

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



USAF CAPT Andrew Olson performs aerial manoeuvres over Fort Worth, Texas.

USAF

ANAO reports on JSF

Katherine Ziesing | Canberra

It's been six years since the ANAO had a [good hard look](#) at the JSF program. The latest [report](#) from the independent auditor landed only a week before the first two Australian jets are to land at RAAF Williamtown to begin their service.

The signature program for RAAF has been on the books since 2002 but it's worth going through the headline numbers again as reference:

- While the US is the primary customer and financial backer, the UK, Italy, the Netherlands, Canada, Turkey, Australia, Norway and Denmark have agreed to contribute US\$4.375 billion toward the development costs of the program.
- Australia is a founding partner in the international program, entitling it to preference

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in workshare that is competed globally (a tension within the program internationally).

- The government has confirmed that it will purchase 72 F-35A conventional take off variants under Air 6000 for three operational squadrons at RAAF Base Williamtown and RAAF Base Tindal, and a training squadron at RAAF Base Williamtown.
- A bridging capability of 24 [Super Hornets](#) and 12 [Growlers](#) were purchased (roughly \$3 billion for Super Hornets and \$1.5 billion for Growlers)
- The total acquisition budget for Air 6000 Phase 2A/2B is \$15.5 billion, with the government approving a further \$4.6 billion in 2014 for operating and support costs until 2024–25.
- The program being led by the US (USAF, USMC and USN) will see the nine major partner nations (plus FMS buys from Japan, Israel, South Korea, Singapore and Belgium, with other nations also looking at the F-35) plan to acquire over 3,100 F-35s through to 2035.

The program has attracted a string of detractors in its lifetime for its contracting and engineering approaches, alongside performance characteristics, but the in-service aircraft are beloved by those that have them.

Former US F-35 JPO executive director LTGEN Chris Bogdan once remarked that this would have to be one of the most reviewed programs in the world, with both [US agencies](#) and various international agencies taking a strong and necessary

interest in the multi-billion generational change program.

The ANAO report into Australia's JSFs notes that "Defence has established effective strategic and project governance arrangements to date for the introduction of the JSF into Australian service and its sustainment" but "has not, however, provided all of the annual updates to Government that Government required in its approval of the project."

Overall, the program has been given a tentative 'thumbs up' from the ANAO – a rare thing.

"The Department of Defence's preparations to date for the introduction and sustainment of the JSF aircraft into Australian service have been effective with the exception of arrangements for sustainment of JSF aircraft under the Global Support Solution," the report notes. "JSF sustainment cannot be fully costed until the Global Support Solution further matures."

The Global Support Solutions of course rests on the Autonomic Logistics Information System. Keep this factoid in mind – the JSF in the air uses about 8 million lines of code, whilst ALIS takes about 14 million lines of code to function. ALIS development/testing/delivery is being led by the US to track and supply spares as needed in conjunction with regional warehousing. Australia is home to one such regional [warehouse](#), which will be operated by BAE Systems.

The ANAO report is also supportive of the infrastructure program efforts that Defence has undertaken to support this capability, from sheds to training to fuel.

"Defence has established effective strategic and project governance arrangements"

50 years of RAAF Orion operations

Nigel Pittaway | RAAF Edinburgh

The RAAF formally celebrated 50 years of Lockheed Martin P-3 Orion maritime surveillance operations with a multi-ship low-level formation flight around Adelaide and environs on November 30.

Initially intended to be a four-ship formation, one aircraft suffered technical problems before take-off and did not get airborne, however the other three aircraft completed the mission as planned.

“The Orion crew has always been a team”

The flypast was followed by a short ceremony, attended by Chief of Air Force Air Marshal Leo Davies, Commander Surveillance and Response Group Craig Heap, the current Orion community, and P-3 alumni. A families' event the day following the flypast rounded out the celebrations.

The venerable P-3 entered service in January 1968 and, because the fleet has been home-based at Edinburgh throughout its career, the 50th anniversary flypast was one way of thanking the people of SA for half a century of support.

“From the first P-3B in 1968 to today's AP-3C, the Orion capability has been defined by cutting edge sensors and mission equipment,” AIRCDRE Heap told invited guests. “The Orion crew has always been a team, whether it was keeping close watch on Soviet ballistic missile submarines during the Cold War, or protecting coalition, Afghan or Iraqi lives in the Middle East, the personnel and the platform – along with the high-tech sensors and mission systems that form the Orion capability – have been there for Australia for 50 years, dedicated, professional, reliable, resilient, persistent.

“From searching for MH370 to assisting the liberation of Marawi City in the Philippines, from locating the Soviet experimental space shuttle to the battle of Fallujah in Iraq, the Orion was there. It has been a critical component of ADF air power over the last 50 years.”



Former RAAF members and their families queuing to see an Orion at RAAF Edinburgh.

DEFENCE

The celebrations also had an air of farewell about them however, as the Orion fleet continues to be drawn down. There were just six aircraft from an original fleet of 19 AP-3Cs in service with 10 Sqn at the end of November and retirements will continue in coming days, weeks and months, leaving only a small number to operate until the very end of P-3 flying in the 2021-2023 timeframe.

The AP-3C is being replaced initially by the [Boeing P-8A Poseidon](#) and the future of ADF maritime surveillance capability will also include the Northrop Grumman MQ-4C [Triton](#) high altitude, long endurance (HALE) unmanned platform.

ARDU celebrates 75 years of testing

Nigel Pittaway | RAAF Edinburgh

The RAAF's Aircraft Research and Development Unit (ARDU) celebrated its 75th anniversary in a ceremony at RAAF Base Edinburgh on November 30.

The event included a parade of unit personnel and was witnessed by Chief of Air Force, Air Marshal Leo Davies.

The Air Force's premier testing organisation was formed as No.1 Aircraft Performance Unit (APU) at RAAF Laverton in Victoria on December 1, 1943, using the Special Duties and Performance Flight of No.1 Aircraft Depot (1 AD) as its nucleus. It was renamed the Aircraft Research and Development Unit in 1947 and in 1977 it relocated to its current home at Edinburgh.

Although it only operates three PC-9/A aircraft in its own right (soon to be replaced by the PC-21), ARDU has a critical and ongoing role to play in the introduction, upgrade and sustainment of every platform currently in service with the RAAF and Army Aviation Corps.

"[Modern testing](#) of our fleet has included C-27J, E-7A Wedgetail, our Classic Hornets, our KC-30As, P-8As, ARH and MRH-90 helicopters and the F-35 weapons bay – in developing that weapons bay, ARDU had a large part to play," AM Davies told ARDU personnel and invited guests.



Aircraft Research and Development Unit personnel celebrating the 75th anniversary at RAAF Edinburgh.

NIGEL PITTAWAY

“ARDU has a critical and ongoing role to play in the introduction, upgrade and sustainment of every platform currently in service”

“ARDU’s mission statement reflects the Air Force expectation: effective, operationally focussed and relevant test and evaluation. ARDU’s motto, “*Prove to Accomplish*” could not be more fitting, so I say to you that your 75 years is full of proof and full of accomplishment.”

Commanding Officer of ARDU Wing Commander Daniel Rich said that the unit’s role is continuing to evolve from the traditional Developmental Test and Evaluation (DT&E) focus, to that of Operational Test and Evaluation (OT&E), which includes the entire lifecycle of an aircraft, weapon or subsystem, from Acceptance Test and Evaluation through its [operational career](#) in the ADF.

“What ARDU brings to the Air Force is a workforce of highly trained specialists who have a current and relevant operational background. Everyone at ARDU is an experienced operator of their parent platforms, be they an air mobility pilot, fighter pilot, or experienced engineers or mission aircrew, and their experience is combined with outstanding flight test training that we receive from foreign military and civil test schools overseas,” WGCDR Rich explained.

“We have people who are both extremely motivated and highly-equipped to be able to look at things objectively and provide the testing rigour that we need when we’re understanding a new ‘thing’ or property.”

PEOPLE ON THE MOVE

Rear Admiral David Proctor has taken over as NZ Chief of Navy. RADM Proctor said he was humbled by the privilege of leading the RNZN. “It’s my primary task, to assist you to do a great job,” he said. “You need to tell me how we can do it better.” RADM Proctor is the first officer with a logistics background to be appointed to the position, traditionally reserved for warfare officers.

Former Senator Amanda Vanstone has been appointed to the Lockheed Martin Australia Board. Vanstone served as a Senator for SA from 1984 to 2007. During this time, she held several ministerial portfolios including Cabinet roles – among them leadership of the portfolios of Employment, Education, Training and Youth Affairs, Immigration and Multicultural and Indigenous Affairs.

How Navy can adapt to unmanned systems: IFRS

Ewen Levick | Sydney

Rear Admiral (Ret’d) Simon Cullen has completed a [report](#) under the Institute for Regional Security banner into the opportunities and challenges facing the RAN as autonomous and unmanned vehicle technology accelerates.

Titled *Unmanned and Autonomous Vehicles in the Maritime Environment Circa 2035: Opportunities and Challenges for the Royal Australian Navy*, the report draws upon extensive discussions with Navy and security experts.



The Defendtex Hydra launches from the water during Exercise Autonomous Warrior 2018.

DEFENCE

Two observations underpin the report. First, Australia's strategic outlook to 2035 is pessimistic as China challenges US regional dominance. Second, where the military-industrial complex once diffused new technology into commercial markets, the opposite is now true: commercial developments iterate faster and now diffuse into the military sphere. Action has become reaction.

For Navy to compete in 2035, Cullen argues that major platforms will need to be complemented by unmanned and autonomous vehicles that can strengthen the service's strategic and decisive lethality. The push to integrate these systems into Navy's force structure will be catalysed by a pressure for "humans to step back from the contested environment to minimise casualties."

The trend towards unmanned and autonomous systems is widely known. Cullen, however, argues that this trend is an evolution rather than a revolution.

"For the foreseeable future there will remain a human in/on/or over the loop for autonomous systems," Cullen argues. "Machines will enhance human capabilities rather than replace them."

"What is disruptive is not the emergence of a new technology, but the reconfiguration of either new or existing technologies for military purposes."

A workshop held between Cullen and RAN personnel determined that by 2035, unmanned and autonomous vehicles will potentially undertake a variety of tasks, including monitoring acoustic hygiene in noise quiet states, shaping operations ahead of task groups, sensing and engaging targets in and above the water, de-conflicting surface contacts, beach surveys, and even transporting an amphibious assault force to shore.

There are, however, significant challenges to achieving these capabilities. Hollywood has given unmanned and autonomous systems a significant PR problem that will require efforts to fix. This, Cullen argues, will require an international legal framework in the next 5-10 years. Otherwise, cautious legal advice may apply a "speed brake to the development of these systems." It will also require a clear public relations effort from Defence that communicates how humans will remain in control.

"Machines will enhance human capabilities rather than replace them"

A Common Operating Picture that illustrates all unmanned and autonomous vehicles “will be particularly challenging,” with current consoles insufficient for the job. Cullen also observes a trade-off between autonomy and communications bandwidth; the lower the autonomy of a system, the greater network bandwidth it will occupy, and vice versa.

Cullens puts forward a number of policy recommendations for Navy: establish a management program for autonomous and unmanned systems; partner with industry and DSTG to create solutions “outside the traditional capability development process”; establish a testing range; create test and trial elements in the surface and submarine fleets; and develop a roadmap to 2035.

Lying underneath this report is a tacit acknowledgement of the [unique challenges](#) Navy faces in the [unmanned and autonomous space](#). Unlike the Army or RAAF, Navy’s operating environment presents one massive complication to adapting commercial technologies for military purposes – water.

It is all but impossible to transmit data through water by any means other than sound, meaning underwater systems face significant restrictions on range and bandwidth. Whilst a USAF drone pilot can fly a Reaper over Afghanistan from an office in Nevada, underwater vehicles without a tether or a transmitting buoy can only be operated from a distance measured in hundreds of metres. Navy, therefore, will likely play a leading role in adapting autonomous technologies to the battlefield.

This is where the trade-off Cullens identified between autonomy and bandwidth comes into play. It is a question of trust, a search for that sweet spot; a system that can make enough of its own decisions to prove tactically effective, but not so many that it develops a life of its own.

MOST READ ONLINE AT WWW.AUSTRALIANDEFENCE.COM.AU

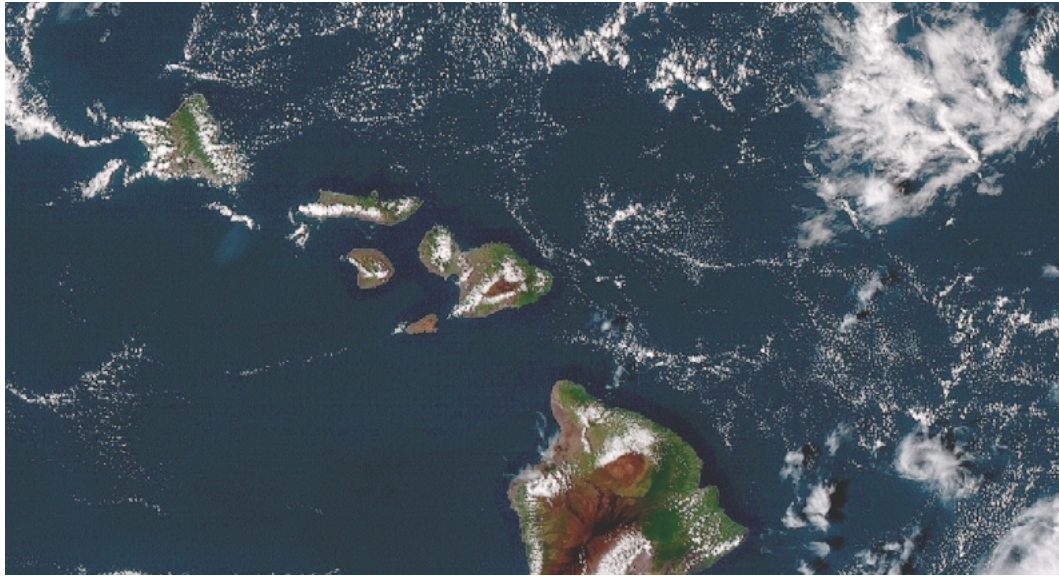


1. [RAN’s next oiler ship launched in Spain](#)
2. [HMAS Arunta undocks after mast upgrade](#)
3. [Defence takes delivery of F-35 cabins](#)
4. [Submarines and manned/unmanned teaming](#)
5. [Cyber security centre launched in Adelaide](#)

US National Oceanic and Atmospheric Administration taps Leidos

Leidos has been awarded a task order by the US Department of Commerce (DOC) National Oceanic and Atmospheric Administration (NOAA) to manage cyber and enterprise security operations for the organization.

In a statement, Leidos said it will build on NOAA’s existing cyber methodologies and the company’s knowledge of transforming security operations centres to ensure the NOAA Cyber Security Center (NCSC) can protect against sophisticated attacks across an asset base supporting over 20,000 users.



A view of Hawaii taken by the NOAA's new GOES-17 satellite.

NOAA

“[The contract] has a total value of approximately US\$100 million”

Similarly, [Leidos](#) will help the DOC Enterprise Security Operations Center (ESOC) provide cybersecurity status information to enable timely decision-making across all Commerce bureaus.

The single award, firm-fixed-price, time and materials task order has a one-year base performance period and four one-year option years with a total value of approximately US\$100 million if all options are exercised.

“Leidos creates a culture of cyber excellence by implementing critical analysis and a strong network defence that ensures mission resiliency for our customers,” Angie Heise, Leidos Civil Group President, said.

NOAA provides environmental data and information that focuses on conditions of oceans, major waterways, and the atmosphere.

First patrol boat handed to PNG

The first Guardian class patrol boat has been handed over to PNG, the first of four new boats to be gifted as part of the Pacific Patrol Boat Replacement project.

The first boat will be commissioned HMPNGS *Ted Diro* on return to PNG and is named after the first Commander of the PNG Defence Force post-independence.

The new boat has a maximum speed of 20 knots and is designed for a crew of 23 sailors and officers.

“The *Ted Diro* is the first of 21 Guardian class patrol boats to be gifted to 12 Pacific Island countries and Timor-Leste,” Minister for Defence Christopher Pyne said.

“The handover marks the start of the maritime element of the Morrison Government’s commitment to the new Pacific Maritime Security Program.”

“The new vessels replace the current Pacific Patrol Boats, operated by 12 participating nations, and will provide each nation with enhanced abilities to conduct maritime surveillance and law enforcement operations.”



CDF General Angus Campbell and Papua New Guinea CDF Major General Gilbert Toropo signing the certificate of transfer. RAN

The new 39.5 metre steel hulled patrol boats are designed and built by Austal in WA.

The next vessel will be gifted to Tuvalu in April 2019, with a boat delivered every four months after.

In April, the government announced that Timor-Leste [will acquire](#) two boats under the program, scheduled for delivery in October 2023.

Promoting submarines in schools

The Submarine Institute of Australia (SIA) is helping to promote careers in submarines and the submarine industry by supporting the 2018 Subs in Schools National Final.

Subs in Schools is an initiative of the Re-Engineering Australia Foundation, of which the SIA is a gold sponsor and members of the SIA are judges for the final.

"Our support of the Subs in Schools National Final is another way the SIA is actively encouraging young Australians to pursue submarine careers at what is one of the most exciting times for submarines in Australia's history," SIA Executive Committee member and former Lieutenant Commander in the RAN Errika Meades said.

"It's vital that school-age children who might be interested in a submarine career are provided with information about how to pursue such an opportunity."

Meades, who has led a pilot submarine careers program on behalf of the SIA in four schools on Queensland's Sunshine Coast, was attracted to submarines in her [youth](#) and went on to serve in the RAN for 12 years.

"I remember as a 15-year-old my father took me to see an Oberon class submarine which had docked in Newcastle and from that point on, I wanted to join the Navy," Meades said.

"My father took me to see an Oberon class submarine which had docked in Newcastle and from that point on, I wanted to join the Navy"



The event is aimed at promoting a career in submarines to schoolchildren.

RE-ENGINEERING AUSTRALIA

“Through the work I did as an integrated support engineer and the work I do now as part of the SIA committee, I’m keen to help other children – and girls in particular – take up similar opportunities.

“School children of today can look forward to serving in the new Future Submarines when they start entering service in the mid-2030s.

“The Subs in Schools National Final is a superb promotional vehicle for careers serving in submarines.”

New website to explain space law

The space industry is set to benefit from expert guidance from University of Adelaide lawyers on Australian and international laws that regulate their activities.

The Australian Navigational Guide Explaining Laws for Space (ANGELS) website will be created in a project of the same name, by the University’s Adelaide Law School and law firm International Aerospace Law and Policy Group (IALPG). A grant of nearly \$100,000 from the Law Foundation of SA has financed the project.

A board composed of experts from the Adelaide Law School and IALPG will oversee the project. Professor Melissa de Zwart, Dean of Law, and Professor Dale Stephens are both experts in domestic and international space law, and Joseph Wheeler, Legal Practice Director of IALPG, is an expert in aviation law. The project will be managed by Duncan Blake, a PhD candidate at the Adelaide Law School and Special Counsel on Space Law with IALPG.

“Information provided on the ANGELS website will give guidance to space start-ups here in SA and throughout Australia to conduct their business in accordance with Australian, foreign and applicable international law,” Professor Stephens said.

“The ANGELS project and website will aim to provide an easy step-by-step online guide on what legal and regulatory requirements need to be satisfied to conduct space activities lawfully and commercially.



The ANGELS website will guide space start-ups through relevant laws.

ISTOCK

“Information provided on the ANGELS website will give guidance to space start-ups”

“Students at Adelaide Law School will develop the content for the website in early 2019. The site will go live later that year in September when the new Australian legislation, the Space Activities (Launches and Returns) Act 2018 comes into effect,” Blake said.

“The ANGELS project will work closely with the SA Space Industry Centre, as well as visiting six Australian cities to meet with space start-ups to understand their regulatory needs.

“Lawyers from IALPG will handle complex legal issues associated with space activities.”

Adelaide Law School was a leader of the [Woomera Manual project](#), a definitive document on military and security law as it applies to space.

“The ANGELS project consolidates and confirms the important contribution that Adelaide Law School and SA make to the Australian and global space industry,” Professor de Zwart said.

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Forthcoming Events

ADM EVENTS

More detail on **ADM** Events can be found on our dedicated website: admevents.com.au

- [ADM Congress 2019](#) – 13 February 2019
- [ADM Space Summit](#) – 30 April 2019
- [ADM STEM and Defence Summit](#) – August, 2019 (TBA)
- [ADM Defence Estate and Base Services Summit](#) – September, 2019 (TBA)
- [ADM North Australian Defence Summit](#) – 23-24 October 2019

BMT's Submarine Design & Engineering Course

Date 10 Dec – 14 Dec, 2018

Location University of South Australia

Website bmtdesigntechnology.com.au/training-courses/submarine-design-engineering

BMT's Submarine Design and Engineering Course presents attendees with the latest thinking and innovations in submarine design and operations. The course provides students with a complete understanding of conventional submarine technology, and our experienced presenters explain how capability requirements and new technologies can impact overall submarine design and management. The course is also accredited by the Royal Institution of Naval Architects.

AIDN National Gala Dinner 2019

Date 13 February 2019

Location: National Gallery of Australia, Canberra

Website consec.eventsair.com/aidn-2019/dinner/site/register

The AIDN National Gala Dinner will be held at the stunning Gandel Hall, National Gallery of Australia on Wednesday 13 February 2019 commencing with pre dinner drinks and networking from 7.00pm. Guests will enjoy an evening of networking, socialising and fun which includes a VIP guest speaker, presentation of the AIDN National Young Achiever Award and Silent Auction with all proceeds donated to Legacy.

Avalon Airshow 2019

Date: 26 February – 3 March 2019

Location: Avalon Airport

Website: airshow.com.au/airshow2019

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.

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.

Paris Air Show

Date 17-23 June 2019

Location Le Bourget

Website siae.fr/en/

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.

Pacific 2019

Date 8-10 October 2019

Location Sydney Convention Centre

Website pacific2019.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 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.