ADM AUSTRALIAN DEFENCE MAGAZINE
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DEFENCE WEEK
PREMIUM EDITION

One of the first strategies outlined in the FSP is the allocation of up to $11.4 billion to replace the Boeing EA-18G Growler. DEFENCE

# FORCE STRUCTURE PLAN – AIR CAPABILITY INVESTMENTS

**The release last week of the 2020 Defence Strategic Update and Force Structure Plan pledges $65 billion of investment in air capability over the next 10 years but, as they say, the devil is in the detail – and what detail was provided in the documents raised more questions than it supplied answers.**

NIGEL PITTAWAY | MELBOURNE

In an attempt to dig down into the detail, *ADM* provided Defence with several questions which immediately sprang to mind on our first reading of the documents and here are the responses, for the large part provided by Head Air Force Capability, Air Vice Marshal Cath Roberts.

## IN THIS ISSUE

In terms of future investment in capability, one of the first strategies outlined in the FSP is the allocation of up to $11.4 billion to replace the Boeing EA-18G Growler, with funding coming on stream around 2027. Given the Growler only entered service with the RAAF in Australia in 2017 and its current planned withdrawal date isn't until 2035, why is funding for a replacement being allocated so early?

"Planning activities for major acquisitions starts well in advance of the entry into service," AVM Roberts explained. "Funding needs to be provided to cater for pre-acquisition planning activities."

**"THE ADF WILL BEGIN TO EXPLORE OPTIONS TO REPLACE WEDGETAIL AS EARLY AS 2029"**

With no US replacement platform yet on the horizon, it will be interesting to see what alternatives will become available to Defence in the next eight years or so.

Slightly earlier than the Growler replacement, in the 2025 timeframe, Defence will spend the first of up to $6.7 billion on an 'additional air capability'. This funding is a separate stream to the Teaming Air Vehicles program, which will see up to $11 billion invested from 2026, so what is an additional air capability?

"A capability edge in the air is critical for Australia. The future air fleet will be focussed around the F-35A Lightning II, the F/A-18F Super Hornet and the EA-18G Growler. Despite our confidence in these aircraft, it is important that we continue to look for opportunities to expand our air combat capability," AVM Roberts said.

"The Force Structure Plan provisions for the development of additional air combat options, especially in remotely-piloted or autonomous systems. This is an area of development where we expect to see rapid change in years to come, and it is important we stay abreast of technology. A number of options will be considered, including teaming systems, loitering munitions, and a future electronic attack capability."

Minister for Defence Linda Reynolds announced in June that Australia will acquire an additional Northrop Grumman MQ-4C Triton maritime ISR platform, taking the total number on order so far to three. Triton is being acquired under Air 7000 Phase 1B, which initially specified seven air vehicles, but that has since been reduced to six (although Air Force's website still quotes seven). Given the US has recently announced it would freeze Triton funding for the US Navy for at least two years, how will this affect the number eventually purchased by Australia?

"Plans for the further acquisition of Triton aircraft are yet to be considered by Government," AVM Roberts responded. "Australia is adopting an incremental approach to our acquisition, which balances our desire to acquire the Triton as a complement to the P-8A Poseidon aircraft, against the developmental nature of the program."

The 2016 White Paper included provision for a further three P-8As to be acquired, subject to future requirements. Given P-8A production for the US Navy, at least, is likely to come to end in the near future, will this option be taken up by Defence?

"Government will review the future balance between the MQ-4C Triton, the P-8A Poseidon, and other capabilities in light of emerging technological and strategic change," AVM Roberts said.

In addition to Triton and Poseidon, the FSP allocates up to $6.1 billion beginning in the 2029 timeframe for 'additional ISR capabilities.'

**"ONE SURPRISE EXCLUSION FROM THE FSP IS FUNDING FOR TWO ADDITIONAL AIRBUS KC-30A MULTI-ROLE TANKER TRANSPORTS"**

"This new proposal will see the acquisition of additional crewed/uncrewed aircraft and aerial systems to provide increased surveillance and reconnaissance effects in support of the joint force," AVM Roberts added.

AVM Roberts also said Defence's acquisition of the GA-ASI MQ-9B SkyGuardian (Reaper) capability under Air 7003 will go ahead as planned.

"Air Force remains committed to the delivery of the MQ-9B. Following Government Second Pass Approval in FY2021/22, the MQ-9B capability is expected to be in-service by the mid-2020s," AVM Roberts detailed.

"The MQ-9B delivers persistent ISR and strike in support of joint forces, (which are) necessary functions of deterrence and response in a contested environment."

Air Force's Boeing E-7A Wedgetail Airborne Early Warning and Control (AEW&C) capability is also under scrutiny, with up to $21.1 billion of funding for a replacement to begin in 2029 but, as AVM Roberts noted, the program is not linked to the recapitalisation of the USAF E-3 Sentry AWACS fleet at this time.

"The ADF will begin to explore options to replace Wedgetail as early as 2029, through risk-reduction and capability assurance studies. Due to the criticality of the capability, these studies will focus on the future airborne command and control needs of the ADF," AVM Roberts explained.

"There is no official link with the US E-3 recapitalisation program at this time. The RAAF will seek alignment with close allies such as the United States but is open to all technology solutions."

The Force Structure Plan calls for an expanded capability to replace the C-130J-30 Hercules fleet, with up to $13.2 billion of funding starting to be spent from around 2029. One of the interesting pieces of information elsewhere in the plan is the reduction in funding for the modernisation and future replacement of Army's G-Wagon fleet. "Due to a lack of protection, these vehicles will not be deployable to future battlefields and

their role will be accommodated by other vehicles such as the Bushmaster, Hawkei and heavy truck protected mobility fleets," the plan states.

This is interesting, given the requirement to carry a single G-Wagon was one of the 'must have' requirements which drove acquisition of the C-27J Spartan last decade and, according to an Army spokesperson, only one Bushmaster can be carried in a C-13J-30 (albeit with some prior preparation), or one Hawkei with trailer. Does this then flag a future requirement for a larger airlifter?

"The C-130J provides the medium air mobility effect as part of an air mobility capability. The Medium Ait Mobility Replacement Project options have not yet been determined or evaluated," AVM Roberts replied.

Finally, one surprise exclusion from the FSP is funding for two additional Airbus KC-30A Multi-Role Tanker Transports (MRTTs), as forecast in the 2016 White Paper. Although there is up to $20.2 billion of investment for a KC-30A replacement, beginning in 2032. Given the rhetoric from Prime Minister Scott Morrison at the launch of the 2020 Strategic Update, about the ADF needing to deploy globally when required and/or project force into a region which has become more contested and less stable, the cancellation of funding for what is one of the ADF's greatest force multipliers does not seem to make sense. Particularly so if the forecast for air travel in the post COVID-19 world is accurate, when there could well be a large number of low-time, second-hand A330-200s on the market. Why then were the additional aircraft cancelled, when the planned withdrawal date for the current fleet is not until 2041?

"The KC-30A replacement project is scheduled for the mid to late 2030s and has funding for an expanded fleet size. The project is pre-Gate Zero and options have not yet been determined or evaluated," AVM Roberts said.

"Should the strategic environment change, available airframes in the marketplace would be considered."

*Note from the Managing Editor: ADM* understands from other sources close to the FSR that the replacement to the C130J-30 Hercules fleet will see a significant increase in platform numbers.


## MOST READ ONLINE AT WWW.AUSTRALIANDEFENCE.COM.AU

1. Airbus confirms Special Forces helicopter bid under Land 2097
2. Re-thinking the FFG(X) program: why a new contender must be considered
3. EOS to supply RWS under $100 million stimulus deal
4. PM unveils updated Defence Strategy and Force Structure Review
5. Defence Strategic Update and Force Structure Review: highlights and lowlights

# AND THEN THERE WERE THREE – LAND 2097 BIDDERS

**Tenders close for Army's Special Forces Support Helicopter project (Land 2097 Phase 4) on Friday 10 July and three teams have now publicly declared their intent to bid.**

NIGEL PITTAWAY | MELBOURNE

As Managing Editor Katherine Ziesing wrote last week, Airbus Australia Pacific will offer its Airbus H145M solution, and Babcock Australia has previously announced it will team with Bell to bid the Bell 429 helicopter.

This week, *ADM* can confirm that Bell is also teamed with Hawker Pacific and will also offer the twin-engine Bell 429 for the requirement. Bell and Hawker Pacific had previously announced their intent to team for Land 2097/4 at the 2018 Land Forces exhibition in Adelaide and Bell' business director for Australia, NZ and the Pacific Rim, Dan McQuestin confirmed on Monday that the team is still in the race and will lodge its bid before tenders close.

**"WE BELIEVE THAT HAVING TWO PRIMES OFFERING THE BELL 429 FOR LAND 2097 WILL BRING TWO UNIQUE AND DIFFERENTIATED OFFERINGS"**

In effect this means Bell is partnered with Babcock Australia and Hawker Pacific in two separate bids. "Hawker Pacific was a natural fit for Bell given their strong track record in defence and performance-based sustainment contracts in Australia and our partnership with Hawker Pacific as a Bell Customer Service Facility and Independent Representative for many years," McQuestin said.


A Bell 429 at the Avalon Air Show. NIGEL PITTAWAY

"Babcock went through their own internal selection process, they're platform agnostic and they selected Bell and the Bell 429 as the best platform. They wished to partner with us, as a prime systems integrator for Land 2097/4, and we agreed."

McQuestin said Bell's role in both teams is that of 'prime subcontractor' to each company, who are each the prime systems integrator for their respective bid.

The Hawker Pacific/Bell team had previously advised it would offer the single-engine Bell 407GT and/or Bell 429 for Army's requirement, but after the RFT was released it has settled on the latter helicopter. "Our bid is driven by the specifications in the tender and we felt that the 429 was a better fit for those requirements," McQuestin explained. "We believe that having two primes offering the Bell 429 for Land 2097 will bring two unique and differentiated offerings to the ADF."

***Editor's Note:*** A statement from Hawker Pacific; "Hawker Pacific confirms that we will respond to the tender for this capability and our solution is based upon the Bell 429 aircraft. Our position is that we will continue with a strategic low-profile engagement that respects the sensitivity of the Special Operations customer and capability."

# AUSTRALIA LOOKS TO HYPERSONIC TECHNOLOGY

**Thanks to a rapidly growing arms race to develop hypersonic vehicles, a four hour flight from Sydney to San Francisco is fast becoming a reality. But so too is the capability of delivering conventional or nuclear payloads at ultra-high velocities over long ranges.**

LINCOLN PARKER | SYDNEY

Hypersonic missiles, known for their high speeds and unpredictable trajectories, render most of the current generation of air defence systems useless against them.

To learn more about hypersonic vehicles and the implications this technology will have on both the military and commercial sectors, I chatted with Professor Andrew Neely, Associate Dean for Research Engagement, Associate Professor Sean O'Byrne, and Senior Lecturer in Aerospace Engineering Dr Bianca Capra from UNSW Canberra.

## UNIQUELY CLEVER

As usual you won't see much media hype or grandstanding, but Australian scientists are right amongst the best in the world leading the development of this transformative technology.

"We are a leading voice in the international community in fluid thermal structural interaction for high speed flight," Prof Neely pointed out. "And that's because we have come up with some uniquely clever ways to design and test appropriate fundamental experimental cases to learn more about the complex, coupled physics, in order to test


A concept image of Raytheon hypersonic vehicles. RAYTHEON

and develop the simulation tools."

Hypersonic flight is generally defined as flight at speeds beyond Mach 5 – that is above about 6,150 km/hour. These speeds bring many difficulties, not least incredible heat from both air friction and from the shock waves generated by moving faster than the speed of sound. The temperatures a hypersonic vehicle encounters are so high that conventional materials can't withstand them and maintain their strength.

## NO LONGER FLYING IN AIR

In fact, at hypersonic speeds you are no longer flying in air. A/Prof O'Byrne explained that's why materials science is critical to the success of hypersonic flight, as we've seen with re-entry of the Space Shuttle into the earth's atmosphere, because "at very high speeds it actually changes the chemistry of the gas that flows around the vehicle, so you're no longer flying in air, you're flying in a real gas, maybe a mixture of dissociated oxygen and nitrogen or even ionised for very high energy re-entries."

With these incredible speeds, all the decisions for the vehicle and its operations have to occur much faster than conventional flight systems have been designed to deal with, because "the processes that go on when you're trying to fly at 5-10 times the speed of sound occur on much shorter timescales, and so everything that you do to control an aircraft, everything that you do to make an aircraft behave the way you want, has to be done really, really quickly," A/Prof O'Byrne said.

## LASER SPARK PLUG

To solve some of these problems, UNSW have developed a number of novel technologies including the world's fastest laser-based temperature measurement (two nanosecond time resolution), as well as a laser spark plug for hypersonic vehicles to ensure the chemical reactions process fast enough so that they can occur inside the vehicle.

A/Prof O'Byrne also talks about their work developing laser-based sensors that "augment things like pitot tubes to measure 10,000 times a second or faster, what's happening to the air speed surrounding a vehicle; enabling technologies that will allow the next generation of hypersonic vehicles to actually be flyable." This led to a hypersonic laser air speed sensor that was tested in flight, and resulted in a patent for a laser-based air speed sensor for commercial aircraft.

## HYPERSONIC HEADACHE

**"YOU CAN IMAGINE WHAT CAPABILITY WE COULD UNLOCK BEYOND DEFENCE"**

The reason why nations including China and Russia are investing so heavily in developing hypersonic weapons is because their tremendous speed and unpredictable trajectories will force the defender to make rapid decisions based on insufficient information, thereby increasing the likelihood of error. For instance, a hypersonic missile launched towards the east coast of Australia would be skimming in and out of the stratosphere making it very difficult to know whether it will hit Sydney, Canberra or Melbourne.

"It's very fast, it's very hard to hit, it's very unpredictable and it has tremendous potential destructive capability. All of those things make it a very potent potential weapon," Prof Neely said.

China is leading the charge, with Chinese scientists presenting more than 250 papers – more than 10 times the number presented by US researchers – at a 2017 hypersonics conference in Xiamen, China. More recently, China's Zingkong-2 "waverider" hypersonic cruise missile was tested to Mach 6. The Communist Party's Global Times claimed the new weapon's speed and manoeuvrability will "break through any current generation anti-missile defence system."

In reaction to these threats the US Department of Defense is investing over $1 billion annually into hypersonic research. Australian researchers, including the team at UNSW Canberra, work alongside many of them and will make significant contributions to this important capability in years to come.

On a more positive note, Prof Neely explains that "if we look forward 50 or 60 years, you can imagine what capability we could unlock beyond defence – for high speed transport, and for planetary exploration. The fundamentals can feed all sorts of applications and that's what universities are particularly interested in."

# THE IMPORTANCE OF EARLY ENGAGEMENT WITH AUSTRALIAN COMPANIES

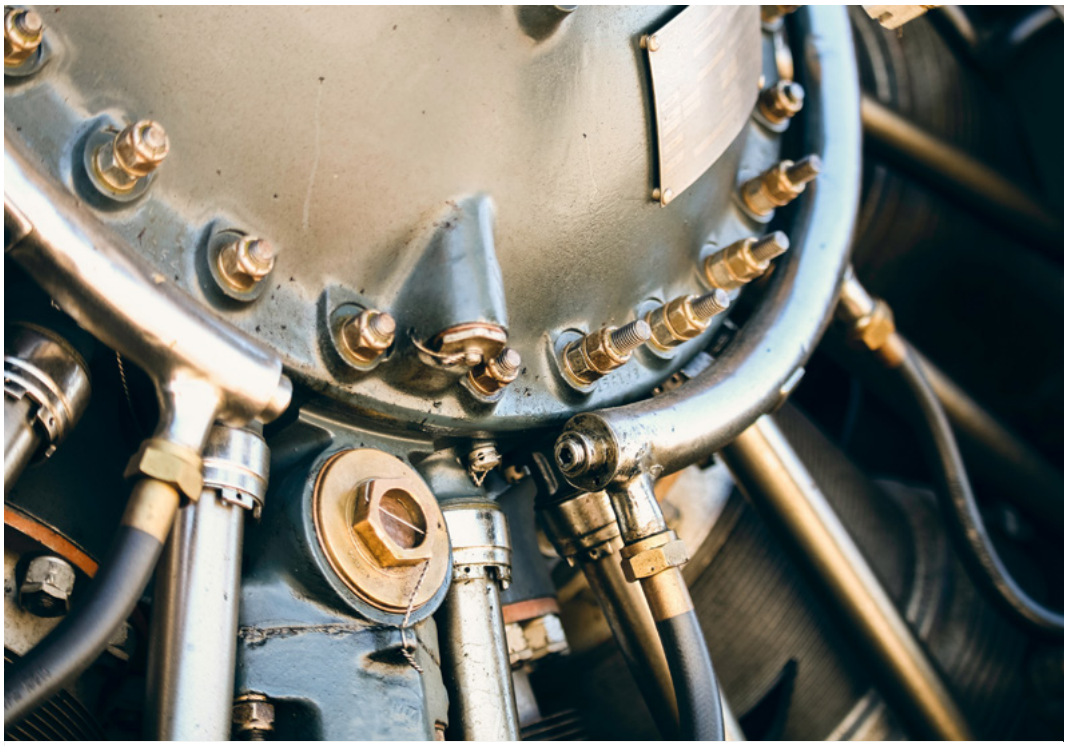
**There has been substantial media and discussion around Australian companies becoming part of the supply chain for the large number of Defence programs.**

BRENT CLARK | OPINION

The Prime Minister recently announced expenditure of $270 billion over the coming decade, a number so large it overwhelms the public.

Maths tells us that if we only achieve 50 per cent Australian content, in effect that means $135 billion of Australian taxpayer money is heading overseas, a 10 per cent increase of Australian content means an additional $27 billion remains in Australia, multiplying throughout the wider economy.

AIDN requires Australian companies to be designed into the supply chain from the beginning of these programs. Do this and meaningful work packages can be contracted, IP exchanged and Australian companies can undertake the required investment to be in a position to compete in a fair and equitable manner in order to become suppliers into these massive programs. If they are not designed into the supply chain from the outset, then the stark reality is that they will not be included at some mythical point down the track.



AIDN requires Australian companies to be designed into the supply chain from the beginning. UNSPLASH

The task of integrating Australian companies into supply chains becomes far more problematic when the supply chain for the initial batches of equipment is established. Australian companies would still need to be qualified to provide supplies; there is a cost to undertake this activity, and that will impact schedule and overall program price. This makes Australian companies appear less competitive than they truly are.

This places Australian companies at a tremendous disadvantage to 'break into' the incumbent supplier base. It also potentially allows for more foreign owned companies to establish 100 per cent owned subsidiaries to be created in the Australian market, effectively forcing the current domestic-owned companies out of their home market.

**"IT IS DIFFICULT TO BELIEVE THIS IS WHAT THE AUSTRALIAN GOVERNMENT HOPED TO ACHIEVE WHEN IT STATED IT WANTED TO CREATE A SOVEREIGN AUSTRALIAN INDUSTRY"**

If we are in the process of qualifying overseas companies for the initial platforms this means that there currently is an activity involving qualification, proving supply chains, transfer of IP and all the other requirements to become certified into the supply chain. Why is there no opportunity to qualify Australian firms into this supply chain? Why is there some need to qualify overseas suppliers first and at a later point qualify Australian-owned companies?

AIDN rightfully asks the question of BAE Systems, to name but one of the foreign owned multinational companies that have been awarded lucrative defence contracts, exactly how many Australian companies are they in the process of qualifying to supply tier 1 and tier 2 level supplies?

This question can also be asked of Naval Group, Rheinmetall, Lürssen, indeed all of the Defence Primes.

Reviewing the contracts associated with some of the larger programs, Naval Group reportedly has no actual percentage of Australian Industry included, BAE Systems reportedly has 54 per cent as a contracted requirement, Rheinmetall has best endeavours as does Lürssen.

If we specifically look at the Hunter Class Frigates example, assuming that the acquisition contract is $45 billion, then nearly $21 billion is heading overseas.

More concerning is that the Prime Contractor for this program could achieve 60 per cent of AIC without actually doing any work in Australia during the acquisition phase, assuming that they can achieve 90 per cent AIC during the sustainment phase. This is highly likely given Defence claims a figure of 92 per cent AIC for the sustainment of the Collins Class Fleet.

AIDN proves this statement based on the maths: "The Prime Minister announced a budget of $45.6 billion for acquisition recently, applying the rule of thumb that sustainment is roughly twice the amount as acquisition, hence $91.2 billion, then the total cost of the program is $136.8 billion.

"Assuming a 90 per cent AIC result for the $91.2 billion of sustainment then this translates to $82.08 billion, i.e., $82.08 billion is spent locally thus achieving 60 per cent AIC over the full life of the program."

Obviously, the Hunter Program will contract some percentage of AIC during the acquisition phase, but as demonstrated from the above concept it is possible to backend load the AIC through sustainment, allowing more of the acquisition work using their existing overseas supply chain.

It is difficult to believe this is what the Australian Government hoped to achieve when it stated it wanted to create a sovereign Australian Industry to ensure as a nation, we have a higher level of self-reliance. The COVID-19 pandemic has demonstrated the absolute need for Australia to achieve the highest possible levels of self-reliance.

At least BAE Systems has a contracted amount of AIC content (54 per cent) in the build phase. We can take some comfort that they have to achieve an Australian spend of at least $24.6 billion during acquisition, assuming that the AIC percentage is specified for the acquisition phase and not the total program life.

AIDN cannot identify what the other prime contractors will deliver in the AIC space, nor does it appear that Defence has a contractual clause to hold them to. The vagaries of 'contractor best endeavours' or 'maximise' do little to ensure that actual work packages are achieved in-country.

AIDN will continually advocate and highlight these issues with Government and Defence. We must ensure that the Prime Contractors are doing what they said they would during the bid phase of these programs.

We have this obligation to our SME community; this critical issue must be made right. The sovereignty of our nation depends upon it.

*Note: Brent Clark is the CEO of AIDN National.*

# OCIUS USVS APPROVED TO OPERATE IN AUSTRALIAN WATERS

**Sydney-based Ocius has secured formal approval for its unmanned surface vessels (USVs) to sail autonomously within Australia's Exclusive Economic Zone (EEZ).**

"*Bob* the Bluebottle left Botany Bay heads at 11 am Wednesday 1 July, arriving at Ulladulla heads at 3pm Thursday 2 July, a distance of 96 nautical miles, averaging 3.4 knots," CEO Robert Dane said. "*Bob* used 360-degree cameras, radar, Automatic Identification Systems (AIS) and collision avoidance software to

The first new next-generation Bluebottle arrives in September. OCIUS

autonomously navigate safely during the voyage, with engineers at our R&D facility at UNSW Campus Randwick and at Charles Darwin University (CDU) Darwin taking it in turns being the 'human on the loop' supervisors.

"Previously, we have escorted USVs out to a 50sq nautical mile AMSA approved area, 20 nautical miles off Ulladulla, where we could operate autonomously.

"However, we are now approved by AMSA to operate Bluebottles as Domestic Commercial Vessels (DCV) under the Marine Safety (Domestic Commercial Vessel) National Law Act 2012. This means they are permitted to operate autonomously out to the extent of Australia's EEZ.

**"THEY ARE PERMITTED TO OPERATE AUTONOMOUSLY OUT TO THE EXTENT OF AUSTRALIA'S EXCLUSIVE ECONOMIC ZONE"**

"We thank AMSA for working with us to achieve this excellent result," Dane said.

*Bob* is now destined for logistics and sea trial tests in Darwin, with next-generation Bluebottle *Beth* scheduled for completion in September. The vessel will use solar arrays embedded in its composites, a design developed by innovative SA-based SME Praxis Aeronautics.

"This will be followed by four more Bluebottles in 2021, each armed with Thales thin line sonar arrays, radar, cameras and other sensors," Dane said.

# REMOTE TESTING TRIAL FOR AUSTRALIA'S NEW ICEBREAKER

**International travel restrictions from the COVID-19 pandemic have led to an innovative remote testing trial for the commissioning of Australia's new icebreaker.**

With the build of the RSV *Nuyina* complete, the project team were faced with the challenge of undertaking the final harbour test; the critical incline experiment, which measures the weight and centre of gravity of the ship. COVID-19 restrictions prevented members of the Australian Antarctic Division and Serco from physically attending the Romanian shipyard to monitor the testing activities, so a remotely monitored experiment was proposed.

With the shipbuilders on the ground conducting the vital testing activities, Serco and the Australian Antarctic Division monitored the physical trials using video conferencing technology, survey data and still and video images taken throughout the testing period.

It is believed to be the first use of remote monitoring technology for such trial activities in the world.

The testing was successfully completed over six days at the end of June.

Serco RSV *Nuyina* Project Manager David Astbury said the team was determined to progress the commissioning activities as restrictions would allow.

"The team worked with our customer, the Australian Antarctic Division, and our shipbuilder Damen to ensure we had a robust plan in place to effectively manage this critical piece of work from a remote location," Astbury said.

"All of the testing activities were filmed and photographed then instantly messaged to personnel in Australia and supported by objective qualitative evidence so that we were confident with the accuracy of the survey data.

"The result is the successful completion of the final testing activities that take place in the shipyard.

"We are now focused on the final sea trials before the vessel is delivered to its home port of Hobart ready for its maiden voyage to Antarctica."

A concept image of the new icebreaker. AAD

# WAGGA BASES SET FOR UPGRADES

**Wagga Wagga Defence sites will benefit from the government's $10 billion investment over the next decade into NSW Defence facilities as forecast through the recently released 2020 Force Structure Plan.**

"The projects include the redevelopment of facilities at Blamey Barracks – Kapooka and RAAF Base Wagga," Minister for Defence Linda Reynolds said. "Wagga Wagga's Defence bases provide initial training for every soldier, airman and airwoman in the Army and Air Force. Many Non-Commissioned Officers and officers post to Wagga as instructors at some stage in their career.

**"THESE PROJECTS WILL FOCUS HEAVILY ON BASE INFRASTRUCTURE"**

"Wagga Wagga will continue to play a vital role building the ADF Australia needs by shaping the ADF's biggest asset – its people."

"These projects will focus heavily on base infrastructure, such as electrical, ICT and water remediation," Minister for Defence Industry Melissa Price said. "Further detail will be announced as the projects develop, and will include information to help local small businesses win work through the Government's Local Industry Capability Plan initiative."


Chief of Air Force Air Marshal Mel Hupfeld and Lou Hupfeld pass through the Guard of Honour on their arrival to RAAF Base Wagga. DEFENCE

# A USB STICK FULL OF PARTS

**Where once large warehouses were filled with spare parts, today a USB stick filled with part scans is all that is needed. Part availability and replacement has become a just-in-time solution, where parts can be made on demand or as required, by using the 3D metal laser printing.**

RAYMAX | SPONSORED

Selective laser melting, or 3D printing, is an additive manufacturing technique that offers a number of key benefits. Firstly, parts can be made when needed – or on demand, embracing the 'just-in-time' opportunity, negating procurement, time-consuming logistics and the expense of storage. Secondly, the finished product doesn't require any additional tooling or post processing thereby reducing costs and time to installation. Thirdly, the part can be made from a scan of the original part and fourthly, design opportunities to customise or improve functionality can be changed at the beginning, well before the final part is created in a build chamber from metal powder.

SLM Solutions 3D metal laser printers are supported by design software, Additive. Designer® that is ready to use in biomimetic design or to support the needs of new users providing step by step guidance. The benefits of increased freedom provided by the design geometry implemented at the planning phase, is exemplified with the re-design of an engine support bracket in the Bugatti Chiron.

The primary task of the bracket is to engage the gears while opening and closing the two clutches of the 7-speed dual-clutch transmission generating very high heats of up to 130°C. Adding cooling channels lowered the operational temperatures by some 40°C. Weight reduction was also achieved by building in AlSi10Mg in an SLM®280 laser system. This outstanding success has seen Bugatti put this new part into series production.

Parts can be made on demand or as required by using 3D metal laser printing. RAYMAX

Producing reliable metal parts locally using proven 3D metal printing systems is now a reality, with multi-lasers systems and large build chambers, fast and repeatable builds can be sustained. An SLM®500 multi-laser system, highly suited to aerospace part production with up to 2,800 W power was recently installed by Rolls Royce specifically for the development of aerospace parts.

Hirschvogel Automotive Group, exploited the benefits of biomimetic or 'bionic' design based on methods and structures developed by nature over millions of years, to address functional requirements in a car steering knuckle attaching the suspension and steering system. Printing in AlSi10Mg an overall reduction in weight was achieved along with a significant reduction of some 40 per cent in the neck area of the part and an improvement in functionality.

**"EXPERTS PREDICT THAT PRODUCING PARTS ON DEMAND AND ON LOCATION WILL ALTER THE SUPPLY CHAIN"**

The impact of COVID-19 on global supply of parts is causing stress on sustainment and MRO at defence sites. What we can learn from this is that measures are required to counter supply chain issues overcoming limitations and maintaining preparedness. MRO planning of defence equipment is a key component of force preparedness whether it be through the restrictive period of COVID-19 lockdowns or future regional developments.

Decentralising part availability to on-site production will not expose Australian defence sectors to vulnerabilities such as have arisen during the pandemic and may well arise with future tensions following this huge interruption to international cohesion.

Experts predict that producing parts on demand and on location will alter the supply chain and strengthen the importance of part producers across the globe. To reduce vulnerabilities in the supply chain and preventing sending ripples through the MRO system, 3D metal printing offers a reliable and sustainable solution.

Note: This sponsored content was provided by Raymax.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# FORTHCOMING EVENTS

## ADM EVENTS

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

- ADM Women in Defence Awards – 23 October 2020 | National Arboretum
- Defence in the North – 28 October 2020 | Darwin Convention Centre
- ADM Space Summit – 2 December 2020, Hyatt Hotel | Canberra
- ADM Congress – 3 February 2021, Hyatt Hotel | Canberra

## 2020 INTERNATIONAL ROUNDTABLE WORKSHOP – BRISBANE

**DATE** 27 August 2020
**LOCATION** QUT Brisbane, Gardens Point Campus, Brisbane City
**WEBSITE** https://iccpm.com/events/2020-rts-brisbane/

The International Centre for Complex Project Management (ICCPM) invites project leaders to participate in the 2020 International Roundtable Series. Workshops will be held in key Australian locations and internationally.

## AUSCERT 2020

**DATE:** 15-18 September
**LOCATION:** The Star, Gold Coast
**WEBSITE:** www.auscert.org.au/giveaway

The AusCERT Conference is the oldest information security conference in Australia. Each year, we attract in the vicinity of 800 participants and approximately 50 sponsors. AusCERT is hosting more than 50 speakers at AusCERT2020, as well as an array of tutorials, workshops, networking events & much more.

## 2020 VERNON PARKER ORATION AND DINNER

**DATE** 13 October 2020
**LOCATION** Hotel Realm, Canberra
**WEBSITE** navalinstitute.com.au/2020-vernon-parker-oration-and-dinner

Sir Peter Cosgrove has kindly agreed to deliver the 2020 Vernon Parker Oration on 17 June. Sir Peter was Governor-General from 2014-2019 and former Chief of the Defence Force. In January 2020 Sir Peter accepted the voluntary role as chairman of the Business Council of Australia's Community Rebuilding Initiative in response to the 2019/20 bushfires.

## 2020 ANI GOLDRICK SEMINAR – REMOTE AND AUTONOMOUS SYSTEMS AT SEA

**DATE** 13 and 14 October 2020
**LOCATION** Adams Auditorium, Australian Defence Force Academy
**WEBSITE** navalinstitute.com.au/latest-ani-events-and-archive/

The 2020 ANI Goldrick Seminar will discuss a wide range of issues around Remote and Autonomous Systems at Sea. It will comprise six sessions over 1.5 days covering an overview of Remote and Autonomous Systems at Sea (RAS); RAS in the Littoral Domain; RAS in the Maritime Air Domain; RAS in the Undersea Domain; Measuring Effective, and Legal and Ethical Considerations.

## 10TH BIENNIAL SIA CONFERENCE 2020

**DATE:** 17-18 November 2020
**LOCATION** Hotel Realm, Canberra
**WEBSITE** https://www.submarineinstitute.com/sia-conferences

The 10th Biennial SIA Conference will be held 17-18 November 2020 at the Hotel Realm, Canberra. This year's theme is 'Submarine Build and Sustainment Programs: The Strategic Nature of Reliable, Sovereign Supply Chains'. The Call for Presentations is available on the website.

# 2021

## 43RD COSPAR SCIENTIFIC ASSEMBLY

**DATE** 28 Jan-4 Feb 2021
**LOCATION** International Convention Centre Sydney
**WEBSITE** www.cospar2020.org

The Australian space research community enthusiastically extends the invitation to you, to meet with us for COSPAR 2020, and in so doing to forge the friendships and opportunities that will connect space research for global impact. The 2020 Assembly will combine the latest in space research findings with activities designed to enrich the global space research community – including helping equip our future leaders, and workshopping with space industry – and inspire the next generation of scientists and engineers.

## LOCATE21

**DATE** 30 March – 1 April 2021 (rescheduled dates)
**LOCATION** Brisbane Convention and Exhibition Centre
**WEBSITE** https://www.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.

## LAND FORCES 2021

**DATE** June 1-3 2021
**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.

## ROTORTECH 2021

**DATE** 15-17 June 2021
**LOCATION** Royal International Convention Centre, Brisbane
**WEBSITE** www.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** https://www.pgcsymposium.org.au

Foresight is more valuable then hindsight! PGCS 2020 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 2020's starts at the top. Now in its 8th year, PGCS 2020 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

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

## PACIFIC 2020 BECOMES INDO PACIFIC 2022

**DATE** May 2022
**LOCATION** Sydney Convention Centre
**WEBSITE** www.pacificexpo.com.au

Reflecting the increasing importance of the Indo Pacific region to the entire world, the PACIFIC International Maritime Exposition will become the INDO PACIFIC International Maritime Exposition from 2022. Initially, there will be a new timing. Instead of the previously planned PACIFIC dates in August 2021, INDO PACIFIC will now, in the wake of COVID 19, initially be held during May 2022.

## VARIOUS DATES

### NSW DEFENCE INNOVATION NETWORK'S REGIONAL ROAD SHOW

**DATE:** Various
**LOCATION:** Various
**WEBSITE:** defenceinnovationnetwork.com/din-regional-road-show-2019-20

NSW Defence Innovation Network and AIDN will be undertaking a series of small business focused regional forums across NSW. Register to attend and hear about the programs, grants, opportunities and services the NSW Defence Innovation Network (DIN) provides to the small business community across NSW. We encourage small businesses to engage with us and participate in opportunities across our networks, including DIN's seven partner universities, as well as with other state and federal agencies.

### ICCPM ONLINE WORKSHOPS

**DATE** Various
**LOCATION** Online
**WEBSITE** www.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.