

# ADM

AUSTRALIAN DEFENCE MAGAZINE

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## DEFENCE WEEK PREMIUM EDITION



A file photo of the aftermath of an explosive ordnance disposal mission during the Gulf War in 1991

DEFENCE/UNKNOWN PHOTOGRAPHER

## WAR WITH CHINA IS NOT INEVITABLE

The deterioration of Australian relations with China over the past year are well-documented, ranging from tariffs on major exports to lists of demands and frozen diplomacy. In some quarters this rapid decline is seen as an accelerant towards an open conflict with China.

**EWEN LEVICK | ANALYSIS**

Peter Jennings, ASPI's executive director, has said that Australia must be prepared to 'fight our corner' as the Chinese Communist Party looks to retake Taiwan by 2049, the centenary of its rule.

"Whatever Biden does about Taiwan, he will expect

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Japan and Australia to be there,” Jennings said. “There is no exit strategy from our own region.”

Perhaps most concerning is that a Taiwan contingency is no longer the worst-case scenario for Australia. In his memoir, as an example, former Prime Minister Malcolm Turnbull said he worried about the possibility of losing a RAN warship in the South China Sea.

“The People’s Liberation Army Navy knows that if it conflicts with a US ship, it runs the risk of rapid escalation into full-blown conflict,” Turnbull wrote. “But an Australian ship is a different proposition altogether.”

As talk of a war with China grows louder, at times it seems we’re almost resigned to the possibility, or desensitised to it, as if open battle with a nuclear-armed superpower in the next three decades is a foregone conclusion. But that may not be the case.

### “I’M ALMOST AS WORRIED BY THE HAWKS AS I AM BY THE CHINESE”

“We’re not going to wake up tomorrow morning and China’s unilaterally decided to attack Australia,” Andrew Davies, ASPI Senior Fellow and former Director of the Defence and Strategy Program, said to ADM. “There’s zero chance of

that. Everything we’ve seen about Chinese aggression and assertiveness in the last few years has been in the grey zone. It’s really hard to see them suddenly upping the stakes, especially against an American ally. It’s a very dangerous game for them.”

According to Davies, it’s also possible that the US may not actually defend Taiwan should Beijing attempt forceful reunification.

“The only thing that would cement America’s position as a major power in the western Pacific would be to fight a war and convincingly win it,” Davies said. “As the risk/reward for the US gets progressively worse in the Taiwan Strait, it becomes harder and harder for the US to convince itself [to go to war].

“Analysts often say that the Chinese Communist Party can’t afford to fight a war and lose – in terms of its credibility and the narrative it tells its people – but to some extent that’s true of the US as well.”

Some would make the counter-argument that the US can’t afford to surrender Taiwan given the implications that would have on its security guarantees for other nations, including Australia. But Davies argues the nature of Washington’s relationship with Taipei may provide a plausible exit strategy.

“The US has always had a policy of strategic ambiguity over Taiwan,” Davies said. “They don’t have a treaty level relationship with Taiwan like they do with Japan or



Australian warships in the South China Sea during the Regional Presence Deployment 2020.

Defence

Korea or Australia.

"I don't get clear answers talking to Americans about it. American naval strategists have said in the last five years [they] could fight and prevail in the Taiwan Strait. But that gets harder with every passing year."

So if the possibility of Washington deciding to go to war over Taiwan is actually fading with time, what does that mean for Australia?

"I think we would be stupid to sleepwalk into a major war," Davies said. "I'm almost as worried by the hawks as I am by the Chinese. We need to do some serious thinking about what an end state we could live with looks like."

"Chinese power is not going away. There's 1.3 billion Chinese people, four times as many as there are Americans, so each Chinese person only has to be 25 per cent as productive as an American and the economy is the same size."

And what might that end state look like?

"I don't think we need to give China a blank cheque in terms of power and influence," Davies said. "If it became clear that the West's approach was to avoid conflicts at all cost, that's probably an error too. It's a balancing act."

"Teddy Roosevelt probably had it right; speak softly and carry a big stick."



# SPACE: ELECTROMAGNETIC WARFARE IN A NEW ELECTROMAGNETIC ENVIRONMENT

Space is globally recognised as being critical to economic success, national security, and societal well-being and has recently been identified as a warfighting domain in Australia's Defence Force Structure Plan 2020. The ability to operate with freedom and confidence in the space domain is of strategic importance and careful thought and planning should be given to the technologies, systems and methods needed to ensure this.

PROFESSOR JACKIE CRAIG | ADELAIDE

Electromagnetic Warfare (EW) is a vital and proven capability for operating successfully in complex, contested environments. In the space domain EW has the potential to be a game changer due to its non-kinetic force protection and force projection capabilities that avoid the generation of space junk.

Space presents us with a new electromagnetic environment where the absence of an atmosphere relaxes constraints associated with electromagnetic propagation, opening up the possibility of new sensing, communication, force protection and force projection capabilities. There is significant potential for technological and strategic surprise, with



The unique environment of space opens new possibilities for electronic warfare.

PIXABAY

emerging threats, opportunities and challenges for those nations wishing to operate in the congested and contested 'Global Commons of Space'.

Space EW will have some fundamental differences. It will operate throughout the entire electromagnetic spectrum (EMS), i.e. will be *spectrum ubiquitous*, and will be *perpetual* to match the perpetual nature of the threat landscape. This article discusses some of the potential new technologies, systems and techniques that may emerge and makes the case for the development of a Space EW capability roadmap. It is through such a roadmap that we can ensure that in the space domain, the opportunity will outweigh the threat.

### A New EM Environment

Figure 1 is a schematic representation of the atmospheric transmission of electromagnetic radiation from 100nm to 10cm wavelength. Absorption is the dominant mechanism that leads to poor transmission but other factors such as scattering and turbulence can also impact system performance.

Traditionally, any electromagnetic (EM) based systems (e.g. radars, electro-optic imagers and communications systems) with medium to long range performance requirements are restricted to operating in wavebands of very high transmission (known as atmospheric windows). The very low transmission regions are rarely exploited but can support boutique applications such as UV solar blind missile warning, and millimetre wave (mmW) high-bandwidth, short distance, covert communications.

In the absence of an atmosphere it is theoretically possible for mid to long range systems to appear at any wavelength and performance envelopes are no longer limited by effects such as scattering and turbulence. For example: we can expect to see

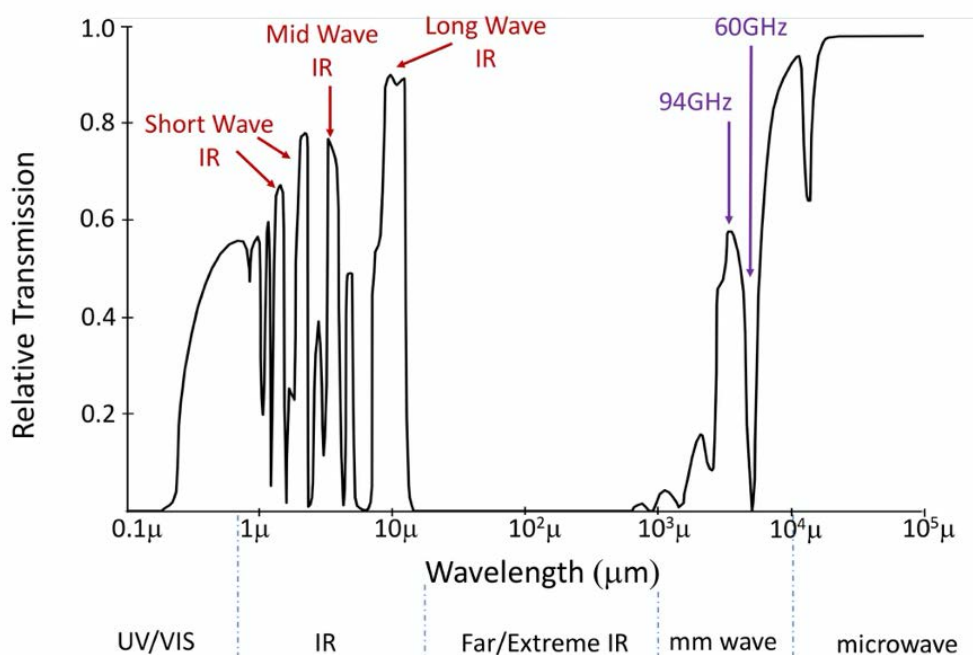


Figure 1

JACKIE CRAIG



long range radar and communications systems appear across the entire mmW band (1mm-10mm); the Infrared (IR) region is no longer “fragmented” enabling remote spectroscopy across the full IR range, potentially leading to new IR imaging and measurement and signatures intelligence (MASINT) capabilities; and laser systems, free from the atmospheric effects that cause scintillation, beam wander and beam distortion, are likely to have an increased presence for high speed communications, sensing and countermeasures applications.

### **EW in a new environment**

As space faring nations develop their space capabilities, spectrum superiority will be key to maximising opportunities and minimising threats. Space EW faces the significant challenge of operating throughout the entire electromagnetic spectrum, driving

the need for new EW techniques, technologies and systems. Insight into the nature of space EW challenges can be gained by placing some of the potential emerging space capabilities in context.

As a first example, in the future we may see the emergence of Artificial Intelligence (AI) enabled sensor network systems embedded in the space environment that are designed to provide a more detailed and timely space situational awareness capability, including information on satellite design and activity. Such systems would consist of passive (EO/IR) sensors coupled with

narrow beam mmWave radars and ladars. EW systems such as radar warners receivers and laser warner receivers can provide warning of this occurring and support surveillance countermeasures.

However there are some complex issues to consider including the impact of the broader waveband coverage and the satellite real estate needed to host EW systems in an era where the trend is towards smaller satellites. Possible solutions to consider would be: distributing EW sensors amongst satellites and sharing the data, dedicated EW satellites, and development of multifunction software-defined sensing systems that include EW functions.

Second, as nations establish a presence on the moon there is likely to be a move towards establishing observation systems to monitor the facilities and activity of others. Development of passive countermeasures to this will require significant effort be invested in building signature databases across all wavebands and in understanding the physical (including thermal) characteristics of the environment. For example signature management of surface tracks made by vehicles will present a challenge as these will have a very long half-life and are an effective means of activity monitoring.

Third, communications traffic analysis can also reveal information on activity and intent. Blue force tracking, an essential element of personnel safety, is vulnerable to traffic analysis. The absence of an atmosphere removes the option of exploiting absorption to provide short range, covert communications and will place more emphasis on other techniques such as a very narrow beam laser communications.

**“AS SPACE FARING NATIONS  
DEVELOP THEIR SPACE CAPABILITIES,  
SPECTRUM SUPERIORITY  
WILL BE KEY TO MAXIMISING  
OPPORTUNITIES AND MINIMISING  
THREATS”**

Space EW must evolve at the same, or at a greater pace, than space capabilities if we are to avoid being in a reactive, rather than proactive mode in responding to threats and challenges. There is a very large and complex range of fundamental science, technology, systems and concepts development that will be required. It is recommended that a detailed roadmap be developed to determine the areas of investment to best evolve a future space EW capability.

*Note: Jackie Craig is an adjunct professor at Flinders University and a non-executive director of the SmartSat CRC. Craig previously worked in DSTG and was Chief Electronic Warfare and Radar Division and the founding Chief of Cyber and Electronic Warfare Division.*

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## AUSTRALIA COMMITS TO THREE MORE LOYAL WINGMEN

**The Australian government and Boeing Australia will co-develop a further three Loyal Wingman aircraft to advance the air-teaming vehicle, payloads and associated support and training capabilities.**

The agreement will increase the aircraft's production capability to six aircraft for the RAAF and is valued at \$115 million over three years.

The Loyal Wingman is the first military combat aircraft to be designed, engineered and manufactured in Australia in more than 50 years.

"The Australian government's continued investment in the innovative Loyal Wingman



The Loyal Wingman took flight for the first time recently.

BOEING

## PEOPLE ON THE MOVE

The Defence Teaming Centre have this month appointed Lee Kormany, General Manager – Maritime, Land and Future Systems, as Vice Chair. Before her current role at Nova Systems, Lee was in the RAN for 21 years as a Weapons Electrical Engineering Officer, transferring to reserves in 2015.

program will create jobs and opportunities for over 35 Australian suppliers and small businesses, including BAE Systems Australia, RUAG Australia, AME Systems and Ferra Engineering,” Brendan Nelson, president of Boeing Australia, NZ & South Pacific, said.

**“WE WILL FURTHER DEVELOP THE  
AIRCRAFT’S MISSION SYSTEM  
INCLUDING ADVANCED AI  
DECISIONMAKING CAPABILITIES  
AND NEW PAYLOADS”**

The contract will support the maturation of the aircraft design, evolution of current and future payloads, and create the sustainment system for the aircraft in operations. It will also advance Airpower Teaming System advanced concepts through digital testing and demonstration.

“In addition to progressing the air vehicle design and support system, we will further develop the aircraft’s mission system including advanced AI decision-making capabilities and new payloads,”

Dr Shane Arnott, program director of the Boeing Airpower Teaming System, said. “Continued digital engineering and significantly expanded live testing of the system will provide RAAF and Boeing with the ability to jointly take the concept to the next level, activities that are critical for us to rapidly understand how the Airpower Teaming System can be employed in the future battlespace.”



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# ROCKET LAB ANNOUNCES PLANS TO GO PUBLIC AND NEW ADVANCED ROCKET

**Launch company Rocket Lab announced on Monday that it will become publicly traded through a merger with Vector Acquisition Corporation.**

The merger will value Rocket Lab at US\$4.1 billion and is expected to close in the second quarter of 2021, upon which Vector will change its name to Rocket Lab USA and the combined company will trade under the Nasdaq ticker symbol RCLB.

The company has also revealed the launch of its advanced new medium-lift rocket, Neutron, tailored for mega-constellation deployment, interplanetary missions and

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**“THE MERGER WILL FUEL THE DEVELOPMENT OF ROCKET LAB’S ADVANCED NEW ROCKET, NEUTRON”**

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human spaceflight. Neutron will be a fully reusable launch vehicle with an 8-ton payload lift capacity.

The new rocket will build on Rocket Lab’s experience developing the Electron launch vehicle, the second most frequently launched US rocket annually since 2019.

“Where Electron provides dedicated access to orbit for small satellites of up to 300 kg, Neutron will transform space access for satellite constellations and provide a dependable, high-flight-rate dedicated launch solution for larger commercial and government payloads,” the company said in a statement.

Neutron will be able to lift more than 90 per cent of all satellites forecast to launch through 2029 and introduce highly disruptive lower costs to the high-growth constellation market.

Proceeds from the merger with Vector are also expected to fund organic and inorganic growth in the space systems market and support expansion into space applications enabling Rocket Lab to deliver data and services from space.

Rocket Lab forecasts that it will generate more than \$1 billion USD in revenue by 2026.



Rocket Lab CEO Peter Beck and the company's new advanced rocket, Neutron. BUSINESS WIRE/ROCKET LAB

# RSL EMPLOYMENT PROGRAM SECURES JOBS FOR VETERANS

**An RSL initiative that takes a holistic approach to veteran employment rolls out across Australia this month, following success in Queensland, Victoria and SA.**

The RSL Employment Program not only helps veterans find work but offers an array of supporting services such as financial counselling, employment for partners and mental health support to empower veterans to remain in work.

RSL Queensland General Manager Veteran Services Rob Skoda said the program, based on a successful program piloted in Townsville, Queensland in 2017, has just launched in NSW and the NT with Tasmania to follow in mid-March.

**“DEFENCE PERSONNEL HAVE A WEALTH OF SKILLS AND EXPERIENCE THAT BENEFIT CIVILIAN BUSINESSES”**

“Every year, around 5,500 defence personnel leave the military for various reasons and unfortunately, a proportion of veterans struggle to find and maintain work,” Skoda said.

“The RSL Employment Program is designed to provide holistic and comprehensive support that address the unique challenges faced when transitioning from a defence career into a civilian workforce.

“The program’s approach has seen incredible success in Queensland, Victoria and SA, with 400 veterans so far securing jobs, plus a 150 per cent growth in enquiries and a remarkable 15 per cent growth in job placement in 2020, during a COVID-disrupted year.”



Energy Queensland are one of the latest to sign on a number of veterans through the RSL Employment Program.

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The roll out of the RSL's Employment Program across the country has been made possible through a \$6 million grant from the Australian Government, through the Enhanced Employment Support for Veterans grants program.

RSL National President, Greg Melick said former Defence personnel have a wealth of skills and experience that benefit civilian businesses, from technical and trade qualifications to corporate leadership.

"Veteran welfare is at the heart of everything RSL does and we welcome this comprehensive and holistic approach to addressing a major issue for our Defence family," Melick said.

"When employers hire a veteran, they are hiring a committed employee who embodies team spirit, has a strong work ethic and is both an effective leader and team member." Employers already on board with the program include Australia Post, Ergon Energy/Energex, Suncorp, Wodonga TAFE, Boeing, BAE Systems and Brisbane Motorways Services.

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**LUMINACT**



Q-CTRL will apply these quantum technologies in coordination with Fleet Space Technologies.

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## AUSTRALIAN SPACE CONSORTIUM TO LEVERAGE QUANTUM- BASED TECHNOLOGIES

**Q-CTRL, a start-up that applies the principles of control engineering to power quantum technology, has announced it will provide the first quantum sensing and navigation technologies for space exploration beginning with un-crewed lunar missions by the Seven Sisters space industry consortium in Australia.**

Commencing in 2023, the missions are designed to find accessible water and other resources in support of NASA's Artemis program to land the first woman and next man on the Moon by 2024 and create a sustainable human presence for later crewed Martian exploration.

Q-CTRL will apply these quantum technologies for use in space in coordination with Fleet Space Technologies, a nanosatellite start-up and founder of the Seven Sisters consortium. The consortium is composed of Australian firms and academic institutions developing advanced exploration technologies for Earth, the Moon and Mars.

Q-CTRL will contribute new high-performance remote sensing payloads in upcoming lunar missions and beyond. Key applications will include remote detection of liquid water and mineral deposits through quantum-based gravity detection and magnetic field sensors. Quantum-enhanced precision navigation and timing (PNT) will also be deployed





Q-CTRL will apply these quantum technologies in coordination with Fleet Space Technologies.

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to provide guidance for long-endurance missions with limited telemetry contact.

“Our focus on quantum control engineering is enabling new applications in quantum sensing that were previously impossible. Quantum control is enabling small form factors, enhanced robustness, and the necessary autonomy to meet the strict requirements of un-crewed space applications,” Q-CTRL CEO Michael Biercuk said. “Quantum-control-defined sensors give us the ability to provide valuable new geospatial intelligence services – whether on Earth or on celestial bodies.”

**“KEY APPLICATIONS WILL INCLUDE  
REMOTE DETECTION OF LIQUID  
WATER AND MINERAL DEPOSITS”**

“We wish to welcome Q-CTRL to the exciting world of space exploration,” Fleet Space CEO Flavia Tata Nardini said. “They have the proven expertise to deliver advanced quantum technology solutions that will enable our missions to achieve goals that would otherwise have been unattainable.”

Q-CTRL says it plans to leverage its work with the space consortium to offer new commercial applications of geospatial intelligence for defence, finance, and climate change mitigation.



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Serco Defence Managing Director Clint Thomas and Sayres Australia CEO Craig Powell signing a Memorandum of Understanding.

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## SERCO AND SAYRES ALLIANCE AIMS TO BOLSTER NAVY CAPABILITY

**Serco Australia and Sayres Australia have signed a memorandum of understanding to explore improved training delivery solutions and identify efficiencies to bolster Navy capability.**

**“TOGETHER, SERCO AND SAYRES AIM TO REIMAGINE HOW, WHEN, WHERE, AND WHY TRAINING IS DELIVERED”**

At a signing yesterday, Serco Defence Managing Director Clint Thomas said Serco and Sayres’ complementary capabilities and wealth of ‘at sea’ and ‘shore-based’ training experience will help Navy better prepare its personnel for duty.

“Serco has been providing high-quality simulator-based maritime warfare training and training support services on behalf of the RAN at HMAS Watson since 2003,” Thomas said. “We have a deep understanding of Navy’s training requirements, program challenges and future training developments, and our alliance with Sayres will allow us to design further improved solutions that will deliver the best possible outcomes for Navy personnel well into the future.”

Sayres Australia CEO Craig Powell said that with Navy embarking on constant evolution in warfare techniques and new technologies, it was important to ensure that Australia's officers and sailors are empowered to unlock the full spectrum of operational capabilities that future systems offer.

"Together, Serco and Sayres aim to reimagine how, when, where, and why training is delivered and the technologies we can bring to Navy's training requirements for optimal effectiveness, positioning Navy to remain ahead of changing technology solutions associated with the Government's continuous shipbuilding strategy," Powell said.

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# FORTHCOMING EVENTS

## ADM EVENTS

More detail on ADM Events can be found on our [dedicated website](#).

- [Defence Estate and Base Services Summit](#) – 07 July 2021, Hotel Realm | Canberra
- [STEM in Defence Summit](#) – 16 August 2021, Emporium Hotel | Brisbane
- [Northern Australia Defence Summit](#) – 28 October 2021 | Darwin

## AAUS RPAS IN AUSTRALIAN SKIES 2021

**DATE** 09-11 March 2021  
**LOCATION** Hotel Realm Canberra  
**WEBSITE** [aaus.org.au/rpas-in-australian-skies-2021](https://aaus.org.au/rpas-in-australian-skies-2021)

The Australian Association for Unmanned Systems' "RPAS in Australian Skies 2021" conference is an important strategic event aimed at the continuing discussion on the safe integration of RPAS into Australian Airspace. It is supported by key government and industry participants and has established itself as a landmark event in the Australian RPAS calendar.

## MARCH 2021 AVIATION AUCTION

**DATE** 12 March 2021  
**LOCATION** 80 Beach Road, Lara, Victoria  
**WEBSITE** [australianfrontlinemachinery.com.au/march-2021-aviation-auction](https://australianfrontlinemachinery.com.au/march-2021-aviation-auction)

With Australian Frontline Machinery – This huge ex-Military Aviation Auction includes 8 Pilatus PC-9/A Aircraft, 4 Schleicher ASK 21 Mi Gliders, an Aermacchi MB-326 'Macchi' grounded Jet Training Aid and over 200,000 Spare Parts direct from ADF up for auction on the 12th March 2021. Please check individual listings for each aircraft. Inspection held on 15th – 19th March 2021\*. Inspection advised, video inspections available. \*Subject to change

## CHANGING OUR WORLD



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## **BATTLEPLAN FOR LAND FORCES**

**DATE** 23 March 2021  
**LOCATION** Online  
**WEBSITE** [www.eventbrite.com.au](http://www.eventbrite.com.au)

With the upcoming Land Forces 2021 being held in Brisbane, AIDN has designed a workshop to assist AIDN members and the wider Defence Industry community to plan their individual organisations' journey to Land Forces in June 2021. This interactive workshop will include targeted trade show and marketing information, and attendees will be provided with a number of electronic templates and tools.

## **LOCATE21**

**DATE** 30 March – 1 April 2021 (rescheduled dates)  
**LOCATION** Brisbane Convention and Exhibition Centre  
**WEBSITE** [locateconference.com/2021](http://locateconference.com/2021)

Due to COVID-19, Locate20 has been rescheduled for Locate21 happening in Brisbane March 30 – 1 April 2021. The event will focus on how geospatial technologies are intersecting with business, Government and defence to address national challenges. It's Australia's premier spatial conference with the inclusion of over 50 inspiring thought-leaders including speakers from government, academia, the defence force, technology, mining, natural resources and more. We believe this conference is of interest to defence personnel.

## **CHIEF OF ARMY SYMPOSIUM**

**DATE** 19-20 April 2021  
**LOCATION** Brisbane Convention and Entertainment Centre

In previous years, the Chief of Army's Land Forces Seminar (CALFS) was an event focused on counterpart engagement and featured as part of the broader Land Forces Exposition. In 2021, the Chief of Army's Symposium (CAS) will replace CALFS and will include a number of activities focused on partnerships, technology, innovation and people. It is scheduled to be held at the Brisbane Convention and Entertainment Centre over the period 19-20 April.

## ARMY ROBOTICS EXPOSITION 2021

**DATE** 20 April 2021

**LOCATION** Brisbane Convention and Entertainment Centre

Army is hosting the Army Robotics Exposition 2021 (ARX 2021) to facilitate observation and demonstration of RAS concepts and technologies. ARX 2021 will provide an opportunity for Defence personnel including Capability Manager Delegates to view available technologies and innovations which may be applied to the future operating environment.

## TRUSTED AUTONOMOUS SYSTEMS SYMPOSIUM 2021

**DATE** 20-22 April 2021

**LOCATION** Townsville

**WEBSITE** [tasdcrc.com.au/symposium2021](https://tasdcrc.com.au/symposium2021)

Trusted Autonomous Systems is pleased to launch information and registrations for the Accelerating Trusted Autonomous Systems Symposium, 20-22 April 2021 at 'The Ville' Townsville. There will be a breadth of perspectives on offer and interactions for those in academia and industry to senior Australian Defence Force (ADF) in leadership roles in Robotics, Autonomous Systems and Artificial Intelligence (RASAI). The Symposium is focussed toward a physical audience with a comprehensive technical capability to support virtual attendance and participation.

## HUNTER DEFENCE CONFERENCE

**DATE** 22-23 April 2021

**LOCATION** Crown Plaza, Hunter Valley

**WEBSITE** [www.hunterdefence.org.au](http://www.hunterdefence.org.au)

The Hunter Defence Conference will be held in April next year at the Crown Plaza in the Hunter valley. More details will be available soon.



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## **LAND FORCES 2021**

**DATE** June 1-3 2021  
**LOCATION** Brisbane Convention Centre  
**WEBSITE** [landforces.com.au](http://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 2021 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.

## **ROTORTECH 2021**

**DATE** 15-17 June 2021  
**LOCATION** Royal International Convention Centre, Brisbane  
**WEBSITE** [rotortech.com.au](http://rotortech.com.au)

The new dates for Rotortech will be Tuesday 15 June to Thursday 17 June 2021. The venue, the Royal International Convention Centre in Brisbane, is unchanged. Rotortech is the region's premier helicopter and unmanned flight systems showcase and forum, featuring more than 100 participating companies and key speakers from industry and government. We believe that deferring Rotortech to its new June 2021 dates will achieve this goal by moving the event to a time where the COVID situation will have improved and the current uncertainties will have passed.

## **PROJECT AND PROGRAM MANAGEMENT SYMPOSIUM**

**DATE** 10-12 August 2021 (rescheduled dates)  
**LOCATION** Canberra Rex Hotel  
**WEBSITE** [pgcsymposium.org.au](http://pgcsymposium.org.au)

Foresight is more valuable than hindsight! PGCS 2021 is designed to help project and program managers, and their sponsors and senior managers, develop the skills and understanding needed to deliver projects success in the next decade. Creating the organisational capability needed to underpin the consistent delivery of successful projects in the 2020s starts at the top. Now in its 8th year, PGCS 2021 will focus on ways to build the foundations needed to create project and program success

**AVALON 2021**

**DATE** 23-28 November 2021  
**LOCATION** Avalon Airport  
**WEBSITE** [www.airshow.com.au/airshow2021](http://www.airshow.com.au/airshow2021)

The Australian International Airshow and Aerospace & Defence Exposition is one of Asia-Pacific's most prestigious aviation and aerospace events and the most comprehensive aviation, aerospace and defence exposition in the southern hemisphere. Avalon hosts multiple concurrent conferences and expo streams, across the spectrum of Defence, Airlines, Business and General Aviation, Sport and Recreational Aviation, Airports, MRO, Space, Unmanned Systems, Air Safety and Ground Equipment.

**2022****INDO PACIFIC 2022**

**DATE** 12 May 2022  
**LOCATION** ICC Sydney  
**WEBSITE** [pacificexpo.com.au](http://pacificexpo.com.au)

INDO PACIFIC, the biennial International Maritime Exposition, will combine an extensive exhibition presence, a comprehensive conference program and a schedule of networking and promotional opportunities. It will be the 12th iteration of this internationally renowned event, and will be a critical link event for Defence, government and industry as Australia defines how it will invest \$90 billion on new ships, submarines and their systems and support.

**2022 MARITIME ROBOTX CHALLENGE**

**DATE** 11-17 November 2022  
**LOCATION** Sydney International Regatta Centre  
**WEBSITE** [dst.defence.gov.au/event/2022-maritime-robotx-challenge](http://dst.defence.gov.au/event/2022-maritime-robotx-challenge)

Robonation and Defence Science and Technology Group are hosting the 2022 Maritime RobotX Challenge, an international autonomous maritime robotic vehicles competition. This competition will give teams of university students a unique opportunity to develop their autonomy skills. Using the WAM-V surface craft, participants will develop an autonomous maritime system that will be put through its paces in a series of tasks in the maritime domain.

## VARIOUS DATES

## ASDEFCON TD /IP ONLINE COURSES

**DATE** Various  
**LOCATION** Online  
**WEBSITE** [defence@majortraining.com.au](mailto:defence@majortraining.com.au)

Defence have begun online delivery of its short course on the Technical Data / Intellectual Property (TD/IP) clauses in its ASDEFCON suite of templates. These clauses provide far more flexibility and scope to deal with TD/IP issues than the previous ones. Defence will offer a number of spaces to Defence Industry on each online course to ensure the new TD/IP regime is successfully adopted by industry. These positions are centrally funded by Defence.

## ICCPM ONLINE WORKSHOPS

**DATE** Various  
**LOCATION** Online  
**WEBSITE** [iccpm.com/online-workshop-webinars](http://iccpm.com/online-workshop-webinars)

Designed to support project teams who are experiencing new challenges due to COVID-19 concerns – Learn how to mitigate new risk levels, effectively deploy virtual teams, manage messy problems and more. ICCPM Online Workshops and Webinars provide you with an easily accessible and engaging option to continue your training from anywhere in the world. These options provide you and your team with a conducive learning environment to support your complex project success.

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