

**Submission
No 8**

**INQUIRY INTO THE DEFENCE INDUSTRY IN NEW
SOUTH WALES**

Name: University of Wollongong

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UNIVERSITY
OF WOLLONGONG
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Inquiry into the Defence Industry in NSW

NSW LEGISLATIVE COUNCIL, STANDING COMMITTEE ON STATE DEVELOPMENT

SUBMISSION FROM THE UNIVERSITY OF WOLLONGONG

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Introduction

The University of Wollongong (UOW) welcomes this opportunity to provide input into the Legislative Council's Inquiry on the 'Defence Industry in NSW'. The Commonwealth Government commitment to invest \$195 billion in the defence sector over the next decade heralds a new approach to national defence and creates significant opportunity for NSW to grow defence related expertise, jobs, and innovation.

As stated in the NSW Defence Strategy, NSW is home to the largest number of defence bases and capabilities of any state, with over 20,000 jobs and a direct spend of approximately \$7.9 billion in 2014/15¹. There is strong industry and research expertise across the State, that provide a strong starting point for attracting an increased proportion of defence investment to the State.

The NSW Government have a critical role to play in coordinating greater collaboration across industry, government and academic institutions to foster the innovation and expertise required to build defence capability across Australia. UOW supports the NSW Government's recent progress in this area through the *NSW Government Defence and Industry Strategy 2017* (NSW Defence Strategy), and support for the emerging Defence Innovation Network (DIN). The NSW Defence Strategy's recognition of the importance of defence to regional economies and communities throughout the document is very positive.

The NSW Defence Strategy and the DIN are necessary to address the previously ad-hoc approach to NSW businesses and academic institutions pitching for federal defence funding. Similar established networks in other jurisdictions have shown the benefits of bringing together researchers and industry end-users in a coordinated and timely fashion to find innovative solutions to problems. Formal collaboration networks will prevent parties from competing independently and help organisations identify complementary skills and expertise to mobilise quickly to respond to specific opportunities. Victoria and South Australia have had similar pre-existing networks, and have been effective in securing higher amounts of funding in recent Commonwealth grant opportunities.

Given the complexity of the defence supply chain and innovation, it is essential that the NSW Government makes a long term commitment to supporting and investing in the sector across the State, including regional areas. Previous focus on the defence sector has not been sustained by successive NSW Government administrations, which impedes the long-term development of expertise and relationship building across the sector. Strong competition across Australia to leverage these defence opportunities, means NSW needs to catch up to embedded networks that exist in other States, and ensure that these investment and support mechanisms are sustained over the long-term. Therefore, getting bi-partisan support of the NSW Defence Strategy is crucial.

This brief submission highlights the leading research capabilities of UOW in the defence sector, our collaboration activities with other research institutions and industry, and identification of ways in which the NSW Government can support opportunities to incentivise and grow the defence industry in NSW.

ABOUT THE UNIVERSITY OF WOLLONGONG

UOW is a research intensive university that has built a strong international reputation for world-class research and exceptional teaching quality, and is ranked amongst the top 2% of Universities worldwide. In 2016 UOW had over 33,900 total student enrolments across its global campus network and more than 2,400 staff (FTE²).

¹ NSW Government 2017, *New South Wales: Strong, Smart and Connected. The NSW Government Defence and Industry Strategy*, 2017, p.6.

² Full time equivalent



The University offers more than 400 undergraduate/postgraduate courses and research degrees across a wide range of disciplines through the five broad faculties of:

- Business
- Engineering and Information Sciences
- Law, Humanities and the Arts
- Science, Medicine and Health
- Social Sciences

Since gaining independence from UNSW in 1975, UOW has undergone massive expansion growing from around 12,700 student enrolments in 1998 to 33,900 in 2016 (onshore and offshore combined), which represents around 8.4% average annual growth over this period. UOW is now an international multi-campus university, with three Sydney campuses (at Loftus, Liverpool and Sydney CBD), Wollongong, Shoalhaven, Batemans Bay, Bega, and the Southern Highlands. The University also has campuses in Hong Kong and Dubai.

Our most recent facility is the new South West Sydney Campus in the Liverpool City Centre. This campus started operations in February 2017, to better service the rapidly expanding population of South West Sydney and growing demand for higher education in the region.

UOW has developed the Innovation Campus in Wollongong (with assistance from the NSW Government) which is an education, research and related business precinct. This state of the art facility provides strong linkages between business and research, and complements the University's leading research and innovation institutes, which include:

- iAccelerate (an incubator for new business start-ups)
- Sustainable Buildings Research Centre (which focuses on retrofit technologies)
- Australian Institute for Innovative Materials (a key national laboratory for medical and energy materials)
- Illawarra Health and Medical Research Institute (a joint venture with the Illawarra Shoalhaven Local Health District)
- SMART Infrastructure Facility (a key national laboratory for research on infrastructure)
- Early Start (focusing on early childhood development)

A recent economic impact assessment, estimated the total value-add contribution of UOW to Australia's Gross Domestic Product in 2015 was \$1.2 billion, with \$815 million in value add to the local Illawarra economy, as summarised in Table 1 below. The total direct, indirect and induced job creation for the Illawarra region is 7,195 FTE, which increases to 7,794 FTE across NSW.

UOW also generated \$557.9 million in research and innovation income between 2006 and 2015, and has incubated over 65 start-up businesses through its iAccelerate facility since 2012.

Table 1: UOW total economic contribution (2015)

	ILLAWARRA	NSW	AUSTRALIA
GROSS OUTPUT	\$1,393M	\$1,545M	\$2,161M
VALUE ADDED	\$815M	\$886M	\$1,210M
JOBS (FTE)	7,195	7,794	10,169

Note: Totals quoted include direct, indirect and induced impacts

Source: Branigan, J., Harvie, C., Michalas, G., Ramezani, F. (2016) *Leading Locally, Competing Globally: Measuring the University of Wollongong's Economic and Social Contribution to the Illawarra and Beyond*. University of Wollongong, p.48.



UOW Defence Capabilities

BUILDING EXPERTISE

Reviews completed to inform the Commonwealth Defence Strategy have highlighted the challenge of developing sufficient expertise required for the design, construction and sustainable of defence contracts and projects. One assessment found that the Future Submarine Program alone will need 300 - 500 skilled engineers with skills in systems engineering, ship design, production engineering, ship construction and mega-project management. A workforce of this size and skills does not yet exist in Australia, however with appropriate support and planning this could be cultivated over the next 15 – 20 years. Therefore, the NSW Government needs to ensure there is appropriate support for skills development and training for the current and future defence needs.

UOW is helping to develop these necessary skills and is recognised as a leading engineering, mathematics, physics and ICT research institution in Australia, based on our long standing collaboration with local and multinational industries and research centres in Australia and overseas. The Federal Government's Quality Indicators for Learning and Teaching (QILT) ranked UOW in 2017 as the best university in Australia for Engineering.

UOW also ranked in the top 100 universities in the world for mineral and mining engineering, top 150 for materials science, civil and structural engineering and top 200 mechanical, aeronautical and manufacturing engineering in the QS World University Rankings by Subject 2016.

In addition to engineering skills, UOW also offers a Bachelor of Computer Science (Cybersecurity), which builds capabilities required for defence-related cyber security projects. UOW has an international reputation as being at the forefront of cyber security research through the ICT Research Institute. The institute works closely with the Australian Signals Directorate and the Defence Science and Technology Group (DST Group).

POST-GRADUATE TRAINING

UOW recognises the importance of providing higher education to the existing and future defence workforce. UOW provides post-graduate training for Australian Defence Force (ADF) personnel through its Faculty of Business and the Australian National Centre for Ocean Resources and Security (ANCORS). UOW's Faculty of Business provides three Masters degrees that qualify for Defence Force Advanced Standing, in Business Administration, Management and Science (Logistics/Project Management). The Logistics/Project Management degree in particular has proved popular with ADF scholarship holders.

The Department of Defence provide a number of scholarships each year for international students who are competitively appointed from defence forces of alliance partners including Indonesia, Malaysia, Pakistan and the Philippines to undertake the Master of Maritime Policy degree at ANCORS. In recent years the Department has also funded ANCORS to provide capacity-building courses for nations in East and West Africa.

The University of Wollongong is a member of the Research Training Centre for Naval Design and Manufacture. This centre was established in 2015 specifically to provide training for future Defence industry personnel in the maritime sector. This is a collaborative centre funded by the Australian Research Council and comprises three academic institutions, industry and DST Group. This centre is providing 10 PhD scholarships, three of which have been taken up by UOW.

TRAINING CENTRE FOR THE NAVAL MANUFACTURING INDUSTRY

Australia's navy building program is set to become the largest commitment to Defence. UOW is part of a consortium that has recently received Australian Research Council funding to develop a Training Centre to create a new network of engineering researchers across industry, universities and government research organisations to enable the Australian naval manufacturing industry to rapidly innovate. The consortium of research providers includes three universities spanning three states and the national organisations of DST Group and DMTC.



This Training Centre will seek to provide the high-level and broadly skilled engineers and engineering researchers necessary for Australia's ambitious plan for naval manufacturing over the next 50 years. The current shipbuilding industry has insufficient skilled engineers to achieve this program of construction and needs to improve shipbuilding productivity. This project will effect the transformation required for the industry and realise opportunities for significant improvements in productivity and capability.

The key objectives of this project are:

- Training a new cohort of industry-focused, high-level and broadly skilled engineers and engineering researchers.
- Creating a new network of engineering researchers across industry, universities and government to enable the Australian naval manufacturing industry to more rapidly evolve and innovate.
- Solving key problems that are currently restricting the efficient design, construction and sustainment of naval platforms.

DEFENCE RESEARCH

As a leading academic and research institution in engineering, materials and IT, UOW have strong defence related capabilities. The following section provides a summary of relevant UOW research and expertise.

DEFENCE MATERIALS TECHNOLOGY CENTRE

UOW is one the founding members of the Defence Materials Technology Centre (DMTC), which is a national multi-partner collaborative research centre to provide the defence industry with materials and manufacturing solutions to enhance Australian defence capability.

Established in 2008, UOW is the NSW node for DMTC, and is one of eight participating universities. UOW involvement in DMTC projects have drawn on our traditional strength in materials engineering to develop improved armour steels for a range of defence uses on land and at sea, including submarines, destroyers and armoured land vehicles. Since 2008, UOW has participated in over 20 research projects worth over \$10 million, supported a number of post doctorate researchers and PhD candidates.

A key project for the UOW-based node has been the development of improved ballistic and blast protection properties in the armour steel used in the Australian-developed Bushmaster armoured personnel carriers manufactured by Thales in Bendigo. The research, which is based at UOW, involves a team which includes Thales, the DST Group, the Australian Nuclear Science and Technology Organisation (ANSTO), steelmaker BlueScope and specialist steel manufacturer Bisalloy, working with UOW researchers.

The DMTC Armour Applications program, in which UOW's team played a major role, won the 2013 Eureka Prize for Outstanding Science in Safekeeping Australia for its contribution to safety and performance through advancing material and manufacturing techniques for the Bushmaster armoured vehicle. These new materials and manufacturing techniques are already protecting Australian troops in the field against blast and ballistic threats. The team is exploring ways to optimise manufacturing techniques to ensure that the Australian defence industry can deliver high-quality products at an internationally competitive price.

BlueScope Steel, in conjunction with Bisalloy Steels, successfully supplied the steel plate for the Collins Class submarine fabrication and is now drawing on this experience to work with DMTC on high strength steels specifically designed to suit the construction of Australia's future maritime platforms.

UOW has been involved in a number of welding research projects, under the School of Mechanical, Materials, Mechatronics and Biomedical Engineering. UOW adopts a multidisciplinary approach to draw on relevant expertise to facilitate projects in the welding and joining area. The group has access to state of the art welding equipment, in particular the welding capabilities comprise:

- Advanced controlled transfer GMAW systems
- Hybrid Laser and Plasma GMAW
- GTAW and Plasma welding facilities
- High speed transient weld data monitoring
- High speed video recording of metal transfer



These welding resources are complemented by one of the most comprehensive robotic welding facilities in Australia.

UOW's welding automation group forms a critical part of the estimated \$1.3 billion contract awarded to Thales Australia to supply the Australian Defence Force with 1,100 four-wheel drive vehicles over 3 ½ years from 2017. The highly-armoured vehicle, known as Hawkei, will provide soldiers with increased protection and mobility.

The welding group's contribution to naval research and development was recognised with the National Innovation Award at the Pacific 2015 Maritime Exposition. The award was for a range of technologies developed with partners DST Group, ANSTO and ship builder Forgacs, for work in improving the quality of welding in naval shipbuilding and therefore improving shipyard productivity.

UOW is now providing DMTC program management and research for the new maritime platform program recently announced by the Federal Government in the recent Defence White Paper.

AUSTRALIAN NATIONAL CENTRE FOR OCEAN RESOURCES AND SECURITY

The Australian National Centre for Ocean Resources and Security (ANCORS) is Australia's only multidisciplinary university-based centre dedicated to research, education and training on ocean law, maritime security and natural marine resource management.

ANCORS was established as a joint venture between the Royal Australian Navy and UOW in 1994. Originally named the Centre for Maritime Policy and focusing on marine strategy and security, the Centre has expanded significantly over the years in recognition of the increasing importance of the sea and the consequent need for improved management of the oceans and as a response to growing challenges to security at sea.

CENTRE FOR HUMAN AND APPLIED PHYSIOLOGY

UOW's Centre for Human and Applied Physiology is one research arm of the School of Medicine and has been working with the DST Group since 2009, when the University received funding to establish a National Centre of Excellence in Physical Employment Standards. A key focus of the centre's work is to accurately evaluate the physical demands of service in military occupations, particularly combat roles, to establish age and gender-neutral standards that will both increase operational capability and reduce injuries.

STEEL MANUFACTURING RESEARCH HUB

Under the umbrella of the ARC Research Hub for Australian Steel Manufacturing (Steel Research Hub), UOW is currently engaged in the following three programs:

- Market-focused product innovation. Improved abrasion resistant and high-strength Q&T steels; steel-intensive, mid-rise residential building designs and anti-fungal coatings for steel surfaces.
- Innovative coatings technologies. Innovative coatings technologies for existing BlueScope coatings and processes.
- Sustainable steel manufacturing. Involving researchers from UQ, the University of Newcastle and Monash University, this program covers a broad array of projects focused on environmentally and economically sustainable steel and iron manufacturing for BlueScope and Arrium.

SMART INFRASTRUCTURE FACILITY

The SMART Infrastructure Facility at UOW has significant expertise in Model Based Systems Engineering (MBSE), which is used in Defence and infrastructure applications. The dedicated team of researchers also apply System of System methodologies (SysML), which has multiple Defence applications.

SMART can provide assistance in:

- Development of Agent Based Models (ABM) and simulations. Used in the development of decision support tools for military applications, in particular for special operations and for joint deployments.
- Training in software systems. SMART is certified to supply training in the specific vendor UPDM and SysML tools which the DST Group has chosen to use. We have the capability to provide similar training in other vendor tools.



- Evaluation of virtual reality training programs.

SMART has recently engaged with DST Group to develop SysML modelling language to assist in providing a framework for modelling Joint Fires, which is required by Defence.

OTHER RESEARCH AREAS

UOW also applies its expertise to Defence projects in:

- Materials engineering for titanium and aluminium alloy development and welding and joining for aircraft components, including the Joint Strike Fighter program.
- Development of two agent-based simulations to support organisational change within the Australian Defence organisation, architecture design for model-based systems engineering applications to support evolvable systems integration management and the development of software agents to replace humans in the loop in Defence and T&E environment.
- Electromagnetic technology for the development of lightweight energy-harvesting kits that soldiers can wear in the field.
- IT for defence-related cyber security projects. UOW has an international reputation as being at the forefront of cyber security research through the ICT Research Institute. The institute works closely with the Australian Signals Directorate and the DST Group.
- Intelligent systems for the development of intelligent agent software and neural networks to support real-time combat decisions.
- Automation systems for military vehicles.
- Robotics that facilitate new advanced aerospace joining, machining and assembly processes.
- Surface engineering expertise to machine light alloys with improved wear qualities, for machine tool life extension.
- Lean automation skills for manufacturing high cost, low volume components for aerospace uses.
- Whole of life sustainability and maintenance.
- Explosive resistance of structures and buildings.
- A wide range of additive manufacturing technologies.
- Single crystal growth technologies for next generation sonar.



Inquiry terms of reference

A. MAXIMISE OPPORTUNITIES FOR NSW BASED COMPANIES FROM DEFENCE'S GROWING EXPORTS AND INVESTMENT IN DEFENCE CAPABILITY

Increasing the capabilities and capacity of small and medium enterprises (SMEs) to collaborate with researchers and others to innovatively meet the needs of defence contracts will be one of the key catalysts for NSW to attract increased Commonwealth defence funding. UOW welcomes the work of the NSW Department of Industry, which work with companies to develop their capabilities and business development skills to procure defence work. NSW Government should continue to look for ways to build the capacity of industry to innovate and collaborate with other parts of the defence supply chain. For example through the NSW Defence Innovation Network, which is referred to further below.

UOW have built strong relationships with local SME's, through initiatives such as the Southern Manufacturing Innovation Group (SMIG) and iAccelerate. SMIG is a UOW initiative to bring together innovative manufacturers in the region with university researchers, which was launched in 2015. The aim of this group is to create a three-way exchange of ideas and specific collaborative opportunities. The common characteristics of the group are innovativeness, and interest in learning from each other as well as collaborating on projects.

UOW have received funding through the government's Next Generation Technologies Fund for a project titled 'Synthesis of high entropy alloys for high temperature and high erosion applications.' While this is a relatively small project, what is significant about it is around two-thirds of the grant is going to a local start-up company to help them with a new product in the high-tech area of advanced aerospace materials. The project is exploring new classes of metals and non-metals for aerospace applications in defence.

The NSW Government should seek further opportunities to leverage these types of partnerships with research institutions and industry, especially start-ups, to generate greater collaboration and commercialisation of research. As an example the Government could at ways support the development of innovation hubs between universities and business in regional areas.

B. ENCOURAGE DEFENCE INDUSTRY INNOVATION, RESEARCH AND EDUCATION INCLUDING DEVELOPING THE FUTURE WORKFORCE

As noted there is a clear need in NSW to strengthen the formal collaboration networks between industry, government and academia. The collaborative nature of the work of universities means they are well placed to play a key role in helping to create and drive networks to support the growth of the defence industry. The details of two collaboration networks that UOW are looking to establish are provided below. Support from the NSW Government is critical to the successful establishment and outcomes of these networks.

NSW DEFENCE INNOVATION NETWORK

UOW is one of six universities that is part of the NSW Defence Innovation Network (DIN), which brings together businesses, universities, State Government and the DST Group. The aim of DIN is to help increase the competitiveness and innovation in NSW businesses to strengthen the response to the priorities outlined in the Commonwealth Defence Industry Policy Statement 2016.

DIN will address the existing need to identify and broker opportunities for researchers and industry to collaborate on defence projects, facilitate research connections and maintain a watching brief over DIN's projects to ensure they are delivered as planned. Where necessary DIN will help its members look for opportunities to leverage funding from other sources, such as the ARC, CRC program, as well as international bodies. It will also work collaboratively with its interstate counterparts in Victoria and South Australia to identify Australian research capability and capacity to address international defence challenges with the potential to attract foreign investment to Australia, amongst other nation-wide initiatives.

It is based on the Victorian model, called the Defence Science Institute (DSI) based at the University of Melbourne. It has established a collaborative approach to sectoral engagement at the regional level, by



partnering with DST Group and all Victorian universities, and acting as a broker assisting universities to partner with industry and win funding contracts. DSI is jointly funded by the Victorian State Government, the DST Group and Melbourne University. DSI's role in coordinating a hub of businesses and research institutions, has been successful in providing access to a significant portion of Defence funding through the direct allocation of Defence selected projects.

FACILITY FOR INTELLIGENT FABRICATION

UOW is proposing to form the Facility for Intelligent Fabrication in Wollongong. The Facility will bring together UOW, TAFE NSW, the Welding Technology Institute of Australia (WTIA) and other affiliated partners to provide expertise, technology, equipment and education through a 'one stop shop' to deliver integrated 'end to end' solutions to industry needs. A wide contact base and facilitated partnership arrangements will ensure that users can gain access to all the skills and knowledge they need to fully implement these solutions in their business, at a competitive price-point to add substantial value and scope to their future operations.

The Facility will be targeted at existing companies, especially SMEs, to help them sustain, evolve and grow their business.

The Facility will:

- Make a nationally unique set of expertise, skills, technology and equipment in welding, automation and rapid metal fabrication available to provide a 'one stop shop' to industry to allow tackling of a range of type and size of challenges
- Help companies have confidence in pursuing new technology and fabrication approaches because of the Facility staff's ability to work with industry to identify issues, opportunities and risks
- Help companies implement solutions through the partnerships, by linking them to suppliers and providing training and ongoing support
- Facilitate ongoing support, networking and collaboration to those using the Facility

UOW is currently seeking government funding to set up dedicated equipment and systems. UOW and TAFE NSW will provide a suitable building, equipment, and expert staff for the Facility. The facility is expected to be financially self-sustaining through an affordable fee-for-service business model.

D. MAXIMISE THE ECONOMIC BENEFITS OF LOCATING DEFENCE FORCE BASES AND DEFENCE INDUSTRY IN THE REGIONS

The NSW Defence Strategy have identified the need to 'explore opportunities to help reduce congestion in Fleet Base East' at Garden Island, as well as the objective to support the growth of the defence industry in the Illawarra region. In June 2015, RDA Illawarra and a regional consortium developed a business case that identifies the benefits of relocating the Royal Australian Navy Fleet Base to the Port of Port Kembla. The strategic proximity of the Illawarra region and the Port of Port Kembla to Canberra, Nowra and Sydney, means the location, assets of the deep water port, pre-existing cluster of defence industry and research activities, and advanced manufacturing capabilities within the region, uniquely places the Illawarra as a strategic location for defence force bases and industry.

UOW undertook a study tour to San Diego in April 2016 to learn more about the major social and academic impacts of the San Diego Naval Base on the community particularly from a regional development and education perspective. The study tour involved exploring some of the major partnerships and links which have been developed between the US Navy, and companies in the supply chain and universities, such as the University of California, San Diego.

San Diego is a harbour city that thrives from a significant military presence. The higher education institutions and strong culture of entrepreneurship and research combine with the US Department of Defence to create a unique culture that fosters innovation and growth. San Diego's military and defence complex is a critical economic driver in the region. Meetings with key organisations in San Diego such as the SD Regional Economic Development Corporation, The Maritime Alliance and at the SD Naval Base demonstrated that the



impact of defence spending on a local economy is exponential and as previously stated, has a disproportionate effect to the size of the presence.

These key findings from the study tour combine to demonstrate that even a small defence presence in the Illawarra would have a tremendous positive impact on the area. Wollongong has the key characteristics to make it a successful base for defence activity by virtue of its deep harbour, existing infrastructure, and available work force and expertise. It has a successful University with capacity and expertise in defence related activities, including research and training. The potential for the relocation of select naval activities to Port Kembla represents an opportunity to take prudent action that addresses both port capacity issues in Sydney and long term cost effectiveness. In turn it represents an opportunity for the Illawarra to thrive and innovate at a pivotal time in Australia's endeavour to be truly innovative.

A significant and long term defence presence in San Diego has had a long lasting effect on the industries related directly to defence, but also led to a much broader unrelated group of industries such as cybersecurity and biotech. This flow on effect that has seen the emergence of new industries in the San Diego economy shows that even a small lasting defence contribution to the Illawarra would have a disproportionate effect to the size of the presence. Pursuing relocation of parts of the defence force to regional areas as identified in the NSW Defence Strategy would lead to exponential benefits for regions like the Illawarra, and would be strongly welcomed by UOW.

F. FURTHER ENHANCE COLLABORATION BETWEEN THE NSW AND COMMONWEALTH AGENCIES

As is highlighted throughout this submission, there is strong need for collaboration across industry, government, and universities to build relationships, identify existing capabilities and skills gaps, identify collaboration opportunities and to build capacity across NSW. These networks and relationships need to be built and sustained over the long-term, and the NSW Government has a crucial role to play in building those relationships between NSW and Commonwealth agencies.

The NSW Government support for the NSW Defence Industry Network, will help to support and enhance this collaboration with the Commonwealth Government. However, the NSW Government lead agency, Defence NSW, needs to ensure that these relationships and collaboration are positive and sustained over the medium – long term. It is essential that Defence NSW has a clear picture of the capabilities of the supply chain across the State, and is aware of the work that is currently underway.

UOW is happy to collaborate and work with the NSW Government to continue to build these relationships with Commonwealth agencies.

Summary

The Federal Government's investment in the defence sector represents a unique opportunity for NSW to build on its existing strengths across the supply chain. The key role the NSW Government needs to play is to support effective collaboration across the sector and help to build long-term relationships with the Commonwealth agencies and lead contractors.

The NSW Government could help support the development of NSW defence supply chain and innovation by:

- Support the establishment of the Defence Innovation Network.
- Make a long-term, bi-partisan, commitment to supporting and investing in the defence sector across the State, including regional areas.
- Recognise UOW as one of the leading engineering, mathematics, physics and ICT research institution in Australia. UOW is helping to develop the skills and expertise needed by the defence sector through undergraduate and post-graduate training, and defence related research, particularly as the NSW home of the DMTC through which UOW has completed over \$10 million in research since 2008.



- The NSW Government should seek further opportunities to leverage partnerships with research institutions and industry, especially start-ups, to generate greater collaboration and commercialisation of research, such as innovation hubs between universities and business in regional areas.
- Consider the benefits of relocating parts of the defence force to the Port of Port Kembla to take advantage of its unique proximity to Canberra, Nowra and Sydney, deep water port, pre-existing cluster of defence industry and research activities, and advanced manufacturing capabilities within the region. This flow on effect that has seen the emergence of new industries in the San Diego economy shows that even a small lasting defence contribution to the Illawarra would have a disproportionate effect to the size of the presence.

FURTHER INFORMATION

The University would welcome further opportunity to elaborate upon, or further clarify, the matters raised within this submission, as may be required by the Committee. Please do not hesitate to contact the UOW

