

ADM AUSTRALIAN DEFENCE MAGAZINE DEFENCE WEEK

PREMIUM EDITION

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Army Innovation Day is a joint venture between Army and the Defence Innovation Hub.

DEFENCE

Army Innovation Day turns six

Katherine Ziesing | Canberra

Now in its sixth year, Army Innovation Day (AID) in 2019 had a theme of network assurance with 10 companies pitching their tech to Defence.

"This year's theme, network assurance, will ensure the Army's communication networks are more resilient, agile and protected against adversaries," Minister for Defence Industry Melissa Price said.

AID is a joint venture between Army and the Defence Innovation Hub, with selected companies showcasing a range of the latest technological advancements on this year's theme.

Organisers were much more targeted in their approach this year with a smaller field of contenders compared to previous years.

While it can be hard to get excited about the ones and zeros behind the networks

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that support a true fifth generation force, they are now crucial to how the ADF fights.

"We're very excited about a number of systems here to support connectedness, resiliency and agile security," Brigadier Richard Vagg, Director General of Systems and Integration in Army Headquarters said. "They are mainly SMEs here today so we can really go after some smart local systems."

Brigadier Vagg explained that the network is now central to the way Army fights and this is only going to increase with new capabilities under Land 400 and 200 coming online.

"But we also need to make it simpler," BRIG Vagg said to *ADM*. "We have to make sure there are less seams, less interfaces that can be points of vulnerability in those networks."



Organisers were much more targeted in their approach with a smaller field of contenders. DEFENCE

"The network is now central to the way Army fights and this is only going to increase"

Companies on show this year included Defendtex, Penten, Advanced Design Technology, Net Consulting Australia, Advanced Navigation, Agent Oriented Software, SRC Australia alongside the CDIC, Army History Unit, DST Group and Army's Future Land Warfare Centre.

From self-healing networks that frequency hop without a user realising to cyber security approaches that focus on secure mobility, the technology on show covered a range of approaches to network assurance.

Past AID 'winners' SYPAQ and DefendTex were also on hand with some of their previous technologies that are progressing through trial phases with Army. On show last year, SYPAQ's the Precision Payload Delivery System ([PPDS](#)) has evolved thanks to a tight design/test/design/test framework with Army.

"We're really looking forward to the next round of trials," SYPAQ CEO Amanda Holt said to *ADM*. "Although it is cardboard, it's proven to be much more resilient than we thought and can be reused multiple times on round trips."

[DefendTex](#)'s Drone 40 was also on display, a technology that has been going through the AID/Innovation Hub process with the company winning multiple Innovation Hub contracts to progress its technologies. Senior Defence sources are impressed with the utility of the product that has a more than odds on chance of seeing service with the Australian Army in the near future.

If aliens are out there, why are they hiding?

Ewen Levick | Sydney

We spend billions of dollars on military equipment, yet most of it will likely never see battle. According to philosopher Thomas Hobbes, we do this because humans are motivated primarily by fear and a desire to survive – we'd like to think other states won't threaten us, but history shows that sometimes they do.

The same logic yields interesting results when applied to potential interstellar relations. Mathematically speaking, we're unlikely to be the only intelligent species around. Should we be as afraid of them as we are of each other?

NASA aims to put the first human boot on Martian soil sometime in the [late 2030s](#), meaning homo sapiens will have taken just 350,000 years to become a multi-planetary species. If the history of Earth was [shortened to a single day](#), our ascent from ape to space-farers has taken place in the final minute and 17 seconds.

We also know there are plenty of planets in our galaxy with conditions that could support life. We've already [discovered 3,200](#) in the small areas we've looked at. The final tally could be in the billions. The principle of non-exclusivity states that diversity tends to prevail unless there is a systemic mechanism preventing it, and mathematical probability also says we're not alone: according to the [Drake Equation](#), which uses a number of variables to estimate the density of cosmic life, we should be one of 20 neighbouring civilisations.

So if it doesn't take long for intelligent species to spread beyond their home planet, and there's billions of home planets out there, where is everyone?



Principles of astronomy and mathematics say advanced civilisations are nearby. So why are they hiding? JOSH GORDON/UNSPASH

This question is known as Fermi's Paradox, and it has puzzled academics for decades. There are a number of explanations. Perhaps we haven't met any other forms of intelligent life because they don't exist in our galaxy. Space is prohibitively enormous, so it's possible intelligent life exists in nearby star systems but, like us, hasn't yet figured out how to travel through interstellar space. There is also the possibility that they have and we just don't know it, or that they could figure it out if they wanted to but just can't be bothered.

[Other studies](#) argue that the distribution of life through the galaxy is not dependent on propulsion technology. Researchers have run simulations of interstellar settlement, including variables such as spacecraft velocity, and found that the natural movement of stars over a long enough time period is itself enough to create a galactic civilisation. Yet the simulations also found a large natural variability: their galaxies were either teeming with life or almost totally silent. Perhaps ours is silent; perhaps intelligent life rarely becomes space-faring; perhaps it self-destructs before it can.

Nonetheless, it seems remarkable that we have yet to gain even a hint of

another civilisation. Humanity has been inadvertently broadcasting signals into space since the invention of the radio, and stronger TV signals have reached [well beyond](#) nearby habitable planets. We're spending millions looking for similar signs of modulated radiation from other civilisations. Why haven't we at least heard something?

There is a darker explanation, one that follows the Hobbesian logic of spending billions on defence capability to protect us from each other. Maybe civilisations that give away their location don't survive.

As Chinese author Liu Cixin puts it: the galaxy is a dark forest, each civilisation a quiet hunter eliminating those it encounters before they can do the same. This explanation

may seem far-fetched. Yet it is grounded in game theory, and according to [a paper](#) from the Royal Astronomical Society, is one of only two plausible hypotheses explaining the 'Great Silence'; it provides a mechanism to systematically prevent all contact over vast time periods, is wholly consistent with all the factors in the Drake Equation, and fits our observations of the galaxy's electromagnetic environment.

This was the view taken by Stephen Hawking, who [once compared](#) possible contact with interstellar intelligent life to the arrival of Europeans in North America. Only one civilisation of the many possibly out there would need to follow this path for the theory to work, destroying all other civilisations soon after they invent the radio.

Yet Europeans didn't go to North America simply to eradicate Native American nations or because they were afraid: they were motivated by ideology and perceptions of prestige and glory. These may be our vices, the traits that push humans towards violence, but our species is actually less violent today than we have ever been, increasingly pulled towards peace by what Steven Pinker called the '[better angels of our nature](#)' – empathy, reason, self-control. Pinker argues this

“If it doesn't take long for intelligent species to spread beyond their home planet, and there's billions of home planets out there, where is everyone?”

trend is a product of the same Hobbesian logic used in the 'Dark Forest' theory.

If humans have become less violent as we've advanced, despite outbursts of war and what the news leads us to believe, then perhaps the same is true of other space-faring civilisations. As scientist David Brin [wrote](#): "It might turn out that the Great Silence is like that of a child's nursery, wherein adults speak softly, lest they disturb the infant's extravagant and colourful time of dreaming."

Australia signs on to US Moon mission

Ewen Levick | Sydney

One of the major announcements out of Prime Minister Scott Morrison's state visit to the US was the news that Australia has committed \$150 million to supporting NASA's return to the Moon.

The Artemis program aims to see 'the first woman and the next man' back on the Moon by 2024 with joint commercial missions in place by 2028. The program will use a powerful new rocket and spacecraft to take astronauts on a five-day commute to the 'Gateway', a spaceship the size of a studio apartment orbiting the Moon. Astronauts will use the Gateway as a base for manned and unmanned lunar exploration, but will not live there year-round (unlike the International Space Station).

Ultimately, this program is about more than the Moon. The Gateway will serve as a base for future missions to Mars and will help develop and prove many of the technologies and practices needed for interplanetary travel. It will also help NASA understand how to live and work on the surface of another celestial body.

\$150 million might seem like small change relative to such ambitions, but the investment has been heralded by some in [Australia's space sector](#) as 'transformational' for the economy.



A Launch Abort System with a test version of Orion attached, the spacecraft that will take astronauts on their commutes to the Moon.

NASA

"I think it's not hyperbole to say it's going to change the face of what Australia looks like 10 or 20 years from now, because it's an investment in new technologies, new scientific enterprises," Australian astronaut Andy Thomas told [Nine mastheads](#). "It's building the base for a new economy in Australia. That's the paradigm shift."

The money will be spent primarily in Australia, helping the Australian Space Agency develop a local space economy that the government hopes will be worth \$12 billion by 2030. It intends to leverage Australian expertise in robotics, automation and remote asset management, largely developed through the mining sector.

"This could add welcome political tailwinds to Australia's start-up space industry"

The idea that the investment will change the face of the Australian economy may be overstated. To put the funds in perspective, \$150 million buys just one and a half F-35 fighter jets, or six Boxer combat reconnaissance vehicles. Australian coal and iron ore exports are currently worth around \$117 billion, almost 10 times what the government hopes Australian space industry will be worth in a decade.

It does, however, indicate that the government sees space industry as a means of bolstering the economy and our alliance with the US at the same time. This could add welcome political and military tailwinds to Australia's start-up space industry. The investment is also a means of tapping into the visuals of another Moon landing to inspire the next generation of Australian scientists and engineers, which could help address STEM-qualified worker shortages.

This may be a small contribution to a giant project, but could be a forecast of investments to come.

PEOPLE ON THE MOVE

Ultra Electronics has named **Bevan Conole** as Sales and Marketing Manager. Bevan brings significant ASW and maritime systems experience from his naval career and from advisory and training roles in industry.

Ivan Slavich has been appointed as the new CEO of Soldier On, reporting to the Board. Ivan has previously been employed in various CEO positions, namely with; TransACT Communications, PARASOL and Energy Action. He has been the MD of his own company Trident Corporate Services since 2013 and was previously the Head of Retail for ActewAGL.

MOST READ ONLINE AT WWW.AUSTRALIANDEFENCE.COM.AU



1. [Rheinmetall and Hanwha shortlisted for Land 400 Phase 3](#)
2. [The reasons behind the Land 400 Phase 3 decision](#)
3. [A closer look at Land 400 Phase 3 and Land 8116](#)
4. [First new VIP aircraft for RAAF nears completion](#)
5. [Boeing Defence Australia chief Darren Edwards passes away](#)

Electric VTOL is a game changer

Lincoln Parker | Sydney

This August the Australian movie [Danger Close: The Battle of Long Tan](#) was released, revealing the most recognised Australian battle of the Vietnam War. It was a significant pitched conflict in a war that had hitherto been defined primarily by guerrilla tactics and small contacts.

At the end of the day, an Australian infantry company of 108 men had survived an unexpected encounter with two Viet Cong formations numbering over 1,000 soldiers and beat them.

During the battle the critical issues of resupply and evacuation of wounded soldiers favoured the Australians due to the intense rain. The heavy rain provided crucial cover to our helicopters, enabling munitions and other supplies to be delivered and the wounded to be evacuated. The outcome might have been very different without the helicopters, but what would have happened were the sun shining instead? Helicopters are large targets, very noisy and will not land during a firefight.

In part, this is what inspired former RAN aeronautical engineer Andrew Moore to design and develop an autonomous electric vertical take-off and landing (eVTOL) aircraft. I recently sat down with Andrew to hear more about his innovations, work with Defence and the [Defence Innovation Network](#). Andrew explained his initial inspiration emerged in response to an Army requirement to evacuate a



Vertiia emerged in response to an Army requirement to evacuate a casualty in a way that doesn't put a helicopter and its crew at risk.

ANDREW MOORE/AMSLAERO

casualty and resupply soldiers in combat with critical cargo in a way that doesn't put a helicopter and its crew at risk.

Moore named the product [Vertiia](#) and, partnering with [Mission Systems](#) to provide the sensing and autonomous architecture, submitted a Defence Innovation Hub proposal, winning a Phase 1 contract to explore the concept for Army application. Similar to a tilt rotor the aircraft takes off and lands vertically and then flies efficiently on wing lift, like an aeroplane. Andrew designed the aircraft based on the box wing, which evolved from Australian aeronautical pioneer [Lawrence Hargrave's](#) box kite glider.

Moore explains that the box wing is the single most efficient aerodynamic design, perfect for an eVTOL aircraft. It is structurally and aerodynamically efficient, providing a lightweight, very fast aircraft with quite a high payload, he said. This design enables it to fly at very low altitudes at a cruising speed of 300 kph, and do it quietly. The system is designed to map out the optimum route autonomously, which includes avoiding areas where an enemy might be, taking

advantage of terrain to stay out of harm's way.

What this means in an operational sense is that a commander who needs an urgent resupply or a medivac, would demand Vertiia and forget about it. If it's within 100km it will arrive within 20 minutes in near silence, having identified a suitable landing site within the vicinity autonomously.

Once landed, supplies can be unloaded and a casualty with a medic can be put on the aircraft. It will automatically return to base to ensure the casualty is treated within the [golden hour](#).

The advantages over helicopters are significant. The simple design is also cost effective, without all the moving parts and over-engineering of a helicopter. Vertiia's electric motors don't require the same maintenance and are far cheaper to run. There are no pilots to train, and although the model does have the option to be flown if/when needed, Andrew says the effort required is far easier than any helicopter.

Moore is also testing hydrogen fuel cells for future versions of the Vertiia, providing significant range advantages (out to 800km). And as the model was designed from the outset to be operated from ships it will provide commanders with many new options from rapid transport, surveillance and loitering capabilities to armed attack.

When Vertiia gets off the ground it will not only disrupt the role of helicopters and traditional VTOL aircraft like the [V-22 Osprey](#), but like many military developments it will find its way into the commercial world challenging our current modes of transport, including commercial airliners.

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.

"A commander who needs an urgent resupply or a medivac, would demand Vertiia and forget about it"



An unarmed Minuteman III intercontinental ballistic missile launches during an operational test on Vandenberg Air Force Base.

US DOD

Boeing willing to lobby US government on missile defences

Frank McCall, Boeing's director of strategic deterrence systems, has warned that his company is willing to lobby the US Air Force and Congress to secure a share in the Ground Based Strategic Deterrent (GBSD) program.

The GBDS will replace the aging LGM-30 Minuteman III intercontinental ballistic missile fleet, which entered service in the 1970s with an initial 10-year service life. The Air Force intends to invest US\$570 million next year for a preliminary design of the Minuteman's successor, a major component of the American nuclear triad.

Boeing withdrew from the competition last July, on the basis that its only remaining rival bidder Northrop Grumman enjoyed an unfair advantage since acquiring solid rocket motor manufacturer Orbital ATK.

"Boeing is tempted to force Northrop Grumman's hand into collaboration in order to preserve its share in the US defence market," Nicolas Jouan, Aerospace and Defence Analyst at GlobalData, said. "GlobalData's latest US Defence Market report reveals that the company will rank first in research and development related expenditures, but will be third in platforms acquisition related expenditures with 16 per cent market share, far behind first place Lockheed Martin on 34 per cent.

"Boeing is a historic player of the US missile defence market, and is not ready to lose without a fight.

"Boeing is tempted to force Northrop Grumman's hand into collaboration"

"Isolation is a danger for Boeing, also confronted to multiple setbacks in other segments of the market," Jouan added. "The F-15EX is still to be sold to Congress as a credible fighter alternative and the KC-46 Pegasus suffers major technical issues, while the grounding of the B-737 MAX badly impacted the company's commercial business."

Northrop Grumman and Boeing are in the running for Australia's [Air 6500](#), which will see the development and integration of a Joint Battle Management System (JBMS) that will interconnect the many disparate platforms, systems and sensors across the air, land, sea, space, electromagnetic and cyber domains into a collaborative environment that provides shared situational awareness of the battlespace.

Boeing tests unmanned aerial refueller

Boeing and the US Navy have successfully completed the first test flight of the MQ-25 unmanned aerial refueller.

The [MQ-25 test asset](#), known as T1, completed the autonomous two-hour flight under the direction of Boeing test pilots operating from a ground control station at St. Louis Airport, where the test program is based.

The aircraft completed an autonomous taxi and take-off and then flew a pre-determined route to validate the aircraft's basic flight functions and operations with the ground control station.

"Seeing MQ-25 in the sky is a testament to our Boeing and Navy team working the technology, systems and processes that are helping get MQ-25 to the carrier," Boeing MQ-25 Program Director Dave Bujold said. "This aircraft and its flight test program ensures we're delivering the MQ-25 to the carrier fleet with the



The Boeing-owned test asset is being used for early learning and discovery.

BOEING

safety, reliability and capability the US Navy needs to conduct its vital mission.”

The Boeing-owned test asset is a predecessor to the engineering development model (EDM) aircraft and is being used for early learning and discovery to meet

the goals of the US Navy’s accelerated acquisition program. Boeing will produce four EDM MQ-25 air vehicles for the US Navy under an \$805 million contract awarded in August 2018.

The MQ-25 will provide the US Navy with a much-needed carrier-based unmanned aerial refuelling capability. It will allow for better use of the combat strike fighters currently performing the tanking role and will extend the range of the carrier air wing.

“[This] flight is an exciting and significant milestone for our program and the Navy,” Unmanned Carrier Aviation Program Manager Captain Chad Reed said. “The flight of this test asset two years before our first MQ-25 arrives represents the first big step in a series of early learning opportunities that are helping us progress toward delivery of a game-changing capability for the carrier air wing and strike group commanders.”

“The flight of this test asset two years before our first MQ-25 arrives represents the first big step”

Portrait of VC winner put on permanent display

A portrait of Victoria Cross recipient Cameron Stewart Baird will be put on permanent display at an ADF base named in his honour.

Serco Defence has accepted delivery of the painting from the artist George Petrou and will support its transfer to the forward operating base at Al Minhad Air Base (AMAB), in the United Arab Emirates, named Camp Baird in 2014 to honour the fallen hero.



Serco Defence Managing Director Clint Thomas; Doug Baird, father of CPL Cameron Baird VC MG; Michael Madden, author of *The Victoria Cross: Australia Remembers*; George Petrou, the artist.

SERCO

Corporal Baird was a soldier in the Australian Army who was tragically killed whilst on operational service in 2013 in Afghanistan. He was posthumously awarded the Victoria Cross for Australia and is the 100th Australian to be bestowed the pre-eminent award.

The portrait was formally received by Serco Defence Managing Director Clint Thomas at a special event at the Australian National Veterans Art Museum (ANVAM) in Melbourne. Corporal Baird's father Doug Baird attended the presentation,

along with Chairman and Director of the ANVAM Mark Johnston, and Brigadier David Smith representing the ADF.

Thomas said he was pleased to see the portrait going to a base that honours the service and sacrifice of Corporal Baird.

"Serco is proud to have been supporting the ADF and its members in the Middle East for more than eight years. I am very pleased that we have been able to play a small part in ensuring this wonderful painting of Corporal Baird can be put on permanent display in the forward operating base that proudly bears and honours his name".

"We appreciate the gesture by Serco to build on Corporal Baird's memory and legacy through art," Johnston said. "Memorialising him in this way provides a link to Corporal Baird's own connection to the arts, most famously through his emotional musical tribute to his mate, Private Luke Worsley, which is just one of many ways Corporal Baird will be remembered."

"We appreciate the gesture by Serco to build on Corporal Baird's memory and legacy through art"

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PUBLISHED BY

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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

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.

2019 C.E.W. Bean Oration and Dinner

Date 15 October

Location Australian War Memorial

Website www.trybooking.com/book/sessions?eid=528447&ses=1570182

Mr Rodney Cavalier Chair of the Foundation, and Members of the Board invite you and your guest to the 2019 C.E.W. Bean Oration and Dinner. This year's oration, "Why it's crucial to have media on the battlefield" will be delivered by General the Honourable Sir Peter Cosgrove.

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?

70th International Astronautical Congress

Date: 21 – 25 October 2019

Location: Washington D.C., USA

Website: <http://www.iafastro.org/events/iac/iac-2019/>

It is with great pleasure that the International Astronautical Federation (IAF) invites you to the 70th annual International Astronautical Congress (IAC). #IAC2019, hosted by the American Institute of Aeronautics and Astronautics – AIAA will take place in Washington D.C., United States from 21 – 25 October 2019.

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.

Collaborative Technology Showcase: “Conquering the Tyranny of Distance”

Date 25 October

Location The Venue, Fannie Bay

Website tamara.cardillo@baesystems.com

Following ADM's Northern Australia Defence Summit in Darwin, BAE Systems Australia's shipbuilding unit, ASC Shipbuilding, is inviting local businesses to come and view Australian companies' latest cutting-edge innovations and hear from exhibitors how their next-generation technologies can help conquer the tyranny of distance.

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.

GEO Week 2019

Date: 4 – 9 November 2019

Location: Canberra

Website: <http://geoweeek2019industrytrack.com.au/registration.php>

Technology and space companies from around the world are invited to participate in the Group on Earth Observations (GEO) 'GEO Week 2019' as part of the brand new Industry Track. GEO Week 2019 will be held in Canberra, Australia, from 4-9 November 2019.

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.

National Defence Industry & Workforce Skilling Summit

Date 6-7 November 2019

Location Perth

Website www.eventbrite.com.au

The National Defence Industry & Workforce Skilling Summit will be held in Perth from 6-7 November 2019. Join representatives from government, industry, academia and peak industry bodies, to explore the complex skills challenges facing Australia's defence industry.

Defence Ipswich Supply Chain Opportunities Symposium 2019

Date: 08 November 2019

Location: Ipswich

Website: <https://live.eventtia.com/en/defenceipswichsymposium2019/Home/>

Following the successful Queensland Defence Summit Ipswich 2018, Ipswich City Council, proudly supported by the City of Ipswich Defence Industry Development & Attraction Committee, will host our next annual event, the Defence Ipswich 2019 Supply Chain Opportunities Symposium. The event brings together defence and industry participants from government, industry and academia to exchange information and connect with key decision makers over networking and B2B sessions.

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).

Defence Seaworthiness Symposium

Date 21-22 November

Location ADFA, Canberra

Website www.defence.gov.au/seaworthiness/Contact_Symposium.asp

The Office of the Defence Seaworthiness Regulator is hosting the inaugural Defence Seaworthiness Symposium in Canberra 21-22 November 2019. The theme of the symposium is 'Reforming to Transform – Seaworthiness as a Defence wide priority'. Day 1 will consist of an address from VADM Michael Noonan and presentations from Capability Managers and their representatives as well as an informative panel discussion. Day 2 will consist of 2 concurrent workshops facilitated by staff from the Office of the Defence Seaworthiness Regulator. Places are strictly limited.

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.

The 26th Session of the Asia- Pacific Regional Space Agency Forum

Date: 26 – 29 November 2019

Location: Nagoya, Japan

Website: https://www.aprsaf.org/annual_meetings/aprsaf26/meeting_details.php..

The 26th Session of the Asia-Pacific Regional Space Agency Forum (APRSAF-26) will be held in Nagoya, Japan from 26-29 November 2019.

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.