

ADM **DEFENCE WEEK** AUSTRALIAN DEFENCE MAGAZINE SERVING THE BUSINESS OF DEFENCE **PREMIUM EDITION**



Boeing is proposing its AH-64E Apache attack helicopter for Defence's Land 4503 program.

BOEING

Boeing proposes FMS/DCS mix for Land 4503

Nigel Pittaway | Melbourne

Boeing Defence Australia managing director Darren Edwards has revealed, possibly to no-one's surprise, that Boeing is proposing its AH-64E Apache attack helicopter for Defence's Land 4503 (armed reconnaissance helicopter) program.

Edwards said late last week that [the proposal](#), for 29 Apaches, will include a mix of Foreign Military Sales (FMS) and Direct Commercial Sale (DCS) acquisition methodology, which he says will maximise potential benefit to local industry.

"We've approached this from a capability perspective, we have a capability offering that includes FMS and DCS – training capabilities, spares and repairs and

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a lot of emphasis on a sovereign capability here in Australia because, at the end of the day, this is going to be an Australian platform and an Australian-operated and sovereign capability, so we need to build that from the ground up,” Edwards said.

Edwards explained that US law requires some elements of an Apache sale to a foreign government to be done through the FMS process, but that also comes with the advantage of economy of scale, as the Australian helicopters would be joining a global fleet of more than 1180 Apaches. The Boeing proposal is also based on what Edwards said would be a “maximised” DCS component, with the focus on sustainment.

“The Apache on offer to Australia is the latest ‘Version 6’ configuration now under production for the US Army”

“That really means how we get the most local industry content into the sustainment of this platform from day one. We have an effort already underway to figure out how we maximise Australian Industry Content (AIC) and in particular small to medium enterprises (SME) and how we can plug them into the Boeing Company and make them part of the global Apache supply chain if they’re successful,” he said.

BDA has formed the [Boeing Rotorcraft Network Australia](#) (BRNA) to facilitate local industry bids for work packages across its Australian rotary wing enterprise, which includes the CH-47F Chinook fleet in Townsville and the Helicopter Aircrew Training System (HATS) program at Nowra. Edwards said 43 Apache work packages have already been posted on the BRNA ICN gateway, to gauge the capability of local industry to participate in its bid.

The Apache on offer to Australia is the latest ‘Version 6’ configuration now under production for the US Army, which Boeing revealed has an upgraded Northrop Grumman APG-78 Longbow Fire Control Radar, offering twice the range of earlier versions and, importantly for the Army Aviation, a maritime capability, which could support amphibious warfare operations.

The radar has been upgraded to accommodate the longer range of the US AGM-179 Joint Air to Ground Missile (JAGM), which is intended to replace the current Lockheed Martin AGM-114 Hellfire munition. The new Longbow radar has an unclassified range of 16km, double that of the earlier variants.

Terry Jamieson, Boeing Global Vertical Lift Sales and Marketing also revealed that Boeing has sufficient Apache orders today for production to continue through to 2028. However, he said there are contingencies built into the schedule to accommodate potential FMS customers such as Australia and the company could meet Defence’s requirements for Initial Operational Capability (IOC) and Final Operational Capability (FOC).

“2028 is not a hard-set date, as other customers will either want to remanufacture their AH-64Ds to E models, or existing customers will want to expand their current fleet, or new customers will buy Apache,” Jamieson said. “Quite honestly, based on the trends we’re seeing, we expect (the Apache) production line will extend beyond 2028.”

In the next issue of *Defence Week*, we will examine Bell’s Land 4503 proposal, including its relationship with BAE Systems Australia for in-country support.

The largest yet – DEBSS 2019

Nigel Pittaway | Canberra

The 2019 ADM Defence Estate and Base Services Summit (DEBSS) held this week in Canberra was the biggest in the series to date, attracting in excess of 400 delegates from across industry and Defence.

Held in Canberra's Hotel Realm on September 12, the 2019 conference was the eighth in the series and the annual conference has proven so popular to date, that proceedings were divided into two separate streams after lunch. The first stream considered base services and estate planning, which included two informative presentations on per- and poly-fluoroalkyl substances (PFAS) contamination of Defence bases and surrounding areas and the considerable efforts underway to remediate the problem.

The second stream focussed its attention on capital project delivery and included a panel discussion to that effect.

The main conference was chaired by Josef Baukes, key account manager – Defence for Coffey, A Tetra Tech Company and the first keynote speaker was Steve Grzeskowiak, deputy secretary – Estate and Infrastructure Group (E&IG), who provided an update of his organisation.

Grzeskowiak told delegates that the E&IG has an annual budget of \$5.3 billion and it is increasing, as strategies laid down by the 2016 Defence White Paper are rolled out. Altogether, he said the Defence Estate covered 2.8 million hectares of land (approximately equal to the size of Albania) and included 70 bases and 30,000 structures, with a capital replacement value of around \$68 billion.

"The condition of the estate has been deteriorating, but is now ticking up in the right direction thanks to recent investment. It's important we make better decisions about how we invest in the estate," Grzeskowiak said.



Steve Grzeskowiak, deputy secretary – Estate and Infrastructure Group (E&IG), providing an update to delegates. ADM/LEIGH ATKINSON

"Our guiding strategy is a strategically aligned, affordable, safe and sustainable estate that enables Defence capability and operations. This strategy holds up very well (and) if you are hoping to win work off Defence, reading our strategy is something I'd recommend."

Other keynote speakers included Jodie Patron, economist and director of KPMG Australia; Chris Birrer, first assistant secretary – Infrastructure; and Stuart Fowler, CEO Norman, Disney & Young (NDY).

A more detailed report from DEBSS 2019 will be a feature of the November issue of *ADM* and our [current \(September\) issue](#) includes an interview with Steve Grzeskowiak about the current and future activities of the E&IG.

"The condition of the estate has been deteriorating, but is now ticking up in the right direction thanks to recent investment"

Note from the Managing Editor: *ADM* spoke to Sodexo's CEO for Government and Agencies Worldwide Tony Leech about Sodexo returning to the Defence Infrastructure and Services domain. The joint venture between Sodexo and Serco dissolved in 2018 but the business now feels there is space in the domain for the company to add value.

"Given our international experience in a range of five-eyes nations, we think Australia is a good market for us to return to in a Defence context," Leech said to *ADM*.

Defence speakers at DEBSS were keen to highlight the importance of a customer-focused in facilities and base services management, with a presentation from Philip Capps, Head of Product Strategy & Development for Qantas, highlighting what best practice looks like for a customer centric model. E&IG Deputy Secretary Steven Grzeskowiak and his team are looking to apply the lessons learned from the last decade of base services contracts into the new suite of garrison support arrangements in both current and existing contracts.



Grzeskowiak spoke of increasing investment in the estate and infrastructure space.

NIGEL PITTAWAY

Quantum computing in a Defence context

Lincoln Parker | Sydney

In 2017 China achieved what no other country has been able to then or since in quantum communications. In a world-first long distance secure quantum communication, Chinese physicists connected Beijing with Shanghai – a distance of over 1,900 kilometres.

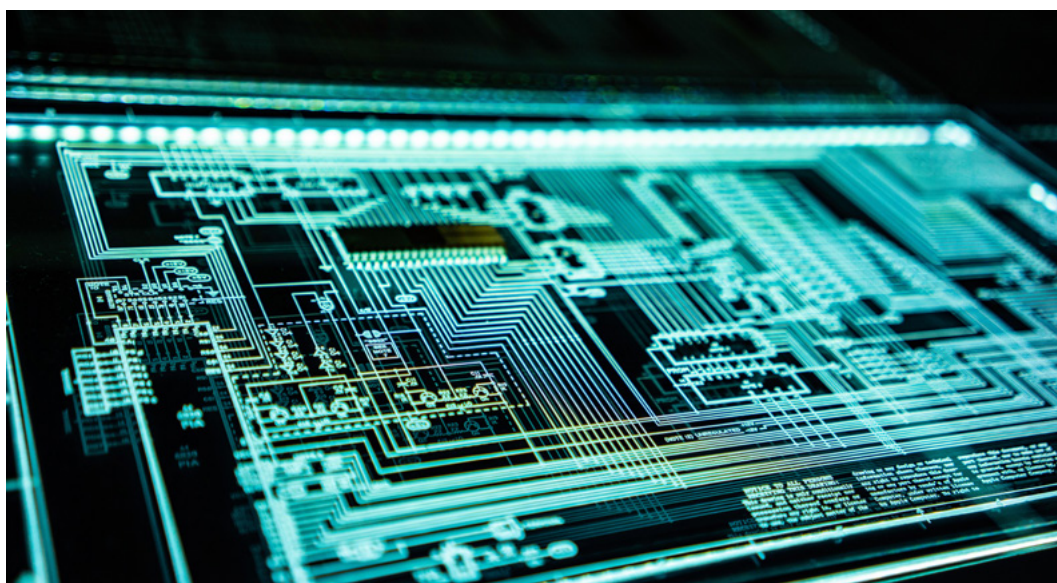
They were able to demonstrate a secure key, distributed using quantum bits of light, or photons, from earth to their satellite and back down to earth. And in another world-first they were able to transmit a video signal encoded from this quantum secure key to make a secure video call from China to Austria.

These two milestones were celebrated worldwide, primarily by scientists, and highlighted to the scientific and military establishments in the US and Europe just how far in front China has developed their quantum technologies.

To understand the importance of these world firsts, we need to know what quantum communication is all about and why it is so special. Quantum communication is an ultra-secure way to communicate or exchange data. To get more technical, it is the ability to send or share particles in an entangled state, carried by single photons of light. These photons cannot be exactly replicated, meaning data transmitted as quantum information cannot be listened in on, nor hacked.

Where does Australia fit into this picture? Australia leads the world in some areas of quantum technologies and I recently sat down with [Professor Gavin Brennen](#), Director of Macquarie University's Centre for Quantum Engineering, to learn more.

Prof Brennen explains that with advances in quantum computing any and all previously encrypted sensitive communications (from government and military secrets to bank transactions) can potentially be compromised. Optimistic



Quantum communication is an ultra-secure way to communicate or exchange data.

ADI GOLDSTEIN ON UNSPLASH

estimates of quantum computer development suggest that achieving this feat could be only about 10 years away, he says.

You might ask why anyone would care if old information or old secrets being hacked really matters? For governments, militaries and corporations it is crucial. 'Old' but sensitive information regarding military deployments, installations or locations of missile silos for instance, can still be relevant and help adversaries piece together their intelligence map. Commercial secrets, intellectual property (IP), designs, bank transactions will also all be vulnerable.

Therefore, if you want to ensure your data is robust enough to remain secret then you need a way to communicate that will be secure against future quantum computers. At the moment quantum cryptography is the only proven way to do that, but there is a big push to develop more secure classical codes called [post-quantum cryptography](#), Prof Brennen explains.

Institutions like Macquarie University, along with the University of Technology Sydney, UNSW and Sydney University are leading the way. Government understands the importance of this technology and in March of this year, the then NSW Minister for Innovation [Matt Kean](#) backed a proposal for a Sydney Quantum Academy (SQA), which will see researchers from these four universities collaborate to advance quantum technologies (primarily in quantum computing) and link them to industry.

Another area in which Australian research is leading the world is quantum sensing. Among other quantum technologies, an exciting development Prof Brennen and his team are working on is a gravimeter. A gravimeter is a very sensitive sensor which can detect change in the gravitational field – sensing things that cannot be detected via any current sensory system. It is a passive system that probes, not sending out a signal, just receiving the field that is observed by the gravity everywhere around it. A gravimeter will even detect things that don't emit any kind of electromagnetic signal.

These gravimeters could be deployed on aircraft (or, in the future, satellites) to detect deep underground bunkers, missile silos, or indeed any cavity –without the adversary knowing it has been detected. Prof Brennen explains the gravimeter he is working on "could sense the change in the gravitational field of a human being walking a metre away."

Note: Lincoln Parker works for the NSW Defence Innovation Network (an initiative of the NSW Government, Defence Science & Technology Group and seven NSW universities). The author's views are his own.

"Data transmitted as quantum information cannot be listened in on, nor hacked"

MOST READ ONLINE AT WWW.AUSTRALIANDEFENCE.COM.AU



1. [BAE and Army to make two autonomous M113s](#)
2. [Special Forces Industry brief for Land 2097 Phase 4](#)
3. [Airbus offers cost effective Tiger replacement](#)
4. [New mast installed on HMAS Anzac](#)
5. [Lockheed consolidates Sikorsky operations in Nowra](#)

Landing craft now fit for purpose and future-ready

Warren Levin | Sydney

Army's Land Mobility System Program is currently looking at replacing the ageing Mechanized Mark 8 Landing Craft (LCM8), which were originally brought into service by the US Navy for river operations during the Vietnam War. The Australian Army have been using similar platform types for many years, which will soon be replaced by a more suitable watercraft under Project Land 8710 Phase 1 (Army Water Transport).

Now that the landing craft (LLCs) aboard HMAS *Canberra* and HMAS *Adelaide* are fit for purpose, they could serve as a viable contender to meet Army's future water transport requirements.

The LLCs were originally flagged in Senate Estimates in May 2016, when tests of the crafts' suitability to take Army's M1A1 Abrams tanks [were suspended](#) after RAN discovered the vessels 'sat lower in the water than expected' with an Abrams on board.

Defence also postponed further trials until May 2018 because of an inability to transit out the back of the ship in a docked position. This meant that the ADF's ability to use Abrams tanks in amphibious operations depended on the two Mexeflote craft on board HMAS *Choules*, which are also compatible with RAN's two Landing Helicopter Dock ships (LHDs).

However, HMA Ships *Canberra* and *Adelaide*'s LLCs are now performing well beyond expectations, as seen during the recent Talisman Sabre exercise, thanks



An M1A1 tank aboard an LHD landing craft in July.

CHIEF OF NAVY VIA TWITTER

to work undertaken by Naval Ship Management (NSM) at Sydney City Marine's dockyard in Rozelle, a short water transit from Fleet Base East.

The LLCs have undergone a major bulkhead upgrade program to increase their operating load carrying capacity as a primary ship-to-shore connector, and can now successfully carry Abrams tanks and heavier support vehicles across the full range of operating sea states. With only a few vessels awaiting completion of their upgrades, this has paved the way for the LLCs final certification to further support the RAN in achieving Final Operational Capability (FOC) for Australia's Amphibious Task Group.

“With the LLCs now fit for purpose, these vessels could represent an ideal alternative to the ageing LCM8s”

This upgrade work is ongoing and continues to be managed by NSM at Sydney City Marine.

With the LLCs now fit for purpose, these vessels could represent an ideal alternative to the ageing LCM8s and satisfy the requirements for Land 8710 Phase 1.

Additional LLC platforms would enable the Army to use them in their current operating parameters and also enable greater interoperability between Army and Navy to and from the deployed LHDs. With increased platform numbers positioned in Townsville and Darwin, a greater degree of flexibility is now being afforded to the LHDs' command should they be required to sail without the full complement of LLCs onboard. The LHDs could rely on embarking LLC platforms either from Townsville or Darwin and then proceed on deployment with the required assets and maintain full operational capability.

Despite the ever-increasing operational demands of the ADF and the on-going need to review and acquire more assets to meet and satisfy those obligations, the ADF remains hesitant to increase maritime asset platform types if there is little need.

Now that the current Navantia-designed LLCs are fit for purpose and future-ready, building more to be used by both Army and Navy appears to satisfy those requirements and would provide greater flexibilities for the ADF in the long term.

Note: Warren Levin is Commercial & Defence Director for [Sydney City Marine](#).

Study finds soldiers treat robots as colleagues

It is increasingly common to use robots in war zones to examine and disarm hazards or recover objects with the understanding that the loss of a robot is a far more acceptable outcome than the death of a soldier.

But as robots become valuable members of the team, there's a tendency to treat them like colleagues rather than machines.

University of SA Professor of Human Computer Interaction, Professor Mark Billinghurst, has collaborated with Dr James Wen and other members of the US Air Force Academy (USAF) to explore these connections and their impact on team efficiency and productivity on the front-line.



Corporal Aaron Le Jeune from the 9th Force Support Battalion trials an unmanned ground vehicle.

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Their research shows that for robots to be fully integrated within a human-machine team (HMT), they first must be accepted as teammates. To facilitate this, a lot of work has been done over the years to make robots more 'human-like' by altering their physical characteristics and capabilities.

While humanising robots strengthens the working relationships between soldiers and their robots, it also inflates the value of the robot team members in the minds of military personnel, leading to an increased emotional response when the robot is put under stress.

Designing a simulation-based application, researchers tracked the emotional responses of two teams of participants who undertook a range of simulated tasks with either a personified or non-personified robot.

The study showed that teams working with a personified robot were 12 per cent less likely to put their robot at jeopardy of destruction compared to teams working with a non-personified robot, and that they were more sensitive to the robot's health and the possibility of seeing the robot 'killed' in action.

This is the first time that research has measured how actions can be altered by empathy when potential harm is induced in a simulation.

Prof Billingham says the results show first-hand how emotional connections can impact decision making in the field.

"We have evidence to show that teams working with a personified robot are significantly more mindful about limiting damage and harm towards it – but this can have significant consequences," Prof Billingham said.

"Participants who limited their use of robots or chose not to use the robots had a similar overall achievement to the teams that did, the result of an increased level of self-sacrifice in the form of working harder to gain the same result."

"The study showed that teams working with a personified robot were 12 per cent less likely to put their robot at jeopardy"

For most of us, an emotional attachment to a robot is considered harmless. Creating a bond with your Roomba vacuum or Google Home speaker can be fun and comforting, but empathy shown by a soldier towards a military robot has the potential to interfere with performance on the front-line.

“Rather than sacrificing the robot, participants who were working with a personified robot had to increase their workloads and were willing to take more personal risks and would stop before putting the robot at risk – impacting their decision-making under pressure,” Prof Billingham said.

“Such hesitation and having an empathic response in these circumstances could have dangerous consequences for military personnel.”

Where split second decisions can determine the difference between life and death, it will become increasingly important to monitor soldiers working in collaboration with robots.

It is expected that military robots will be increasingly used in the future necessitating further research, training and evaluation on the topic.

The research also has implications for a wide range of other human/robot collaborative tasks in non-military settings, such as on the factory floor, in hospitals, or even in the home.

PEOPLE ON THE MOVE

NIOA has announced the appointment of Major General Fergus (Gus) McLachlan (Retired) as a Strategic Adviser. Gus will provide the company advice and support on a range of matters including leadership, governance, strategic policy as well as supporting major programs such as dual tenancy at Benalla, including domestic manufacture of munitions and Land 159 / 4108.

RAAF to conduct first air combat exercise with Japan

Up to 150 Air Force personnel will participate in the first bilateral air combat exercise between the RAAF and Japan’s Air Self-Defence Force.

RAAF will deploy support aircraft and seven F/A-18A/B Classic Hornet fighter aircraft to participate in the exercise.

The deployment will be supported by [KC-30A Multi-Role Tanker Transport](#) aircraft, providing personnel transport and air-to-air refuelling capability; and a C-17A Globemaster and C-130J Hercules providing heavy airlift capability.

Minister for Defence Linda Reynolds said Exercise Bushido Guardian 2019 marks a new precedent in Australia and Japan’s air-to-air, defence and broader bilateral relationship.

“This is the first exercise of this nature between our two countries which aims to increase our practical engagement with Japan – a key partner that shares

“This is the first exercise of this nature between our two countries”



A newly painted F/A-18B Classic Hornet aircraft from No.2 Operational Conversion Unit.

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Australia's commitment to regional peace and security," Minister Reynolds said.

"Importantly, the exercise will offer all personnel involved the opportunity to build and maintain relationships – a vital contributor to the strength of the Australia-Japan Special Strategic Partnership."

Air Commander Australia, Air Vice-Marshal Joe Lervasi said the exercise offered great training benefits and was a chance to enhance shared cooperation and military appreciation.

"Exercise Bushido Guardian 2019 will offer opportunities for Australia and Japan to not only test and evaluate existing interoperability, but also to increase mutual awareness on force generation requirements including long range deployment and sustainment practices," AVM Lervasi said.

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Forthcoming Events

ADM EVENTS

More detail on **ADM** Events can be found on our dedicated website:

- [ADM Northern Australia Defence Summit](#) – 23-24 October 2019
- [ADM Outspoken Women Masterclass](#) – 23 September 2019

Defence Industry Trade Show Preparation Workshop

Date: 18 September 2019

Location: Cairns Civic Reception Rooms

Website: <https://www.eventbrite.com.au>

AIDN QLD in partnership with DEFNQ would like to invite you to attend the ASC Shipbuilding & CASG Industry Briefing Opportunities for Australian Industry in Cairns. Wayne Cooper, Director of Industry for the Hunter Class Frigate Program will provide an overview of the Government's broader continuous naval shipbuilding strategy, and provide an update on the Hunter Class Frigate Program and the Government's commitment to maximising Australian Industry Capability in the program. ASC Shipbuilding will also provide a supply chain update detailing the plan and opportunities for Australian industry.

Australian Naval Institute's Goldrick Seminar

Date 18 September 2019

Location ADFA

Website www.trybooking.com/BDYHF

The 2019 ANI Goldrick Seminar will discuss defence issues associated with the maintenance of Australia's maritime trade. Speakers will be drawn from senior levels of Defence, academia and industry. As in previous years, the theme – Maritime Trade and its Implications for Australia's Defence – was selected by the Chief of Navy; an outcomes report will be provided to the Chief of Navy and it is anticipated that the proceedings will be subsequently published by ACSACS.

Understanding Chinese Strategy for the 21st Century

Date 18 September 2019

Location Victoria Barracks, Brisbane

Website www.rusi.org.au/event-3491733

Join us to hear deeply researched insights into China's strategic calculus in the region and how this will affect Australia's security. Professor Evans is a leading expert in strategy and leadership whose expertise is highly sought-after by international institutions, especially the US military. His command of military history and the extrapolated implications for our strategic considerations are peerless in Australia.

NZDIA Member's Meeting

Date: 18 September 2019

Location: Wellington, NZ

Website: Michelle.denholm@nzdia.co.nz

The theme for the next Member Meeting in Wellington on Wednesday 18 September is:

"Defence and Industry-Delivering on the DCP together: Technology, Security and Procurement Challenges". Speakers/topics will include: NZDIA Members' Technology RoadMap; Update on security challenges and solutions; DCP Project updates from MOD; Update on the CJDS Portfolio; and an MBIE presentation on early engagement and market briefings.

The Future Australian Army: An Evening with Lieutenant General Rick Burr

Date 19 September 2019

Location 215 Queen Street, Brisbane

Website tattersallsclub.com.au

Don't miss this opportunity to hear how the future Australian Army is being shaped now by its Chief, Lieutenant General Rick Burr. Listen to General Burr outline the type of Army Australia will need to meet the threats and challenges of a dynamic Indo-Pacific strategic landscape, and how he intends to position the Army satisfy government-directed policy objectives and protect Australia's national interests.

ASDEFCON TD/IP Courses

Date 23-24 September 2019

Location: WA, Vic, NSW

Website defence@majortraining.com.au

Defence have begun delivery of its short course on the new Technical Data / Intellectual Property (TD/IP) clauses in its ASDEFCON suite of templates. The new clauses provide far more flexibility and scope to deal with TD/IP issues but require a better understanding from both Defence and Industry. Defence is delivering this course around Australia and offering a number of spaces to Defence Industry: 6-7 August 2019 in WA: 28-29 August 2019 in Victoria: 23-24 September 2019 at RAAF Richmond: 29-30 October 2019 and 24-25 February 2020 in the ACT.

Capability Life Cycle (CLC) Management

Date 23-25 September 2019

Location Canberra, Brisbane, Sydney, Melbourne, Adelaide, Perth

Website unsw.adfa.edu.au

This course provides attendees with an overview of how Australian Defence conducts business with regard to development and management of capability. Attendees from within the Australian Defence Organisation, other government agencies and defence industry are provided with an opportunity to develop an understanding of the principles, processes, practices and artefacts associated with the Australian Defence Capability Life Cycle.

Army Innovation Day 2019

Date 25 September, 2019

Location Adams Auditorium, ADFA

Website www.army.gov.au

AID19 will be held on 25 September and the purpose is for selected respondents to pitch their proposed innovations to assessors, Capability Managers and Defence Innovation Hub personnel. Respondents may also be able to verify, validate and clarify their Request for Proposal response. Request for Proposal submissions closes on 3 September and on 12 October respondents will be notified of outcomes.

2019 SIA Nuclear Seminar

Date 02 October 2019

Location Australian Strategic Policy Institute

Website www.submarineinstitute.com/events/Nuclear-Seminar

The Submarine Institute of Australia (SIA) is Australia's premier organisation for the promotion of submarine matters. The SIA is hosting a single day seminar, aiming to stimulate national discussion on a holistic approach to a nuclear industry.

Australian Cyber Conference 2019

Date 07-09 October 2019

Location Melbourne Convention and Exhibition Centre

Website cyberconference.com.au

The Australian Cyber Conference 2019 will provide business leaders with insights and best practices taught by the industry's top experts through keynotes, panel sessions and live demonstrations. Attending the conference will enable you to network with these practitioners to help you better understand and manage current threats, as well as identify and prepare to meet emerging challenges.

Pacific 2019

Date 08-10 October 2019

Location Sydney Convention Centre

Website www.pacificexpo.com.au

As the only comprehensive international exhibition of its kind in the Indo-Asia-Pacific region, PACIFIC 2019 will again provide the essential showcase for commercial maritime and naval defence industries to promote their capabilities to decision-makers from around the world.

ITAR/EAR/AU Export Control Awareness – Brisbane

Date 15 October, 2019

Location Brisbane

Website www.stickytickets.com.au

Join us for a one-day face-to-face awareness course covering the unique aspects, agreements and regulations for US and Australian Export Controls. Whether you are handling ITAR or EAR controlled technology as a current or prospective contractor, or looking to export your Australian controlled defence article, you must ensure you comply with regulations at all times.

Women in A/AA Melbourne Summit 2019

Date 16 October 2019

Location Level 17, 501 Bourke St.

Website www.aviationaerospace.org.au/events

This year, the summit will focus on how we, both men and women can engage the future through STEM and how we can encourage a more inclusive and diverse workforce. Discussing the barriers and opportunities for women in the industry, we will ask the tough questions and address how we can close the gender gap. What will it take for us to encourage more women to study STEM and what will take for us to encourage more women to pursue a career in STEM?

Williams Foundation Seminar – The Requirements of Fifth Generation Manoeuvre

Date 24 October 2019

Location National Gallery of Australia

Website www.williamsfoundation.org.au/event-3161281

Since 2013, the Sir Richard Williams Foundation seminars have focused on building an integrated fifth generation force. The seminar in October 2019 is titled 'The Requirements of Fifth Generation Manoeuvre' and will examine the differences and potential gaps in how the ADF must equip and organise for multi-domain operations.

AIDN QLD Young Achiever Award

Date: 31 October 2019

Location: TBC

Website: INFO@AIDNQLD.COM.AU

Driven and talented young people are the key to the future of the defence industry. In order to recognise individuals who may be future industry leaders, AIDN has created the AIDN Young Achiever Award. Nominations for the 2019 AIDN QLD YAA (YAA) are now open. The award is held at the AIDN QLD level and the winner will compete for the national award.

2019 Parari Australian Explosive Ordnance Safety Symposium

Date 05-07 November

Location ADFA

Website parari@defence.gov.au

This year's symposium brings together delegates from around the world to discuss the latest innovations and advances in explosives, munitions and weapons safety. International and local experts from industry, academia, military and government will share their research to explore Explosive Ordnance Safety opportunities and challenges as a community.

EW Australia 2019 Canberra Symposium

Date: 06 November 2019

Location: QT Hotel, Canberra

Website: <https://aomevents.eventsair.com/aoc-convention-2019/aoc-symposium/>

Held at the QT Canberra on Wednesday 6 November 2019, this thought leadership symposium will focus on ‘Electronic Warfare Battle Management and Manoeuvre in the Cyber and Electromagnetic Battlespace’. Attendees will have access to dedicated sessions on EW and Cyber Security, while being able to maintain connections and expand networks within the Australian EW and Cyber Defence Community.

MilCIS 2019

Date 12-14 November 2019

Location Canberra Convention Centre

Website www.milcis.com.au

In November each year, the Defence Chief Information Officer Group (CIOG) partners with the UNSW Canberra and the Institute of Electronic and Electrical Engineers (IEEE) to present MilCIS. The annual Military Communications and Information Systems (MilCIS) Conference welcomes military and government organisations, academia, and defence industries to contribute to the future direction of military communications and information systems.

SubSTEC 5 Conference

Date 18-21 November

Location Esplanade Hotel, Fremantle

Website www.submarineinstitute.com

The 5th Submarine Science, Technology and Engineering Conference (SubSTEC 5) will be held at the Esplanade Hotel, Fremantle, WA 18th-21st November 2019. The theme of the Conference will be: ‘Innovation and Investment in the Sub-Sea Environment’. SubSTEC5 will be held with the support of the Institute of Marine Engineering, Science and Technology (IMarEST).

Corrosion and Prevention 2019

Date 24-27 November

Location Crown Promenade, Melbourne

Website conference.corrosion.com.au

Corrosion and Prevention 2019 will bring together leading researchers and industry practitioners who combat corrosion daily. Diverse technical streams will showcase the latest developments in corrosion, ranging from fundamental corrosion science to hands-on application.

2020

CIVSEC 2020

Date 24-26 April 2020

Location Melbourne Convention and Exhibition Centre

Website www.civsec.com.au

CIVSEC 2020 International Civil Security Congress and Exposition is your gateway event to the growing Indo-Asia-Pacific civil national security environment. CIVSEC 2020 is a premium international event with exceptional opportunities to reach key driver organisations in an evolving, tech-savvy regional marketplace.

Rotortech 2020

Date 16-18 June 2020

Location Royal International Convention Centre, Brisbane

Website www.rotortech.com.au

RotorTech 2020 is the region's premier helicopter and unmanned flight systems showcase and forum, bringing together operators, manufacturers, suppliers, regulators and government across the Indo-Asia-Pacific. With a comprehensive three-day free industry conference program, RotorTech 2020 will also feature manufacturers technical workshops and an industry exhibition showcasing more than 100 helicopter and unmanned flight related companies.

Land Forces 2020

Date 01-03 September 2020

Location Brisbane Convention Centre

Website www.landforces.com.au

The biennial LAND FORCES exposition is an international industry event to showcase equipment, technology and services for the armies of Australia and the Indo-Asia-Pacific. The Land Forces 2020 team is now setting about ensuring the event will achieve its goals of providing an effective platform for the exchange of ideas on key land forces issues and of taking Australian industry to the world.