

ADM AUSTRALIAN DEFENCE MAGAZINE
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DEFENCE WEEK
PREMIUM EDITION



Lillian flies a flight simulator in the Project Jericho Astro-STEM Zone during the Avalon Airshow.

DEFENCE

Defence STEM Strategy: A starting point

Katherine Ziesing | Canberra

At Avalon earlier this month, former minister for Defence Industry Steve Ciobo released the much anticipated [Defence Industry Skilling and STEM Strategy](#). First hinted at in 2017 at ADM's inaugural [STEM in Defence summit](#), the strategy looks to provide a coherent response to the workforce challenges that the Defence community as a whole is facing over the coming years.

Measures outlined in the document include:

- \$4 million for a new model of skilling support grants, administered through the Centre for Defence Industry Capability, that will help reduce the financial barriers SMEs face when up-skilling their workforce;
- \$2.6 million for the 2019-20 continuation of the Schools Pathways Program;
- An additional 20 places in the Defence Industry Internship Program. There will now be 50 internship opportunities in defence industry SMEs to facilitate pathways into the sector;

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- Defence will establish the National Defence Industry Skills Office to improve collaboration and coordination between industry stakeholders. The Office will help facilitate information sharing, put defence industry's skills concerns in a national context and leverage opportunities for collective action to meet the sector's workforce needs.

A national defence industry skilling and STEM summit will be held in the second half of 2019 to facilitate targeted engagement between key stakeholders and the Office. *ADM* is pursuing what this event will look like.

“The STEM pipeline begins in primary school and requires constant feeding at every stage”

ADM Comment: This is a tough issue to quantify to readers.

It's hard to track what success even looks like in this space, as the human factors at play are diverse. Does a student choose a STEM career/study because of a program they took part in? Did they have a teacher that inspired or killed a love of STEM pursuits? If a person does study a STEM degree or vocational pathway, do they work in that space, and for how long?

Definitions are, of course, important. It is easy to dismiss STEM as a small subset of a workforce, or think only of tertiary qualified individuals specialising in one or more of the components of STEM. Australia's Chief Scientist describes STEM as referring collectively to a “broad field of distinct and complementary approaches to knowledge.” Each has a critical role to play in its own right, but also enables discovery and progress in other fields. This definition accords with the view taken in the draft Defence STEM strategy.

The measures listed above are welcome, of course. Providing more avenues for workers in the Defence community to discover the work we do is invaluable. Australian Bureau of Statistics research finds that while STEM jobs in Australia have grown at one and a half times the rate of non-STEM jobs, the number of STEM qualified people is growing slowly – 15 per cent compared to 26 per cent for the non-STEM workforce. The National Innovation and Science Agenda also notes that women only hold around a quarter of STEM and ICT related jobs, and are significantly underrepresented in high level research positions.

Most of the fastest growing occupations involve STEM skills. Defence will experience strong competition for talent at the same time that the White Paper calls for Defence growth of the STEM-based workforce by up to 1,700 people across the ADF and APS alone. The majority of these new roles are to acquire, manage or operate new high-tech capabilities.

It is tempting to think about building a STEM capability as a linear progression; students go in one end and come out the other end as STEM qualified machines, to be deployed as needed throughout the economy. This is true to some extent, but the pipeline is far from a straight line when the human element is at play. The STEM pipeline begins in primary school and requires constant feeding at every stage as people flow in and out of that talent pool.

The whole-of-government response needed to make sure Australia as a broader economy has enough STEM workers to go around is nascent at best. There is no single centralised point of organisation for STEM programs. The [STEM Program Index](#) from the Office of the Chief Scientist lists hundreds of amazing STEM

programs nationally at every level of schooling and is a good place to start if you're looking to support an existing program.

It would have been good to see more detail about how Defence is approaching the STEM challenges at a whole-of-government level in this document. Nevertheless, it's a great starting point to address this complex challenge.

The case for an unmanned Australian warship

Ewen Levick | Sydney

The US Navy submitted its [budget request](#) for financial year 2020 to Congress last week. It is seeking US\$205.6 billion, a 4.8 per cent increase from the year prior that will allow the Navy to field over 300 ships for the first time since 2002.

Interestingly, the submission also included US\$400 million towards procuring two large unmanned surface vessels (LUSVs), with a further two procured each year until 2024.

The request has reportedly emerged from Project Overlord, a USN 'Ghost Fleet' program seeking an unmanned ship that can operate for 90 days in moderate seas with a 40-ton payload, travelling at 19 knots with a 29 knot top speed. It also follows from (but is separate to) Leidos' [Sea Hunter](#) medium USV program, which recently navigated autonomously from San Diego to Hawaii and back.

"I would liken this to the surface vessel version of where we picked up on MQ-25," US Chief of Naval Operations Admiral John Richardson [told US media](#). "We are moving very aggressively to get something on deck in unmanned aviation, and we were able to do that very quickly by taking advantage of what we'd learned in that field to date, bringing industry in early, so we're going to be using a lot of those practices."

International momentum towards fielding large unmanned surface ships is clearly building, but as Admiral Richardson observed, still lags some way behind



Just as the Loyal Wingman complements and protects F-35s, a fleet of USVs could complement and protect manned ships. DARPA

airborne systems. This is in part a reflection of international maritime legal restrictions on unmanned ships on the open ocean, which pose a greater spill and fire risk if an accident were to occur.

The USN's investment nonetheless raises interesting questions for Australia, particularly in the wake of the '[Loyal Wingman](#)' Airpower Teaming System reveal. The case for that platform rests on its ability to complement and protect expensive manned aircraft in a high-end fight.

This rationale applies equally to LUSVs. There are [significant doubts](#) surrounding the survivability of surface ships in conflict with a near-peer adversary; even

ships with defences that are 90 per cent effective against incoming missiles have only a 35 per cent chance of avoiding at least one hit from a volley of 10, whilst a system that is 80 per cent effective reduces the survival rate from the same volley to 11 per cent. In other words, it is possible to overcome even the most effective missile defence systems by simply firing more missiles – a point that is certainly not lost on near-peer adversaries.

That equation becomes more complicated, however, by the introduction of unmanned vessels. Just as the Loyal Wingman is intended as a low-cost method of reducing the risk to F-35s, a fleet

of USVs (large or small) could serve as a relatively low-cost method of reducing the risk to manned ships – particularly the two Canberra class LHDs, which form the spine of Australia's ability to project force in the South Pacific. LUSVs could also magnify the capabilities of the Hobart-class destroyers and Hunter-class frigates in the same way the Loyal Wingman will magnify the capabilities of accompanying manned aircraft.

Australia also has no shortage of local expertise capable of developing an indigenous LUSV. Sydney-based SME Ocius, for example, has pioneered the Bluebottle USV, which was on show at Exercise [Autonomous Warrior](#) in Jervis Bay last year alongside 25 other Australian and international participants. Large swathes of open ocean away from busy shipping lanes would also serve as a suitable test site. It is not difficult to imagine local industry rising to the challenge of building larger unmanned warships.

In short, there is strategic motive and local opportunity for an experimental Australian LUSV program (if it isn't already happening behind closed doors). If maritime legislation were adjusted to allow for greater research and development, and funding were made available, this appears to be a niche Australia is well-placed to fill.

“A fleet of USVs could serve as a relatively low-cost method of reducing the risk to manned ships”

MOST READ ONLINE AT WWW.AUSTRALIANDEFENCE.COM.AU



1. [G550 EW aircraft buy clarified for RAAF](#)
2. [Is the F-35 obsolete?](#)
3. [Rheinmetall chooses Hilton steel for Land 121](#)
4. [New armour piercing round launched for F-35](#)
5. [BAE completes Hawk LIFCAP upgrade](#)

Airbus confirms bid for Special Forces helicopter

Airbus Australia Pacific Managing Director Andrew Mathewson has confirmed that Airbus had recently responded to the [Commonwealth request for information](#) for a four-tonne class, rapidly deployable, multi-role helicopter for Special Forces.

“It is based on a commercial off-the-shelf platform with military-specific modifications”

“The Airbus H145M helicopter is the military version of the H145 – the most advanced member of Airbus’ multi-purpose twin-engine category. It is based on a commercial off-the-shelf platform with military-specific modifications and is an operationally proven, affordable and low-risk option for Australia,” Mathewson said.

“The Airbus Australia Pacific response included selected industry partners and the provision of training, maintenance, logistics and engineering activities. A comprehensive transfer of technology and skills will make Airbus Australia Pacific a regional centre able to proactively support Australian operational needs.”

The RFI calls for a proven light commercial or military off the shelf helicopter (COTS/MOTS) which is already in service and able to be rapidly transported aboard the RAAF’s C-17A Globemaster aircraft.

The helicopter must be optimised for operations in dense urban environments and capable of being fitted with “simple” electro-optic sensors (EOS) and weapons. Four helicopters are required to be uplifted by a single C-17 and must be capable of accommodating two pilots and four troops sitting on the cabin floor.

The primary role for the new helicopter is air assault by small teams of Special Forces troops.



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DEFENCE

Trials begin on UAS parcel deliveries to ships

Airbus has begun shore-to-ship trials in Singapore with its Skyways parcel delivery drone.

This marks the first time drone technology has been deployed in real port conditions, to deliver a variety of small, time-critical maritime essentials to working vessels at anchorage.

“The use of UAS in offshore resupply could speed up delivery speeds by a factor of six”

The maiden shore-to-ship delivery flight was made to a tug supply vessel over a kilometre from the shoreline of Singapore’s Marina South Pier, carrying 1.5 kilograms of 3D printed consumables.

After landing on the ship deck and depositing its cargo, the Skyways UAS returned to its base with the entire flight taking less than ten minutes.

“We are thrilled to launch the first trial of its kind in the maritime world,” Airbus’ Skyways lead Leo Jeoh said.

“This accomplishment is a culmination of months of intense preparation by our dedicated team, and the strong collaboration with our partner, as we pursue a new terrain in the maritime industry.”

“We are also happy to be taking a step forward for Airbus’ urban air mobility endeavour, as we continue to explore and seek better understanding of what it takes to fly safe and reliable autonomous flying vehicles safely.”

“Modern technology such as the unmanned aircraft systems, are just a new tool, albeit a very cool one, with which we can push our industry ever forward and improve how we serve our customers,” Marius Johansen, Vice President Commercial, Ships Agency at Wilhelmsen Ships Services, said.

Further trials are being undertaken in conjunction with partner Wilhelmsen Ships Services. During the trials, Airbus’ Skyways drone will lift off from the pier with a payload capability of up to four kilograms, and navigate autonomously along pre-determined ‘aerial corridors’ to vessels as far as three kilometres from the coast.



The Skyways parcel delivery drone taking off.

WILHELMSEN SHIPS SERVICES

The use of UAS in offshore resupply could speed up delivery speeds by a factor of six, lower costs by up to 90 per cent, reduce carbon footprints, and significantly mitigate the risk of accidents associated with launch-boat deliveries.

Airbus and Wilhelmsen Ships Services signed an agreement in June 2018 to drive the development of an end-to-end UAS for safe shore-to-ship deliveries. A landing platform and control centre were set up at the Marina South Pier in November 2018 in cooperation with the Maritime and Port Authority of Singapore, which also designated anchorages for vessels participating in the trials.

Skyways is an experimental project aimed at establishing seamless multi-modal transportation networks in smart cities. Through Skyways, Airbus aims to develop an unmanned airborne infrastructure solution and address the sustainability and efficiency of UAS in large urban and maritime environments.

TOP COMMENTS

Is the F-35 obsolete?

It doesn't make the F-35 obsolete, it makes the F-35 better. The Loyal Wingman concept may have numerous modular sensor payloads – electro-optics, ESM/ECM etc – but it will be limited in that it probably won't be able to carry them all at once and likely will not have access to a true multimode radar in the league of the APG-81, whereas the F-35 has the full spectrum of sensors built into the aircraft. It will almost certainly have far inferior payload capacity and a less diverse array of compatible weapons so its utility in the air-ground role I think will be limited. **-Joel Robertson**

One critical aspect is missing in all these comments. This relates to the exponential increase in the rate of improvement in AI and its capabilities. Future drones will be smarter than pilots in aircraft and have very small radar cross-sections. A few dozen human pilots may be facing thousands of these cheap agile drones in combat scenarios. **-KKB**

SpaceFest gets underway at Woomera

Defence has partnered with industry to develop Defence's space capability at SpaceFest 2019, a capability demonstration and equipment trial conducted by DST on behalf of the RAAF, supported by Plan Jericho.

SpaceFest 2019 industry participants include EOS Space Systems, HEO Robotics, Inovor Technologies, Lockheed Martin Australia, Silentium Defence, Western Sydney University (WSU), Curtin University and DST.

Minister for Defence Christopher Pyne said SpaceFest 2019 provided Defence an opportunity to observe Australian industry and university space surveillance capabilities first-hand.

"Participants will complete a series of trials designed by DST to assess their ability to detect and track objects in space, which will inform future capability decisions," Minister Pyne said.

"The Woomera Test Range within the Woomera Prohibited Area in SA was selected as the site to conduct this activity and capability trial.

"The Woomera Prohibited Area is a significant national security

"Participants will complete a series of trials designed by DST to assess their ability to detect and track objects in space"



The HIFiRE4 Hypersonic test taking place at Woomera.

DEFENCE

asset and provides Defence with a secure environment for the testing and evaluation of advanced systems and capabilities.

“The area has a low-risk of electromagnetic interference, and clear visibility conditions with reduced risk of cloud, which is helpful when testing optical sensors.

“Defence is also seeking to partner with industry on existing and emerging space surveillance capabilities through a Request for Tender which is currently open to industry through AusTender.”

The space situational awareness tender is available [here](#).

F1 in Schools national winners announced

The Evolve team from Trinity Grammar School, Kew, are the national champions in the Professional class for the Re-Engineering Australia F1 in Schools competition.

Evolve competed against 17 other professional teams from five states. The team was judged in 13 categories; innovation, design, use of computer software, collaboration with industry, engineering excellence, technical portfolio, pit display, verbal presentation and car speed. Evolve claimed three and were finalists in five.

Trinity alumni watched on at the awards ceremony, including members of Hyperdrive (World Champions 2017) and Matthew Nirenberg, a judge and member of the first Australian team to win the World Championship trophy in 2006.

Another school to appear in almost every National Final for the past decade are reigning world champions Brighton Secondary School, led by a former F1 in Schools student Finn Galindo.

Galindo was present in Singapore last year when his first F1 in Schools team, Horizon, stood on top of the podium to score back to back World Championships



The F1 in Schools program aims to generate kids' interest in STEM.

RE-ENGINEERING AUSTRALIA

for Team Australia.

After three days of intense competition at the headquarters of Robert Bosch in Melbourne the judges, who included engineers, educators, Robert Bosch staff and Defence personnel, tallied the results.

Mount View High School from the Hunter Valley scored well, with teams Pentessellate finishing second in the Professional class and Impro Racing achieving fourth place in the Development category.

Many new names also made the podium: Blue Mountains Grammar School, the winner of the Development class; Gold Coast Christian College, which came a close second; and Penrith Christian School, which came third in the Professional class.

ADM's STEM in Defence summit, which covers ways industry and Defence can recruit young people into STEM, takes place on 13 August. More information is available [here](#).

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Forthcoming Events

ADM EVENTS

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

- [ADM Space Summit](#) – 30 April 2019
- [Women in Defence Awards](#) – 11 July 2019
- [ADM STEM and Defence Summit](#) – 14 August 2019
- [ADM Defence Estate and Base Services Summit](#) – 12 September 2019
- [ADM North Australian Defence Summit](#) – 23-24 October 2019

What Does a Project Manager of the Future Look Like?

Date 28 March 2019

Location EAST Hotel, Canberra

Website [https://iccpm.com/events-2/
what-does-a-project-manager-of-the-future-look-like/](https://iccpm.com/events-2/what-does-a-project-manager-of-the-future-look-like/)

The future success of an organisation relies on the ability to manage a diverse body of talent that can bring innovative ideas, perspectives and views to their work. The challenge and problems created by workplace diversity can be turned into a strategic organisational asset if an organisation is able to capitalise on this melting pot of diverse talents. Come and join our ICCPM hosted Breakfast Panel Discussion where our panellists will be sharing their experiences and perspectives from different industries and positions on managing and leveraging diverse talents.

The National Police, Defence and Emergency Services Women's Leadership Summit

Date 29 March

Location Hyatt Hotel, Canberra

Website www.wla.edu.au

The National Police, Defence and Emergency Services Leadership Summit is a major annual event for women at all levels to connect, share ideas and build their leadership skills. Created by Australia's leading authority on women's leadership, Women & Leadership Australia, the Summit has been developed in consultation with a broad range of stakeholders across these sectors.

Export Control Training Session

Date 03 April 2019

Location 60 Clarence St, Sydney

Web <https://www.stickytickets.com.au/81012>

Join us for a 1-day face-to-face training course to de-mystify the complex area of Export Control regulations. The course will address an overview of the ITAR, EAR, and DEC; how the ITAR and EAR apply to all areas of your business; advice on employing dual and third country nationals; licensing and permit requirements; and more.

Williams Foundation – Seminar: Hi-Intensity Operations and Sustaining Self Reliance

Date 11 April 2019

Location National Gallery of Australia – ACT

Website <http://www.williamsfoundation.org.au/event-3159758>

Since 2013 the Sir Richard Williams Foundation seminars have focused on building an integrated fifth generation force. In doing so they have, among other things, highlighted the challenges of making the strategic shift from counterinsurgency operations in Iraq and Afghanistan to higher tempo and higher intensity operations involving peer competitors. Allies are crucial to the Australian concept of defence; however, the emerging strategic circumstances demand it is vital we reconsider the ways and means of enhancing Australian sovereignty to better contribute to our relationships and ensure a more sophisticated and independent defence of Australian interests. During the 2019 seminars, the Sir Richard Williams Foundation will develop this theme and address more broadly the question of how to look at the evolution of the Australian Defence Force from the perspective of the sovereign lens and setting the conditions for future success.

Defence Synthetic Environment Working Group (SEWG)

Date 15 April

Location QT Hotel – Canberra

Website

Established as a government and industry communication forum; the requirement for the SEWG has evolved into an interactive working group exploring innovative uses of Modelling and Simulation (M&S) and investigate the future for emerging M&S technologies. Additionally, the SEWG represents an opportunity to explore how to integrate the M&S Industry as part of the ninth Fundamental Input to Capability.

ASPI China Masterclass – Canberra

Date 15 Apr 2019

Location Hotel Realm

Website <https://www.aspi.org.au/>

The ASPI China masterclass is a one-day intensive event that will give participants a strategic understanding of how China is seeking to shape the world around it. Participants will learn and debate with specialists on China with deep knowledge of the current security, political and thematic landscapes. The Masterclass will track China's global and regional ambitions, and review the Chinese Communist Party's (CCP) investments in cyber, intelligence, defence, space & social credit. This event will offer a deeper understanding of China, the CCP and its rapidly evolving place in the world and explore the policy implications for Australia and the Indo-Pacific region more broadly.

ASPI China Masterclass – Melbourne

Date 17 April 2019

Location Melbourne

Website <https://www.aspi.org.au/>

The ASPI China masterclass is a one-day intensive event that will give participants a strategic understanding of how China is seeking to shape the world around it. Participants will learn and debate with specialists on China with deep knowledge of the current security, political and thematic landscapes. The Masterclass will track China's global and regional ambitions, and review the Chinese Communist Party's (CCP) investments in cyber, intelligence, defence, space & social credit. This event will offer a deeper understanding of China, the CCP and its rapidly evolving place in the world and explore the policy implications for Australia and the Indo-Pacific region more broadly.

BMT's Introduction to Fleet Life Cycle Management (Perth)

Date 01-05 May 2019

Location Perth

Website <https://www.bmt.org/training/introduction-to-fleet-life-cycle-management-course/>

BMT's, five-day Introduction to Fleet Life Cycle Management course covers all aspects of naval life cycle management. The modules provide detailed insight into Asset Management and its applications to naval ships and support systems in Defence's maritime environment.

IMDEX Asia 2019

Date 14-16 May

Location Changi Exhibition Centre, Singapore

Website imdexasia.com

Coming to its 12th edition, the biennial IMDEX Asia is Asia Pacific's premier international maritime defence show and a must-attend event in the global naval and maritime security calendar. With established conferences and real-time discussions on maritime security, IMDEX Asia draws a plethora of global leaders and distinguished guests.

AusCERT Conference 2019

Date 28-31 May

Location Surfers Paradise Marriott, Gold Coast Australia

Website <https://conference.auscert.org.au>

The AusCERT Conference is the oldest information security conference in Australia. Each year, we attract in the vicinity of 700 participants and approximately 50 sponsors. This year's conference is focused on gaining as many tools for you and your team's toolbox as possible to ensure you are armed and ready for any battle you may face.

Paris Air Show

Date 17-23 June 2019

Location Le Bourget

Website

The 53rd Paris Air Show will once again bring together all the players in this global industry around the latest technological innovations. The first four days of the Show will be reserved for trade visitors, followed by three days open to the general public.

PGCS 2019

Date 20 – 22 August 2019

Location The Canberra Rex Hotel, Canberra

Website <https://www.pgcsymposium.org.au>

Now in its 7th year, PGCS 2019 will focus on ways to build the foundations needed to create project and program success. Creating the organisational capability needed to underpin the consistent delivery of successful projects in the 2020's starts at the top. Leadership and a sustained focus are required to build a culture of excellence that can balance innovation with surveillance and accountability, encourage learning, and manage knowledge effectively.

Australasian Simulation Congress

Date 2 – 5 September 2019

Location Gold Coast Convention and Exhibition Centre, Gold Coast

Website www.simulationcongress.com

The Australasian Simulation Congress provides a focused opportunity for industry development, business growth, training, discussion and distribution of information related to Simulation, Modelling, Training and Decision Support. Simulation Australasia can help you directly engage with industry, policy makers, Government and relevant stakeholders to facilitate you and your organisation achieving the success only a truly international Congress can provide.

Australian Cyber Conference 2019

Date 7-9 October 2019

Location Melbourne Convention and Exhibition Centre

Website <https://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 8-10 October 2019

Location Sydney Convention Centre

Website <http://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.

MilCIS 2019

Date 12-14 November 2019

Location Canberra Convention Centre

Website <http://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.

Land Forces 2020

Date 1-3 September 2020

Location Brisbane Convention Centre

Website <http://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.