defence, industry and research institutions to collaborate on innovative technologies that can be developed into an advanced capability for Defence.

## Centre for Defence Industry Capability

The Centre for Defence Industry Capability (CDIC) is a cornerstone of the Government's strategy for resetting the Defence-industry partnership and supporting Australian industry to position itself to meet Defence's current and future capability needs. The program is assisting to build a world-class, globally competitive and sustainable Australian industry as a fundamental input to Defence capability.

The CDIC plays an important two-way enabling role between Defence and Australian industry through tailored advisory services, export and sector development initiatives, funding for defence business development and skilling, and facilitating innovation proposals. Headquartered in Adelaide, the CDIC has advisors across Australia forming a national advisory network.

The CDIC brings together the program delivery and industry expertise of the Department of Industry Innovation and Science, with the strategic guidance from the Department of Defence, and the passion, skills and expertise of industry participants.

## Facts and figures



1,100+

PROPOSALS RECEIVED FOR  
DEFENCE INNOVATION PROGRAMS



750+

ADVISORY SERVICES  
PROVIDED BY CDIC



\$80M +

DEFENCE INNOVATION  
CONTRACTS SIGNED



800+

ATTENDEES AT GRAND CHALLENGE AND  
DEFENCE CRC INFORMATION SESSIONS



\$860,000+

CAPABILITY IMPROVEMENT  
GRANTS AWARDED



1,800+

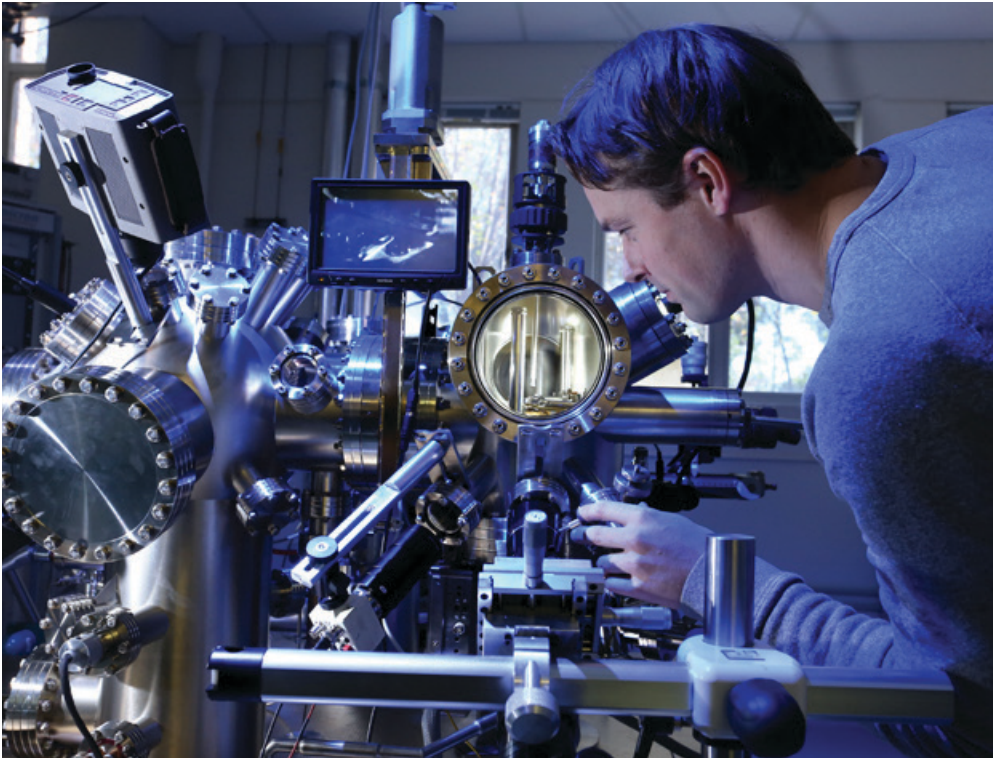
ATTENDEES AT SHIPBUILDING  
INFORMATION DAYS



75%

CDIC ADVISORY SERVICE APPLICATIONS  
FROM BUSINESSES NEW TO DEFENCE  
INDUSTRY PROGRAMS

# First year progress report



## Achieving the Government's objectives

The Government's objective for Defence industry policy is to deliver the Defence capability necessary to achieve the strategy set out in the *2016 Defence White Paper*, supported by a competitive, sustainable and innovative Australian defence industrial base. In the first year of operations, all three programs the Next Generation Technologies Fund, Defence Innovation Hub and CDIC have met major milestones and demonstrated success against measures set out in the *2016 Defence Industry Policy Statement*.

## Delivering Defence Capability – Aligning investment to strategy

A more focused, coordinated and transparent relationship between Defence and industry is required to maximise delivery of Defence capability. The foundations of the Next Generation Technologies Fund, Defence Innovation Hub and CDIC have been guided by the principles of the Government's First Principles Review: Creating One Defence. The streamlined programs support the capability life cycle and Defence Investment Committee, by ensuring investments are aligned with strategic and resource guidance.

The new approach to Defence innovation takes its direction from Defence's strategy and policy settings. The strategic objectives set by Government and the resulting Defence capability and enterprise needs, technology foresighting and force design are driving the direction of the Defence innovation system. This ensures that Defence innovation investment priorities are coherent across the Defence Innovation Hub and the Next Generation Technologies Fund, and are aligned with Defence strategy.

Defence has established governance and operational arrangements to provide strategic oversight and coordination of the Defence innovation system to ensure visibility of funding recommendations and linking innovation investment to capability priorities. To maintain alignment with the capability life cycle and force design process, the Defence Innovation Hub investment model uses the six capability streams identified in the Integrated Investment Program. The Government's approach to transparency and clarity on innovation

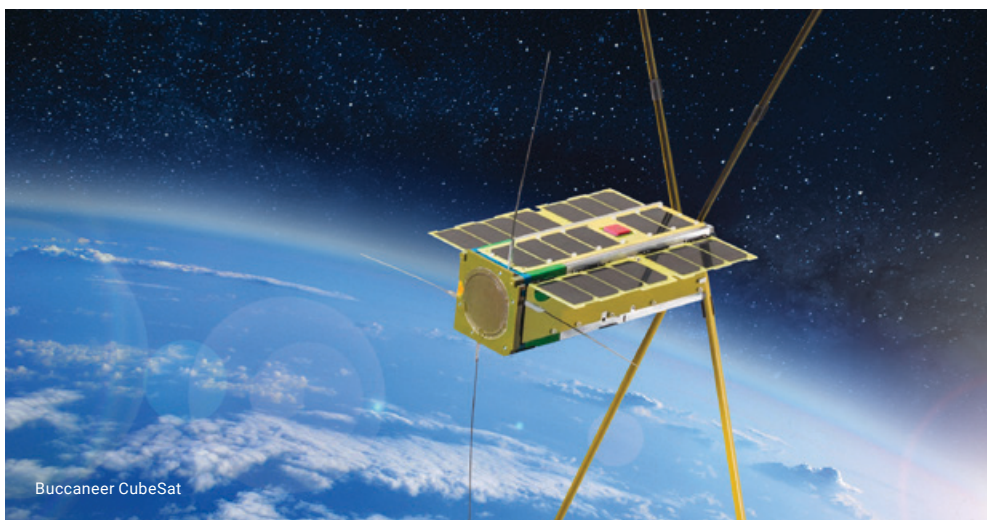
investment priorities have provided greater certainty to industry, with 86 percent of all Defence Innovation Hub proposals received aligning with Defence's top three priority innovation capability streams.

As the conduit between Defence and Australian industry, the CDIC is working collaboratively with Defence Groups and Services, including the Defence Innovation Hub and the Next Generation Technologies Fund programs to ensure it understands the requirements and priorities of Defence. This allows CDIC business advisors to work as trusted brokers with Australian industry to assist them to identify and compete for domestic and international defence supply chain opportunities.

## A new approach to Defence innovation

Defence has developed and introduced new operating models, rationalised Defence's previously disparate programs, and provided a simplified and streamlined approach to innovation. Defence now has a single innovation development pipeline, with two-signature innovation programs: the Next Generation Technologies Fund; and, Defence Innovation Hub. A portfolio of legacy innovation projects worth approximately \$61.2 million has also transitioned into the Defence Innovation Hub.

The architecture of the new system is proving effective, with the three program initiatives designed to complement each other. The CDIC provides the front door for companies and researchers wanting to work with Defence for the first time and provides tailored advisory services, export and sector development initiatives, funding for defence business development, and facilitating innovation



proposals. Based on the recommendations of CDIC business advisors participants can be guided to either the Next Generation Technologies Fund or Defence Innovation Hub depending on the nature of their capability and their innovation. The Next Generation Technologies Fund targets early-stage science and technology research, while the Defence Innovation Hub targets the development and application of technologies, providing a pipeline for the realisation of innovations.

In the first twelve months of operation, over 800 businesses benefited from either detailed engagement with the CDIC advisers and facilitators, or as a result of an export initiative. Seventy-five percent of the applications for the CDIC's tailored advisory services were from businesses not previously connected with Defence industry programs. The CDIC has also awarded over \$860,000 in grants targeted to achieving defence business specific improvements for small to medium enterprises. Critical partnerships with some of the major Defence projects have been established by

the CDIC, to assist with developing Australian involvement in supply chains such as with the Future Submarines and Future Frigates.

The Defence Innovation Portal, as the digital marketplace for Defence Innovation opportunities, has been highly successful in soliciting proposals for the Defence Innovation Hub and Next Generation Technologies Fund. The website provides an easy to use gateway between Defence, industry and research organisations and is the entry point for 'new starters' to engage with Defence. In particular, small to medium enterprises that do not have established Defence relationships are able to use the Portal to gain an understanding of Defence's capability needs and to support their ability to contribute to Defence's requirements.

The Defence Innovation Hub has made significant progress since launch, awarding 30 innovation contracts, with values ranging from \$97,000 to around \$8 million, with a total investment of more than \$53.5 million. In the first twelve months of operation, over 390

proposals have been received from Australian small to medium enterprises through to primes and research organisations. The portfolio of Defence Innovation Hub projects is already addressing a wide spectrum of Defence gaps and opportunities. The Hub is actively managing a pipeline of projects, providing each one with the opportunity to prove its suitability for continued progression and its potential for successful introduction into service as a Defence capability.

Since the launch of the Next Generation Technologies Fund in March 2017, new partnering mechanisms have been developed to deliver game-changing technologies for Defence, through cross-disciplinary, cross-sector collaboration. Several new Defence research frameworks have been established, notably Grand Challenges, Defence Cooperative Research Centres, the Australia–US Multi-university Research Initiative and the Small Business Innovation Research for Defence program. These frameworks enable new approaches to collaboration, linking researchers from academia, small to medium enterprises, defence primes and publicly funded research agencies. These collaborations are mission-driven: they are shaped by Defence to identify, accelerate understanding of, and deliver key technologies aligned with priorities identified in the *2016 Defence Industry Policy Statement*.

The Next Generation Technologies Fund launched the first Grand Challenge in April 2017. The Grand Challenges are highly complex defence problems which defy conventional solutions and require research that crosses institutional and national boundaries. For the first Grand Challenge, more than 400 representatives from industry, academia and government attended information sessions. The first Defence Cooperative Research Centre

information sessions attracted nearly 400 attendees, and over 800 proposals were received for initial calls for participation in four Next Generation Technologies Fund programs.

In terms of research engagement, Defence has: awarded \$19 million to 13 projects with companies and universities to address Countering Improvised Threats; committed \$9.3 million over 3 years in a strategic partnership in cyber with CSIRO's Data61 and 11 Australian universities, and invested \$5.7 million in exploratory research with 22 universities addressing science and technology priorities set out in the *2016 Defence Industry Policy Statement*. Through the Defence Materials Technology Centre, Defence has invested over \$2 million in a partnership with CSIRO, universities and medical technology companies to initiate 5 projects in the field of medical countermeasure products, with more in the pipeline. The high tempo of engagements is promising. Innovative technologies and concepts researched under the Next Generation Technologies Fund may be further developed and realised into capability through the Defence Innovation Hub.

## Driving competitiveness and export potential

The Government's \$200 billion investment in Defence capability to 2026–27 FY provides a lever for Australian industry transition, specialisation and deepening of its footprint both in local and global supply chains and markets. Healthy, innovative and sustainable business enterprises create a competitive Australian defence industry base, enabling economic growth and delivering benefits to national security.

The CDIC has been working with Australian businesses to identify new markets and opportunities to diversify. These opportunities help businesses achieve economies of scale and develop a more robust and diverse industrial base, as well as unlock their potential to grow, innovate, and support Defence's future needs.

The CDIC's advisory services assist businesses to become 'export ready' and globally competitive, offering market advice to help guide potential export opportunities, and systematically embedding corporate, operational and continuous improvement capability as required by global defence businesses. The CDIC is able to act as a trusted broker of relationships between industry, Defence and other Government agencies, such as AusTrade.

Since its launch, the CDIC has been managing two major export initiatives: the Defence Global Supply Chain Program; and Team Defence Australia. These initiatives are breaking their own records in terms of the level of engagement across the world, businesses participating, and opportunities identified and being pursued. The role the CDIC plays in facilitating innovation is crucial in helping businesses compete, diversify, grow and become more sustainable.

## Cutting red tape – Lowering barriers to doing business and innovating with Defence

Defence has removed barriers to more effectively access the potential of Australian defence industry to innovate. New innovation contracting and intellectual property frameworks have been introduced with the aim of making it simpler and less costly for Australian industry to do business with Defence. The innovation contract is different to the Australian standard for Defence

contracting; it is simplified and specific to the development of technology. This is because developing innovative technology requires a higher risk appetite than traditional Defence procurements. The bespoke innovation contract enables collaborative, flexible contracting, and a more agile approach to entering into and managing the contract to achieve value for money.

Defence also recognises the critical role that Intellectual Property (IP) plays in fostering and encouraging innovation and delivering vital capability to the Australian Defence Force. The Defence Innovation Hub IP Strategy aims to facilitate and support participation by providing a clear public statement of Defence's approach to the treatment and protection of IP used or created in connection with projects funded by the Defence Innovation Hub. The Strategy seeks to achieve an appropriate balance between the interests of Defence and industry. A fundamental principle of the IP Strategy is that Defence will not seek to own IP created in connection with the Defence Innovation Hub unless there are compelling reasons to do so.

As the front door to the Defence innovation system, the CDIC plays a vital role in supporting the Defence Innovation Hub and the Next Generation Technologies Fund. By 31 December 2017, the CDIC Innovation Facilitation team had engaged with over 380 entities seeking advice about innovation opportunities with the two signature innovation programs. The CDIC has worked with companies to provide information about Defence innovation requirements, prepare companies to enter the innovation process, and ensure that innovation proposals are suitable for funding consideration. There is already evidence that the Defence innovation system is changing the Defence research and innovation sector, with many companies engaging Defence for the first time.



Next Generation Technologies Fund roadshow

## Looking ahead

With a culture of continuous improvement, Defence will continue to listen to feedback and improve the industry and innovation programs as they evolve and mature. In 2018, the Next Generation Technologies Fund will continue to implement a program of outreach forums, symposiums and workshops, to bring together Defence, small companies, defence primes and universities to exchange information, build professional networks and explore collaboration opportunities. Defence will actively work to capture the benefit from lessons learned from the implementation of the Next Generation Technologies Fund projects and make improvements to the selection processes.

For the Defence Innovation Hub, an important focus will be on refinement to improve the efficiency of the program, deliver an approach to multi-party collaboration arrangements for

solving complex broad capability problems, and the official launch of the Special Notice service offering in early 2018.

Building on its solid foundations, the CDIC will continue to be pivotal in providing strategic leadership for the Australian defence sector. The CDIC's growing involvement and facilitation of security and supply chain development for individual small to medium-sized enterprises and the major Defence projects will see the Australian industry base build in strength, sustainability, and international competitiveness. Together, the Defence industry and innovation programs will work together to ensure the Australian industry and innovation sector is positioned to meet Defence capability requirements next year and into the future.

# Major highlights

OCT–DEC 2016

## Briefings to industry

Department of Defence, supported by the Centre for Defence Industry Capability (CDIC) delivered briefings to industry on the Frigate and Offshore Patrol Vessel programs, in Adelaide, Perth, Brisbane, Darwin, Melbourne, Hobart and Sydney.

5 DEC 2016

## Launch of the Centre for Defence Industry Capability (CDIC).

CDIC brings together an array of programs and initiatives to offer primary industry players, SMEs and researchers a more easily accessible 'front door' to Defence

## Launch of \$640 million Defence Innovation Hub.

The Defence Innovation Hub enables collaboration on innovative technologies that can be developed into advanced capability for Defence.

22 DEC 2016

## First Capability Improvement Grant awarded.

The CDIC award Australian Aerospace Engineering Pty Ltd the first Capability Improvement Grant, of \$192,286 (GST inc).

17 MAR 2017

## Launch of \$730 million Next Generation Technologies Fund.

A new suite of forward-looking programs for Defence collaboration with research partners in the Australian innovation system addressing emerging and future technologies.

24 MAR 2017

## Strategic partnership with CSIRO's Data61.

Defence and CSIRO joined forces to collaborate with Australian universities to address and develop new approaches to cybersecurity. Data61 is investing \$4 million and Defence is investing \$9.3 million over 3 years.

10–11 APR 2017

## First Emerging and Disruptive Technology Assessment Symposium held.

The symposium addressed the theme of Information, Knowledge and Digital Disruption. 88 delegates attended from academia, industry, Defence and other government departments.



26 APR 2017

### **First Grand Challenge launched.**

The first Grand Challenge was launched, enabling Defence to begin focused engagement with Australian industry and academia to conduct research for a major Defence challenge – countering improvised threats.



26 MAY 2017

### **Australian Universities received \$5.7 million in research funding.**

\$5.7 million was invested in exploratory research with 22 universities addressing science and technology priorities set out in 2016 Defence Industry Policy Statement.

23 JUN 2017

### **Defence Innovation Hub hosted first annual Industry Update Event, attracting 300 attendees.**



APR–MAY 2017

### **Information sessions for the first Grand Challenge attracted over 400 attendees.**

Held in seven capital cities, 431 representatives from industry, academia, Defence and government attended.

23 MAY 2017

### **AUSMURI announced a new grants program.**

The Australia–United States Multidisciplinary University Research Initiative (AUSMURI) was announced, funding Australian universities to partner with US universities to address joint United States and Australian defence science and technology priorities. Defence will invest up to \$25 million over nine years in the program.

27 JUN 2017

### **\$887,000 of investments**

Defence Innovation Hub announced first three innovation investments worth \$887,000 with new investment and contracts to be announced every month from this point.

6 JUL 2017

### **The first Defence Cooperative Research Centre launched.**

The first Defence Cooperative Research Centre in Trusted Autonomous Systems was launched, with a budget of up to \$50 million over 7 years.

**14–18 AUG 2017**

### **More than 500 visitors...**

...from industry, academia, government, the education sector and the scientific community attended Partnerships Week, held at Defence Science and Technology's Edinburgh site in Adelaide.

**1 SEP 2017**

### **National award**

Defence Industry and Innovation Program is awarded the national Project Management Achievement Award (Defence/Aerospace category) by the Australian Institute of Project Management.

**4–8 SEP 2017**

### **Formation roadshows held**

Defence Cooperative Research Centre in Trusted Autonomous Systems information sessions were held in every state capital, attracting 386 individuals from 164 industry, academia, public sector research and government organisations.

**30 SEP 2017**

### **825 proposals and expressions of interest since launch**

Next Generation Technologies Fund has received 825 proposals and expressions of interest since launch for a range of initiatives. Submissions received were for the Counter Improvised Threats Grand Challenge, the Defence CRC in Trusted Autonomous Systems, the 'Fight Recorder' pilot under the Small Business Innovation Research for Defence program and for exploratory research with universities.

**20 OCT 2017**

### **\$33.4 million portfolio**

10 months after opening, the Defence Innovation Hub had a total new investment portfolio worth \$33.4 million.

**6 NOV 2017**

### **Army partnership**

Defence Innovation Hub partnered with Army for Army Innovation Day. The day provided industry with an opportunity to present capability options that could shape Army's approach to novel weapons and novel effects.



**6 DEC 2017**

### **UTAS awarded \$3 million**

The University of Tasmania was awarded \$3 million through the Next Generation Technologies Fund to collaborate with 7 US universities under the US Multidisciplinary University Research Initiative in the field of hydrodynamics.

**20 DEC 2017**

### **CIT winners announced**

The winners of the Counter Improvised Threats Grand Challenge were announced. \$19 million was awarded to 13 proposals from collaborations involving 20 universities and companies, and CSIRO.

# Next Generation Technologies Fund

The Next Generation Technologies Fund will create a research portfolio aligned with Defence priorities to deliver world-class science and technology capabilities.



The program performance of the Next Generation Technologies Fund is reported over the following pages with strategic measures reported qualitatively, supported by quantitative performance information.

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## **COLLABORATION NETWORKS AND ARRANGEMENTS**

Multi-year initiatives, including large, medium and small scale collaborative projects.

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How Australia's innovation system is being activated and engaged on Defence challenges.

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Portfolio investment profile and alignment to Defence priorities

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Pathway mapping from inputs through to benefits

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## Partnering with purpose – Driving change in delivering Defence strategic research

### PROGRAM IMPACT

The Next Generation Technologies Fund will create a research portfolio aligned with Defence priorities which will deliver world-class science and technology applied to create world-leading capability for Defence.

In the first year of operation, Defence has pursued three objectives under the Next Generation Technologies Fund:

- Establish an operating framework designed to address the full range of Defence's science and technology challenges;
- Create the initial portfolio of collaborative partnerships to bring together industry, academia and Defence; and
- Continue to deliver technology foresighting as a central part of the Force Design process.

*"I believe the Grand Challenges Program will prove to be one of the most important research funding initiatives in Australia that has taken place in the past 30 years"*

**PROF JOHN CLOSE, ANU, MEMBER OF ARC COLLEGE OF EXPERTS**

Ready global access to advances in technology brings new challenges for Australia. In response, the 2016 Defence White Paper creates a blueprint for a new innovation approach proposing to rethink and transform the way Defence conducts its science and technology. As an integral part of this, Defence and the Australian science and technology

community need to know each other better than ever before. Defence is connecting researchers and technologists with each other and with Defence to build research networks that are primed to take part in the Next Generation Technologies Fund.

*"The Data61 collaboration with Defence is delivering strongly, across multiple projects. The partnership between Data61, academia and Defence with the Next Generation Technologies Fund has allowed us to invest more heavily in dual-use technologies, delivering benefit to Defence and at the same time seeding new data-driven industries for Australia"*

**ADRIAN TURNER, CEO DATA61**

The Next Generation Technologies Fund focuses on longer-term research, complementing the technology development and transition role of the Defence Innovation Hub.

*"From a Force Design perspective the [technology foresighting] symposium was valuable in gaining an appreciation of the technology environment that will shape future operational and capability decisions. The insights provided through interactions with Industry and Academia on global technology trends will better inform force exploration and experimentation activities into the future"*

**BRIGADIER JASON BLAIN, DIRECTOR GENERAL FORCE OPTIONS & PLANS, FORCE DESIGN DIVISION**

## Collaboration networks and arrangements

Defence has developed an operating framework for the Next Generation Technologies Fund which encompasses a suite of programs to provide a high degree of flexibility in the scale, breadth, and time-to-delivery of research programs, directed towards a range of research partners from start-ups through to defence primes and national research organisations. Using this framework the Next Generation Technologies Fund will begin to deliver research results in 2017–2018.

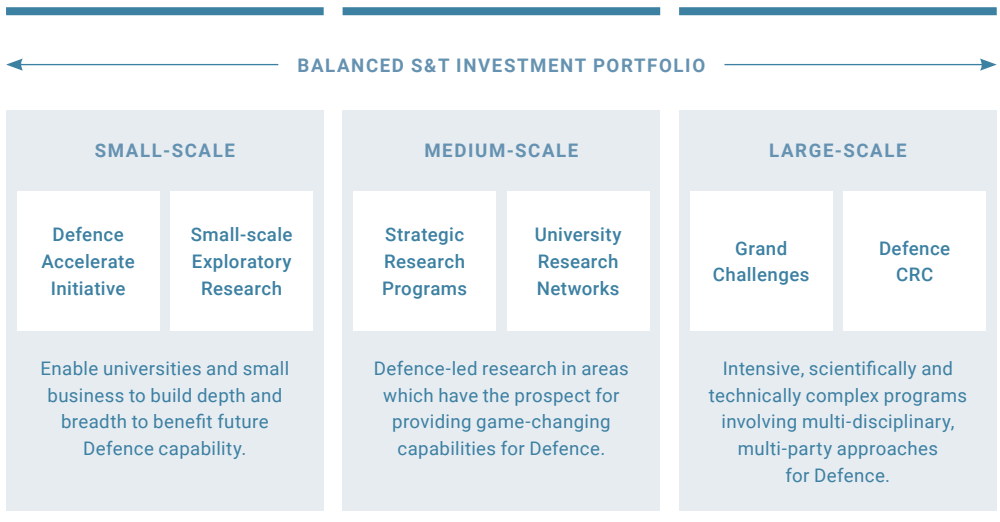
In parallel, Defence has begun building connections in the research community, providing a strong foundation for launching a targeted array of priority-driven research initiatives.

## NEXT GENERATION TECHNOLOGIES FUND OPERATING FRAMEWORK

The operating framework for the Next Generation Technologies Fund encourages ambitious solutions, embraces risk and the concept of fast-fail. There are three broad levels of resource allocation:

- Large programs, which will be few in number, focussed on complex multidisciplinary research, and are envisaged to be allocated approximately 50 to 60% of the total budget;
- Mid-scale programs of strategic research in emerging technologies, such as quantum technologies, and are envisaged to be allocated 30 to 40% of the budget; and
- A range of small-scale investments to seed ideas-acceleration and build collaborative research.

### BALANCED INVESTMENT



Successful initiatives from across the world have been studied in depth, with the best being adapted to suit the Australian defence context. Four major new programs have been announced since launching the Next Generation Technologies Fund:

- Grand Challenges;
- Defence Cooperative Research Centres (Defence CRCs);
- A university research network initiative: The Australia–United States Multi-disciplinary University Research Initiative (AUSMURI);
- Small Business Innovation Research for Defence (SBIRD), a small-scale exploratory research initiative.

In addition, Defence is participating in national technology accelerators and funding competitively-selected research in universities, aligned with Defence priorities.

## GRAND CHALLENGES

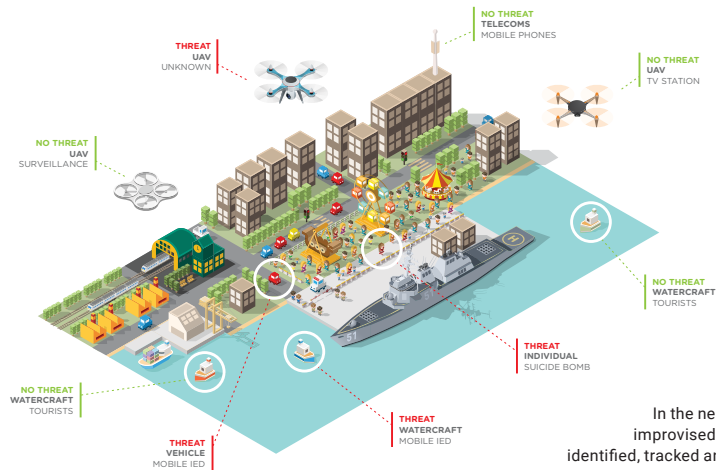
Grand Challenges are designed to provide the scale and intensity required to tackle formidable challenges for which there are no simple solutions. The design of the Grand Challenge program has been influenced by the US Defence Advanced Research Projects Agency (DARPA), Grand Challenges Canada, and the Bill and Melinda Gates Foundation. The program combines small agile companies, larger companies, university researchers and publicly funded research agencies to work alongside Defence scientists in pursuing large-scale, multi-disciplinary, mission-focussed projects with clearly-defined end goals. The program tolerates risk, on a fast-fail basis, to encourage innovation. A number of Grand Challenges will be launched over the decade.

*“Council members also noted the potential for Defence initiatives – such as the Grand Challenges program – to provide a model for other science and innovation collaborations”*

COMMUNIQUE EXTRACT, COMMONWEALTH SCIENCE COUNCIL MEETING, AUGUST 2017  
CHAIR: HON MALCOLM TURNBULL MP, PRIME MINISTER

## CASE STUDY

# Grand Challenge: Activating the National Innovation System to counter improvised threats



In the near future many improvised threats will be identified, tracked and neutralised.

Defence scientists and the Joint Counter Improvised Threat Task Force have partnered to mount the first Grand Challenge to "Counter Improvised Threats", addressing one of the most complex security challenges facing Australia.

The mission is to demonstrate a prototype that detects and neutralises improvised threats with minimal risk to Defence personnel and civilians. As threats evolve, it is expected that further research will be required to develop additional features and integrate them into the system.

This challenge may incorporate technologies from several of Defence's technology priority areas, including advanced sensors, cyber and trusted autonomous systems. In order to find the best researchers in these diverse areas of expertise, Defence has engaged widely with universities and companies who have in turn responded enthusiastically to the national call for participation. Over 200 proposals were received from across the country, from 23 Universities and 76 companies. The project has attracted a number of new researchers to work on Defence problems with 36% of proposals being from applicants without existing Defence collaborations.

As a consequence of this engagement strategy, Defence has announced an investment of \$19 million in 13 projects with 21 partner organisations: 8 universities, 12 companies (primes and small business) and CSIRO, with more than \$16 million indicated as in-kind contributions.

Defence is contributing its own research expertise as part of the team being formed, collaborating directly on projects, and playing the lead role in developing the system architecture and integrating component technologies.

*"Given the seriousness and pervasive nature of this current and future threat to Defence and the broader Australian community, I therefore welcome the critical role to be played by this Grand Challenge initiative in developing potential solutions to this appalling threat"*

**BRIGADIER JOHN SHANAHAN,  
COMMANDER, JOINT COUNTER  
IMPROVISED THREAT TASK FORCE**

## CASE STUDY

### SBIRD – The fight recorder



Defence has launched the first Small Business Innovation Research for Defence challenge to develop a new technology known as the Fight Recorder. It is aligned to the science and technology priority of Enhanced Human Performance as identified in the *2016 Defence Industry Policy Statement*.

The Fight Recorder will be a small device worn by the warfighter. Exploiting advances in wearable hardware platforms, the Fight Recorder will improve battlefield casualty survival by providing an emergency beacon to alert recovery teams. Secondly, it will transmit vital information to reconstruct the events that the warfighter has participated in.

The Fight Recorder will guide the warfighter ensemble's designers in the continual process of improvement to make sure that it continues to be ideally suited to current battlefield tasks and threats.

From the 46 submissions received, two small companies were identified to undertake research to realise the Fight Recorder concept. It was important that the technologies offered by each company solve complementary parts of the problem required to develop the Fight Recorder. Defence brought the companies together to form a cohesive team and drive the research agenda. Defence scientists will remain deeply involved in the project throughout development

and work with the Defence Innovation Hub to support transition into service.

The companies are:

- iMeasureU Ltd, a small industry team from Auckland. iMeasureU demonstrated the strongest ability to design the data analysis techniques and tools to reconstruct the posture and motion of the person based on a single warfighter-worn sensor.
- Myriota, a small South Australian start-up. Myriota demonstrated the strongest ability to build and demonstrate the hardware capable of delivering the emergency beacon and motion measurement capabilities necessary to advance the Fight Recorder concept.

*"The tools being explored through the Fight Recorder project have the potential to advance important aspects of the care of the battle casualty system and refinement of personnel protection systems. Ongoing engagement with the Joint force is vital to realise the potential of the Fight Recorder project"*

**COLONEL MATT PATCHING,  
ACTING DIRECTOR GENERAL FUTURE LAND  
WARFARE, ARMY HEADQUARTERS**

## DEFENCE COOPERATIVE RESEARCH CENTRES

Defence Cooperative Research Centres (Defence CRCs) are Defence-led, industry-delivered collaborative programs, which will draw upon the leading national research capabilities of universities and publicly funded research agencies. This program builds upon the successful national CRC model with some modification in that it has a mission-driven focus. Each Defence CRC has specific goals and objectives that align with Defence needs. Research projects are only supported if they have an identified pathway for adoption by Defence.

As with the other Next Generation Technologies Fund programs, the Defence CRCs will improve the research skills and capabilities of participants and increase small company engagement in collaborative research, with the goal of making the Australian defence industry more efficient, productive and competitively priced. The first Defence CRC is addressing Trusted Autonomous Systems.

*"The introduction of Defence CRCs is an exciting development for Australian innovators and industry. More companies will be able to collaborate with more innovators on issues of critical importance to Australia. New products, new services and new companies will emerge from this process"*

**DR TONY PEACOCK, CHIEF EXECUTIVE,  
COOPERATIVE RESEARCH CENTRES ASSOCIATION**

## SMALL BUSINESS INNOVATION RESEARCH FOR DEFENCE

The Small Business Innovation Research for Defence (SBIRD) program is modelled on international initiatives such as the long-standing and successful Small Business Innovation Research (SBIR) program in the US and the Small Business Research Initiative (SBRI) in the UK. SBIRD enables small business to conduct early stage, high-risk, high payoff research with the potential to mature into Defence capability.

SBIRD projects are focussed on Defence capability and adopt a high-paced, fail-fast approach. They are run in two stages, the first to research the feasibility of a potential Defence technology over a 6–9 month period. In the second stage the technology will be evaluated in the context of the specific Defence application. Promising results will be evaluated for transition through the Defence Innovation Hub.

A pilot for SBIRD is underway, with two small companies selected as initial Defence partners.

## RESEARCH NETWORKS: THE AUSTRALIA–UNITED STATES MULTI-DISCIPLINARY UNIVERSITY RESEARCH INITIATIVE

This program is one of the medium-scale initiatives. The Australia–United States Multidisciplinary University Research Initiative (AUSMURI) will enable Australian universities to partner with US universities in an existing US program (the Multidisciplinary University Research Initiative (MURI)) and undertake research on focussed topics of high priority in both countries.

AUSMURI enables Australian researchers to remain in country rather than have to leave Australia to work with the best US universities.

The Next Generation Technologies Fund provides funding for Australian universities and the US Department of Defense is providing equivalent funding to US research institutions. Australia will work with the United States to set common priorities for future rounds of the AUSMURI and MURI programs.

In the current selection process there are three topics under mutual consideration: quantum sensing, autonomy and multidisciplinary material sciences. Australian universities have established partnerships with their US counterparts and are strongly represented. The selection and award process will conclude in the first half of 2018.

### **RESEARCH NETWORKS: WITH STATES AND UNIVERSITIES**

University research networks are designed to bring together academic researchers from multiple universities and Defence scientists to collaborate on research relevant to game-changing technologies for the future. The networks are co-funded by State Governments. They build on the success of the Defence Science Institute (DSI) model established in Victoria. The multidisciplinary research in the DSI is grouped around cyber and IT security; human protection and performance; surveillance and autonomy.

This year the Defence Innovation Partnerships network has been established in South Australia, with University of Adelaide, Flinders University and the University of South Australia. A network has also been established in New South Wales and it is anticipated that other States will follow.

### **STRATEGIC RESEARCH PROGRAMS**

Strategic research programs draw on partners from across the innovation enterprise to provide substantial focus on specific new

concepts or technologies under the auspices of the Next Generation Technologies Fund. Examples include hypersonic research and cyber research.

### **SMALL-SCALE PROGRAMS**

In collaboration with CSIRO, Defence is investing in the technology accelerator program ON Prime, an initiative of the National Innovation and Science Agenda, with the introduction of a stream in the accelerator focussed on Defence. On Prime: Defence specialises in assisting research teams to explore market-based applications for their science and technology with potential benefit to Defence. Defence is providing mentors for the participants.

In parallel, Defence has provided small-scale funding to universities, after a competitive process, to begin shaping academia to focus on mission-driven research. It is anticipated that this research program may uncover emerging technologies of interest to Defence.

### **GUIDING RESEARCH TO DELIVER DEFENCE OUTCOMES – TECHNOLOGY FORESIGHTING**

The Next Generation Technologies Fund framework is mission-driven. Technology foresighting, in which global trends are monitored and in-depth investigation of emerging technologies is undertaken, is central to preventing strategic surprise. Emerging and disruptive technology symposiums form part of Defence's larger technology foresighting activity. The symposiums bring together internationally recognised thought leaders to explore and identify opportunities and potential game-changing technology areas with Defence scientists, and other Defence Groups and Services, to inform strategic planning.

## CASE STUDY

### The strategic partnership agreement with Data61–CSIRO in cyber research



Defence and CSIRO operate within a national context that has seen the recent release of the Government's 2016 Cybersecurity Strategy, the Defence White Paper and National Innovation and Science Agenda, the establishment of the Australian Cyber Security Growth Network and the Cyber Security Cooperative Research Centre, emphasising the criticality of cyber research. These government policies emphasise the need to strengthen national academic and industry capability to harden national defences against cyber incidents. The need to develop a strong and sustainable national pool of cyber security talent is paramount. With this context, the two organisations have a common interest in growing the national cyber research capacity. For that reason, Defence and CSIRO's Data61 have established a collaborative research program in cyber science and technology. Taking advantage of the synergies and complementarity between the two government bodies, Defence and Data61 have joined forces

to shape and leverage the expertise of the national innovation community. The 3-year research program is underway, with Defence, Data61 and 11 universities co-investing.

A principal aim of the partnership is to grow the national talent pool through a targeted PhD program. It is expected to explicitly support at least 5 new PhDs per year as well as to draw on the expertise of other postgraduate students who support the collaborative projects.

*"The Data61 collaboration with Defence is delivering strongly, across multiple projects. The partnership between Data61, academia and Defence with the Next Generation Technologies Fund has allowed us to invest more heavily in dual-use technologies, delivering benefit to Defence and at the same time seeding new data-driven industries for Australia"*

ADRIAN TURNER, CEO DATA61

## CASE STUDY

# Technology foresighting symposium: Information, knowledge and digital disruption exploring the threat and potential of emerging technologies for Defence



This Technology Foresighting symposium informs three Defence priority technology areas identified in the 2016 *Defence Industry Policy Statement*: trusted autonomous systems; cyber; and integrated intelligence, surveillance and reconnaissance. Held in Sydney, April 2017, 88 delegates attended, with representation from academia, industry, Defence and other government agencies.

With the rise of megacities expected between now and 2040, the symposium considered the impact of disruptive technologies through the scenario of a hyper-connected megacity, exploring the national security implications of a hyper-connected population. The outputs from this symposium are currently informing the command and control functions in Force Design, as well as providing a better

understanding of the potential disruptive technologies which might emerge during the next twenty years. This helps shape future research priorities.

*"The opportunity to network and connect with key principals and practitioners across academia, industry and government provides fertile ground for information sharing in this critical environmental for the expected disruptive technological developments that will be encountered"*

**BRIGADIER MICHAEL MAHY,  
DIRECTOR GENERAL MILITARY STRATEGY,  
STRATEGIC POLICY**

## Building connections

Defence is implementing a program of outreach forums, symposiums, and workshops, bringing together Defence, small companies, defence primes and universities to exchange information, build professional networks and explore collaboration opportunities. Of particular note are Partnerships Week and the technology foresighting symposiums. These are complemented by information sessions and workshops. The Defence Innovation Portal has been an especially successful way to inform universities and industry about opportunities to be involved.

The response from industry, the research community and government has been enthusiastic. At information sessions for the Defence CRC held across all states, 386 people attended, while another 431 representatives of industry, academia and government attended information sessions for first Grand Challenge held in Adelaide, Brisbane, Canberra, Hobart,

Melbourne, Perth and Sydney. Small Business Innovation Research for Defence workshops held at Defence's 'Partnerships Week' attracted 51 participants, including 26 representatives from small companies.

The first Defence CRC in Trusted Autonomous Systems attracted 100 expressions of interest from Australian universities and 36 full proposals from Australian industry. The pilot for the first SBIRD Challenge resulted in a competitive response from the research community: 46 submissions were received, 17 from industry, 29 from academia.

Through these outreach and engagement processes, Defence is ensuring it finds the best talent and best teams to address priority science and technology problems. The researchers attending these events gain a better understanding of Defence's expectations and connect with possible collaborators. Defence is deeply engaged with partners at all stages and is capitalising on the outcomes of its internal strategic



Defence CRC information session, Brisbane, September 2017

## CASE STUDY

### Partnerships Week: Outreach to build engagement with Defence



More than 500 visitors from industry, academia, government, the education sector and the scientific community attended Partnerships Week, held at Defence Science and Technology Group's Edinburgh site in Adelaide. Delegates participated in briefings, site tours, workshops, match-up sessions, industry pitches and networking opportunities over the course of the event. Speakers included the CEO of DefendTex, the CEO of Precise Advanced Manufacturing Group, and the Deputy Vice Chancellor Research & Innovation, RMIT University. The Deputy Vice Chancellor, External Relations and Strategic Projects,

University of South Australia, provided insights into how to better engage with Defence.

Information sessions during Partnerships Week helped potential applicants understand the broader partner engagement processes for the Next Generation Technologies Fund, what Defence is looking for, and the general characteristics of both successful and unsuccessful proposals. The aim was to help every applicant maximise the probability of being funded by submitting proposals which are truly competitive.

research programs to assist larger efforts with industry and academia. Importantly Defence is also identifying potential collaborators with complementary skills and encouraging them to partner with each other.

## Investment portfolio versus priority needs

Defence has started building a portfolio of research with investment in all science and technology priorities identified in the *2016 Defence Industry Policy Statement*.

The sum of investments made\* in each priority technology area is shown below, as a percentage of the total investment made in the reporting period. The Grand Challenge to counter improvised threats and technology foresighting are addressed separately.

The cost of developing and establishing the operating framework and the initial delivery of the Next Generation Technologies Program in the first year of the program was \$2 million, about 12% of the overall funding. It is anticipated that cost for program delivery and assurance in the next year will be 5% of the overall funding.

### INVESTMENT IN SCIENCE AND TECHNOLOGY PRIORITY AREAS



- Trusted Autonomous Systems 23%
- Hypersonics 18%
- Cyber Technology 17%
- Medical Countermeasure Products 12%
- Multidisciplinary Material Sciences 7%
- Enhanced Human Performance 4%
- Quantum Technologies 4%

- Technology Foresighting 4%
- Advanced Sensors 3%
- Space Capabilities 3%
- Integrated ISR 2%
- Counter Improvised Threats 2%
- Directed Energy 1%

\* "Investments made" captures just the initiatives where contracts are fully executed.

## FACTORS SHAPING THE INVESTMENT PROFILE

At any given time, the scale of investment appropriate in a particular technology area depends on the capacity of the national innovation system to undertake world-class research in that field, as well as the maturity of Defence's understanding of the scope of a targeted research program.

In this first year of establishing the Next Generation Technologies Fund, investments have been made in the priority themes outlined in the *2016 Defence Industry Policy Statement* released with the 2016 Defence White Paper. Under the framework, the areas selected for major investment were shaped by horizon-scanning of emerging technologies, technology foresighting as part of the annual Force Design process, and the strategic directions spelled out by the Chiefs of Service in their long-term planning documents, as well as assessments of emerging threats. The complexity and urgency of the impact of improvised threats in complex operational environments drove its selection as the initial Grand Challenge. The broad application and potential impact of the investment in autonomous systems drove its selection as a Defence CRC. The focus on 'trust' in trusted autonomous systems originated from workshops with operational forces covering some of the challenges in creating autonomous systems which have military utility.

Similar drivers informed the scope and scale of investment in the remaining areas identified in the *2016 Defence Industry Policy Statement*, in parallel with establishing the new major programs, Grand Challenges and Defence CRCs. Defence has built substantial strategic research programs quickly by drawing on strategic partnerships with Data61 (CSIRO) in

cyber and with CSIRO and others in medical countermeasure products.

In addition Defence has started collaborative research with Australian universities to conduct mission-directed research aligned with Defence priority technology areas, following a call for participation. It is anticipated that some of this research will become the basis of greater investment in the future as the potential for disruption or game-changing capability is revealed. It is also anticipated that it is the combination of some of these areas of research where the benefits will be realised.

## INVESTMENT IN TECHNOLOGY PRIORITY AREAS

All research initiatives are being shaped through the lens of one or more of the collaboration vehicles in the Next Generation Technologies Fund operating framework. The scale and nature of each initiative is a consequence of the investment context outlined above, taking into account, for example: the partnering goals; the maturity of Defence's understanding of the research needed in each area, and the research community's readiness to participate.

Note that contracting in AUSMURI will not begin until mid-2018, due to selection processes in the linked US MURI program.

The Next Generation Technologies Fund initiatives underway are mapped into Defence S&T priority areas on the following page. This profile captures those initiatives where investments have been made and those where further partners have been selected and announced.

Research theme	Summary of investment
Cyber	<p>The Counter Improvised Threats Grand Challenge includes aspects of cyber research.</p> <p>The strategic alliance with Data61 (CSIRO) and 11 universities covering the following themes: system design for resilience; data analytics; autonomous cyber and sensing to effects. This core element of the cyber portfolio is supplemented through exploratory research with 5 universities to assess the potential of a range of topics of interest to Defence.</p> <p>The technology foresighting symposium on Information, Knowledge and Digital Disruption addressed issues relevant to cyber.</p>
Space capabilities	<p>Exploratory research collaborating with 3 universities and one small company in aspects of domain awareness and precision tracking.</p>
Advanced sensors	<p>The Counter Improvised Threats Grand Challenge includes research in advanced sensing.</p> <p>The University of Tasmania is collaborating in a research network under the US Multidisciplinary University Research Initiative with US universities, conducting research in the field of hydrodynamics.</p> <p>Research Collaborations with 4 universities to investigate potential in novel sensor systems ranging from bacterial sensors to fibre optic sensors and radiation-sensitive sensors.</p>
Hypersonics	<p>Collaborative research in understanding the science behind hypersonic flight, including propulsion, flight dynamics, control surfaces and materials that support flight systems: hypersonic flight trials.</p>
Directed energy capabilities	<p>Exploratory research collaborating with 2 small companies and one university in aspects of advanced laser systems.</p>
Quantum technologies	<p>AUSMURI FY 2017–18 funding is earmarked for investment in successful Australian universities. Participating university consortia are addressing MURI topic 1: Integrated quantum sensing and control.</p> <p>Exploratory research collaborating with one small company and 3 universities in aspects of quantum research including precision sensing, navigation and timing; and communication and information.</p>

Research theme	Summary of investment
Integrated ISR	<p>The Counter Improvised Threats Grand Challenge requires new developments in integrated ISR.</p> <p>The technology foresighting symposium on Information, Knowledge and Digital Disruption addressed issues relevant to ISR.</p> <p>Exploratory research collaborating with 2 universities in aspects of surveillance and target recognition.</p>
Trusted autonomous systems	<p>Establishing the first Defence CRC.</p> <p>AUSMURI FY 2017–18 funding is earmarked for investment in successful Australian universities. Participating university consortia are addressing topic 5: Embodied learning and control.</p> <p>Collaborative research with 9 universities in the following themes: machine cognition; persistent autonomy and human/autonomy integration.</p> <p>The technology foresighting symposium on Information, Knowledge and Digital Disruption addressed issues relevant to trusted autonomous systems.</p>
Enhanced human performance	<p>Pilot SBIRD initiative developing the Fight Recorder concept, with 2 partner companies selected.</p> <p>A technology foresighting symposium to be held in 2018 will address Advances in Biotechnologies and Human Performance.</p> <p>Exploratory research collaborating with 4 universities to conduct research in virtual reality and operator workload.</p>
Medical countermeasure products	<p>Collaboration with 12 industry, academic and government organisations, through the Defence Materials Technology Centre, in the following themes: antimicrobial resistance; point of care diagnostics and security sensitive biological agents.</p> <p>A technology foresighting symposium to be held in 2018 will address Advances in Biotechnologies and Human Performance.</p>
Multidisciplinary material sciences	<p>AUSMURI FY 2017–18 funding is earmarked for investment in successful Australian universities. Participating university consortia are addressing topic 22: Material defect identification for metallic additive manufacturing.</p> <p>A technology foresighting symposium held in November 2017 addressed the topic of Advanced Manufacturing and Materials.</p> <p>Collaborative research with 7 universities in advanced multidisciplinary material sciences such as metamaterials, which provide the basis for new Defence capability in areas including active camouflage, ballistic protection and power and energy sources.</p>

## Partner profiles

In its start-up phase, the Next Generation Technologies Fund has made investments and announced further partnerships with 24 Australian universities, 19 companies and 2 government organisations, in five primary streams of collaborative research:

The **Grand Challenge to Counter Improvised Threats**, in which Defence is in the process of partnering with 21 organisations: 12 companies, 8 universities and CSIRO

The **strategic cyber research partnership** with Data61 (CSIRO) and 11 Australian universities

The **medical countermeasure products initiative** under the Defence Materials Technology Centre, bringing together Defence, CSIRO, the UK's Defence Science and Technology Laboratory (Dstl), 5 universities and 5 medical technology companies

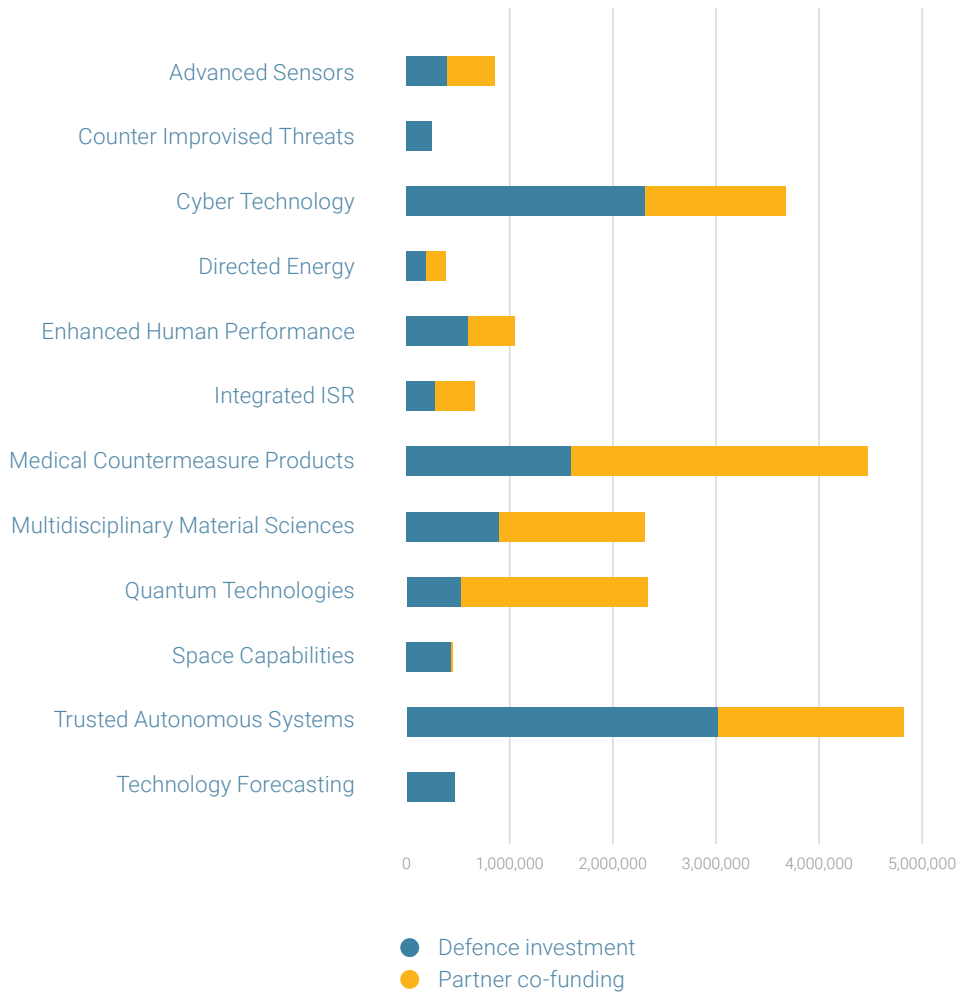
**Exploratory research** with 22 Australian universities, addressing all Defence science and technology priority areas except medical countermeasure products

The **Small Business Innovation Research for Defence** pilot, with 2 small companies, ImeasureU and Myriota who are collaborating with Defence to deliver a Fight Recorder prototype.

## UNIVERSITY AND INDUSTRY CO-INVESTMENT

Across the Next Generation Technologies Fund portfolio, industry and university partners are indicating contributions totalling 85% of Defence investments made. The ratio of co-investment across technology priority areas is shown below.

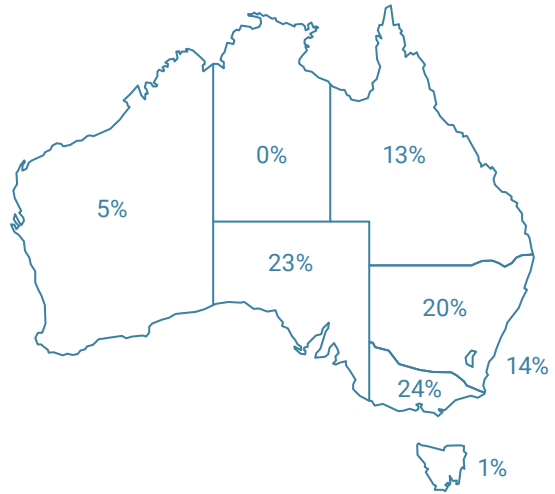
### DEFENCE AND PARTNER INVESTMENT



### FUNDING DISTRIBUTION ACROSS STATES AND TERRITORIES

The distribution of the Next Generation Technologies Fund investments made in the reporting period is shown below.

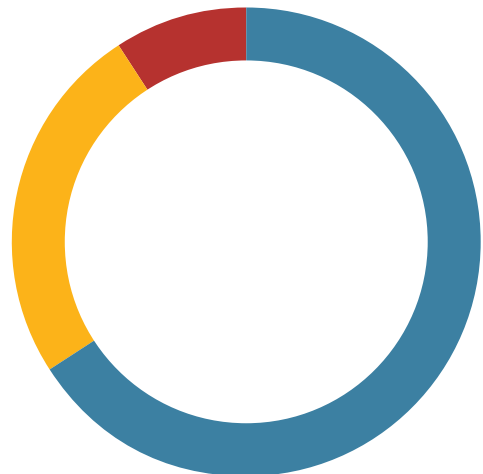
Australian Capital Territory	14%
New South Wales	20%
Northern Territory	0%
Queensland	13%
South Australia	23%
Tasmania	1%
Victoria	24%
Western Australia	5%



### FUNDING DISTRIBUTION BY ORGANISATION TYPE

In the reporting period, 25% of investments made went to industry partners, 66% to universities and 9% to publicly funded research agencies.

These figures will change significantly following the initiation of projects under both the Defence CRC in Trusted Autonomous Systems and the Grand Challenge to Counter Improvised Threats.



● Universities	66%
● Industry Partners	25%
● Research Agencies	9%

## THE GRAND CHALLENGE TO COUNTER IMPROVISED THREATS

Defence has established the Grand Challenges program to support mission-directed collaborative research, tackling specific Defence problems which are ambitious, complex and of high priority. Such research will be intensive, large scale, multi-disciplinary, and multi-party by design.

The topic of the first Grand Challenge, to counter improvised threats, is a problem of critical importance, with its scope and scale rapidly evolving. The challenge topic has encouraged involvement from a wide cross section of Australia's innovation enterprise, with expertise spanning a number of disciplines

and research streams, including: novel concepts for detecting improvised threats, effectors to deal with detected threats and automatic target recognition.

Defence has now selected partners for the first stage of first Grand Challenge and will make investments of \$19 million over 4 years with \$16 million indicated through co-investment. The partner profile demonstrates a high level of collaborative research, with teams involving small companies, primes, universities and CSIRO. Defence's scientists will play a critical role in the research program, and in integration of solutions into a system prototype.

Research Topic	Partners
Bio-Acoustic Integrated Counter Remotely Piloted Aircraft (RPA) Technology	University of South Australia, Midspar Systems, Textron Systems and Lockheed Martin
FIND – Fluorescence Identification of Nascent Dangers	University of Queensland
Ground Based Multiple-Input, Multiple Output (MIMO) Radar and Electro-Optical (EO) Sensor Suite for Long Range Detection of Unmanned Aerial Vehicles (UAVs)	Teledyne Defence Australia
Deep Learning Neural Network for Automatic Target Recognition of Person Borne Improvised Explosive Devices	Teledyne Defence Australia
Detecting and Defeating Emplaced Improvised Explosive Devices using Microwave Energy	Tectonica Australia Pty Ltd and the University of Melbourne
Complex Adaptive Threat Jammer Technology (CATJAT)	RFteq Pty Ltd and Consunet
TACTical Integration of Countermeasures System (TACTICS)	Lockheed Martin Australia, Consilium Technology and the University of Melbourne

Research Topic	Partners
High Energy Laser Array	L3 Micreo
A Portable Multiplexed Sensing Platform for the Rapid Stand-off Detection of Chemical Hazards and Concealed Explosives	University of Queensland of Technology and Flinders University
Unmanned Airborne Imaging and Infrared Spectroscopy for Detection and Identification of Improvised Threats	University of Western Australia, Scientific Aerospace and Panorama Synergy
Upconversion Fluorescence for Real-time Stand-off Detection and Identification of Explosives	University of Adelaide
Terahertz Hyperspectral Imaging Threat Detection System	CSIRO and Wollongong University
Low-cost Electro Magnetic Pulse Equipped Predatory Unmanned Aerial System (UAS)	DefendTex Pty Ltd and University of Adelaide



## DATA61 (CSIRO) STRATEGIC PARTNERSHIP

Defence and Data61 have established a strategic partnership in cyber, which includes collaborative research projects with 11 Australian universities. Defence and CSIRO are jointly investing in the partnership, with CSIRO contributing \$4.75 million over 3 years and Defence contributing \$9.3 million through the Next Generation Technologies Fund. The research program can be categorised against 4 themes, with university capabilities

leveraged for greatest impact. The strategic partnership is strongly guided by the Defence White Paper and National Security strategies, and is well aligned with the overlapping priorities articulated in the Government's national cyber security strategy. Defence's research program extends from support to strategic capabilities to supporting information warfare operations, including military platform cyber defence.

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### Foundational Research Theme

### University Partners

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#### System design for resilience

Development of trustworthy systems from components that have mixed levels of trust; vulnerability discovery and mitigation; and technologies to assure mission continuity under cyber duress.

University of New South Wales, University of Melbourne, University of Adelaide, Australian National University, Swinburne University, University of South Australia

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#### Influence and Analytics

Understanding the interaction between human and machine in order to achieve effective, resilient cyberspace operations; development and application of new data science to analyse and reason about data in cyberspace.

University of South Australia, University of New South Wales, University of Sydney, University of Technology Sydney, University of Melbourne, Deakin University

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#### Sensing to effects

Technologies for sensing cyberspace and for planning and achieving effects.

Macquarie University, University of Sydney

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#### Autonomous cyber

Application of autonomous and automated approaches to augment human analytical and decision processes in cyber operations.

Swinburne University, Australian National University, University of Queensland

## MEDICAL COUNTERMEASURE PRODUCTS

The program addressing medical countermeasure products is a collaboration formed under the umbrella of the Defence Materials Technology Centre. To date, Defence is working with 12 industrial, academic and government organisations, with 5 new partners to join in 2017–18.

The Surgeon General and Chief Medical Officer participated in the Stakeholder Group which identified 3 priority research themes: antimicrobial resistance; point of care diagnostics; and security sensitive biological agents.

In the set-up year, Defence and CSIRO have co-contributed \$2 million and \$5 million respectively.

The medical technology companies are also co-investing where they are project participants. The partners are collaborating around particular themes as shown below. Defence’s scientists are active participants in 2 of the research themes.

Research Theme	Academic Partners	Industrial and Government Partners
<p><b>Antimicrobial Resistance</b> Developing broad spectrum vaccines and therapeutics for force protection and operational continuity.</p>	Defence, University of Western Australia, Peter Doherty Institute – University of Melbourne, University of Würzburg	Dstl
<p><b>Point of Care Diagnostics</b> Compact, low-cost, robust technologies to expedite clinical decision making, to reduce patient loss to follow up while waiting for test results, and to facilitate the delivery of care in the field.</p>	Deakin University Monash University	CSIRO, MiniFab, Planet Innovation, Anteo Diagnostics, Hydrix, Trajan Scientific
<p><b>Security Sensitive Biological Agents (SSBA)</b> Developing therapeutics and vaccines against SSBA to reduce mortality rates and adverse health impacts to the military and first responder (civilian) communities.</p>	Defence, University of Würzburg, University of Western Australia, Peter Doherty Institute – University of Melbourne, Defence Science and Technology, Deakin University	Planet Innovation, Anteo Diagnostics, CSIRO, Dstl

## EXPLORATORY RESEARCH WITH UNIVERSITIES

Defence is funding small-scale, exploratory research with 22 Australian universities. It is anticipated that this program may uncover emerging technologies of interest to Defence. Although one of early-stage investigation,

the program is already mission-driven: the projects funded address 8 priority technology themes identified in the 2016 Defence Industry Policy Statement – all except medical countermeasure products.

## UNIVERSITY ENGAGEMENT IN THE NEXT GENERATION TECHNOLOGIES FUND

A summary profile of each university's currently-funded engagement in the Next Generation Technologies Fund portfolio is given below. Projects and funding are associated with

lead university partners only; in some other cases, other universities may receive some share of the funding through collaborative arrangements.

Partner University	Priority Technology Areas	No. Projects	Defence Investment
Australian National University	Exploratory research in: quantum technologies; trusted autonomous systems Participant in the Data61 strategic partnership (cyber)	5	\$869,000
Curtin University	Exploratory research in space capabilities	1	\$85,000
Deakin University	Exploratory research in enhanced human performance	4	\$349,000
Edith Cowan University	Exploratory research in cyber	2	\$197,000
Flinders University	Exploratory research in advanced sensors	1	\$100,000
Griffith University	Exploratory research in trusted autonomous systems	1	\$97,500
La Trobe University	Exploratory research in advanced sensors	1	\$93,000
Macquarie University	Exploratory research in directed energy capabilities	1	\$99,000
Monash University	Exploratory research in multidisciplinary material sciences	1	\$100,000

<b>Partner University</b>	<b>Priority Technology Areas</b>	<b>No. Projects</b>	<b>Defence Investment</b>
Newcastle University	Exploratory research in trusted autonomous systems	1	\$99,500
Queensland University of Technology	Exploratory research in: multidisciplinary material sciences; integrated ISR	2	\$199,500
RMIT University	Exploratory research in: enhanced human performance; multidisciplinary material sciences; trusted autonomous systems	7	\$642,000
Swinburne University	Exploratory research in cyber Participant in the Data61 strategic partnership (cyber)	2	\$160,000
University of Adelaide	Exploratory research in: advanced sensors; cyber; integrated ISR; multidisciplinary material sciences; trusted autonomous systems Participant in the Data61 strategic partnership (cyber)	12	\$1,147,000
University of Melbourne	Exploratory research in: cyber; enhanced human performance; multidisciplinary material sciences; trusted autonomous systems Participant in the Data61 strategic partnership (cyber) Participant in medical countermeasure products	11	\$1,030,000
University of Queensland	Exploratory research in quantum technologies Participant in the hypersonics research program Participant in the Data61 strategic partnership (cyber)	5	\$1,356,000

Partner University	Priority Technology Areas	No. Projects	Defence Investment
University of South Australia	Exploratory research in: cyber; space capabilities; trusted autonomous systems The position of Chair for the Defence CRC in Trusted Autonomous Systems Investigation supporting early stages of the Grand Challenge to counter improvised threats Participant in the Data61 strategic partnership (cyber)	8	\$1,500,000
University of Sydney	Exploratory research in advanced sensors; multidisciplinary material sciences; trusted autonomous systems Participant in the Data61 strategic partnership (cyber)	5	\$446,000
University of Tasmania	Exploratory research in enhanced human performance	1	\$97,000
University of Western Australia	Participant in medical countermeasure products	1	\$450,000
University of Western Sydney	Exploratory research in space capabilities	1	\$100,000
University of New South Wales	Participant in the Data61 strategic partnership (cyber)	2	\$170,000
University of New South Wales, Canberra (ADFA)	Exploratory research in cyber; integrated ISR; quantum technologies; trusted autonomous systems	5	\$405,000
Wollongong University	Exploratory research in multidisciplinary material sciences	1	\$99,000

## Research quality performance assessment

Because the Next Generation Technologies Fund is still in the early stages of operation, details of knowledge creation, knowledge transfer and knowledge application, such as research publications and citations, postgraduate student graduation, was not addressed in 2017.

Similarly, 'research impact and pathway analysis' will be addressed in detail when the research conducted begins to mature.

### CONTINUOUS IMPROVEMENT

Defence has adopted a rigorous approach to determining the appropriate balance of investment across agreed science and technology priority areas. The same process that has been matured by application to the broader Defence S&T program has been applied to the Next Generation Technologies Fund, with added emphasis on the potential for game-changing outcomes. Defence scientists together with representatives of the Capability Managers and other Defence Groups participate in the prioritisation process and workshop.

The implementation team for the Next Generation Technologies Fund is actively working to capture and benefit from lessons learned from the implementation of the initial Grand Challenge and SBIRD projects.

The following is illustrative of the approach: An assurance process was incorporated into each of the two stages used to down-select from the initial 215 responses to the call to participate in the Counter Improvised Threats Grand Challenge to the final, recommended set of proposals. The assurance panel comprised a senior, international defence scientist with domain expertise, an independent member of the Australian Research Council College of Experts, and an Australian Defence scientist who was also a member of the Australian Research Council College of Experts. The assurance panel confirmed that appropriate and effective processes had been adopted in undertaking the down-select process. While the panel acknowledged that very good processes had been used, it suggested refinements for incorporation into the selection processes for future Next Generation Technologies Fund projects. Each of these suggestions will be considered for adoption as part of the continuous improvement process.

# Defence Innovation Hub

The Defence Innovation Hub enables collaboration on innovative technologies that can be developed into advanced capability for Defence.



The program performance of the Defence Innovation Hub is reported over the following pages with strategic measures reported qualitatively, supported by quantitative performance information.

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### **INVESTMENT PORTFOLIO VS PRIORITY NEEDS**

85% of investments align with the top three investment priorities

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### **INNOVATION HUB INDUSTRY PARTNERS**

Employing 4000+ people across Australia

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Hub investments that introduced new-to-market product or service innovation

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### **PROFILE OF DEFENCE INNOVATION HUB PARTNERS**

10% new entrants to Defence

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### **GLOBAL SUPPLY CHAIN**

Defence Innovation Hub partners that are part of a global supply chain

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### **INDUSTRY CO-INVESTMENT**

Defence Innovation Hub partners' contribution to cash and in-kind co-investment

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### **DEFENCE CAPABILITY THROUGH THE INNOVATION SYSTEM**

Innovation investments that are building Defence capability

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## Enhancing Defence capability through innovation

### PROGRAM IMPACT STATEMENT

Investment in innovation helps to ensure Defence remains resilient to emerging threats, including the possible use of disruptive technologies by adversaries. It also enables Defence to take advantage of new or developing areas of technology that have the potential to provide a capability edge for the Australian Defence Force.

The primary policy objective of the Defence Innovation Hub is to enhance Defence capability through innovation. Program performance is assessed through a range of measures, including through direct feedback from Defence Capability Managers. Feedback in the first year of operation has focused on four key areas: Defence Innovation Hub's strategic approach to investment; transparency of investment priorities; the potential for improved pathways to acquisition; and the ability to target industry and researchers with capability challenges.

*"Fostering early engagement with innovative small to medium size Australian businesses, either that are new to Defence or have previous experience, is particularly valued."*

**AIR COMMODORE, GRAHAM EDWARDS,  
DIRECTOR GENERAL MODERNISATION,  
AIR FORCE.**

### STRATEGIC APPROACH TO INVESTMENT

The strong link between Defence Innovation Hub investment priorities and Force Design guidance puts the program in a position to deliver better capability outcomes for Defence.

The 2015 *First Principles Review: Creating One Defence*, established a permanent Force Design function in Defence. Historically, force design was a periodic activity that only occurred as part of major strategic reviews, such as Defence White Papers. The new Force Design function assesses the planned and future force, provides preparedness assurance, and recommends force structure options to guide the development of a balanced and affordable future force that provides the Government with a capable, agile and potent Joint Force.

The Force Design function plays an important role in analysing gaps and opportunities in Defence's ability to achieve the Defence missions set by Government. Force Design inputs into the Defence Innovation Hub investment priorities are critical to ensuring investment remains linked to strategy.

The Force Design process ensures that outcomes from Defence's innovation programs are captured as opportunities and are considered as part of the Defence Capability Assessment Program. Some of the risks associated with gaps, and some of the benefits associated with opportunities, can be mitigated or realised through the Defence Innovation Hub. Connecting Defence Innovation Hub investment priorities to the Force Design process has set the foundations required to effectively enhance Defence capability through innovation.

*"Force Design Division views the Innovation Hub as a vital conduit to Industry partners in exploring and developing innovative ideas and technologies that not only address capability gaps but also provide opportunities to enhance the capability of the future force. The Innovation Hub is, therefore, a key partner in the Force Design process"*

**BRIGADIER JASON BLAIN,  
DIRECTOR GENERAL FORCE  
OPTIONS AND PLANS**

## TRANSPARENCY

Providing transparency and clarity on Defence Innovation Hub investment priorities has helped industry and research organisations to plan their research and development activities. The Defence Innovation Hub has provided a smoother interface to industry, allowing Defence to ask questions and receive information on innovations that would not be possible via established acquisition procurement methods. By publishing priority innovation streams, the Defence Innovation Hub has shaped the focus of innovation proposals received.

*"Being transparent about our investment priorities will help deliver better capability outcomes for Defence"*

**BENJAMIN HAYES, ASSISTANT SECRETARY  
DEFENCE CAPABILITY AND INNOVATION**

## IMPROVED PATHWAY TO ACQUISITION

Another significant change introduced by the *First Principles Review* was giving Capability Managers full authority and accountability for the end-to-end lifecycle of capabilities, from initial concepts through to in-service operation

and disposal. The Defence Innovation Hub has introduced governance arrangements to drive a single, coherent innovation investment strategy aligned with Defence's strategic priorities. These new arrangements bring together Defence Capability Managers and other key Defence personnel, including those from capability acquisition and sustainment, to ensure stakeholders are engaged in the decision-making process as projects develop.

Capability Managers provide advice to the Defence Innovation Hub on the merits of individual innovation proposals, taking into account all current and potential future capabilities. They have full visibility of the investments made by the Defence Innovation Hub, which ensures that Capability Managers consider potential innovations when considering options for new and upgraded capabilities. It is expected that this will lead to increased opportunities for successful innovations to transition into service when compared to earlier innovation programs.

*"Through the Defence Innovation Hub, Army has been able to identify and contract the development of game-changing technology"*

**BRIGADIER CHRISTOPHER MILLS,  
DIRECTOR GENERAL ARMY MODERNISATION**

## PILOT OF SPECIAL NOTICE SERVICE

When the Defence Innovation Hub launched in December 2016, it sought innovation proposals across a wide range of investment priorities. Capability Managers were also interested in the ability to request innovative proposals from industry and researchers for targeted Defence capability challenges. In June 2017, the Defence

Innovation Hub piloted a Special Notice service to meet this need.

Using the Defence Innovation Portal, the Defence Innovation Hub approached industry and research organisations to meet two specific capability needs: Next Generation Deployable Wireless Environment; and Man-portable Small Unmanned Aerial System of the Future. Together, these two Special Notice requests received over 70 responses from industry and researchers. The Defence Innovation Hub worked with the Capability Managers to evaluate the proposals and determine which proposals would be awarded

innovation contracts. The Defence Innovation Hub will use the lessons learnt from the Special Notice pilot to establish a permanent Special Notice capability. The Special Notice service will leverage the innovative capacity of a wide spectrum of Australian business to solve problems, to enhance Defence capability.

*“The Special Notice function allows focussed industry submissions into critical areas of capability of our asking”*

**COMMODORE PHILIP SPEDDING,  
DIRECTOR GENERAL NAVY PROGRAM  
SUPPORT AND INFRASTRUCTURE**



MAJGEN, Jeff Sengelman, Special Operations Command speaking at a Defence Innovation Hub Industry Update in Canberra.

## Investment portfolio versus priority innovation needs

The Defence Innovation priorities are driven by the new force design process outlined in the *First Principles Review*. This ensures investment priorities are coherent across the Defence Innovation Hub and the Next Generation Technologies Fund and are aligned with Defence strategy.

For 2016–17, Defence identified six capability streams as priorities for investment through the Defence Innovation Hub, with the top three priorities (in priority order):

- Intelligence, Surveillance, Reconnaissance (ISR); Electronic Warfare (EW); Space; and Cyber
- Key Enablers
- Land Combat and Amphibious Warfare
- Strike and Air Combat
- Maritime and Anti-Submarine Warfare
- Air and Sea Lift

### PROPOSALS SUBMITTED BY CAPABILITY STREAM

The percentage of Defence Innovation Hub proposals submitted by capability stream is shown below.



● ISREW, Space & Cyber	35%
● Key Enablers	32%
● Land Combat & Amphibious Warfare	19%
● Maritime & Anti-Submarine Warfare	7%
● Air & Sea Lift	5%
● Strike & Air Combat	2%

### INVESTMENTS BY CAPABILITY STREAM

The quantity and value of Defence Innovation Hub investments by capability stream is shown below.



● ISREW, Space & Cyber	13	\$25,234,000
● Land Combat & Amphibious Warfare	6	\$6,629,000
● Key Enablers	4	\$5,299,000
● Maritime & Anti-Submarine Warfare	2	\$4,007,000
● Strike & Air Combat	1	\$2,423,000

Transparency and clarity on priorities have been effective in shaping the market, with 86 percent of all innovation proposals received by the Defence Innovation Hub aligning with Defence's top three innovation priority capability streams.

85% of Defence Innovation Hub investments\* align with the top three investment priorities: ISREW, Key Enablers and Land Combat and Amphibious Warfare.

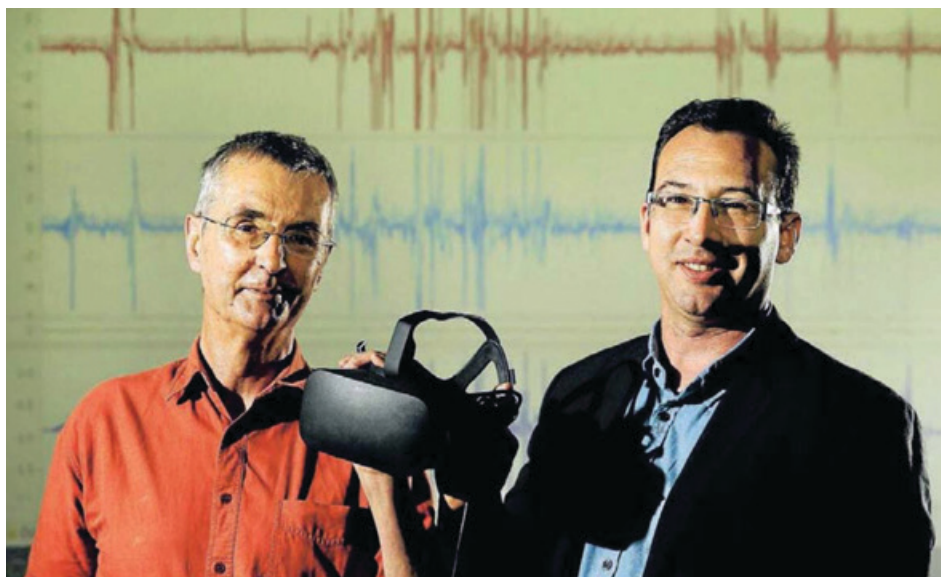
*\* Includes investments approved since launch of Defence Innovation Hub through the strategy-led governance model. Reporting period: 5 December 2016 to 31 December 2017.*

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## CASE STUDY

### Virtual reality key to building resilience of Australian Defence Force personnel

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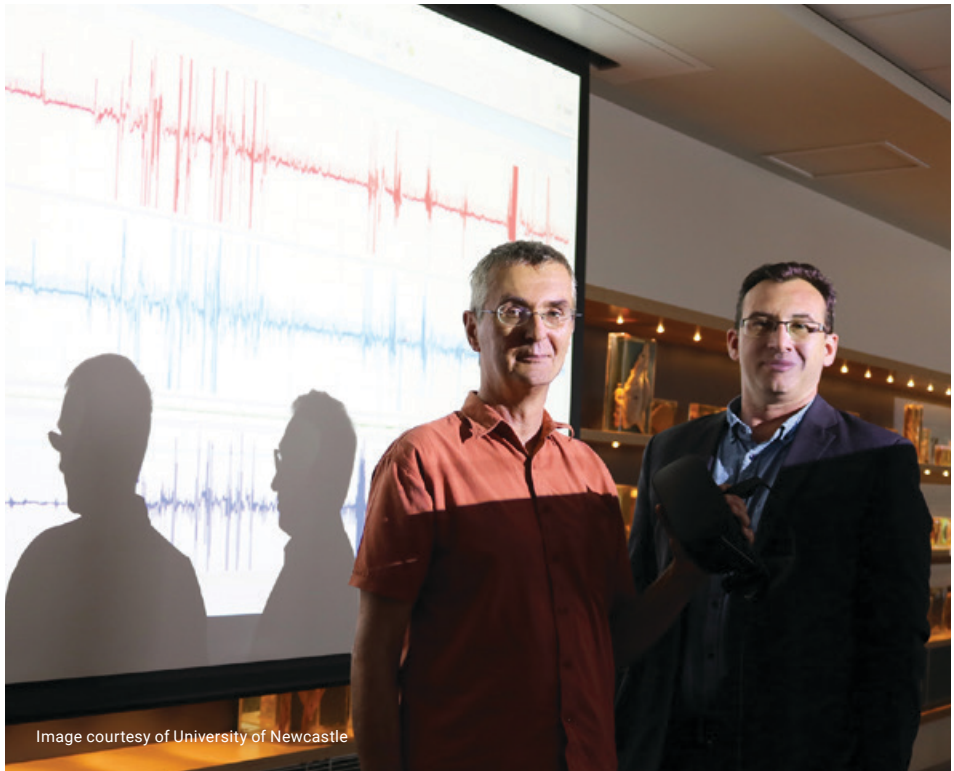


In 2017, the Defence Innovation Hub invested \$2.18 million in a project for the University of Newcastle to work on improving the cognitive resilience of Defence personnel. Australian Defence Force (ADF) members routinely deploy into complex, threatening and highly fluid operational environments. These intense demands place many personnel at risk of developing serious mental health complications, such as Post Traumatic Stress Disorder (PTSD). This makes enhancing the cognitive resilience of personnel a high priority for the ADF.

In order to reduce the incidence of adverse mental health conditions, the ADF has looked into introducing pre-deployment psychological resilience training, the spearhead of which is the Battle Self-Management and Resilience Training (BattleSMART) program. BattleSMART operates as a preventative, evidence-based, “classroom” delivered a program designed to enhance an individual’s ability to cope effectively with increased stress and traumatic events in their lives.

While BattleSMART is highly regarded within the ADF, there are two major ways in which the program can be enhanced. Firstly, objective assessment of cognitive resilience can be improved. Currently, there are no established tools within the ADF for objectively quantifying a member’s level of cognitive resilience. Secondly, in the area of skills consolidation, there are few opportunities for personnel to engage in on-going cognitive resilience training, outside of highly structured scenarios. In response to these two limitations, Associate Professors Eugene Nalivaiko and Rohan Walker from the University of Newcastle submitted an innovation proposal to the Defence Innovation Hub.

Nalivaiko and Walker proposed a novel standard for objective evaluation of resilience based on Biometric assessment. The most commonly used assessment for individuals who undergo psychological skills training is self-reporting. However, the limitation of self-reporting is that it can suffer from self-reporting bias. Biometric assessments do



not suffer from this limitation. Nalivaiko and Walker's team has been working on developing a biological resilience score (BRS) based on multiple physiological metrics that predict resilience. For example, their research found that markers such as startle response and salivary cortisol are strongly associated with psychological resilience. The elevation of these markers from baseline is not the critical measure used; rather, it is the time taken for an individual to return to baseline levels following provocation.

In tackling the second limitation of BattleSMART, Nalivaiko and Walker proposed that, following conventional BattleSMART training, ADF personnel undergo an additional Stress Resilience in Virtual Environments

(STRIVE) training modules. STRIVE is a program that was developed by colleague neuropsychologist Professor Albert "Skip" Rizzo. Within STRIVE, users are immersed in a variety of narrative-based, virtual reality (VR) combat "missions" where they are confronted with emotionally challenging situations that may be experienced in the combat environment.

The work undertaken by the University of Newcastle is an exemplar of how smart ideas and innovation can have the potential to enhance Defence capability. Defence hopes that these two new approaches will lead to a reduced incidence of adverse mental health outcomes for ADF members and a more resilient fighting force.

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## CASE STUDY

### Innovating to guard against cyber threats



In July 2017, the Defence Innovation Hub invested approximately 1.1 Million in Kent Town-based business Data to Decisions CRC (D2D CRC), to develop a system to guard against the impact of new cyber threats.

Partnering with the Defence Innovation Hub is allowing D2D CRC to develop a tool that will assist with guarding against the impact of new cyber threats by providing an estimate of the risk to the organisation, an estimate of the time available before the threat will be actively exploited, and warnings about when threats are being actively exploited. The capability will contribute towards creating cyber threat resilient Defence networks and systems. The current phase of work is expected to continue into early 2020.

D2D CRC is part of the Cooperative Research Centres Programme and brings together researchers and industry to tackle the Big Data challenges that face Australia's national security agencies.

The vision of D2D CRC is to be a leading provider of big data capability resulting in a safer and more secure nation and a sustainable big data workforce for Australia. To achieve this it aims to undertake impactful research, development, education and training that deliver outcomes to national security and other data-intensive sectors.

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## CASE STUDY

### QuintessenceLabs – Securing the transmission of secret information



QuintessenceLabs, a Canberra-based company with an international footprint in the United States, has been at the forefront of the development of quantum security solutions since 2008. In July 2017 the company signed a \$3.26 million innovation contract with the Defence Innovation Hub to continue to develop its sovereign Quantum Key Distribution (QKD) capability in Australia.

QKD is a system for the secure transmission of secret information, namely cryptographic keys, between two parties utilising advanced quantum computing technology. Following distribution, the cryptographic keys can be used for encrypting and decrypting sensitive data transmitted between the two parties.

The advantage of QKD is that it's invulnerable to all known current and anticipated cyber threats due to the nature of quantum mechanics. In order to measure a quantum system it must be disturbed, hence, an unauthorised party attempting to intercept the transmission of the cryptographic key will be detected by the legitimate parties, who can then take action to ensure data remains secure.

The Hub's investment will enable QuintessenceLabs to continue to develop a practical employment of QKD, which involves the protection of sensitive data stored on mobile assets in uncontrolled or hostile environments, allowing the data to remain secure if it falls into the wrong hands.

The solution is further envisioned to enhance the resilience of defence networks both locally and abroad as the QKD capability is extended to work over wireless transmissions.

The Hub's investment in QuintessenceLabs' project comes under a current priority stream: Intelligence, Surveillance, Reconnaissance, Electronic Warfare, Space and Cyber. This category covers technologies that improve intelligence collection, analysis and dissemination across all capabilities and domains within Defence. This is a rapidly-changing field that Defence must keep abreast of to ensure its assets remain secure from cyber threats. Investments such as those with QuintessenceLabs will help Australia to develop and maintain a home-grown technological edge in cyber security.

QuintessenceLabs has a history of working with Defence through the Centre for Defence Industry Capability (CDIC). The CDIC has previously assisted QuintessenceLabs with strategic advice and engagement with Defence stakeholders and were able to assist in the shaping of their ultimately successful submission to the Hub.

The Hub encourages all small to medium enterprises (SMEs) to get in contact with a CDIC business advisor to assist with targeting their applications to the Hub's Call for Submissions and Special Notices.

# Grow the capability and capacity of the Australian industry and innovation sector

## PROFILE OF DEFENCE INNOVATION HUB PARTNERS

4000+

PEOPLE EMPLOYED

The Defence Innovation Hub is investing around \$640 million to 2025–26, to build the innovation capabilities of Australian industry, universities and research institutions to deliver innovative solutions for Defence capability.

The Defence Innovation Hub welcomes submissions from all types of businesses and is committed to building a vibrant and globally competitive Australian industry and innovation sector. Defence Innovation Hub industry partners\* employ over 4,100 people and had a combined annual turnover of over \$1.9 billion in the 2016–17 Financial Year.

\$1.9B

COMBINED ANNUAL TURNOVER

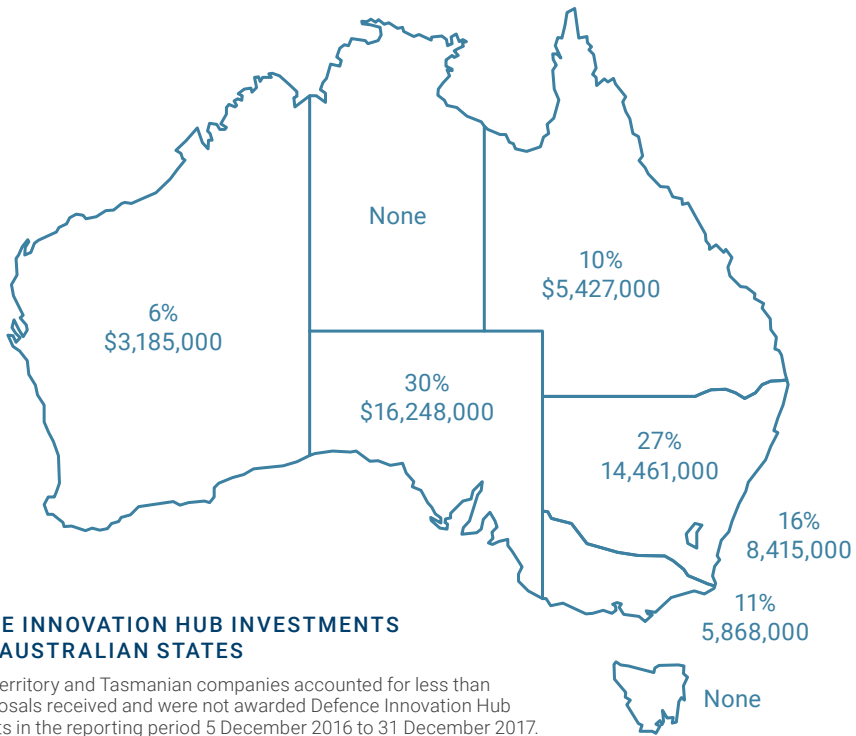
Defence recognise that innovative capability solutions come from organisations and research organisations, whose expertise lies beyond Defence. The Defence Innovation Hub welcomes proposals from non-traditional Defence organisations. The Centre for Defence Industry Capability complements the Defence Innovation Hub, by helping 'new starters' to Defence by providing tailored advice, support and information and guidance on doing business in the Defence market.

## GLOBAL SUPPLY CHAIN

During the reporting period, only one of the 30 Defence Innovation Hub partners was part of a global supply chain. This however, was in their capacity as a prime contractor to Defence. With the Centre for Defence Industry Capability committed to building the effectiveness of the Global Supply Chain program, it is expected that future supply chain opportunities for local companies will be maximised.

As the Defence Innovation Hub program matures, reporting will be extended to include the number of Hub partners that are part of a global supply chain, the number of investments that have introduced a new-to-market product or service innovation, and Defence Innovation Hub partners' contribution of cash and in-kind co-investment.

*\*Defence Innovation Hub industry partner is an entity that has been in contract with Defence Innovation Hub during the reporting period, excluding research institutions.*



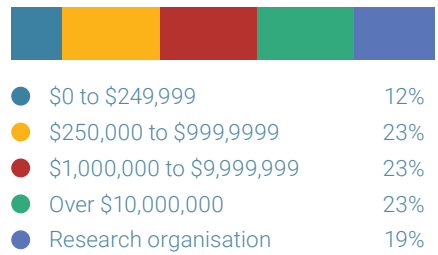
**DEFENCE INNOVATION HUB INVESTMENTS BY THE AUSTRALIAN STATES**

Northern Territory and Tasmanian companies accounted for less than 2% of proposals received and were not awarded Defence Innovation Hub investments in the reporting period 5 December 2016 to 31 December 2017.

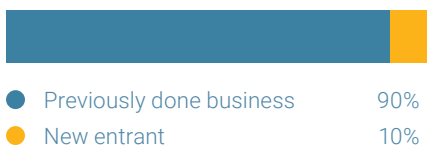
**PERCENTAGE OF INVESTMENT VALUE BY COMPANY SIZE**



**ANNUAL TURNOVER RATES OF CONTRACTED ENTITIES**



**PARTNERS THAT HAVE PREVIOUSLY DONE BUSINESS WITH DEFENCE**



**PERCENTAGE OF INVESTMENT VALUE BY ENTITY TYPE**



## CONTINUOUS IMPROVEMENT

With a culture of continuous improvement, the Defence Innovation Hub will continue to listen to feedback and improve the innovation program as it evolves and matures.

An important focus for the next twelve months will be on delivering an approach to multi-party collaboration arrangements for solving complex broad capability problems, the launch of the Special Notice service offering and refining to improve the efficiency of the program.

### **Deliver an approach to multi-party collaboration arrangements for solving complex broad capability problems**

During 2018, the Defence Innovation Hub will develop and implement a new framework for Defence, industry and research organisation collaboration. The framework will support collaboration on sensitive or highly specialised capability challenges; and incentivise Defence Prime contractors to take a more proactive role in establishing and implementing collaborative arrangements with other Primes, Small-to-Medium Enterprises and research organisations. The service offering will be piloted and launched in 2018, with the aim of delivering better capability outcomes for Defence through a shared understanding of Defence capability gaps and opportunities.

### **Launch of Special Notices**

When the Defence Innovation Hub commenced operations in December 2016, the primary market interface was through open solicitation against the defined priority capability streams, where industry and research organisations “push” ideas and proposals to Defence. Since launch, there has been increasing interest from

Defence stakeholders in the capacity of the Hub to “pull” proposals from industry in response to specific capability challenges or obstacles faced by Defence.

In 2017, the Defence Innovation Hub piloted three Special Notice solicitations. The Special Notice platform allowed Defence to define the problem to the market, not the desired solutions. Industry and research organisations were then able to propose innovative and disruptive solutions to capability challenges. The Defence Innovation Hub will continue to evaluate lessons learned from the pilots to improve and better shape the Special Notice service offering, before its official launch in 2018.

### **Refine and improve efficiency of innovation proposal assessments**

The Defence Innovation Hub has streamlined procurement and contract management processes to achieve a reduction in time and cost from submission of proposals through to contract conclusion. Over the next twelve months, it is expected that the time taken to process proposals will continue to improve as capability managers and technical assessors gain further experience of interacting with and using the Defence Innovation Hub.

## CASE STUDY

### Defence Innovation Hub partners with Army Innovation Day



The Defence Innovation Hub seeks proposals aligned with six capability streams, with all ideas welcome to be submitted at any time throughout the year. However, from time to time, more specific requirements are advertised on the Defence Innovation Portal, as Special Notices.

Fixed-duration Special Notices allow Defence Capability Managers and projects to utilise the Defence Innovation Hub's submissions framework to call for industry to submit proposals in response to specific capability challenges, which are then evaluated in a process tailored to the requirements of the Capability Manager or project.

In 2017, the Australian Army partnered with the Defence Innovation Hub to make use of the Special Notices platform for the industry to submit their innovation proposals online. The Special Notice sought novel technologies covering one or more of the following categories: weapons, countermeasures against weapons, and effects in the signature management of systems including weapons, vehicles, facilities, IT and/or cyber systems.

At the close of the Special Notice in mid-September, 48 submissions were received by the Defence Innovation Hub across all categories from Australian businesses of all sizes. Of those 48 submissions, 19 companies

were selected to demonstrate their novel innovations to a panel of capability specialists and decision-makers at Army Innovation Day, held at the Australian Defence Force Academy in Canberra in November.

Army Innovation Day provided industry with an opportunity to present capability options that could shape Army's approach to novel weapons and novel effects, demonstrating the important need for cooperation between Defence and industry in developing Defence capability.

The Special Notice platform provided the industry with a single point of entry to submit proposals, and also provided Army with high-quality submissions. Using the Hub's technical assessment team in further refining the responses provided by industry assisted Army in identifying innovations that were aligned with Army's capability needs.

The Defence Innovation Hub Special Notice platform is currently in a pilot and evaluation phase before the full capability is launched in 2018. The Defence Innovation Hub looks forward to working closely with industry, research organisations and other Defence Capability managers on future Special Notices, to build on the successes shared by Defence and industry as a result of Army Innovation Day 2017.

## DEFENCE INNOVATION HUB TABLE OF INVESTMENTS (5 DEC 2016 TO 31 DEC 2017)

Since launch, the Defence Innovation Hub has awarded 30 innovation contracts, with values ranging from \$97,000 to around \$8 million, with a total investment of more than \$53.5 million. Investment value includes Defences total investment in the project, including direct contract costs, government furnished materials and other project costs. The Hub has also received more than 390 proposals and released more than 115 individually tailored requests for proposals.

The Defence Innovation Hub also manages a portfolio of 28 legacy innovation projects worth approximately \$61.2 million.

Company	Contract overview	Value inc GST
<b>Australian Capital Territory</b>		
Kord Defence	Develop a wireless soldier control system using Bluetooth Low Energy technology to interface with current Australian Defence Force in service devices.	\$635,000
Quintessence Labs	Explore the feasibility of the establishment of highly secure communications links between two points, both fixed and over line of sight in free space.	\$3.3 Million
Quintessence Labs	Develop a military application that draws upon Virtual Zeroisation (VZ) technology, which will protect sensitive data on assets in uncontrolled or hostile environments.	\$527,000
Seabox	15mm Ammunition ULC Prototypes-Research and development to produce a 155mm ammunition Unit Load Carrier that improves the efficiency of the supply chain and ultimately the safety of Australian soldiers.	\$1.9 Million
Data 61 – CSIRO	Proposing to create a composited multi-domain desktop experience on a single monitor with a single keyboard and mouse.	\$440,000
Nova Systems	Demonstrate a mobile ground target able to represent real operational scenarios, capable of achieving 100kph on prepared roads.	\$779,000

Company	Contract overview	Value inc GST
<b>New South Wales</b>		
Ron Allum Deepsea Services	Explore the feasibility of a novel, high-performance autonomous glider for long-endurance undersea surveillance.	\$3.2 Million
Armor Composite Engineering	Seek to mature and further progress a new body armour capability, which could potentially be used by the Australian Defence Force.	\$655,000
Saber Astronautics	Explore the development of an innovation that will use machine learning technology for autonomous identification and modelling of electronic threats.	\$275,000
Trang Imagineering	Explore the development of 3D sensors that have been used in the mining industry for potential use by the Australian Defence Force for threat monitoring in conflict zones.	\$218,000
Berkeley Information Technology	Explore the feasibility of a software solution to support the protection of documents used on Defence information and communication systems.	\$97,000
University of Newcastle	Explore the development of enhanced resilience training for Australian Defence Force personnel through a set of virtual reality-based training sessions involving controlled exposure to adverse environments.	\$2.2 Million
RingIR	Counter IED Technology – Development of a counter-improvised detection capability.	\$4.6 Million
Sonartech Atlas	Demonstrate a largely automated signal processing chain that detects and classifies underwater transient acoustic signals.	\$1.3 Million
Jenkins Engineering Defence	Developing a highly innovative cost-effective, microwave-band Radar Electronic Support (R-ES) to provide automated warnings and recording capability of potential threats signals.	\$275,000

Company	Contract overview	Value inc GST
<b>Victoria</b>		
Daronmont Technologies	Development of existing software and signal processing to improve performance in detecting fast aerial targets and slower aerial targets.	\$7.9 Million
Deakin University	Explore the feasibility of developing a functioning hot fire training system using haptic (touch) force feedback, high fidelity visuals, and realistic heat experience to improve firefighting training for Navy.	\$2.2 Million
Grollo Aerospace	Explore the feasibility of an affordable re-usable supersonic sea skimming target missile, designed in Australia, with the potential of offering a world-leading capability optimised for the Australian Defence Force.	\$1.9 Million
SYPAQ Systems	Explore the development of software-based systems that effectively train networks to learn how to interpret non-standard intelligence products and convert them to comply with appropriate format standards.	\$274,000
SYPAQ Systems	Explore the development of a small, lightweight next generation power generator that could be tailored to land environments for both individual soldiers and vehicle-based forces.	\$172,000
Agent Oriented Software	Explore the concept of an autonomous teamed intelligent software agent capability that is resilient to cyber-attacks and could also be integrated with existing Defence systems.	\$378,000
<b>South Australia</b>		
Data to Decisions Co-Operative Research Centre	Explore the feasibility of the development of a cyber-threat intelligence capability that could assist enterprise and mission systems in identifying and treating potential adversary exploitations.	\$1.1 Million
Ultra Avalon – Scranell	Project to develop techniques to provide naval ships with early warning of incoming low flying air threats, such as anti-ship missiles.	\$1.9 Million

<b>Company</b>	<b>Contract overview</b>	<b>Value inc GST</b>
BAE Systems	15mm Ammunition ULC Prototypes-Research and development to produce a 155mm ammunition Unit Load Carrier that improves the efficiency of the supply chain and ultimately the safety of Australian soldiers.	\$1.7 Million
BAE Systems	Demonstrate the use of a Single Photon Avalanche Diode (SPAD) array to be used for tracking low observable targets or platforms.	\$2.3 million
<b>Queensland</b>		
Teledyne Defence	Improve the performance of Forward-looking Stand-off Harmonic Radar. Increase the range of detection of electronic IED components.	\$3.4 Million
Explosive Protective Equipment	Enables stand-off detection using Raman spectroscopy. Provides the ability to rapidly scan the surface of a vessel from 10m – 40m allowing boarding parties to assess for drugs and IED threats.	\$1 Million
Explosive Protective Equipment	To explore the integration of a Cobham Amulet Ground Penetrating Radar into an existing unmanned ground vehicle for detection of improvised explosive devices.	\$242,000
Griffith University	To explore the development of a portable device that enables real-time detection of airborne biological threats, such as fungi spores, viruses and bacteria.	\$183,000
<b>Western Australia</b>		
L3 Oceania	Explore the development of an underwater acoustic sensor that could provide significant benefits within the Australian Defence Force's maritime domain.	\$2.9 Million



# Centre for Defence Industry Capability (CDIC)

The CDIC has an important role as the front door for industry to Defence, making a substantial input to realising defence capability by providing leadership and partnership.



The program performance of the Centre for Defence Industry Capability is reported over the following pages with strategic measures reported qualitatively, supported by quantitative performance information.

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The impact of the CDIC on industry's and Defence's understanding of each other

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## Program impact statement

The Centre for Defence Industry Capability (CDIC) has an important role as the front door for industry to Defence. In the first year of operation, the CDIC made a substantial input to realising defence capability, growing the capability and capacity of Australia's defence industry and innovation, and providing leadership and partnership.

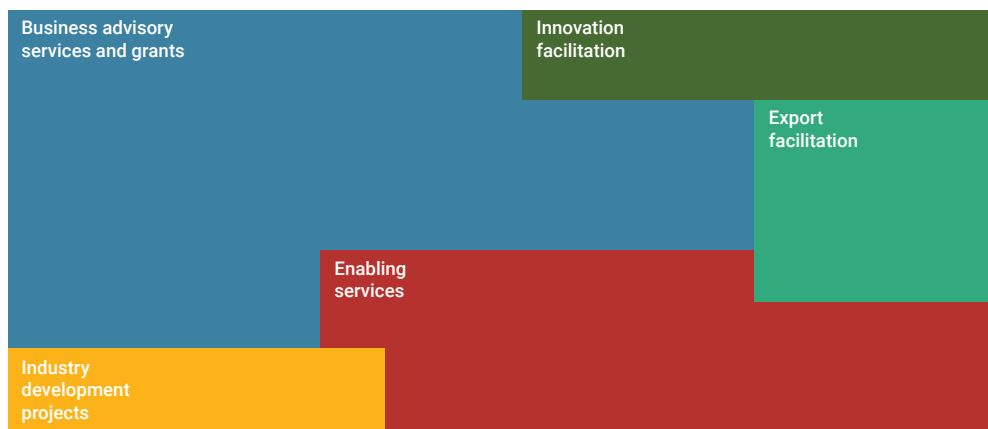
The CDIC delivers a blend of initiatives and activities that are developing industry, facilitating innovation, building business competitiveness and exports and contributing to national security.

The CDIC has already delivered tangible outcomes to Defence and Australian industry. The program has established a solid reputation for providing advisory services and facilitating engagement between businesses and innovators, government agencies, and industry organisations.

The demand for CDIC services is far beyond what was envisaged in the *2016 Defence Industry Policy Statement*. The services to businesses have expanded to address growing demand, opportunities and expectations of stakeholders. Importantly, this includes contributing to the national endeavours of the major Defence acquisition and sustainment projects.

The CDIC has established mechanisms for managing the volume of interest and the number of enquiries it receives. Businesses and Defence members can get relevant, reliable, and real-time defence business information and responses to their queries through the CDIC website, webchat, email, and by speaking with a Contact Centre agent.

Standing by at all times to handle more complex enquiries are the CDIC specialist Defence Industry Facilitators and Business Advisors. Over 800 businesses have already benefited from either detailed engagement with the CDIC advisors and facilitators or as a result of an export initiative.



*19,854 unique visitors to the CDIC home page since launch, alongside 1,000+ phone enquiries to the business.gov.au contact centre*

The CDIC is a critical conduit between Defence and Australian industry. The CDIC achieves this by working collaboratively across the Defence Groups and Services with an array of business units and project offices connected with materiel and enabling supply chains.

The CDIC has an essential role as the front door and facilitator to the Defence Innovation Hub and the Next Generation Technologies Fund investment opportunities. The CDIC has formed partnerships with Defence capability projects to undertake vital industry engagement and facilitation. Through this engagement, the CDIC exposes the industrial talent resident in Australia and equips those businesses to participate in national and international supply chains. The CDIC also works in partnership with the Defence Security and Vetting Service and the Business and Government Liaison Unit to mature and continuously improve the security of Defence supply chain participants.

## Enhancing Defence capability

### READINESS AND CAPABILITY

The Government investment in major Defence capabilities impacts on the Australian industrial landscape. Defence recognises that it needs to engage early with industry in the development of its capability to ensure businesses can prepare for opportunities in the defence supply chains.

Sixteen years ago, the F-35A Joint Strike Fighter (JSF) program took on a mandate to maximise opportunities for Australian industry. The CDIC through its predecessor program, the Defence Industry Innovation Centre, has developed a strong partnership with the JSF program and has been instrumental in setting a benchmark for Defence and industry engagement.

Australian industry, which was once fragmented and disconnected, can now boast of its contribution to the fifth generation strike aircraft capability. From millions of hours of engineering to countless components and technologies developed and manufactured in Australia, the program has generated a showcase of Australian industry. The CDIC is proud to have been part of this success story.

A key role of the CDIC is providing Defence with a current and accurate understanding of Australian industrial capability and capacity, and our innovator's approaches to investment.

The JSF experience has shown what long-term collaboration between government and industry can achieve. This collaboration model has now spawned similar involvement and working arrangements for the CDIC in major projects such as the Future Submarines and Future Frigates, and expansion of support into

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## CASE STUDY

### Capability growth through Australian talent in F-35 program

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The CDIC is best known for its support to Australian businesses; however, the Director Industry in the Joint Strike Fighter (JSF) Division at the Department of Defence, Ms Cate Caldwell, believes the CDIC's support to Defence has been critical to achieving their goals, too.

"The CDIC is a critical partner to Defence, engaging with Defence primes and nurturing many Australian businesses, from small to large, into the global supply chain," Ms Caldwell said.

"The CDIC has supported us to issue 34 grants worth \$14.7 million to 20 companies in four states of Australia, to help Australian businesses win work with the global F-35 Program.

"This has meant increased Australian industry involvement towards our objective to deliver a strong industry base that supports the F-35A capability and provides Australia with long-term economic benefit.

"The CDIC's understanding of Australian industry capability has been an essential part of our work to ensure that Australian industry is ready for the increases required in the global production of the F-35, and in preparation for Australia's participation in the global sustainment solution.

"The CDIC team provides knowledge and expertise to the JSF Division and to Australian industry, so we both understand the expectations, pressures and challenges of the F-35 Program. This is key to establishing a trusted environment in which we can maximise the benefits of the F-35 program for Australian industry and Defence."

With the support of the CDIC, the JSF Division has been instrumental in helping Australian industry win more than AU\$800 million in contracts on the global F-35 Program.

## CASE STUDY

### Autonomous innovation



Caloundra business, Praesidium Global, may only be a few years old, but they are already demonstrating the potential of their autonomous innovations for the Australian Army.

Business Development Manager, Martin Alexander believes their success is due to their focus. "The idea was always military-based. Praesidium Global's drive is to reduce the Warfighters' exposure to danger.

Praesidium Global is currently contracted with the Australian Army to supply Unmanned Ground Vehicles (UGVs). "MAPS (Mission Adaptable Platform System) a multi-purpose system, can be adapted in the field. The Army has procured it as a 'mule' variance to transport goods like ammunition and packs while they're in the field to relieve the burden on the Warfighter.

"The other platform procured is a logistics platform with a robotic arm. It can lift up to 250 kilograms for items like generators and weaponry" Mr Alexander said.

"We strive to make our systems ruggedized, simple to operate and reliable by design – this means the system can be autonomous, where soldiers can mark way points and the vehicle will follow it. It has onboard sensors to make

sure it doesn't collide with anything. You don't need anyone to steer it, but if you want to, you can control it from a C2 trailer or with a game controller which has been configured and is a commercial off-the-shelf item.

"We've been fortunate to have the support of the Centre for Defence Industry Capability – they've been brilliant to discuss ideas, and they took a lot of time out to answer my questions.

"We've also had great support through the Team Defence Australia program to take two of our systems to the Defence Security Equipment and Industry trade show in London to exhibit in 2017. We couldn't have done it without the support of the Centre for Defence Industry Capability – being so new in the space, any ideas, thoughts or queries, we could pick up the phone to our Defence Business Advisor and get an answer, or be pointed to the right person.

"Their support has led to discussions with the United Kingdom Ministry of Defence and Praesidium Global has been down selected to be part of the UK Army Warfighting Experiment 2018.

"It's been great to have part of the Government really go into bat for up and coming companies like ours – having that backing is crucial."

capability domains such as infrastructure and information technology. The aim is to look back in another fifteen years and see the stories of success multiplied.

The CDIC provides an important role in helping Defence identify how its capability requirements might be met by Australian industry. Being able to facilitate the presentation of a niche capability or service to meet a specific need or solve an obscure technical problem delivers better outcomes for Defence and Australian industry. The CDIC's advisors are also skilled at seeing the potential in a company and how it might transfer its technology to a Defence capability, or from a current Defence application into a commercial opportunity.

### **CONTRACTING WITH DEFENCE**

The unprecedented investment by the Australian Government into defence capability of \$200 billion is providing new opportunities for Australian industry to participate in Defence projects. The CDIC works closely with industry to build the capability and capacity of Australian businesses so that the increased opportunities in the defence market can be realised. The CDIC's work of providing advice on engaging in defence supply chains and raising awareness of tender opportunities is instrumental for Australian industry to leverage these new opportunities.

The launch of the CDIC has enabled the increased involvement of specialist defence industry facilitators in industry engagement days and information sessions run by acquisition teams across Defence. This work is vital to support the Government's strengthening of the Australian Industry Capability (AIC) Program, to maximise opportunities for competitive Australian industry. The Defence-

led AIC Program aims to create opportunities for Australian companies to compete on their merits for Defence work on a value for money basis. CDIC advisors work with companies to help them demonstrate how their proposed approach will enhance defence industry capability and capacity.

The CDIC is working with Defence project offices to build the understanding of the industrial capability requirements, and identify the capacity and capability of relevant supply chain participants to contribute to defence projects. Importantly through this process, an understanding is also building of the areas where the industry needs to improve and develop in order to successfully win contracts both now and in the long term. With that knowledge the CDIC advisory services are assisting businesses in targeted ways, to better demonstrate how their product or service contributes to a defence outcome, and improve in the areas valued by the defence supply chains. Because the CDIC works across a broad range of Defence projects, it provides a critical role in linking and developing industry's capabilities across projects and defence force domains. For example, the CDIC is helping to ensure that relevant capabilities that have been developed on the Joint Strike Fighter program are known to the Future Submarine project.

The CDIC is playing an important role in building Australian industry's capacity to contribute to major defence acquisitions.

*"...the Government is committed to maximising the opportunities for our Australian Defence industry to participate in these naval shipbuilding programs...the new Centre for Defence Industry Capability will help small to medium enterprises identify opportunities to join the supply chains necessary to deliver these ambitious naval shipbuilding projects."*

**THE HON MALCOLM TURNBULL MP,  
PRIME MINISTER OF AUSTRALIA,  
18 APRIL 2016**

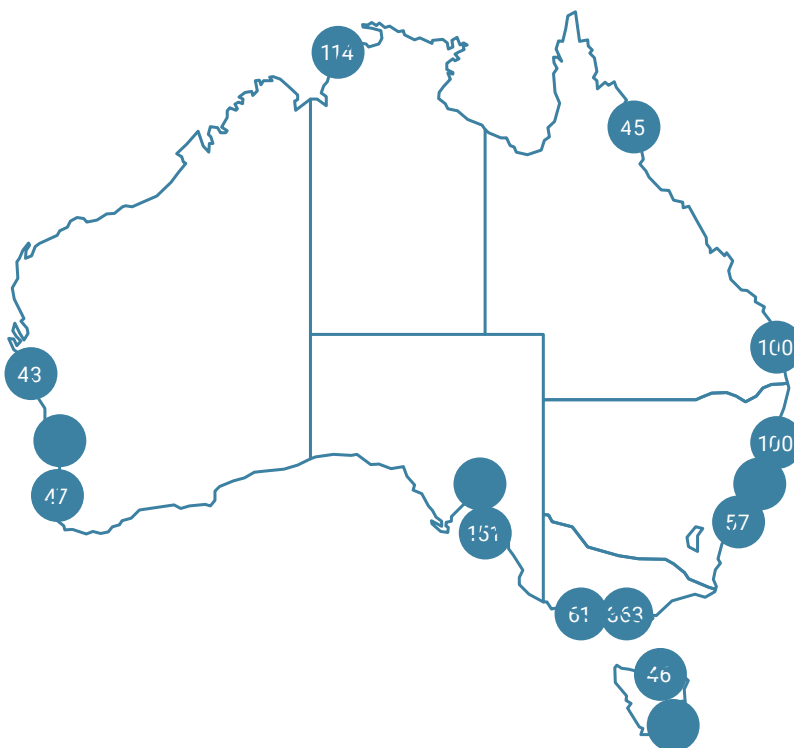
The *Naval Shipbuilding Plan* released on 16 May 2017 outlines the Government's vision for the Australian naval shipbuilding enterprise

and the significant investment required in coming decades. The CDIC has a major focus on supporting Defence's continuous shipbuilding programs to maximise Australian industry involvement. The CDIC's national footprint supports the continuous shipbuilding programs as a national endeavour and is providing Defence with intelligence and analysis of Australian industry capability.

The CDIC is working with small to medium enterprises to ensure they are skilled and prepared for participating in the major Defence projects.

As the CDIC was setting up in 2016, it was already contributing to the shipbuilding

**NUMBER OF ATTENDEES AT SHIPBUILDING INFORMATION DAYS**



industry engagement events. Defence project managers, CDIC and Defence Industry Policy Division provided a unique insight into the shipbuilding projects and new industry and innovation programs to a total of over 1800 representatives of Australian industry across the nation.

The CDIC continues to support the SEA5000 Future Frigate program as it pursues the Government's commitment to building supply chains in Australia. The nine Future Frigates are part of the Government's \$89 billion national shipbuilding endeavour, which will see Australia develop a strong and sustainable naval shipbuilding industry. This critical investment will generate significant economic growth and sustain thousands of Australian jobs over decades.

The CDIC has been formally engaged by the program to gather industrial capability information and assist with industry engagement. The CDIC's project-specific team for SEA5000 is the first in a series that will build upon the CDIC delivery model.

Critical to the success of many Defence projects is the need for dependable, enduring, cost-effective and up to date information about potential supply chain participants. Building on the work undertaken for Defence projects such as SEA5000, the CDIC is working with the Department of Industry, Innovation and Science and the Department of Defence to map Australian industry capabilities. Over time it is anticipated that this work will enhance exposure of the Australian industrial base, including opportunities in adjacent and global markets.



## CASE STUDY

# Opening the 'front door' to industry for naval shipbuilding opportunities



The Centre for Defence Industry Capability (CDIC) took their assistance to the streets during late 2016 and throughout 2017 so Australian businesses could be aware of the naval shipbuilding supply chain opportunities available now and in future.

The Offshore Patrol Vessels (OPVs) and Future Frigates, projects with a combined value of almost \$40 billion, partnered with the CDIC to deliver a series of industry briefings in capital cities and key regional locations to ensure Australian businesses were best positioned to reap maximum benefit from these large scale Defence procurements.

At the briefings Defence and CDIC presented information on the Future Frigate program which will see the acquisition of a fleet of nine new frigates, and the OPVs, which will replace the current patrol boats with 12 new larger, more capable vessels. The OPVs will begin construction with the first two vessels in Adelaide in the second half of 2018, with the Future Frigates to follow in 2020.

During 2016-17, 15 industry briefings were delivered to over 1800 attendees, with over 500 of these directly registering with CDIC's naval shipbuilding information portal for future updates and assistance.

"It was important we get out and let industry know where the Future Frigate program is up to and how to get involved," Paddy Fitzpatrick, Director General Future Frigate program said. "We can't deliver this new capability without industry's help".

The CDIC's assistance has meant both traditional shipbuilding business and the broader industry can consider where the Government's continuous naval shipbuilding program offers them real opportunity in the design, build and sustainment phases.

With the decision on a single shipbuilder for the Future Frigates in 2018 looming, the Defence project team and the CDIC are already planning the next phase of deeper engagement with Australian industry.

## Grow the capability and capacity of the Australian industry and innovation sector

### CAPABILITY AND PRODUCTIVITY

The CDIC has a strong focus on business capability improvement. The CDIC national network of specialist business advisors have the regional and operational expertise to assist Australian businesses to develop their capability, so they are able to work with Defence. Advisory and facilitation services are targeted at eligible defence sector small and medium-sized enterprises.

The services include:

- business process improvement;
- skills development;
- export and supply-chain facilitation;
- a supplier continuous improvement program;
- defence innovation proposal facilitation; and
- defence market preparedness.

The CDIC is delivering support for skilling Australian industry at the firm level through Capability Improvement Grants. The CDIC's Capability Improvement Grants reimburse a business for up to half the cost of engaging a consultant or expert to implement the eligible recommendations provided in the service report.

The CDIC's one-on-one specialist advisory services have directly benefitted over 160 Australian businesses across all states and territories. Of those businesses, 20 have been

awarded capability improvement grants, ranging from \$5,834–\$157,962 (incl GST), following their service engagement, of which a quarter of the total grant amount has been for skills and training.

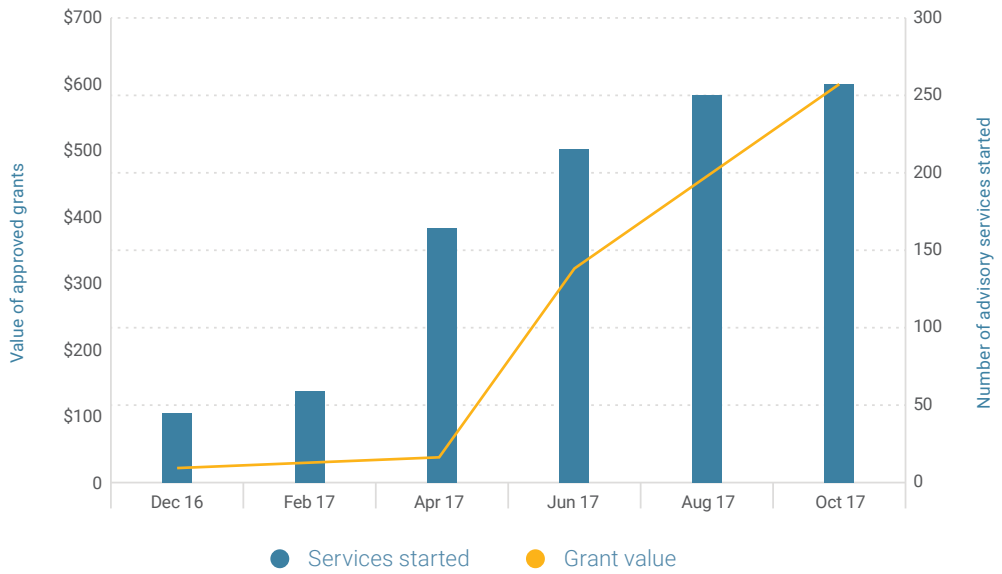
Around 20 percent of companies receiving services in 2017 were micro businesses of less than 5 employees, showing the CDIC is developing the capability and productivity at all levels of Australian industry, improving management capability, systems and processes, supply chain and skilling profiles.

Micro businesses are often established by innovators who have developed niche products or services with Defence application. By working with Defence, or businesses in the defence supply chain, these micro businesses have successfully grown an idea into a business which contributes to Australia's national security, while also creating jobs and economic growth for Australians.

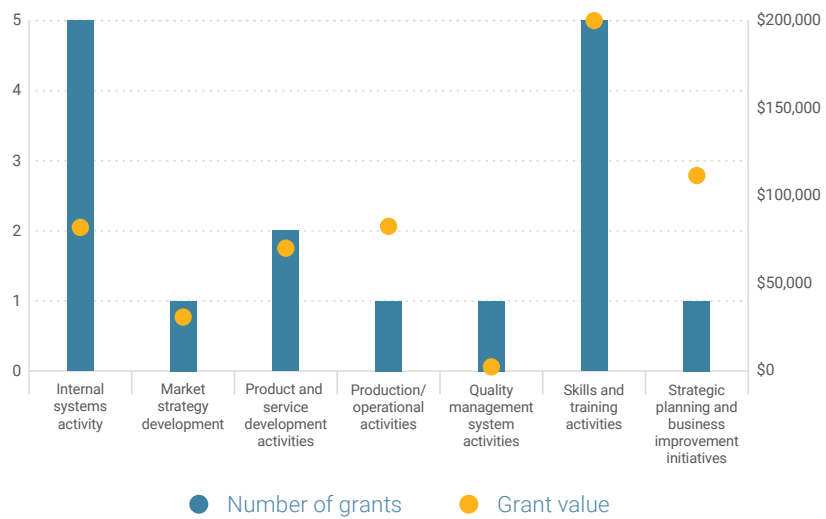
To better realise these opportunities, the CDIC facilitates access for innovators and researchers wanting to work with Defence for the first time, through the innovation proposal process. This process recognises the challenges for small business entering the defence market, and CDIC advisors works with innovators to help manage their levels of risk and exposure, help build relationships, and find opportunities to grow the business. This has directly resulted in the establishment of a number of micro businesses contributing to defence capability.

**\$863,713** *(inc GST)*  
*approved in capability  
improvement grants*

### SERVICES STARTED AND VALUE OF APPROVED GRANTS



### NUMBER AND VALUE OF GRANTS



## FEATURE

# Day in the life of a business advisor: Dwayne Kirk, CDIC Business Improvement Advisor



As a Business Improvement Advisor for the CDIC, I coach small Australian companies in strategies for business management so they can pick it up, run with it and participate in the Defence market.

I am based in Melbourne and Defence is a strong passion of mine. I have a proud family history of military service across four generations. Being a Naval officer for six years, I am particularly interested in maritime technology and innovation for the Navy.

I have been inside the R&D world for the past 20 years either developing and commercialising it or implementing the organisational processes and culture to manufacture and deliver it. As a Business Improvement Advisor my background

in commercialisation and experience in creating a productive and motivated workplace allows me to support smaller innovative companies. I work with them to improve their business and to commercialise new products. This is a very rewarding part of my job, helping businesses accelerate their goals.

The CDIC is a real highlight of my career, to be playing such a fundamental role in re-shaping our Australian defence industry. I really enjoy the opportunity to bring strategy and capability to companies that have grown a great technical expertise but are not sure how to make the most out of it. I connect them with the right area in Defence to validate what they think they're going to produce, or create synergies by bringing companies together or introducing them to the Innovation Hub. There are definitely lots of opportunities.

We are on a deliberate and very long journey of growing defence industry in Australia, which will multiply several times from what it is now. Businesses shouldn't hesitate to contact an advisor. Jump in and come and talk to us!



## INNOVATION FACILITATION

Driving innovation is a critical element of the Government's economic vision for the nation, and Defence's approach to innovation complements the Government's overarching vision. The increasing pace of geopolitical, economic and technological change means it is critical that Defence ensure it continues to access the best innovation Australia has to offer. Investment in innovation helps to ensure Defence remains resilient to emerging threats.

The journey to innovate is not an easy one. Many innovators have an idea but very few will be able to navigate through to a commercial success story. And even when they get there they face many ongoing challenges to protect their market position.

The CDIC's experienced innovation facilitation advisers actively collaborate with industry to identify and introduce their innovative ideas and developmental products to the Defence innovation system. They provide advice to

industry to ensure that proposals submitted to the Defence Innovation Hub and the Next Generation Technologies Fund via the Defence Innovation Portal are structured in an acceptable manner.

The benefit to businesses from the CDIC's services is evident from the quality of the proposals presented to Defence. Much of the initial work with innovators is to help prepare them for the journey. Having been innovators themselves, advisors are able to help proponents understand the Defence capability requirement that their technology might address.

Innovation Facilitation services can range from redirecting simple commercial product pitches away from the Defence Innovation Hub to more appropriate existing procurement stream, to helping form strong teams around start-up companies with amazing and highly relevant technology. The advisors are experts in linking SMEs and research organisations together and



The GREENGUM force protection system.

working with mature Defence SMEs and primes to pitch new technology, or seek funding for important incremental development of existing technology.

The CDIC has responded well to the high level of requests from innovators regarding innovation proposals and is getting more frequent requests to attend events to support the Defence Innovation Hub and Next Generation Technologies Fund events.

During the reporting period, the CDIC assisted 30 percent of Defence Innovation Hub partners. Assistance included business advice and support on the presentation of innovation proposals. Advice was also provided on sources of financial support during business maturity and development while forming the proposal, such as grants and connecting business with teaming partners.

*CDIC innovation facilitators have engaged with over 380 entities interested in submitting proposals to the Defence Innovation Hub*

There are amazing opportunities in the defence market and the CDIC is making it easier for small businesses with little experience in participating in Defence contracts. The CDIC is working to help ensure innovators manage their levels of risk and exposure, that they deliver contracts and then extend, build relationships, find other opportunities, leverage funding, diversify and find the right path to sustain themselves and grow.

## **FACILITATING COMPETITIVENESS AND EXPORTS**

The Australian defence market has a limited size and does not necessarily allow for cost-effective production volumes or allow Australian industry to maximise its growth potential. The CDIC plays a core role in facilitating Defence exports and increasing the companies' international competitiveness. The CDIC has been delivering two major export initiatives: the Defence Global Supply Chain Program and Team Defence Australia.

Under the Defence Global Supply Chain Program (GSC), Defence contracts multinational defence primes to identify and award bid opportunities to Australian small to medium-sized companies. The contracts are won on merit requiring the Australian companies to be globally competitive.

Seven primes are currently contracted under the GSC program: BAE Systems, Northrop Grumman, Lockheed Martin, Rheinmetall, Raytheon, Thales and Boeing. As the program is based on the commercial needs of the primes, each prime has a slightly different focus, giving Australian industry access to a broad range of opportunities across all domains. In addition to the identification and award of contracts, the primes facilitate meetings, site visits and provide mentoring and training. This includes feedback on why the Australian small to medium-sized company was successful or unsuccessful in its bid.

Since the program was first trialled in 2007, the participating primes have awarded over \$950 million to 158 organisations. The CDIC has been managing the program on behalf of Defence since 6 December 2017 and has overseen the award of \$88 million worth of work to 51 Australian small to medium-sized enterprises.

## CASE STUDY

### Growing Aussie business brings flight testing to the world



Adelaide based, Prism Defence, punches well above its weight on the world stage when it comes to helicopter safety. Providing ship-air integration to ensure helicopters can safely land in a range of weather conditions, the company has already worked with eight Navies around the world since they were founded in 2004.

Communication Manager, Claire Suckling said "In 2017, Prism contacted the Centre for Defence Industry Capability to seek help from a Defence business advisor. They helped put a plan together and we applied for an \$11,000 grant to upgrade the skills of our software developers; and meet *ISO Standards 9001:2008*, for engineering consultancy and design and development of software and technical systems for defence and industrial applications.

"The funding allowed us to invest in a Professional Management course to assist

Prism's Senior Engineer / General Manager, Dr James Forrest to further develop his business management skills and Agile Software Development courses to teach software engineers to apply lean principles to software development. Their upgraded skill sets have had an immediate impact.

"Achieving our ISO Standards has also been beneficial because it demonstrates to our customers that we can meet the right standards and quality for the aviation, space and defence sector, and it has improved our efficiency and effectiveness. With these standards, it will be much easier to earn new work, grow rapidly, and see the business succeed into the future," Ms Suckling, Communication Manager said.

Prism Defence has grown from 15 to 27 staff in the last 12 months (to October 2017), mostly in the area of software development.

## CASE STUDY

### Lockheed Martin looks to leverage Australian innovation



Lockheed Martin through the Global Supply Chain (GSC) program is working with Australian industry to foster and capture Australian innovation. Lockheed Martin has established an expert Global Supply Chain Program team that works with industry to identify Australian capability and match with opportunities in Lockheed Martin's global supply chain. The team partnered with the Defence Science Institute on a Meet the Technologist (MTT) program to connect local research organisations to leading Lockheed

Martin technologists and their specific technology challenges. The MTT program has successfully led to three new research and development contracts in the area of Space research. The projects, with combined value over one million US dollars, is utilising Australian universities expertise, and will be vital to facilitating breakthroughs to advance the state of technology in very specific areas such as additive manufacturing and advanced materials, autonomy, and communications.

An example of the effectiveness of this program has been showcased by Lockheed Martin who are providing opportunities for Australian industry by exploring technologies that exist in Australia's research and development community. Due to this program they have taken a new approach to industry collaboration, by working closely with industry to understand their capabilities and capacity, and how they can be leveraged into the global supply chain.

To further facilitate exports, the CDIC has been managing the Team Defence Australia (TDA) initiative, which provides export-ready companies with avenues to showcase their products and services to customers across the globe.

From December 2016 to December 2017, the CDIC, often in conjunction with the Capability, Acquisition and Sustainment Group of Defence, organised an Australian stand at seven international trade exhibitions and has partnered with Defence, Austrade and the State-Territory governments to maximise success for the Australian companies.

In September 2017, the CDIC managed the largest ever Australian industry delegation at the Defence and Security Equipment International exhibition (DSEI) in London. A record 46 businesses exhibited on the TDA stand and a further 10 Australian businesses exhibited independently or attended the exhibition separate to the official delegation. In total, there were around 120 representatives

from Australian small to medium-sized enterprises, Commonwealth agencies and State and Territory Governments. A number of the Defence GSC Program primes were also present, facilitating access to their parent company or overseas subsidiary and scheduling meetings with companies of interest.

The launch of the Defence Export Strategy in January 2018 heralds the establishment of the Defence Export Office. The CDIC will work closely with the new Office and remain the front door to Defence for Australian industry. The CDIC will continue to provide advice and facilitation services to build the capability of Australian industry, with a strong focus on supporting SMEs to export as part of their broader growth strategy. Where Australian industry is seeking to market its capability overseas, the Australian Defence Export Office will help to realise success internationally. To assist in this the Team Defence Australia

initiative will transition to the Office and the CDIC will provide support by helping SMEs to get the most out of trade missions and leveraging relationships with prime companies in the Global Supply Chain program.

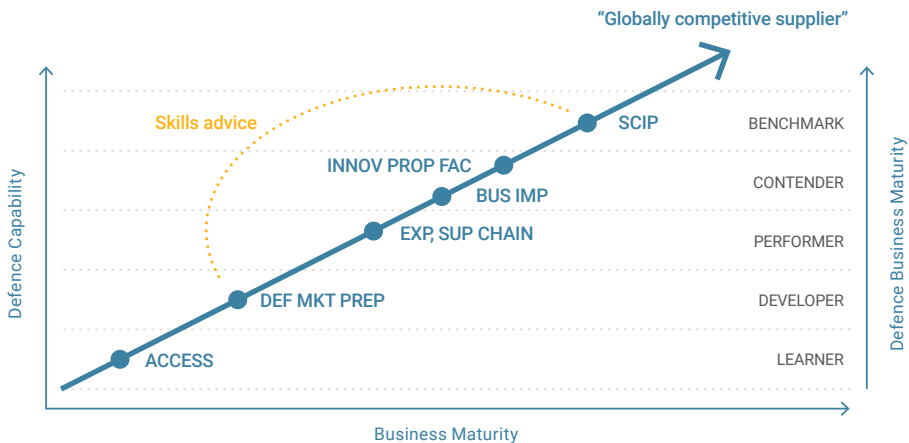
### SECTOR-WIDE SOLUTIONS

As well as one-to-one services, the CDIC is developing Industry Development Projects to address sector-wide capability gaps identified by industry, the CDIC, Defence or other partners.

The CDIC is developing a portfolio of projects to commence delivery in 2018. The first approved industry development project is the Defence Business Maturity Framework (DBMF).

The DBMF will assist aspirational suppliers to the defence market to understand what it means to be "Defence Ready". Specialist business advisors will be able to assess the readiness of a business to provide products

### MODEL OF THE DEFENCE BUSINESS MATURITY FRAMEWORK



## CASE STUDY

### Seeking advice early to grow



Adelaide business, Norseld, is proud to be taking steps to enter the growing Australian defence industry. Traditionally a medical company, Norseld is applying their unique Diamond-Like Carbon (DLC) technology, CoolDiamond DLC to military use, to benefit the Australian Defence Force.

Managing Director, Mr Peter Shute said entering the defence industry was a strategic decision. “We’ve taken a strategic decision to pick defence as our first opportunity for further growth.

“Norseld is in its 31st year. We’re a medical laser company that exports to over 30 countries, but we’ve recently entered the defence market as an opportunity for us to grow using our industrial laser.

“We are unique in our capabilities – other carbon processes have to operate at high temperatures but we operate at room temperature. This gives us unique opportunities to coat plastics and metal alloys. There is a lot of interest in what we can do for Air Force’s F/A-18 aircraft canopies and moulds for the F-35A Joint Strike Fighter, laser range finders for the Army, and we’re in a discussion about potential applications for coatings for space technologies,” Mr Shute said.

Entering the Australian defence industry can be competitive and takes investment by

businesses, but Mr Shute said having the right advice is important.

“We recognise we’ve been faster to these markets than others, which is great. This is partly because we have something truly unique that is differentiated, and because we got good advice from the outset.

“The assistance of hiring a dedicated defence consultant and the Centre for Defence Industry Capability (CDIC) has helped us navigate our way. We engaged early with a very capable Defence business consultant from the CDIC, who was able to set up the pathway and make introductions and outline the assistance that’s available to us from all sorts of organisations.

“The value of the CDIC is very broad. The CDIC made introductions to larger Defence ‘primes’ that I probably wouldn’t have been able to get in front of without the CDIC. Being at a conference and being introduced by someone who is well regarded and respected to initiate those discussions and pave the way has been important,” Mr Shute said,

Norseld is also taking advantage of the Defence Global Supply Chain program, which introduces smaller companies with a relevant product, service or capability into Defence global supply chains with Raytheon, Boeing, Lockheed Martin, Northrop Grumman, Rheinmetall, BAE or Thales.

“We are now well on our way to entering the defence industry, already undertaking trials with BAE, Boeing, Thales and L-3,” Mr Shute said.

“The CDIC has also supported us through Team Defence Australia, supporting us to attend the Defence and Security Equipment International conference in London to make connections with European contacts.”

“We’ve only entered the defence market in the last three years, but already we have lots of potential opportunities. The applications for Diamond-Like Carbon technology is very broad, and we’re very excited about the potential.

and services to Defence or as a part of a defence supply chain. Small and medium-sized enterprises will also be able to compare themselves to best practice in the defence sector and identify areas for improvement to progress along a business and defence maturity continuum.

The DBMF is a foundation element for the way CDIC will deliver services to business in the future. It will also create a commonly understood method for describing the maturity of Australia's defence business, and it will provide a way to align conversations at all levels across the Commonwealth, States and Territories, industry associations and other groups.

The DBMF will also enable the CDIC to strengthen ongoing customer service relationships with businesses, matching the right services to the right business at the right time.

## Providing leadership and partnership

### RAISING MARKET AWARENESS

The CDIC is raising Australian industry's awareness and understanding of the defence market, and Defence's awareness of Australian industry, striving to ensure both customer and potential suppliers are well informed about the rewards and challenges of operating in the defence market. This market awareness work underpins all of the tailored services the CDIC offers industry and Defence.

The CDIC delivers the Defence Industry and Innovation Newsletter to over 2,600 subscribers every month. The newsletter lets industry and innovation stakeholders know about industry events, latest news and innovation funding opportunities, and helps the

CDIC grow its understanding of the nature of small businesses interested in working in the defence industry.

*75% of advisory service applications from clients new to the CDIC*

There has been significant interest in the CDIC, particularly from businesses new to the defence market, seeking to break into the exciting sector. The CDIC has engaged face to face with Australian small and medium-sized enterprises, defence industry associations, research organisations and academia, and government and defence project representatives through a variety of defence and industry conferences, expositions, industry briefings, workshops and roadshows.

To satisfy the level of interest, as quickly as possible, the CDIC has hosted workshops for businesses that are new to Defence. The workshops provided businesses with information and advice about working with Defence and possible business opportunities. Following a group presentation, businesses were encouraged to register for a single 30-minute one-on-one session.

*84% satisfaction with New to Defence Workshops and 1:1 sessions*

*“The mix of local, federal government input and private sector presentations helped me to get to a greater understanding of the industry and where we might fit.”*

#### PERTH WORKSHOP ATTENDEE

The workshops reached 344 businesses new to the defence market in Perth and Darwin and provided one-on-one advisory services to 135 businesses.

Of all the tailored one-on-one advisory services provided, the highest demand (nearly half) has been for defence market preparedness. The defence industry is an expanding area of opportunity for businesses, and it is important to recognise it is a marketplace rather than just one customer. About half of the opportunities for SMEs will be in supply chains rather than contracting with Defence directly.

The CDIC’s market preparedness service ensures businesses have a comprehensive understanding of what operating in the defence market entails. It provides a range of information to assist industry in assessing the alignment between their capabilities, Defence procurement priorities and general market opportunities.

*In 2017, 90% of businesses were satisfied with the advice provided.*

*Dissatisfaction was related to market complexity rather than assistance provided.*

## STAKEHOLDER SATISFACTION

A measure of success for the outcomes of the CDIC is how satisfied its clients, customers and other stakeholders are with the services provided.

*100% of firms found advisors were very, or extremely, responsive to their questions and concerns.*

The CDIC routinely surveys program participants for their qualitative and quantitative feedback on the services provided. This information plays an important part in personnel and program development and continuous improvement.

The CDIC is now seen as a one-stop-shop for support to Australian industry. But the CDIC knows that this is not done well in isolation. Partnering and collaboration is a key aspect of the successful operation of the CDIC.

One of the key discriminators of the CDIC as a support program is its national perspective of the defence industry, coupled with its close relationship with Defence leadership and workforce, the Defence major projects, and defence primes.

The CDIC is partnering with industry, Defence and State–Territory Governments to combine knowledge and networks to build a world-class, globally competitive Australian industry that is sustainable for future generations.

The CDIC collaborates, leveraging its position as a national entity to share its lessons learned with State and Territory Governments, trade

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## FEATURE

### Day in the life of a defence industry facilitator: Alison Everett, CDIC Defence Industry Facilitator



As a Defence Industry Facilitator for the Centre for Defence Industry Capability (CDIC), I provide support to small and medium Australian businesses in the Australian Capital Territory and New South Wales to enter the Defence industry. It is particularly rewarding to work with small and medium businesses and see them grow and mature over time.

It's exciting to see all the new technology and what opportunities might be there for Defence too. My aim is to build a Defence industry in Australia with local businesses that can support Defence capability. Part of that is ensuring that new and innovative ideas get in front of the right people in Defence to be considered.

I have significant experience in the private sector with rural and industrial companies and worked for Defence for six years. My private sector experience allows me to relate to the challenges faced by businesses, while my Defence background underpins my

understanding of Defence requirements for accessing the Defence supply chain. I also leverage the experiences of other business advisors. We are part of a network, and sharing our different perspectives and experience helps us to work with businesses effectively so they succeed.

For me, success is when you can develop an ongoing relationship with the business. When they continue to seek assistance as their business matures in the Defence market, this is when you know that you are providing value and have become a trusted guide.

It can take time to develop into a Defence supplier, but the CDIC is available to meet with businesses so they can learn what the requirements are, and demystify what can be a complicated system. We can provide help making connections with other avenues for support – including broader industry programs, State and Territory Governments and industry groups which may be able to help as well.

associations and other key stakeholders. So the levels of satisfaction with the CDIC by Defence, defence industry, CDIC Advisory Board and State and Territory Government are of great importance.

The CDIC is collaborating at an international level. The CDIC has established a positive relationship with Aerospace, Defence Security and Space (ADS Group), a counterpart organisation in the United Kingdom. In September 2017, the Minister for Defence Industry, the Hon Christopher Pyne MP met with the UK Secretary of State for Defence, the Rt Hon Sir Michael Fallon and discussed the common objectives for Defence capability, innovation and industry. The CDIC will be exploring further the opportunity to invest in collaboration with similar organisations such as the UK Department of International Trade Defence Security Organisation, and the closely related UK Defence Solutions Centre and Defence Growth Partnerships.

## STATES AND TERRITORIES

Defence, and State and Territory Governments, are critical partners in delivering the defence capability and industry objectives outlined in the Integrated Investment Program and the *2016 Defence Industry Policy Statement*.

*"In Australia, cooperation and collaboration between the state and Commonwealth government is critical to the delivery of defence capability and developing a sovereign defence industry. The South Australian Government has a strong working relationship with the Centre for Defence Industry Capability that plays such a vital role in implementing defence industry policy."*

RICHARD PRICE, CEO, DEFENCE SA.

The CDIC has been instrumental in establishing a Defence-State and Territory Government Industry Advisory and Engagement Forum to provide advice to the Department of Defence on defence industry-related matters and to coordinate implementation of the Defence Industry Policy Statement initiatives. A working group has also been established to action the implementation of initiatives.

## CDIC ADVISORY BOARD

The CDIC Advisory Board provides strategic oversight of the CDIC through advice to government and recommendations to the CDIC Program Delegate. The CDIC Advisory Board comprises representatives from Defence, private industry and industry groups.

*The CDIC Advisory Board has a 44% female representation.*

The CDIC Advisory Board works closely with the CDIC Steering Group which directs the vision, strategic objectives, priorities and activities that underpin the broader Defence Industry and Innovation Program, which includes the CDIC.

The industry representation on the CDIC Advisory Board gives industry the ability to steer and shape the activities that are intended benefit business. The CDIC Advisory Board meets at least quarterly and has met six times in the 12-month period covered by this Update Report.

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## FEATURE

### Positive direction for change

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Paul Johnson, Co-Chair of the CDIC Advisory Board believes the CDIC has made a significant contribution since it was established in December 2016. "Since the CDIC commenced, there's been a change in attitude between Defence and industry. I've been in Defence – either in uniform or in the defence industry for over 50 years. I haven't seen this degree of collaboration before," Mr Johnson said.

CDIC Advisory Board member, Chris Jenkins echoed this sentiment. "With our current model and structure, we've had a considerable effect on defence industry already. In all the organisations I talk with, the relationships between industry and Defence is opening up for new innovations, opportunities and career paths, which is really positive," Mr Jenkins said.

"The CDIC has an important role in assisting industry to properly understand and exploit the opportunities that now present as a result of the Government's new policies. I see that as being the biggest value-add of the CDIC", Mr Johnson said.

"I've never seen this level of opportunity that's being presented to Australian industry. Small and medium businesses are now receiving detailed feedback on defence prospects and starting to have confidence about the changes and increased opportunities for Australian industry. This also means they have to ramp up the capability to enjoy the benefit – the work is being done by Government, but it also has to be done by industry too.

"As the major projects start to come online, the role of the CDIC will be increasingly important to helping the local Australian defence industry meet the projects' objectives. The work and skills of the CDIC will continue to evolve over the next five to ten years, to support industry's needs," Mr Johnson said.

Chris Jenkins believes that because of the CDIC and the current way of operating, Australia is now well placed to be competitive on the world stage. "There is a real passion

for Australian defence industry to be globally competitive. People quickly jump to the view that if we're doing it locally, it costs more, and that's not the case. With the efforts of the CDIC, there's a real drive to make sure we're globally competitive and can deliver the most advanced and innovative capabilities, both by Defence primes and small Australian businesses.

"With our combination of primes and small business, Australian industry is creating the unique capabilities the ADF needs that is good value-for-money. There is no magic light switch; things of this scale of change take time but the proactive approach the CDIC is taking with exports, the activation of the Defence Innovation Hub, and the Government's support – they all combine to create a sense of confidence in industry, so they can act and start to build their capability for the future," Mr Jenkins said.

Paul Johnson MBE is an experienced Australian defence industry leader and former Chief Executive of Lockheed Martin Australia Pty Ltd. Today he is Co-Chairman of the CDIC Advisory Board, Chairman of the Rail Manufacturing Cooperative Research Centre, a member of the Air Force Board, and a Director of Industry Defence and Security Australia Ltd. Previously his roles included Chief Executive Officer of RLM and he was regional President of Lockheed Martin.

Chris Jenkins is a defence industry leader, a passionate believer in local skills, and a strong advocate for Australian manufacturing. He has held senior roles in Thales locally and internationally for over 17 years. His appointment as Thales Australia CEO in January 2008 followed two years as Vice President Operations, and before that three years as CEO of a Thales consortium in the Netherlands. Chris started in the defence industry as a mechanical engineer with Racal in 1981, Plessey in 1983, and then GEC Marconi in 1990 heading up its Underwater Systems business in Australia.

## CASE STUDY

### Ready to defend



Queensland business, Wisely Group, is working hard to learn about the Defence market and grow with Defence. The Australian Government is investing \$200 billion in Defence capability over the next ten years, and Wisely hopes to help Defence meet requirements and grow their business at the same time.

Superintendent Services, Mr Damien Noon believes working with Defence takes time, but he's confident they're ready. "We're still trying to get our toe in, but tendering for some recent opportunities has really opened the door for us. We received some really helpful feedback and we now have a better understanding of the expectations, thanks to the feedback Defence gave us. It's also helped put us on the radar inside Defence," Mr Noon said.

Wisely's 250 employees have extensive experience with large companies, and such a diverse range of service options that Mr Noon summarises their business by saying "We are an Australian privately owned company providing end to end asset management solutions and professional support services to meet industry challenges."

Wisely Services Manager, Mr Paul Hannay said, "I'm really proud of how Wisely has transformed into a reputable service based company and achieved our triple ISO certification 9001

(Quality Management Systems, AS/NZS 4801 (Occupational Health and Safety Management Systems and ISO 14001 (Environmental Systems), feedback from our audit process shows that systems and processes we have adopted are 'best practice' in this area, which was a real highlight and re-confirmed to us that we are doing the right things. BHP Billiton is one of our major clients, so it's not a big leap for us to transition into working for other primes including Defence," Mr Hannay said.

Wisely Asset Management Manager, Mr Noel Zahra said "Our approach is always to integrate closely with our clients to understand their processes and procedures to not only provide a service to our clients but to "value add" to their business in the process. Because we're privately owned, we really have to rely on our reputation for delivery, so we can commit to everything we say we will do."

"We decided to join the Australian Industry Defence Network (AIDN) where we learnt about the Centre for Defence Industry Capability, who have been fantastic. AIDN gives us a great network of other businesses to work within the Defence space, and the Centre for Defence Industry Capability has given us some very practical information and assistance."

"Our advisor from the Centre for Defence Industry Capability gave us direct information about what we were doing well, the types of opportunities in Defence right now, and some context around tenders that was really practical. We think our Infrastructure program and project management experience, and SAP delivery, installation and maintenance capabilities are key opportunities for us and Defence," Mr Zahra said.

Mr Noon added that "Defence is a long-term opportunity for Wisely, but with the support of AIDN, Defence's feedback and the Centre for Defence Industry Capability we're years ahead of where we would be otherwise."

## Continuous improvement

The level of engagement from both Defence and industry in the first year of the CDIC operation has been challenging and rewarding. While the CDIC has made progress towards building industry as a fundamental input to capability, there is much still to do.

By working collaboratively across industry and government, the CDIC aims to turn Defence's \$230 million investment in the CDIC over the next decade, into billions of dollars of additional industry outcomes which will contribute to the growth of Australian industry, our national security and economic prosperity.

Innovation will be critical in not only achieving our client businesses' successes and Defence capability outcomes, but in how the CDIC is structured and operates to meet the demands of the program.

### AN AGILE OPERATING MODEL

The environment in which the CDIC is operating continues to change at a stellar pace as Defence and Australian industry recognise the benefit of the services provided by the program.

Since the inception of the CDIC, there has been a greater emphasis on and promotion of the Government's intent to build industry capacity and engagement with major Defence acquisition projects. This has expanded the role of the CDIC as a primary facilitator between Defence and industry, beyond the level of support to Defence and industry that was envisaged in the CDIC's establishment.

In the coming year, the Government will release a number of national defence industry policies, which will include the Defence Industrial Capability Plan, Defence Industry Participation Policy, and Defence Industry Skilling and STEM

Strategy. The CDIC program must adapt and adjust to support the implementation of those policies, ensuring the CDIC continues to provide Defence and industry with a one-stop-shop and one-front-door, while still maintaining and improving support and advisory services.

It is likely that the success of engagement with the JSF and SEA 5000 programs will stimulate other major Defence acquisition projects, over the next 18 months, to seek the CDIC's assistance with opening up contract and supply-chain opportunities for Australian industry.

The Government anticipates that the naval shipbuilding initiative alone will create over 15,000 new jobs by 2030. In addition to supporting the established defence businesses that will be directly involved in the shipbuilding initiative, there will be thousands of more businesses seeking to find out more information on how they can participate in the defence industry.

Smaller projects and cross-domain divisions in CASG, such as Joint Systems Division, hydrographic and oceanographic survey capability project (SEA2400), Maritime Patrol Aircraft Replacement Project (AIR7000) and long-range air defence capability project (AIR6500) have also enquired about how they use the CDIC to understand Australia's industrial capabilities and how to best engage with Australian industry.

The CDIC will need to ensure it has the optimal business management tools, processes and staff in place, with a culture of agility and resilience. Prioritisation of its services in accordance with new policies will be essential to ensure the achievement of defence capability outcomes and industry outcomes remain balanced and relevant. Services will be tightly focussed on supporting Defence priorities.

## A FLEXIBLE WORKFORCE

CDIC personnel are highly skilled, drawn from the private and public sectors. The program has leveraged the technical skills of Defence employees by seconding this expertise across to the Department of Industry Innovation and Science. This model has been highly successful in maintaining the expertise, and preserving the existing networks while using the program delivery capability and capacity of AusIndustry. The professionalism and reputation of the program are such that in the first 10 months it has attracted the interest of graduates across both departments seeking placements with the CDIC.

Currently, the direct involvement of industry is confined to the CDIC Advisory Board. If the CDIC is to maintain and mature its defence and industry knowledge and experience, and meet the growing demand, in the future the program may seek to provide placements for industry secondees and Defence reservists.

## WHAT'S NEXT?

The CDIC has actively sought and listened to feedback from users of [business.gov.au/cdic](http://business.gov.au/cdic), and will be introducing improved features such as assisted navigation. The Defence Innovation Portal and other communication tools will continually evolve to enhance the experience for both businesses and Defence.

The CDIC has made good progress in its first year, with significant engagement across Defence, industry, and the States and Territories. Building on these solid foundations the CDIC will continue to provide strategic leadership for the Australian defence sector and partner with industry to help build a strong, sustainable, and internationally competitive Australian industry that meets Defence capability requirements next year and into the future. The CDIC's role in building Australian industry's capacity to contribute to major defence acquisitions will continue to develop.



# Industry policy impact and engagement through the integrated investment program

The focus of defence industry policy has been to normalise the Government's defence industry policy settings across defence planning and to put in place strategies and plans to deliver the defence industry capability required by Defence over the next decade. Through the recognition of industry as a Fundamental Input into Defence Capability, industry impacts are now considered formally through the early stages of the capability development life cycle. Defence is able to make more informed recommendations to Government on Australian industry involvement in the acquisition and sustainment of capability.

The Australian Industry Capability (AIC) Program seeks to maximise Australian industry outcomes in defence Major Capital Equipment Projects of \$20 million and above and is the most significant of long-term Australian industry capability development. The program was strengthened in 2017 in line with Government's defence industry policy of maximising Australian industry involvement in meeting Australia's defence capability goals.

The strengthened AIC requirements on tenderers were incorporated in the SEA1180 (Offshore Patrol Vessel) and SEA5000 (Future



Frigate) Requests for Tender and are being rolled out across all relevant Major Capital Equipment projects. There were significant Australian industry commitments resulting from Government decision-making on Defence capability. Defence and a number of Defence Primes undertook a range of industry engagement and showcasing activities to provide advice to Australian industry on opportunities and raise awareness of Australian industry capability.

Defence developed the first Defence Industrial Capability Plan for release in early 2018. The Plan will provide a roadmap for development of Australian defence industry over the next decade, opportunities for Australian industry to support delivery of the Integrated Investment Program, and the initial sovereign industrial capability priorities that will be managed across the capability life cycle.

Defence also matured the first Defence Export Strategy released on 29 January 2018. The Strategy provides a systematic approach

to identifying, facilitating, and supporting Australian defence industry exports. This supports greater capability, resilience and sustainability in defence industry to meet Australia's long-term defence capability needs.

Defence also maintained its investment in defence industry skilling and Science, Technology, Engineering and Mathematics (STEM) programs and commenced work on a ten-year defence industry skilling and STEM Strategy for release in mid-2018.

Work also commenced on the development of a Defence Industry Participation Policy for release in the first half of 2018. The Policy will provide a more consistent approach to Australian industry involvement in Defence procurement of \$4 million and above.

All of the whole-of-defence industry initiatives were implemented in complement with the Naval Shipbuilding Plan and the continuous shipbuilding program requirements.



The Heights School Students Tara (right) and Caitlin (observed) talk to Flight Sergeant Ngari Cannons (left) about careers for women in the Air Force, while Flight Sergeant Yvette Davey (second left) assists Hamilton Secondary School student, Anthony, during the 2015 Concept to Creation Remotely Piloted Aircraft Challenge.

# Defence alignment with the National Innovation and Science Agenda

The 2016 Defence Industry Policy Statement and Defence's industry and innovation programs are aligned with and support the Innovation and Science Australia 2030 Strategic Plan, and the four pillars of the National Innovation and Science Agenda (NISA).

## Culture and capital

### **To help businesses embrace risk and incentivise early stage investment in start-ups**

Defence creates and fosters a culture of innovation through supporting businesses to embrace risk responsibly. Defence recognises the benefits of Australia's unique industrial base, including that SMEs are a critical part of Australia's defence industry and provide agility and risk tolerance for innovation. Defence is well-placed to encourage investment in Australia's good ideas. The Next Generation Technologies Fund portfolio includes the Small Business Innovation Research for Defence Program, funding small businesses to engage in early-stage, high-risk, high payoff research. Defence is also collaborating with CSIRO in the NISA-funded technology accelerator program to include defence themes. Already one defence-oriented start-up has resulted from this collaboration.

The Defence Innovation Hub is funded at around \$640 million to 2025–26 and encourages Australian business of all sizes to submit innovation proposals that are ready to enter the engineering and development stages of the innovation process, from concept exploration and technology demonstration, through to prototyping and integrated capability demonstration and evaluation. With the support of the Centre for Defence Industry Capability, Australian businesses are being connected with market opportunities to grow their business ideas and to commercialise emerging and future technologies.

## Collaboration

### **To increase the level of engagement between businesses, universities and the research sector to commercialise ideas and solve problems.**

Closer collaboration between Defence, State and Territory governments, industry and research organisations is needed to jointly develop game-changing innovation, and to provide greater benefits to the Australian defence industry and innovation sector. Defence is working with the best of businesses, universities and the research sector to minimise risk and solve complex and challenging problems for the defence sector.

The Centre for Defence Industry Capability helps to form connections and collaboration. The Next Generation Technologies Fund Grand Challenges Program and Defence Cooperative Research Centres provide the scale and intensity needed to make a difference. The programs require small agile companies, including start-ups, larger companies and researchers to form collaborative teams and work alongside Defence Science and Technology (DST) scientists. The pilot Small Business Innovation Research for Defence program brought together two small companies which had no awareness of each other's respective capabilities prior to their involvement in this project.

The Special Notice platform within the Defence Innovation Hub, was piloted in mid-2017. Special Notices facilitate and promote collaboration, by bringing Defence, Australian industry and research organisations together to respond to specific capability challenges. In 2018, the Defence Innovation Hub will deliver an approach to multi-party collaboration arrangements for solving complex broad capability problems.

## Talent and skills

### **Training students for the jobs of the future and attracting the world's most innovative talent to Australia.**

The Government's \$200 billion investment in defence capability over the next decade will deliver a more capable, agile, and potent future force that is able to secure our interests at home, in our region and across the world. Student participation in science, technology, engineering and mathematics (STEM), including strong research, problem

solving and critical reasoning skills will be vital to assuring our defence industry capability.

The Next Generation Technologies Fund is investing heavily in PhDs through several programs, including Defence Cooperative Research Centres, the Australia–United States Multi-university Research Initiative and the collaboration with Data61 on cyber. Another activity to build the pipeline and attract a talented STEM workforce is that under a MOU, Defence will place up to 100 PhD students over four years under the National Research Internship Program of the Australian Mathematical Sciences Institute. This internship program, supported by the Department of Education and Training, will see the PhD students posted to Defence laboratories for periods between 4–6 months to work on multi-disciplinary projects.

Defence has a comprehensive program that supports student interest in STEM, provides training opportunities, and aims to attract and skill students to develop careers directly in Defence, defence industry or undertake research of relevance to Defence in universities, CSIRO and other Publicly Funded Research Agencies. Some 70 Defence scientists are involved in the STEM Professionals in Schools Program (managed by CSIRO) which creates partnerships between Defence researchers and teachers to bring real STEM into the classrooms of Australian schools. To encourage women to take up science careers, DST introduced the Women in Science Undergraduate Scholarships. Eight such scholarships have been offered to students at Adelaide University, the Australian National University and the University of NSW.

The Defence Graduate Program has a Research and Innovation stream with a particular focus

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## CASE STUDY

### School Pathways Programme: Hunter Region

Defence has funded the School Pathways Programme in the Hunter Region of New South Wales since 2009 to build industry workforce capacity by engaging high school students in STEM activities; improving their awareness of manufacturing and defence industry careers; providing hands-on learning experiences for students in advanced manufacturing education; establishing student mentoring and networking

opportunities with industry; and establishing a consultative network between local industry and participating schools.

Over 40,000 students are estimated to have been involved in the program since its inception and program reporting indicates that there has been a 19% increase in overall participation in STEM subjects in affiliated schools.



Students from the School Pathways Group tour the facilities of the Submarine Escape and Rescue Centre at HMAS Stirling.

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## CASE STUDY

### School Pathways Programme: Re-Engineering Australia Foundation

Re-Engineering Australia Foundation (REA) delivers a national School Pathways Programme utilising its STEM motivation programs to increase the pool of young people with STEM skills and increase their awareness of defence industry as a viable career pathway.

REA's signature program, the *F1 in Schools Technology Challenge* is the world's largest secondary school technology program.

REA has also developed the *SUBS in Schools* program in association with the Department of Defence and a number of industry stakeholders.

The *SUBS in Schools* program is focused on engaging student interest in the technology of submersible vehicles and submarines and is built on the fundamentals of project-based learning. The program recently expanded internationally with a launch in the United Kingdom.

The program equips students with employability skills and knowledge to help prepare them to take part in Australia's Naval Shipbuilding Enterprise.

## CASE STUDY

### The Defence Engineering Internship Program



Seaman Marine Technician (SMNMT) Matthew Johns works on the Turret Lathe at HMAS Stirling.

Defence has funded six annual rounds of the Defence Engineering Internship Program (DEIP). The Program increases engineering students' level of interest and participation in defence industry, particularly with SMEs. The DEIP also provides eligible Australian defence SMEs with the opportunity to market defence industry as an innovative, interesting and viable career path for engineering students who undertake a sponsored work placement in their firm.

The Program attracts high-performing engineering students and exposes them to

defence work to increase the likelihood they will pursue employment in the defence sector upon completion of their study. 85% of interns indicated that they were more likely to pursue a career in Defence Industry after participating in the program and completing their studies. To date 49 interns have been offered ongoing work at their host defence industry SMEs; 13 interns have been employed in other Australian defence industry companies and 7 interns now work for the Department of Defence.

on recruiting undergraduates on an annual basis from a number of STEM discipline areas such as maths, computer science, physics and engineering. Under this program, five graduates commenced with DST in 2017 and eight more will join in 2018.

#### **SUPPORTING STEM AND DEFENCE INDUSTRY CAREER PATHWAYS**

Encouraging interest and curiosity in STEM subjects and demonstrating that there are great careers built on STEM is an important

factor in ensuring young Australians are equipped with the necessary skills to undertake careers in defence industry.

Defence has continued to fund the School Pathways Programmes to help address skills shortages in defence industry by increasing the pool of young people with STEM skills and increasing the awareness of Australia's defence industry as a viable career pathway.

## THE NAVAL SHIP BUILDING COLLEGE

The continuous shipbuilding program will see more than \$90 billion invested in constructing our future submarines, frigates, and offshore patrol vessels in Australia. This is the largest and most complex national project in our history and relies fundamentally on a strong, sovereign naval shipbuilding industry. We will need more than 15,000 workers in our naval shipbuilding and sustainment industry alone with many more thousands across our broader defence industry.

The Australian Government announced on 24 March 2017 an initial investment of \$25 million to establish a Naval Shipbuilding College to support the need a highly capable, productive and skilled naval shipbuilding and sustainment workforce.

The Naval Shipbuilding College will provide opportunities for national collaboration in the education and training of high-quality candidates for future employment in the naval shipbuilding and sustainment industry. It is expected the College will attract, train or retrain more than 1,500 students across the country in its first few years of operation. The Naval Shipbuilding College will be implemented in early 2018.

## LONG TERM SKILLING AND STEM STRATEGY

Defence commenced work on a ten-year defence industry skilling and STEM strategy to update how we support our defence industry workforce and skills base to meet Defence's capability needs over the next decade. The Strategy will ensure that the defence industry workforce with the right skills is in place when required to meet Defence's capability needs over the next decade. The Strategy will

consider the pipeline from early engagement, attraction, upskilling, reskilling and retention to help increase the quality and quantity of skills available, and more coordinated investment between Defence, the wider Commonwealth, industry, and the states and territories.

## Government as an exemplar

### To lead by example in the way Government invests in and uses technology and data to deliver better quality services.

Defence is leading by example by delivering innovation programs with streamlined, agile processes and is taking calculated risk to harness bright ideas. In order to remove barriers to innovation and deliver a streamlined, agile, single innovation pipeline, the Defence innovation system has adopted:

- agile business processes and calculated risk-taking to harness bright ideas;
- new contracting frameworks;
- new intellectual property policies; and
- new governance, assessment and funding models to allow quick decision-making.

# Governance

## Industry and innovation expertise

The CDIC, Defence Innovation Hub and Next Generation Technology Fund are underpinned by a unified framework, to ensure investment is strategy-led. Defence has established governance and operational arrangements to provide strategic oversight and coordination of the Defence innovation system, ensuring visibility of funding recommendations and linking innovation investment to capability priorities.

In establishing and developing the Defence industry and innovation programs, Defence has sought input from a range of defence industry and innovation experts. The Defence industry and innovation programs are underpinned by a governance framework that incorporates private sector and Defence representation.

The Defence Innovation Steering Group includes two representatives external to Defence: Dr Megan Clarke, non-executive Director at Rio Tinto and former CEO of CSIRO; and Jim Whalley, Co-founder of Nova Systems. The two representatives provide feedback from industry and research organisations on the performance of the Defence innovation system; advise the Steering Group on innovation practices in organisations outside Defence, and provide feedback on the implications for industry and research organisations on proposed changes to the Defence innovation system.

The Next Generation Technologies Fund similarly uses independent experts from

industry, academia and international defence S&T organisations to review and validate the selection processes used to identify research partners. The experts engage in the areas in which they have an acknowledged reputation. They include Professor Hugh Durrant-Whyte, UK MoD Chief Science Adviser; Professor Ian Chubb, CRC Advisory Panel member, Vice Chancellor of ANU and former Chief Scientist; AVM Neil Hart (Rtd), co-author of the Defence White Paper and Force Structure review co-author and former Head of FPR Implementation; Mr Paul Merrow, former CEO of GD Defence Australia and General Manager Defence Australia; Mr Guy Powell, Principal Technologist Dstl UK; and Professor John Close, ANU, Member of the SRC College of experts.

## Annual reporting to Government

This is the first Defence Industry and Innovation Programs Update Report to the government, covering the reporting period 5 December 2016 to 31 December 2017. Future reporting will be conducted annually, by financial year. The reporting framework reflects the Department of Finance Commonwealth Performance Framework Guidance, with strategic measures reported qualitatively, supported by quantitative performance information.







