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FLIGHT DAILYNEWS

See page 4 for pictures of the static display

AVALON
AUSTRALIAN INTERNATIONAL AIRSHOW

Coming of age

Sixteen years after first delivery, launch operator's Wedgetail proving 'exceptional' in global hotspots

Aircraft are based at RAAF Williamstown

Ryan Finnerty

After a protracted period of refinement, debutant operator Australia is expressing full confidence in its fleet of Boeing E-7A Wedgetail airborne early warning and control (AEW&C) jets.

The Royal Australian Air Force was the first in the world to field the 737-derived platform, with the type making regular appearances at Avalon since Boeing delivered the initial two aircraft in 2009.

A single E-7A from RAAF Williamstown in Newcastle is on static display. With the full complement of six aircraft now in service, the RAAF is operating the E-7A in global hotspots and leading the training of future Wedgetail crews for Canberra's allies.

"It's been an excellent platform for us," says RAAF Squadron Leader Daniel Dobbin in an interview with *Flight Daily News*.

That assessment follows a six-month deployment to Germany that concluded in 2024, during which an E-7A and some 100 RAAF personnel deployed in support of a NATO mission to supply Ukraine with critical munitions and military hardware.

The Australian Wedgetail logged some 250 flight hours providing early warning for potential threats from Russia outside of Ukraine. The mission also served as demonstration of the E-7's capability for the USA, UK and NATO headquarters, all of which now plan to field their own Wedgetail fleets to replace the ageing Boeing E-3 Sentry.

Dobbin says it is "difficult to overstate" the degree of improvement between the two aircraft, particularly with the E-7A's Northrop Grumman Multi-Role Electronically Scanned Array surveillance radar.

The dorsal mounted sensor can track aerial and maritime targets while maintaining continuous surveillance of an operational area, according to Northrop.

"The aircraft performed exceptionally well in that theatre and by all accounts our NATO and US partners were very happy with the performance," Dobbin says of the Germany deployment.

Before that, the RAAF E-7A fleet had already logged more than 6,900 combat flight hours over 550 frontline missions in the Middle East from 2014 to 2020, supporting the US-led campaign in Iraq to defeat the Islamic State terrorist group.

During that effort, Canberra says individual E-7A crews regularly managed more than 80 aircraft in an assigned battle area.

Australia and its allies are leveraging that experience to train American and British personnel, as their services ramp toward fielding the 737-based Wedgetail.

The UK is set to receive the first of three planned aircraft later this year, while the USA expects delivery of two prototypes from Boeing around 2028, launching a projected fleet of 26 aircraft.

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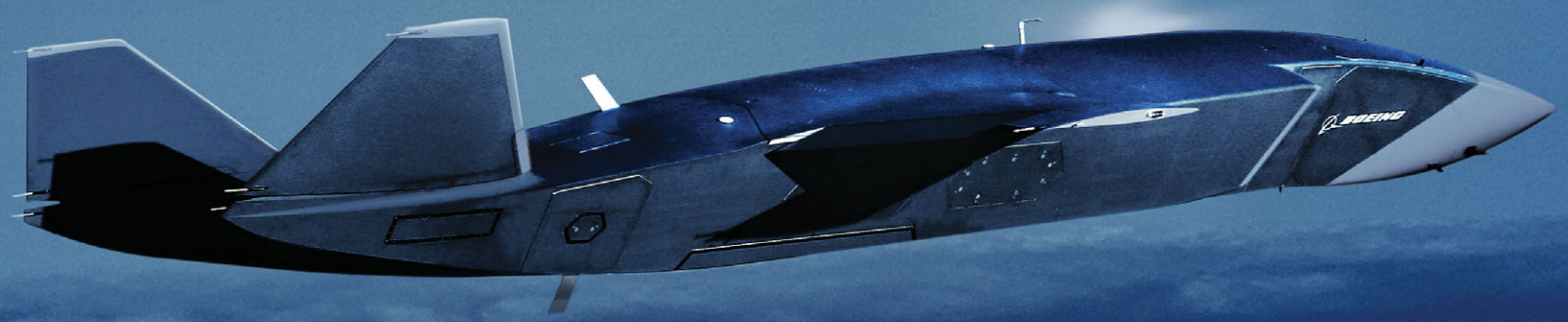

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THE DECISIVE
EDGE

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L to R: Minister for defence industry Pat Conroy and deputy prime minister Richard Marles in front of a HiMARS unit at the show's set-up day yesterday

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First strike

Army takes delivery of HIMARS rocket system on eve of show

Greg Waldron

Australia has taken delivery of its first US-made High Mobility Artillery Rocket System (HIMARS), two years after it announced plans to obtain the advanced strike system.

Deputy prime minister and defence minister Richard Marles presented the country's first pair of HIMARS units on the set-up day of the show yesterday. Marles says the long-range weapon, which is mounted on a 5t truck, is highly mobile by air and sea, greatly boosting the Australian army's expeditionary strike capability.

Australia announced the acquisition of 20 HIMARS units at the 2023 Avalon show and subsequently increased this to 42.

A key element in Canberra's decision to obtain the system, says Marles, is its mobility by air and sea.

Army Brigadier General Nick Wilson says that the Lockheed Martin C-130J tactical transport can carry one HIMARS unit, and the Boeing C-17 strategic transport three. The Royal Australian Air Force is a major operator of both types.

At the 2023 Avalon show, Lockheed told FlightGlobal that C-130J compatibility was a "high priority" requirement for Australia's HIMARS acquisition. Under the "fire raid" concept of operations, the US Marine Corps has demonstrated the C-130's ability to land on an airstrip and rapidly unload a HIMARS system. The HIMARS then launches its rockets and re-embarks aboard the aircraft, which takes off.

The tactic is intended to engage high value targets from a surprise location, while limiting risk to the HIMARS system through mobility.

Asked about where Australia stands on this capability, Wilson says that Australia's concept of operations for HIMARS is still being developed, specifically how the system is loaded on the C-130J.

To boost Australia's defence capability, GMLRS will be produced locally, notes minister for defence industry Pat Conroy, who also took part in the ceremony.

Debut for Black Hawk

The Australian army is displaying its new Sikorsky UH-60M Black Hawk helicopter at the show for the first time.

The appearance of A60-006 (*pictured*) follows the type's recent attainment of initial operating capability (IOC) in February.

As of mid-February, Canberra had taken 12 UH-60Ms out of total commitments for 40. Seven more UH-60Ms are due this year, with all 40 aircraft to be delivered by 2030.

There is notable urgency in the army's introduction of the UH-60M following the premature retirement of the NH Industries MRH90 Taipan – the local designation of the NH90 – in 2023, creating a significant capability gap.

The MRH90 had a troubled career with the Australian army, characterised by sustainment and safety issues, ultimately leading to its departure from Australian service.

The Black Hawk's IOC means that the type can support Australia's basic operational needs for counter-terrorism operations and fill other gaps left by the exit of the Taipan.

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Qinetiq's DASA deal

Qinetiq has won a A$47 million ($29.5 million) contract with Australia's Defence Aviation Safety Authority (DASA) to help manage policies, training programmes and safety standards.

The five-year contract with the Department of Defence agency, with a five-year extension option, becomes operational on 1 July.

Gary Stewart, chief executive Australia for the UK-based defence technology group, says Qinetiq has been supporting Australia's aviation safety needs for more than a quarter of a century. "This new contract positions us to enhance defence aviation safety and capabilities further," he says.

Papua New Guinea's gift workhorse

Papua New Guinea has underlined its close defence relationship with Australia by sending a single NZAero 750XL (*pictured*) to the show.

The aircraft, P2-702, is one of two aircraft that Canberra has donated to Port Moresby in recent years. Australia's Department of Defence announced plans to gift the aircraft at the 2023 show, and the New Zealand-built examples were delivered later that year. The donation brought the PNG fleet of the type to three aircraft.

In service with PNG, the aircraft focuses on supply and personnel transport, facilitated by a large left-side cargo door.

Powered by a Pratt & Whitney Canada PT6 turboprop, the eight-seater type is uniquely well suited to PNG's difficult terrain. It can take-off fully loaded from a runway of just 220m (721ft) and land on 165m and is capable of operating from semi-prepared airstrips in various terrains.

NZAero was formerly known as NZSkydive. It took over the operations of Pacific Aerospace – the former producer of the 750XL – in 2021.

Australia is highly supportive of PNG's aerial capabilities, with the routine deployment of a Royal Australian Air Force Leonardo C-27J to the island nation under the auspices of the Defence Pacific Air Program.

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Packing a punch: RAAF E/A-18G Growler

Water beauty: Royal Australian Navy SH-60 Seahawk

Shark attack: PNG Defence Force PAC P-750

Eye in the sky: RAAF Boeing E-7 Wedgetail

Power parade

Flash: F-35A Lightning II from RAAF No2 operational conversion unit

Mighty beast: RAAF C-17A Globemaster

Swiss rolls: Pilatus PC-21 from the RAAF aerobatic team, the Roulettes

Blade runner: AH-64 Apache

The array of fixed-wing and rotary military and special mission aircraft on the static display is always a highlight of Avalon, and this year's show does not disappoint. Our photographer walked the line to bring you the highlights

Photography: BillyPix

CAE's reality show

Training company demonstrating VR and big data technologies for defence

The company is exhibiting Ridge data-driven training system at Avalon

CAE

Murdo Morrison

CAE is at Avalon showcasing advances in virtual reality and big data analytics, after marking 30 years as a training partner to Australia's armed forces.

The Canadian training provider and simulator manufacturer is highlighting virtual reality headsets that adapt Apple Vision Pro technology to create realistic representations of flight-deck interactions, allowing pilots to complete certain training activities before they step into a full mission simulator. The company is also demonstrating its Ridge data-driven training system that provides an immersive visualization tool for planning and joint operations, enabling interaction with 3D terrain, objects, and entities in a virtual environment.

CAE's presence in the country was "born out of tragedy", according to Matthew Sibree, managing director Indo-Pacific for CAE Defense & Security.

The 1991 crash of a Royal Australian Air Force Boeing 707 on a training exercise that killed all five crew was a "wake up call that showed the air force couldn't accomplish all their training requirements using live flight", he says.

The incident prompted the service to invest in a 707 and a Lockheed Martin C-130H simulator from CAE, with the Montreal-based outfit going on to establish its Australian office in 1994.

Since then – in line with the wider transition of CAE's business – the company has evolved from supplying and supporting simulator equipment to being a fully-fledged training services provider, on types including the Sikorsky UH-60 Black Hawk and MH-60R Seahawk, Hawk 127 lead-in fighter, CH-47 Chinook, Leonardo C-27J, Textron Aviation Beechcraft King Air 350, and Airbus KC-30A tanker.

With its headquarters in Homebush, near Sydney, CAE operates from eight bases around Australia, training more than 2,500 defence force personnel annually.

Australia is also the capabilities hub for CAE's defence activities throughout the Indo-Pacific region, where it has government contracts in Brunei, India and Singapore among others.

CAE also has a significant presence in the commercial sector in Australia. In November, it opened its training centre near Sydney's international airport in partnership with Qantas. The facility hosts five full-flight simulators, with more equipment due to arrive in coming years, including the airline's first Airbus A350 device that will train Qantas pilots for ultra-long-haul Project Sunrise flights.

The centre marks a return to Australia's largest city for Qantas's training activities, after the flag-carrier relocated its simulators to Melbourne and Brisbane in 2021 to make way for the New South Wales government's Sydney Gateway project to improve road access to the airport.

FLIGHT DAILYNEWS

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RAAF's Super Hornets step up anti-ship capabilities

Boeing's Super Hornet has a significant presence at Avalon, weeks after an F/A-18F of the Royal Australian Air Force (RAAF) successfully launched the Lockheed Martin AGM-158C Long-Range Anti-Ship Missile (LRASM), amid concerns about the nation's maritime security.

The test was conducted off the coast of California in February, and means the weapon is ready for operational use by RAAF Super Hornets, according to defence minister Richard Marles.

The validation work involved the preparation and loading of the weapon, as well as a long-range strike against a simulated adversary.

Three other aircraft supported the test: a Boeing E-7A Wedgetail and EA-18G Growler from the RAAF, and a Boeing P-8A Poseidon from the US Navy.

Royal Australian Air Force F/A-18 Super Hornets arrive at Avalon

BillyPix

"Capabilities such as the LRASM will help the Australian Defence Force protect against threats to Australia and our national interests," says Marles.

"These weapon systems equip our forces to better protect Australia's maritime approaches and when necessary, conduct operations in our region. It will be seen across the Super Hornet, [P-8A] Poseidon and [Lockheed Martin] F-35 fleets."

Australia operates 24 of the two-seat Super Hornet jets, alongside the RAAF's growing fleet of F-35A stealth fighters.

The successful LRASM test comes weeks after a Chinese naval flotilla conducted an unprecedented circumnavigation of Australia in February, which involved an unannounced live fire drill in the Tasman Sea.

The Chinese deployment, which generated significant alarm in Australia, demonstrated Beijing's increasing ability to project power.

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GENERAL ATOMICS
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Patrick: Challenger aircraft particularly suited to Australian military and special mission market

Bombardier

Open for business

Canadian airframer says Adelaide office will help it boost defence Down Under

Murdo Morrison

Bombardier Defense's new Australian office will help the Canadian company build its business in one of the world's fastest growing and innovative defence markets.

That is the view of Bombardier Defense vice-president Steve Patrick, who opened the Adelaide-based facility last May.

Although the Montreal-based business jet manufacturer traditionally had a sales presence in the country, this established a subsidiary operation for the first time.

"This is our foothold in Australia – our acorn, and from little acorns mighty oaks grow," says Patrick. "This is a market with lots of local capabilities, but with an opportunity for other companies to participate with platforms and engineering expertise."

Although Bombardier Defense – which is headquartered in Wichita, USA – does not have any military contracts in Australia, Patrick says it is keen to collaborate with partners on tenders such as the Enhanced Aerial Surveillance Program aspect of the Pacific Maritime Security Partnership (PMSP). The PMSP is an Australian-led initiative with 15 of its mostly small-island neighbours to enhance security in their territorial waters.

He maintains that the involvement of Australia, Canada, and the USA, along with the UK and New Zealand, in the Five Eyes intelligence sharing partnership, is "core" to Bombardier's expectations.

"Five Eyes encourages collaboration between companies and countries. We have strong relationships with all the primes and with the governments of the USA and Canada. It's all about reinforcing the idea of community and putting the emphasis on interoperability and commonality, so that puts us in a good place," he says.

Bombardier is based in Adelaide's Lot Fourteen, a government-sponsored business and innovation district in the city that is "fast becoming an aerospace hub", according to Patrick.

He says that Bombardier has no near-term ambitions to establish an industrial presence in Australia. Instead, the company will provide engineering support from the USA or Canada and work with local partners.

"There is an expectation [by the Australian government] of local benefit and developing local, sovereign capabilities, and we are prepared to do that," he says.

Patrick says Bombardier's Challenger and Global aircraft are particularly suited for the Australian defence and special mission market.

"Grab and atlas and look at the size of the country and its area of interest around the south Indian and Pacific oceans. Range is a huge requirement here, but at high speed. Whether it is from Sydney to Perth or deep out into the ocean, you need to get there quickly," he says. "Then there is the payload and volume of the cabin. We can carry pretty much any payload the customer wants, and we have plenty electrical power to accommodate it. For many of these missions you don't need an airliner because it is too big, but turboprops are too slow and don't have the range."

Bombardier Defense has a chalet at Avalon. "We are not bringing any aircraft but on the flight line you will see plenty of our platforms," he says.

Bombardier berths in Perth

Bombardier has boosted its service footprint in Australia ahead of Avalon, with a new line maintenance station (LMS) in Perth and plans for another LMS in Sydney later this year.

The Perth facility brings the Canadian airframer's LMS presence to 10.

The LMSs provide light maintenance and aircraft on ground (AOG) support for operators of Global, Challenger and Learjet families, and complement 24/7 response centres in Montreal and Singapore, says the company.

In September 2022, Bombardier opened a 4,650sq m (50,000sq ft) full-service centre in Melbourne Essendon Fields capable of housing three Global 7500s.

The LMSs replace arrangements with authorised service providers, mostly undertaking warranty work. Anthony Cox, vice-president of customer support says Bombardier has taken the "extra step" by opening company-owned centres.

"If we are offering customers a premium service, it really should be with Bombardier people. We are moving to a full-service model."

Since the pandemic, Bombardier has expanded or opened new full-service facilities in London Biggin Hill, Miami Opa Locka, and Singapore.

Babcock

MRO and SAR support are areas of interest for firm

Babcock eyes military aviation

Babcock Australasia says it is targeting opportunities in military aviation in Australia and New Zealand, including crew training, maintenance, repair and overhaul, and support for search and rescue operations.

The UK-headquartered group provides outsourced engineering services mainly to government agencies and other public bodies. In this region its contracts include rotorcraft air ambulance services and naval MRO.

Babcock Australasia chief executive Andrew Cridland says the move into the military aviation sector is in response to Canberra naming the MRO and upgrade of Australian Defence Force aircraft as one of seven sovereign defence industrial priorities.

"Our shift into the military aviation space couldn't be better timed to support this endeavour," he says.

"The combination of our existing defence experience, understanding and partnerships, and our decades of delivery and maintenance of aircraft in high tempo, high reliability envelopments, has us well positioned to support technical innovation and operational excellence across military applications."

‘Gamechanger’ 10X goes the distance

Murdo Morrison

Dassault Aviation is exhibiting the 6,450nm (11,945km)-range Falcon 8X at the show, but it is its 7,500nm-range 10X sibling – deliveries of which are set to start in 2027 – that could be a “gamechanger” for the Australian market.

So says the Carlos Brana, executive vice-president civil aircraft, who adds that the French manufacturer has returned to Avalon because “this is a market we cannot neglect”.

While the number of Falcons based in Australia is relatively small, with “a little over 10” in operation, long-range private jets are essential to many corporations because of the distance of the country from major global cities.

“In this part of the world, range matters,” says Brana. “There is a lot of trade with Europe, Asia, and North America and these people need to travel.”

The 10X – like its direct competitors the Bombardier Global 8000 and Gulfstream G800 – can reach the US West Coast, Brazil, and most of the Middle East without stopping. However, Brana says the ultra-wide-cabin, Rolls-Royce Pearl 10X-powered twinjet has the edge over its rivals in “comfort and volume”.

The aircraft, which was launched in 2021, had been slated for certification later this year, but around 12 months ago Dassault pushed that date back to 2027, partly blaming issues with the supply chain.

Brana: Here, range really matters

Dassault Aviation

The 8X, which was certificated in 2016, is Dassault’s longest-range in-service jet. Unlike the 10X, but in common with its 7X predecessor, the Pratt & Whitney Canada PW307D-powered 8X is a trijet. Brana also says Australia is a “good” pre-owned market, and Dassault representatives at the show will also be focusing on that side of the business.

The French manufacturer is displaying its 8X at Avalon

BillyPix

Dassault is well known in Australia as a military manufacturer, with the Royal Australian Air Force (RAAF) operating Mirage 111 fighters between the mid-1960s and late 1980s.

The RAAF has also been flying three 7Xs as VIP transports since 2019.

Dassault operates maintenance centres in Brisbane, Perth, Melbourne and Sydney, as well as Auckland and Wellington in New Zealand, under its ExecuJet MRO subsidiary.

ExecuJet MRO’s heavy maintenance hub for the Asia-Pacific region, in Kuala Lumpur, Malaysia, opened in 2023.

New home in Sydney for DroneShield

DroneShield, an Australian publicly listed company that makes technologies to counter armed and surveillance drones, opened its new Sydney headquarters just ahead of the show.

The ribbon cutting ceremony was performed on 11 March by minister for defence industry and capability delivery Pat Conroy, who praised the business’s commitment to “make the world a safer place”.

The company, which also has facilities in Virginia in the USA, supplies 70 international customers, including Ukraine, which has more than 1,000 DroneShield units deployed. It was founded in 2014 and has grown from a “handful of staff” to a workforce of more than 250, including 200 engineers.

DroneShield, which uses radio frequency sensing and artificial intelligence technologies in its products, says it is committed to maintaining its “predominantly Australian supply chain”.

Honeywell’s oxygen task

Honeywell is to partner with RFD Australia to provide sustainment support to the Lockheed Martin F-35 fleet in the Asia Pacific.

The US manufacturer of the fighter’s back up oxygen system (BOS) will license the Beaufort Group subsidiary to provide maintenance, repair and overhaul services to the Royal Australian Air Force and other services in the region from a new depot in Australia, the location of which has not been disclosed.

The BOS ensures pilots have a continuous supply of oxygen while flying at high altitudes and other extreme conditions.

Most repairs of the unit are currently carried out from Honeywell’s site in Yeovil, UK. “A new depot in the region will significantly improve F-35 sustainment activities in Asia-Pacific,” says Honeywell.

Japan, Singapore, and South Korea are the other F-35 operators in the region.

Skyportz’ launch pad to success

Australian vertiport developer Skyportz is releasing at the show what it calls an “innovative vertipad patent” that solves the problem of downwash and outwash from electric vertical take-off and landing (eVTOL) aircraft.

The issue is a challenge for the urban air mobility industry, which hopes to establish safe landing and take-off zones for eVTOL air taxis in city centres.

Skyportz

Skyportz cites a study published today by the Swinburne University of Technology which indicates that its design could dissipate energy up to 250% faster than an air taxi landing on a conventional flat surface.

“The Skyportz vertipad patent has some very real applications as cities move to establishing vertiport networks outside of existing airports and helipads,” says Skyportz founder and chief executive Clem Newton-Brown.

“It means that with our vertipad you can safely use less land or fit more pads onto smaller plots”.

The start-up says international air regulators and air taxi and vertiport operators have expressed an interest in its patent (*pictured*), which Skyportz will offer to licence.

“The vertiport infrastructure is the missing piece of the puzzle for this industry,” says Newton-Brown. “Without a multitude of new vertipad landing sites in places people want to go, the aircraft will never fulfil their potential”

See AAM feature P25

Australian organisations could increase the amount of MRO work they do on US-built military equipment

The Boeing E-7 airborne early warning and control jet is one platform ripe for increased Australian sustainment work

USAF

Keeping it local

Ryan Finnerty

More American military equipment could soon be repaired in Australia, rather than returning to the USA for maintenance.

The Pentagon wants to increase the use of regional maintenance, repair and overhaul (MRO) providers to support equipment that is forward deployed in the Indo-Pacific, as Washington seeks to better prepare its forces for any potential conflict in the vast region.

Under an initiative called the Regional Sustainment Framework (RSF) announced in 2024, the US Department of Defense says that, when possible, it will seek to move away from repairing its ships and aircraft at home and instead make use of locally available MRO resources.

"Currently, we return assets to the continental United States for major repairs, missing an opportunity to use existing ally or partner nation MRO capabilities for shared weapons systems," the RSF strategy document says.

Instead, the Pentagon will attempt to fill those sustainment needs locally with assets owned by "partner nations, industrial partners or through cooperative partnerships".

Washington says this will allow it to service critical equipment closer to the point of need, "in both competition and conflict".

How exactly that will work in practical terms remains nebulous. Since the RSF strategy was unveiled, new leadership has come to power in Washington, preaching the signature "America First" transactional nationalist philosophy of President Donald Trump.

That could mean a renewed preference for steering business toward American firms at home.

Alternatively, regional MRO partnerships could be seen as furthering the priorities of the new defence secretary Pete Hegseth, who emphasised a "laser focus on readiness, lethality and war-fighting" during his first month in office.

Without offering specifics as to how the RSF will be rolled out, the Pentagon tells FlightGlobal the strategy is "still a priority for the department as far as how we sustain the force".

Some hints are available as to how the new approach may unfold. The RSF strategic outline calls for weapon platforms to be selected based on "relevance to operational plans" and overlap with foreign military sales customers.

Industry sources also tell FlightGlobal that Australia is Washington's first priority when it comes to expanding the use of local MRO providers for American-owned equipment.

Deeper sustainment cooperation with Australia would support all three of the goals outlined in the RSF strategy: prevailing in a contested logistics environment, enhancing military readiness and strengthening regional partnerships.

Canberra also operates many of the same systems deployed by the US military in the Indo-Pacific, including the Lockheed Martin F-35 stealth fighter, Boeing EA-18G electronic attack fighter, Northrop Grumman MQ-4C uncrewed surveillance aircraft and Boeing P-8A maritime patrol jet.

The Royal Australian Air Force also operates the Boeing E-7 Wedgetail airborne early warning and control platform, which the US Air Force is in the process of acquiring.

That overlap would allow the Pentagon to take advantage of existing sustainment networks, in addition to Australia's strategic geographic position much closer to potential flash points around Taiwan and the South China Sea – moving key repair hubs forward across thousands of miles of potentially contested ocean.

Australia also stands to benefit from the new arrangement, and not just from additional contracts for domestic firms.

In its 2024 Defence Industry Development Strategy, Canberra said close industrial collaboration will help the country build "strategic weight" and make Australia "less vulnerable to coercion".

"The goal is to build capable, resilient, competitive and secure supply chains that include Australian businesses, and create economies of scale for the security and stability of the Indo-Pacific," the strategy notes.

Despite enjoying support from both the US and Australian governments, the push to deepen industrial linkages between the two countries does face some impediments from within the defence industry itself.

Chief among these is apprehension from American firms about proprietary company secrets finding their way into the hands of potential competitors.

"Concerns about there being documents that would be interesting to Australian industry that they just can't see and that they don't know about was a pretty pervasive concern," says Cynthia Cook, who is with the Washington-based Center for Strategic and International Studies.

The group earlier this month released a report (sponsored by the Australian government) detailing pathways and barriers to further defence industrial cooperation between the USA and Australia.

Cook notes there is culture of caution within the US defence industry when it comes to sharing information, driven in part by the USA's strict International Traffic in Arms Regulations that restrict the export of sensitive military technologies, even to allies.

"We had one company tell us that they were concerned about talking to foreign nationals about things that appeared on their website," she says.

That culture of reticence may have to change if ambitious industrial goals outlined in RSF and the trilateral AUKUS security pact are to be achieved.

Washington's top American military officer in the Indo-Pacific recently went even further, calling for integration between the Washington and certain key allies in the hemisphere on some of this century's most crucial sectors.

Speaking at the Honolulu Defense Forum in February, US Indo-Pacific Command chief Admiral Samuel Paparo said American policy makers should go beyond the use of local MRO capacity and embrace regional expertise in areas such as semiconductor production, rare earth minerals processing and shipbuilding.

"Japan, South Korea and Australia possess tremendous manufacturing capability," Paparo noted. "By coordinating our efforts, we can achieve the surge production that the environment demands."

Adversaries of the US-led bloc are already engaged in that type of industrial cooperation, Paparo added, noting 90% of semiconductors and 70% of machine tools supporting Russia's wartime economy are coming from China.

A new Pentagon strategy for sustaining forward deployed equipment could see Indo-Pacific allies like Australia undertaking the type of MRO that currently requires sending aircraft to depots in the USA

US Navy

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Over 32 years with the service, Chief of the Royal Australian Air Force Air Marshall Stephen Chappell has accumulated over 2,900h in combat types such as the Boeing F/A-18A Hornet, F/A-18F Super Hornet, EA-18G Growler, and F-15C Eagle. He has also held several leadership roles. Here he answers our questions about the RAAF's role today, its objectives for the next 10 years, and why interoperability with key allies is so important

Shaping up for a changing strategic reality

Q Can you share how the RAAF has changed over the last 10 years?

A The 2023 Defence Strategic Review and the 2024 National Defence Strategy (NDS) sparked significant and necessary change in the Australian Defence Force. The NDS details the government's approach to address Australia's most significant strategic risks based on the concept of national defence and is making a generational reinvestment in the Defence Force's posture, capability and structure. From an air perspective, the NDS and the 2024 Integrated Investment Program provided the direction necessary to prioritise the air force's capabilities, including intelligence, surveillance and reconnaissance and long-range strike.

Q What are the RAAF's objectives in the coming decade?

A In preparation for the coming decade, we are developing our vision of the air force beyond the current generation of capabilities and driving the organisational cultural change that the air force must go through in light of Australia's more complex and challenging strategic reality.

At the start of my tenure, I outlined my priorities – people, purpose and preparedness. Priorities that I believe will ensure the RAAF's success in generating and delivering highly effective air power as part of an integrated and focused force. It requires deliberate integration with our whole of government partners, our industry partners, and internationally with our allies and partners.

I have said it many times: our people are our greatest capability. Without them our platforms and systems remain impressive, but inanimate. Our aviators, public servants, and industry colleagues are the ones that create airpower — and ensure it is highly effective, lethal, and survivable. We will drive systemic change to ensure the air force offers a positive and consistent experience to all aviators. This will challenge our culture, beliefs, and priorities, requiring us to better understand the impact on our people. All our aviators – regardless of rank or specialisation – must embrace this opportunity for improvement.

Our mission requires us to shift from service-

centric approaches towards true collaboration with other defence elements. We must connect all our aviators, and our APS and industry colleagues in the air domain team, to our shared purpose — they all contribute to the generation and delivery of airpower each and every day. Connecting every member of the air domain to this shared purpose will generate a higher performing team, critical to seizing the opportunities and tackling the challenges before us.

Over the next decade, we will continue to build integration into our daily activities. This will enhance our ability to fight and win if we are called upon to defend our nation and its interests. In order to succeed, we must build capacity early by prioritising our time and efforts effectively. I see us doing this by critically evaluating our tasks to ensure they remain relevant to our contemporary strategy and prioritising activities that allow our aviators to recover and build team cohesion.

Our force generation delivers preparedness. It also contributes to deterrence – by emphasising our ability to deliver, to disrupt, to degrade, to destroy, and to defeat. We will demonstrate that we are ready, if called upon, to generate and deliver highly effective airpower with enhanced lethality and survivability; how our capability is amplified as part of the integrated force; and how it is further enhanced when working with allies and partners.

As we prepare over the coming years, we will explore how the RAAF can exploit depth in time, space, and posture. We will pursue agility and asymmetry in all that we do. This approach to preparedness will leverage our unique geography, culture, and character to support national defence. I strongly believe we must continue adapting our organisation, mental models, and relationships to build a better air force for the future.

Q Technology is moving fast, particularly in areas such as unmanned systems and artificial intelligence. Given that nobody is certain as to what the future of air power looks like in terms of the mix of manned and unmanned systems, how does the RAAF set priorities for future technologies?

RAAF F-35s at Nellis AFB

RAAF

Chappell and Warrant Officer of the Air Force Ralph Clifton conduct a town hall at Williamton

RAAF

A The RAAF recognises the importance of innovative Australian sovereign capabilities in the rapidly evolving technological environment. We are working to achieve this innovation in a variety of ways, including enhancing collaboration through partnerships with small to medium-sized enterprises (SMEs) and start-ups, providing clearer direction with simplified procurement processes and research support, and looking to invest in emerging technologies, including AI, quantum computing, and advanced materials.

Over the past 10 years the air force directly developed and supported innovative Australian sovereign capabilities, many from SMEs, through the Jericho Disruptive Innovation (JDI) directorate, originally known as Plan Jericho. JDI – in collaboration with Australian industry, academia, other ADF innovation units, Defence Science and Technology Group, and most recently the Advanced Strategic Capabilities Accelerator – continues to seek out and develop capabilities. This now includes AI and machine learning, which provides an opportunity for asymmetric advantage.

More broadly, the air force's best foot forward in fostering industrial innovative talent is to identify those talents/niche areas and advocate for ways to support and grow them (where there is direct relation to enhancing military capability and Australian industry capability).

We are continuing to explore the future of autonomous air power through such programmes as the [Boeing] MQ-28A Ghost Bat and similar programmes for smaller uncrewed systems. We will continue to evolve our organisational structures to ensure they are optimised to generate and sustain air operations in the event of conflict.

Q What is the status of the MQ-28?

A The Ghost Bat project began as a collaborative effort between Boeing Defence Australia and Defence, and that continues to this day. Collaborative combat aircraft (CCAs) are a completely new capability; we are not replacing something already in-service. This means the concepts, dependencies and integration requirements are all new.

The collaborative efforts undertaken to date are providing Boeing and the air force with an enhanced understanding of the potential applications of emerging CCA capabilities through the continued development of mission payloads, behaviours and autonomy.

We will demonstrate these capabilities, integrated with air force platforms in a series of activities throughout the year. The project is on track to deliver three MQ-28A Block 2 aircraft and a ground control station by the end of 2025.

Q All of the RAAF's Lockheed Martin F-35As are in Australia. Given the delays with Block 4 software, how comfortable are you with the capabilities of the fleet?

A I am very pleased the final nine of our F-35A Lightning II aircraft arrived in Australia at the end of 2024. These aircraft contribute leading edge air combat capabilities as part of the integrated force.

Maintaining this capability involves building capacity support, by maturing the F-35A Lightning II logistics and supporting infrastructure to grow the operational capacity of the F-35A Lightning II force.

Australian suppliers are now bringing online component

maintenance, repair, overhaul and upgrade (MRO&U) capabilities, which have the potential to support aircraft operating outside the USA through to F-35 partners' planned withdrawal dates.

The Department of Defence (DoD) has been communicating early and often on these contracted MRO&U services, which will enable Australian industry to plan, deliver and grow the skills and supplier networks needed to achieve our MRO&U outcomes over the decades to come.

Q The RAAF is moving in tandem with the US Navy to update the F/A-18F to the new Block III configuration. Will this work be undertaken in Australia? When will it be completed? When done, will RAAF Super Hornets be identical to USN aircraft, or will there be some differences?

A Australia maintains and upgrades our Super Hornet capability through an ongoing spiral upgrade programme and will upgrade the existing Australian Super Hornet fleet to the Block III standard. Super Hornet upgrades include infra-red search and track pods, advanced datalinks and additional weapons including the [AGM-158C] Long Range Anti-Ship Missile and [AGM-158] Joint Air to Surface Standoff Missile – Extended Range. Most Block III upgrades will be conducted in Australia over the next few years, and Block III is expected to be complete in 2028. Our Super Hornets will be practically identical to US Navy aircraft and will continue to receive spiral upgrades throughout the life-of-type.

Q How do you see the role of the F/A-18F evolving with the growing maturity of the F-35A fleet? Do you foresee RAAF Super Hornets using the US Navy's new long-range air-to-air missile, the AIM-174B AAM?

A The F/A-18F Super Hornet will remain an important air combat capability out to 2040 despite the growing maturity of the F-35A fleet. Indeed, F/A-18F capabilities complement the F-35A fleet. The Super Hornet's capacity to carry long range weapons (particularly maritime strike weapons) and ability to integrate with US capabilities are critical to achieving the requirements of the NDS. The DoD undertakes a rigorous process for determining future weapon requirements and detailed evaluation of candidate weapons. At this stage Defence has no plans to acquire the AIM-174B for our Super Hornet.

Q Can you discuss the evolving role of the EA-18G? And what is the status of the new Gulfstream MC-55A? How will it complement the Boeing EA-18G? How will its capabilities differ?

A Consistent with Defence's approach to maintain interoperability and commonality with US capabilities, Defence plans to continuously upgrade the RAAF EA-18G Growler fleet throughout its service life, including Growler Block II upgrades, as this upgrade becomes available. The role of the Growler is unlikely to change significantly, but its ability to counter increasingly complex threats will continue to grow throughout its life-of-type.

F/A-18F Super Hornets will remain an important air combat capability to 2040

RAAF

The MC-55A project will enhance Australia's airborne intelligence, surveillance, reconnaissance and electronic warfare (ISREW) capability by delivering a fleet of MC-55A Peregrine aircraft, which are based on the Gulfstream G550 business jet. Mission system integration of the ISREW capability is in progress. Due to the classified nature of the project, I am not able to provide specific details regarding delivery schedule and capability milestones.

The MC-55A aircraft will complement the EA-18G by providing a specialised, long range, unarmed ISREW capability.

Q Can you offer some insights into the RAAF's plan to replace the Hawk trainer fleet? Why is this necessary?

A The primary role of the Lead-In Fighter Training System (including the Hawk 127) is to prepare RAAF fast jet aircrew for conversion to the F/A 18F, EA-18G and F 35A. It also supports other force generation activities for the navy, army and air force.

The Hawk 127 planned withdrawal date is 2032. This will be re-evaluated for possible further extension, and replacement systems considered, to meet NDS priorities. Noting air force Super Hornets and Growlers will be in service until 2040, and the F-35 into the 2050s, a credible lead-in fighter will be critical to meet the operational requirements of frontline fighters and joint force training.

Q The RAAF continues to work closely with allies in joint exercises, joint refuelling, and cooperation with UK Royal Air Force and US Air Force on the E-7 airborne early warning and control (AEW&C) aircraft. Can you explain why these activities are a priority for the RAAF?

A It is important to note our objectives around innovation and collaboration. The DoD works closely to foster collaboration between industry, academia and government. By cultivating a culture of innovation, we provide clear direction and support, focusing on emerging technologies.

In the case of the E-7A and Airbus KC-30A [Multi-Role Tanker Transport], Australia chose to forge ahead with ambitious solutions by ourselves to meet each of the respective capability needs, after carefully assessing the available capability options for both the AEW&C aircraft and refuelling tanker.

The resultant products for both of the E-7A and KC-30A have provided a significant capability dividend for Air Force and Australia. Both are world-leading capabilities, acknowledged by allies in operations and exercises since their introduction.

While each of these programmes experienced development challenges that added to both their cost and delivery schedule, Australia continues to reap benefits from our early investment in both E-7A and KC-30A. This includes increased skills and experience for both Air Force and industry personnel as well as opportunities to influence the direction of next-generation capabilities in development.

Chappell speaks with aviators at the officers' mess during a visit to RAAF Base Amberley

RAAF

Q Why is the RAAF a good career choice for a young person in Australia? What skills will it give a young person that can be used later in their career?

A I would say that there are countless opportunities available in the RAAF. You will embark on a fulfilling career with talented and highly trained teammates who are passionate about pursuing outcomes that are bigger than themselves.

We are at a very important period in our nation's history. We are growing a highly specialised and skilled workforce to meet Australia's current and future needs. We need the young, and the not so young, to join our ranks to enable us to achieve our mission.

You would be hard pressed to find a career anywhere in Australia that gives you the same opportunity to operate or enable some of the most technologically advanced kit in the world and be well paid for doing so.

I would encourage your readers to visit the ADF Careers website (adfcareers.gov.au) and take a look at the options available to join our Air Force team.

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After receiving its first MQ-4C, the RAAF is preparing for its maiden domestic flight – which is timely given China's recent maritime posturing

Australia has signed contracts with Northrop Grumman for four MQ-4Cs, but could ultimately order up to seven

US Navy

Troubled waters

Ryan Finnerty

Australia is ramping toward the first domestic flight of the country's new Northrop Grumman MQ-4C Triton long-range maritime patrol platform.

The first example of four currently under contract by Canberra was turned over to the Royal Australian Air Force (RAAF) in mid-2024, after a US Navy (USN) ferry flight from the continental USA.

Northrop delivered two more examples of the uncrewed surveillance jets to the USN in February, which the USA will transfer to Australia after completing final check-out flights and evaluations on the US East Coast.

The manufacturer tells FlightGlobal that the RAAF is moving through ground trials with the first MQ-4C airframe, with Australian crews readying their first indigenous sortie.

"They're progressing through the build-up of their activity to get into what we call dynamic testing," says Brad Champion, Northrop's MQ-4C programme director.

Canberra's fourth Triton is undergoing assembly at a Northrop facility in Mississippi, after which it will be transferred to California for system tests and final assembly.

The new fleet is expected to reach initial operational capability as soon as the first quarter of 2026.

"The Australian Defence Force, alongside our industry partners, continue to conduct integration and acceptance testing of Australia's recently acquired MQ-4C Triton," the ADF tells FlightGlobal. "This will be followed by operational test and evaluation activities as well as training for aircrew and maintenance personnel."

As Northrop works to deliver the four Tritons under contract, Champion says the company is also in discussions with the commonwealth government about adding up to three more aircraft to the order.

"Ultimately their need is for upwards of seven aircraft to service all of the mission areas that they are focused on," he notes of the RAAF.

Whatever its final count, the new fleet will be based at RAAF Tindal in Australia's Northern Territory. Just south of Darwin on the continent's northern coast, the base offers an ideal launching point for monitoring the maritime approaches to Australia and contested waterways like the South China Sea.

That capability comes not a moment too soon.

Between February and March, a Chinese naval flotilla circumnavigated the Australian continent, a 12,000nm (22,200km) voyage that included unannounced live fire exercises southeast of Sydney and incursions into Australia's exclusive economic zone.

The brazen expedition, which brought the Chinese warships to within 170nm of the city of Perth, came as the top American military officer in the Indo-Pacific recently warned that Beijing appears to be preparing its forces to take control of Taiwan.

"Their aggressive manoeuvres around Taiwan right now are not exercises as they call them," said Admiral Samuel Paparo at the Honolulu Defense Forum in February. "They are rehearsals for the forced unification of Taiwan to the mainland."

Should China launch such a campaign, it would likely begin with a naval blockade of the island, according to senior military officials who spoke to FlightGlobal on background.

In such an event, the MQ-4C would play a critical role in ascertaining the disposition and location of Chinese naval assets. The remotely piloted vehicle can cruise at altitudes of 50,000ft with a flight endurance of more than 24h and a 7,400nm range.

"In a single flight, we're surveilling 4.2 million square nautical miles," Champion says. "There really isn't another platform like this from a maritime intelligence perspective."

Carrying a long-range multi-functional radar and sensor suite, the MQ-4C can identify vessels at sea and provide weapons tracking for targeting by other weapon systems.

While the Triton itself does not carry armaments, USN doctrine calls for the unmanned intelligence surveillance and reconnaissance (ISR) aircraft to be teamed with crewed Boeing P-8A Poseidon maritime patrol jets to form a kill chain.

The P-8 carries a full suite of anti-submarine warfare weapons and sensors. Australia has already fielded 12 of the 737-derived patrol jets, with two more on order.

"By combining those two platforms, you really optimise what each of them are tailored to do," Champion says.

"It ends up extending the life of the P-8 because you're not racking up flight hours on the airframe of P-8 trying to perform ISR," he adds. "It allows P-8 to focus on the anti-submarine warfare and it allows Triton to focus on that ISR mission."

Northrop continues to advance the MQ-4C capabilities, with an Increment 2 version currently in development for the USN.

The manufacturer is also in talks with Norway – another P-8A operator and a NATO member – about acquiring the Triton.

In 2024, Northrop and state-owned Space Norway collaborated to launch a new satellite constellation that will provide communication coverage to US and Norwegian military forces operating in the high north.

Such coverage is critical to the operation of remotely piloted aircraft like the MQ-4C in the polar region, where traditional satellite communication networks typically suffer from reduced reliability.

55Th

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The versatile C-27J tactical airlifter has become a crucial part of the RAAF's inventory, as a way of delivering aid into places often inaccessible to larger types, but also potentially as a battlefield asset

Getting into tight spaces

The C-27J regularly deploys to neighbouring countries such as Fiji

Commonwealth of Australia

Greg Waldron

The Leonardo C-27J tactical transport has become a key asset for the Royal Australian Air Force (RAAF) to provide humanitarian assistance domestically and to regional neighbours, as it also continues to perform key military roles.

The RAAF's 10 C-27Js serve with 35 Sqn, which is more popularly known as 'Wallaby Airlines'. The Australian marsupial features on the unit's badge.

The squadron has a strong heritage in military logistics, tracing its origins to the Second World War, when it flew Douglas C-47 Dakotas. It was retired in 1946 but was reborn as an operator of the De Havilland Canada DHC-4 Caribou in 1966, when 35 Sqn saw service in the Vietnam War.

The unit was again retired in 2000 but was reactivated in 2013 to operate the C-27J, which had prevailed in a competition against the Airbus Defence & Space C295 as a Caribou replacement.

As part of its C-27J sales campaign, the then-Alenia – using an Italian air force example – demonstrated the aircraft at the 2011 Avalon air show. The aircraft showed off its ability to descend sharply and stop in a very short distance. Even more impressive were its barrel rolls and loops: manoeuvres more commonly associated with fighters.

Wing Commander Mark Seery is commanding officer of 35 Sqn. He is well aware of the C-27's power and manoeuvrability, but stresses that the squadron does not perform aerobatics – even though the type is appearing in the air display at the show this year.

"No loops and rolls from us," says Seery. "We just want to get these aircraft out into the late 2030s."

The Australian Department of Defence (DoD) originally cast the twin-engined type as a "battlefield airlifter", but in July 2021 Canberra redefined the C-27J's mission to focus on humanitarian and disaster relief (HADR) in Australia and the surrounding region. The battlefield airlifter label was dropped in favour of "light tactical airlift".

In Seery's view, the 2021 redefinition was more about changing the priorities around C-27J activities, such as how funding is used and where effort is placed.

"All capabilities, as we go through the life of them, we look at the strategic environment that we're operating in at the time, and we pivot to where we can utilise the platform best, now that we know more about [the C-27J]," he says.

"We didn't necessarily stop doing anything, and we didn't necessarily remove anything, but it was more about where we needed to pivot and focus."

Seery contends that the C-27J's flexibility and nimbleness are key attributes both for HADR and military work. The type's manoeuvrability is crucial when getting into and out of tight airfields.

Training for the C-27J has remained much the same, as has integrating core skills into the squadron's aviators. Despite the ostensible HADR focus, C-27J crews can use all aircraft systems, including self-protection equipment, and they know how to operate in threat environments.

Seery, alluding to Australia's changing geopolitical environment, adds that the twin-engined airlifter's role has continued to evolve in the four years since the redefinition.

The C-27J's credentials as a military aircraft are not in dispute. Mission

The C-27J cockpit has significant commonality with that of the C-130J

Commonwealth of Australia

sets include air dropping cargo and paratroopers, cargo carriage, as well as medical evacuation. The aircraft has made appearances at defence exercises in Southeast Asia and in the US territory of Guam.

According to the RAAF's website, the C-27J has capacity for 34 passengers, 21 stretcher patients, or 5t of cargo. Seery says that the number of passengers could be stretched in an emergency.

He notes that a key benefit of the C-27J is its cargo handling system, which allows it to carry pallets that are compatible with other aircraft types. The type can also carry vehicles, which can be loaded and unloaded via the aircraft's ramp.

The C-27J has significant commonality with the four-engined Lockheed Martin C-130J tactical transport, the workhorse of the RAAF. The two types share a high degree of cockpit and avionics commonality, as the C-27J was developed under the Lockheed Martin Alenia Tactical Transport Systems partnership.

Seery notes that the cockpit commonality between the two fleets has started to move apart, especially following a hardware and software upgrade of the RAAF's C-130Js.

"Their cockpit systems are slightly starting to diverge a little bit from what we have," says Seery. "Later in life, we'll probably do something similar when we'll do a mid-life upgrade as well."

Still, things such as head-up display symbology, flight procedures, and general cockpit philosophies remain broadly the same.

"If I have a pilot who comes across from 37 Sqn, which operates the C-130J, it's a really quick conversion for them onto our aircraft type. Equally, if we send some of our pilots across to them, it's also a relatively quick, easy conversion onto their type."

The two types are also powered by the same turboprop engine, the Rolls-Royce AE2100.

This sort of commonality is especially helpful for a small air force such as the RAAF, says Seery.

From their base at RAAF Amberley, located south of Brisbane, Queensland, the aircraft are regularly deployed inside Australia. The type has become a stalwart for humanitarian missions.

When announcing its redefinition of the C-27J's mission in 2021, the DoD made much of the type's utility during Australia's 2019/2020 bushfire crisis. During Operation Bushfire Assist, the Australian Defence Force's (ADF's) response to the disaster, C-27Js evacuated 2,400 people from fire-affected communities and moved 300,000kg (661,000lb) of cargo.

Critically, the C-27J was able to reach locations that were inaccessible for other Australian operated types, such as the C-130J and Boeing CH-47 Chinook transport helicopter.

Seery says that three C-27Js were deployed for the effort. For a while bushfires cut off the small coastal town of Mallacoota. In addition to being challenging to get into and out of, the town's runway was too short and "soft" to handle larger aircraft, but the light footprint of the C-27J allowed it to form an air bridge.

Over a one-week period, 35 Sqn's C-27Js evacuated about 1,000 people from Mallacoota. Animals were also evacuated. It also delivered essential supplies such as food, water, medicine, and other necessities.

Despite its humanitarian aid and disaster relief focus, the aircraft remains a tactical transport asset

Commonwealth of Australia

A C-27J drops supplies during an exercise in Queensland

Commonwealth of Australia

"Of all the strengths the C-27J brings, it's got a light footprint, and you can land and take off on relatively soft runways where heavier aircraft, such as the C-130 and Chinook at times, will have a challenge. They might damage those strips as they come in and out."

In addition to the type's usefulness as a domestic HADR asset, a C-27J is regularly deployed overseas in Haiti or Papua New Guinea (PNG) under the Defence Pacific Air Programme. The programme has been running since 2023 and sees the RAAF integrate the C-27J capability with the New Guinea Defence Force's three PAC P-750 aircraft, of which Canberra furnished two examples to Port Moresby in 2023.

The C-27J was a key part of Australia's response to a devastating landslide that occurred in the PNG's highland province of Enga in May 2024. Casualties were likely in excess of 1,000 people and 7,850 were affected by the disaster. The landslide also cut power lines and made clean water inaccessible.

Among other efforts, Canberra dispatched two Boeing C-17 supply flights from Brisbane to Port Moresby. RAAF C-27Js and C-130Js then ferried supplies and personnel to Wapenamanda airport, which is at an elevation of 5,889ft and has a single 1,540m (5,050ft)-long runway.

"It's a relatively short airfield that sits at high density altitude," says Seery. "It is quite high up in the mountain ranges and has lots of challenging approaches to get in and out of there."

Visual flight rules are the only way in and out. Pilots on approach often needed to fly underneath clouds and manoeuvre up a valley before landing.

"This showed the diversity and utility of the aircraft in that the airfield itself was quite a challenging strip to get in and out of. Mountain operations is something we qualify our crews in as well."

Thanks to its relatively small size, the aircraft can manoeuvre around small airfields. Critically, it has the capability to reverse. Seery says that in a narrow space, the aircraft can perform the equivalent of a three- or six -point turn to reverse its direction.

One challenge facing the global C-27J fleet is its relatively small size. According to Cirium, an aviation analytics provider, just 87 examples are in service globally, divided among 16 operators. With its 10 examples, the RAAF is the third largest operator, after the US Coast Guard (14) and the Italian air force (12).

Asked about aircraft availability, Seery says that this is "quite good", noting that Northrop Grumman Australia provides base maintenance for the fleet.

He adds that the RAAF learned a considerable amount about the C-27J during its original certification effort and that this offers a strong understanding of how to manage the fleet.

While the small size of the fleet can be a challenge, the Australian C-27J team works closely with US and Italian counterparts.

"We communicate regularly, stay across each other's problems, so that when we do need support from the OEM, whether it's spares difficulties, whether it's engineering solutions or problems, we work those problems collaboratively and ensure that we're all trying to prioritise them together."

Logically, the C-27J should have a place in the Agile Combat Employment (ACE) strategy that has been adopted by the US Air Force and the RAAF. Under ACE, USAF, RAAF and allied combat aircraft complicate the targeting dilemma for adversaries by operating unpredictably from diverse airfields.

The ACE concept of operations places great emphasis on the timely transport of fuel, munitions, and personnel to sometimes austere locations.

Seery does not touch on the C-27J's specific role in ACE scenarios but observes that both the ADF and RAAF are very focused on ACE. He feels that the pilot skills and aircraft attributes that allow the C-27J to operate into difficult airfields during peacetime would be highly relevant during a conflict.

"Broadly speaking, [the C-27J] is a military aircraft, and it can and will be utilised in military circumstances, including in times of conflict."

See Cutaway P30

The US systems house's recently opened subsidiary will help support Australian acquisition programmes, while also expanding domestic production of defence technology

Why SNC made for Adelaide

Sierra Nevada

Sierra Nevada's RAPCON-X jet was selected by the US Army's Athena-S programme. The company also hopes to export the Bombardier Global 6500-based design to Australia

Ryan Finnerty

The defence business is booming Down Under, driven by geopolitical security concerns across the Indo-Pacific and the trilateral AUKUS security agreement between Australia, the UK and the USA.

American military systems integrator Sierra Nevada (SNC) is moving to capitalise on the enthusiasm, recently opening its first Australian subsidiary, based in Adelaide.

"The Commonwealth of Australia is really in an ascending role in the Indo-Pacific area," says Stu Wildman, SNC's senior vice-president of business development.

SNC was already supporting several local acquisition programmes, including the fielding of Boeing P-8A maritime patrol jets and Northrop Grumman MQ-4C remotely piloted aircraft to the Royal Australian Air Force (RAAF), when it made the decision to open shop in Adelaide.

With the Nevada-headquartered company already having a subsidiary in the UK, the 2022 AUKUS agreement created a strong incentive to expand that footprint into Australia.

Although the pact is best known for its promise to deliver nuclear submarine capability to Canberra, the so-called second pillar of AUKUS provides for the sharing of sensitive technologies between the three partners, including artificial intelligence, autonomy, hypersonic flight and electronic warfare.

It could also open the Australian market to products such as the SNC RAPCON-X jet, recently selected by the US Army's Athena-S programme. The company will be hoping to export the Bombardier Global 6500-based design to Australia

Australia stands to benefit from AUKUS, not just by gaining access to better imports, but also by improving its own domestic production capability.

"The Commonwealth is making significant efforts to develop and enhance their defence industrial base," Wildman notes.

While those efforts may previously have been hampered by export licensing requirements, US firms like SNC can now share some of their previously restricted technologies more freely with Australia and the UK.

Wildman says the USA will also benefit from the transfers, noting Australia has several firms possessing global expertise in electronic warfare battle management.

While the submarines covered under the first pillar of AUKUS will still take years to deliver, the benefits of deeper industrial integration will manifest more immediately. Having personnel based in Adelaide will allow SNC to circumvent the oft remarked upon "tyranny of distance" that affects both military and business operations spanning the vast Pacific Ocean.

"By being there we can essentially project our presence, both logistically and technologically, into Australia," Wildman notes.

The company's new office is located at the Lot 14 industrial hub in central Adelaide, home to other defence companies and start-ups. The city also hosts a major university and RAAF Base Edinburgh – home to the RAAF's 09 Squadron, which will remotely pilot Australia's fleet of MQ-4C Triton uncrewed aircraft.

"It's really growth minded," says Josh Rooney, SNC's Australia managing director, of the South Australia capital.

"It's defence centric and they're really trying to push for the hub of Australian defence industrial base to be in South Australia," he adds. "They align perfectly with our intentions of what we are looking to do down here."

The SNC site will initially employ five workers, with plans to grow that number to 20 by the end of 2025. While the team in Adelaide will be focused on executing new contracts and sustaining capabilities already delivered to Australia, Rooney says the company wants to do more than just sell American-made products overseas.

"SNC Australia is not just focused on bringing in US technology and delivering it to the Commonwealth," he notes. "It's about building organic capabilities here as well."

To that end, SNC is expanding its use of local suppliers on its Australian contracts, and even helping those companies expand their operations beyond the domestic market.

Wildman says SNC partnered with an Australian sensor manufacturer to contribute to a product SNC had sold to Canberra. The partnership was so successful that SNC is now helping Australia market that domestically produced capability to European members of NATO.

"We are an integrator, but we're also an opportunity for these companies to get their product into the US or even into other areas like NATO," Wildman says.

Another Australian firm working in the realm of electronic warfare battle management has caught the Americans' attention, and Wildman says SNC is exploring how to incorporate that capability into its own products, thus opening markets in the USA and UK to the Australian supplier.

"Australia is an innovative country," he says. "Enabling them to bring that to the marketplace is a win for both of us."

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The RAAF uses its KC-30As to bolster relationships with regional allies

Commonwealth of Australia

Australia has an air-to-air refuelling pact with South Korea

Fuelling friendships

Greg Waldron

The Royal Australian Air Force (RAAF) has worked to provide allies with the air-to-air refuelling capabilities offered by its seven Airbus Defence & Space A330 Multi-Role Tanker Transports (MRTTs).

In recent years the RAAF has used the aircraft – which it designates as the KC-30A – to deepen relationships with close allies and partners and improve interoperability among regional air forces.

Australia's Department of Defence (DoD) periodically issues statements highlighting new additions to the KC-30A's roster of recipients.

November 2024 saw Canberra announce that the type would be allowed to refuel aircraft operated by India's military, namely Boeing P-8I Neptune maritime patrol aircraft – which are broadly similar to the P-8As operated by the RAAF.

A little over a year earlier, in August 2023, an RAAF KC-30A conducted a major refuelling exercise with Lockheed Martin F-16s operated by Indonesia. The work involved over 60 F-16 sorties and 200 successful boom contacts.

May 2023 saw the KC-30A cleared to refuel Japan Air Self-Defense Force (JASDF) Boeing/Mitsubishi F-15Js following 11 flights and 325 boom contacts. The milestone came one year after the KC-30A was cleared to refuel another mainstay of Japanese airpower, the Mitsubishi F-2.

"Air-to-air refuelling is an essential function of fighter aircraft operations and greatly contributes to JASDF-RAAF interoperability," said the JASDF of the effort.

In addition, Australia has an air-to-air refuelling pact with another Asia-Pacific partner, South Korea. Seoul, for its part, operates four A330 MRTTs.

"This helps further ensure that our two air forces can support one another in the skies, during exercises and training activities and on any future operations," said a senior RAAF officer on the occasion of the 2022 agreement with Seoul.

"The transfer of fuel when required to sustain and prolong our presence in the air is critical to our aircraft being able to successfully project air power."

In addition, RAAF KC-30As have worked with aircraft from other partners such as France, the UK and the USA.

The type also participated in Operation Okra, Australia's contribution to a coalition campaign against Islamic State terrorists in Iraq from 2014-2020. The work involved over 1,600 sorties, during which the KC-30A refuelled a broad number of allied types.

The international effort comes on top of the KC-30A's main work, which is refuelling RAAF types such as the Lockheed Martin F-35A, Boeing EA-18G Growler, F/A-18F Super Hornet, C-17, and P-8A.

While the DoD's statements and accompanying images make the KC-30A's international refuelling work look relatively straightforward, a significant amount of work takes place before a foreign aircraft lines up on the MRTT, connects with its boom, and takes on fuel.

Squadron Leader Lee McDowall is part of 33 Sqn, which operates the KC-30A from RAAF Amberley south of Brisbane, Queensland. A line air refuelling officer and instructor, he is a subject matter expert on air-to-air refuelling with the KC-30A's boom.

In addition to his existing role with 33 Sqn, he has also been deployed to Airbus's facility in Getafe, Spain to work on the MRTT programme there. He is highly conversant with the world of fighter aircraft, having spent time in the back seats of the now-retired RAAF F/A-18B Hornet, as well as in the F/A-18F, of which Australia operates 24. In McDowall's existing role he handles clearances for new receiver types.

He reveals that a significant body of work goes into clearing overseas partner aircraft to refuel from the KC-30A. Initially there is a conversation between air forces about the desirability of obtaining a clearance to tank from the KC-30A, at which point the effort moves to flight testing.

"We've done about fifteen clearances with different kinds of receivers," says McDowall. "We have a well laid out path to do the testing. It takes about eight to ten flights spread over two or three weeks."

Before this, McDowall and his RAAF colleagues will work with the flight test agency for the receiving aircraft and develop a joint test plan. This will outline how the test work will progressively assess the extremes of altitude, airspeed, weights, weapons loadouts on the receiver platform, and even the boom elevation. This effort can take two to three months.

Engineers in Australia and for the receiver aircraft conduct a compatibility assessment to confirm that the pairing will be successful in the air.

"The aim of our testing is to assess the compatibility of both aircraft, and there is a list of areas we look at," he says.

One area is purely mechanical, or the binding between the receiver aircraft's fuel receptacle in all elevation, roll, and boom telescope positions.

Another area considered is the geometry of the contact. "Is there any risk of our boom coming into contact with antennas or the canopy?" asks McDowall. "Or even the fuselage as the receiver moves around?"

Also assessed are boom handling qualities and the receiver's handling

qualities, and how these might influence each other as the two aircraft get into proximity and make contact via the boom.

"Once we make contact and the tanker starts turning to make an orbit, is the receiver happy back there?"

Apart from aircraft handling, test work also includes several fuel transfers aimed at assessing pressures and flow rates.

Human factors are also assessed. In the MRTT, the air refuelling officer sits in a comfortable seat at a rear-facing console in the cockpit. Wearing 3D goggles linked to a series of cameras located on the jet's fuselage they fly the boom into the receptacle of the receiving aircraft. This is a major improvement over the ubiquitous Boeing KC-135, in which the boom operator lies on their stomach and guides the boom as they peer through a rearward facing window, with their chin resting on a padded support.

During a 2017 media visit to RAAF Amberley's KC-30A simulator centre, which is managed by simulator specialist CAE, FlightGlobal – with no prior training – was able to use a sidestick controller to easily guide a simulated boom into the receptacle of an F-35A. The process was intuitive and simple. Other defence journalists – also untrained – enjoyed similar success.

Still, human factors remain critical in air-to-air refuelling, which is fundamentally a highly complex endeavour with a range of potential safety issues. As such, McDowall and his team look at a range of variables that can affect the boom operator's perception, such as lighting conditions, clouds, and how these interact with the KC-30A's external lighting, which offers essential cues for receiver aircraft.

Prior to working with a new receiver type, the RAAF will brief pilots on the idiosyncrasies of the KC-30A, and how things may differ from tankers they are used to.

An RAAF crewman monitors a refuelling from a comfortable station in the rear of the aircraft

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Moreover, the attributes of the KC-30A are posted in documentation provided by NATO's Joint Air Power Competence Centre (JAPCC). Once the KC-30A is cleared to refuel a certain receiver type, operational pilots can use JAPCC resources to help plan refuelling activities with the KC-30A.

"As for the testing process, we start at the heart of the proposed envelope, and check that there are no adverse effects from them or us, and then we incrementally explore different conditions, changing one variable at time," says McDowall.

Altitudes can range from low level to 35,000ft. For attack jets such as the Fairchild Republic A-10, the KC-30A needs to slow down, while for fighters it needs to go much faster.

"We progress gradually toward the extremes of the envelope we're trying to achieve. We have only rarely discovered any compatibility concerns, because the jet is designed to be easy to perform refuelling with."

McDowall adds that receiver pilots are big fans of the KC-30A and are impressed with the amount of fuel it can offload in comparison with other tankers.

The KC-30A, as with MRTTs operated by most other air forces, offers refuelling through the boom and through hose and drogue pods mounted outboard of the aircraft's engines – GE Aerospace CF6s in the case of RAAF examples. Hose and drogue refuelling, such as for the F/A-18F, requires considerably less clearance work, with receiver aircraft simply nosing their refuelling probe up to the basket.

Despite the intuitive nature of the KC-30A's refuelling interface within well-defined control laws, the boom is altogether more complicated.

"There's more people flying different things," says McDowall. "With hose and drogue, we trail them, and it's up to the receiver pilot to do his work. With the boom we're flying it, and it adds just one more, quite large, variable – another person in the loop flying a big thing into their receptacle."

Asked about what allied aircraft are most challenging to refuel, McDowall feels things have gone very smoothly and that no receiver aircraft type is especially challenging. The main challenge tends to fall in the planning phase, when there is a considerable amount of administration work within the two air forces. Once things move to the flying squadrons, McDowall says things "are pretty easy".

Still, some receivers are unique. Most allied aircraft, such as the F-35 and F-15, have the receptacle further back behind the cockpit. The US Air Force's A-10 ground-attack jet and Boeing B-1B bomber, however, have their refuelling receptacle in the nose, forward of the cockpit. The different layout calls for modified procedures.

"This changes the approach that we use, especially in terms of calling out distance to go," says McDowall.

When refuelling aircraft with fuselage-mounted receptacles, the boom operator has more cues around the fuselage that indicate the distance from the boom. For aircraft that refuel through the nose more guesswork is required.

"But it's fun. Generally, all receiver types are considered equal, but the unique ones are the most fun for the air refuelling officer, because it's something different."

McDowall adds that in addition to its tanking capabilities, the KC-30A can carry 270 passengers and 34t of cargo, making it a key air mobility asset for Australia and allies. To this end, he feels the aircraft is "hugely beneficial" in fostering relationships with Australia's defence partners.

In August 2023, an RAAF KC-30A conducted a major refuelling exercise with Lockheed Martin F-16s operated by Indonesia

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The country is leading the way in this new field of air travel with a need for better urban and remote regional connectivity, several home-grown start-ups, and a regulator open to innovation

Australia's AAM adventure

Dovetail Aviation

Dovetail is to offer its retrofittable electric powertrain on types including King Airs

Murdo Morrison

Australia's unique geography of sprawling coastal cities and remote outback communities makes it an ideal testbed for advanced air mobility (AAM). Add to the mix a regulator open to new ideas and a have-a-go entrepreneurial culture, and it is unsurprising that the nation has spawned several promising start-ups and caught the eye of some of the biggest names in this fast-emerging sector. These include Joby Aviation, Embraer's Eve, and Boeing-owned Wisk Aero.

The country has long been a disruptive aviation pacesetter. A quarter of a century ago, its Civil Aviation Safety Authority (CASA) became the first in the world to regulate the operation of civil remotely piloted air vehicles. Now, many in the AAM industry are hoping that it and sister organisation Airservices Australia will be as adventurous when it comes to approvals for a new breed of electric vertical take-off and landing (eVTOL) and other non-conventionally powered aircraft.

Several of these would-be change-makers are exhibiting at the show this week, where disruptive, sustainable air transport is set to be a theme. They include AMSL, a private company based in the Sydney suburb of Bankstown that is developing the Vertiia, a hybrid hydrogen- and battery-powered vertical take-off aircraft with a distinctive design. It is capable of transporting four passengers – or significantly, given the market it is targeting, a patient on a stretcher with two medical staff.

The Vertiia was conceived about seven years ago by founders Andrew Moore and Siobhan Lyndon – their initials make up the AMSL name – as a response to a Department of Defence requirement for an autonomous battlefield evacuation platform and attracted incubator funding from the government, explains chairman Chris Smallhorn.

Since then, the company has pivoted to the commercial market with a piloted version of the aircraft, although it is still focused on longer-distance medical evacuation (medevac), where it feels its 540nm (1,000km)-range and economics make it attractive against helicopters and fixed-wing aircraft for transporting the sick and injured from outlying communities to hospitals.

That is reflected in AMSL's orderbook. It has taken deposits for 26 Vertiias from medevac operators including Aviation Logistics, which operates the Air Link, AirMed and Chartair brands. "Unlike some of our rivals, we're not trying to compete in the urban market," says Smallhorn.

The Vertiia – which AMSL describes as "the most complex civil aircraft ever developed in Australia" – flew untethered for the first time in November under battery power in the central west region of New South Wales and has since taken to the air more than 50 times. The company, which plans a hydrogen-fuelled flight later this year, is aiming for certification in 2027.

The aircraft can operate on power from both batteries and liquid hydrogen and features a box-wing configuration that "remains the most efficient sub-sonic design" as well as a patented V-tail that boosts structural integrity and will help pilots manage flutter, says Smallhorn.

While Australia lacks Silicon Valley levels of financial backing for innovative start-ups, AMSL, which employs about 70 people, has been able to attract investment from Australian energy transition specialist StB Capital Partners, and plans another fundraising round this year. Longer term, AMSL will look at territories in Australia's "back yard" such as the Philippines and Indonesia – archipelagos where economical eVTOLs could prove a boon in connecting communities.

And it is not just conventional aviation markets such as medevac that are in AMSL's sights. Just-in-time freight is another area where Smallhorn believes eVTOLs could change the way small manufacturers or distributors do business. "We believe there are industries that don't even know they're going to use aviation yet," he remarks.

Another significant Australian AAM player is Stralis. Unlike AMSL, the young Brisbane-based business is focusing on developing a hydrogen-electric propulsion system it will retrofit on existing general aviation aircraft, although eventually it hopes to partner with a manufacturing company to build a clean-sheet 50-seat aircraft under its own brand.

American Bob Criner came up with the idea for Stralis with a colleague he worked with at Washington State-based electric powertrain developer Magnix, after concluding that hydrogen fuel cells offered a more practical solution than batteries in helping aviation with its sustainable transition. With help from US technology start-up accelerator and venture capital outfit Y Combinator, they set up Stralis three years ago with a team of about 15, mostly drawn from the AAM world.

Criner maintains the company's polymer electrolyte membrane (PEM) fuel cell is six times lighter than competitors on the market and has an energy density 20 times that of a battery. "The drawbacks of batteries are that they are too heavy and have too low an energy density," he says. The fuel cell is powered by ❯

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Skyportz

Skyportz wants to usher in a network of vertiports in Australia

liquid hydrogen – the same as is used in cryogenics and MRI scanners in healthcare – stored in vacuum insulated tanks on wing tips or elsewhere on the aircraft.

In December, at Brisbane's international airport, Stralis conducted its first hydrogen-electric-powered propeller spin on a Beechcraft Bonanza ground demonstrator called Clyde. In the final quarter of this year, it hopes to follow this with a flight using the technology on Clyde's sister aircraft Bonnie. "It will be Australia's first hydrogen-powered flight and we're pretty much on track for what will be a real moment in the country's aviation history," says Criner.

Criner believes that Australia is a "great place to develop technology and do experimental flight testing". While home-grown finance for tech start-ups may be in shorter supply than in the USA, venture capital funds in the likes of Singapore, Tokyo and other Asian cities are available, he says. There is also a "diaspora of Australian engineers working all over the world who want to come back if the innovative, well-paid jobs are there", says Criner.

He believes his adopted country is fast becoming a "renewables superpower" and will be one of the first to have hydrogen aircraft in its skies. "Hydrogen propulsion makes more sense here than in Europe," Criner says. "It's all about playing to our strengths."

The next stage for Stralis is finessing the 250kW system that will power Bonnie the Bonanza and start selling it early next year. "That will bring in revenue," says Criner. "Then we'll scale up to 1MW on a Beechcraft 1900 towards the end of the decade, and then in our third step in the 2030s, we'll move up to a 50-seater. This could be our own clean-sheet aircraft."

Stralis is not the only Australian company developing a disruptive propulsion system. Melbourne- and Seville-based Dovetail is a venture formed by much-travelled Spanish/Australian aerospace engineer David Doral and the founders of Sydney Seaplanes, a charter operator that offers scenic flights.

Dovetail is developing an electric drive train – comprising an electric motor, digital control unit, power distribution unit, cooling system and proprietary battery system – that it plans to offer for installation on Cessna Caravans and eventually Beechcraft King Airs, De Havilland Twin Otters, and Pilatus PC-12s through a supplemental type certificate (STC). The company is displaying a mock-up of its system at its booth in the Victorian state pavilion.

By promising to reduce operating costs by 40%, Doral believes the propulsion system will make short-haul routes viable that would not be economic to operate with a conventionally powered aircraft of 10 to 20 seats. Initial customers include Norway's Scandinavian Seaplanes, which last year signed for five conversions on Caravans that it plans to add to its fleet.

Dovetail, which has also attracted investment from the Victorian government's Invest Victoria agency, demonstrated its powerplant in a King Air in ground tests in Seville last July, and now plans to apply for an STC for the Caravan in Australia. "Once we have that, the plan is to industralise to produce around 50 a year, initially for the Caravan and then, as we move forward, for the Twin Otter and King Air," says Doral, who has worked for Airbus and Boeing.

He sees the potential market for Caravans alone as up to 600 aircraft – roughly a fifth of the total global fleet that typically fly routes of less than 30min. "However, in three years' time, as the technology improves, that could go up to 800," he says. "In four or five years, we might be able to introduce a hydrogen-electric version and then the market will boom exponentially."

For the AAM sector to take off – particularly urban eVTOL air taxis – ground infrastructure in the form of so-called vertiports will be essential for processing passengers and providing charging. One Australian company hoping to help usher in a network of such sites is Skyportz, a venture by former planning lawyer and politician turned entrepreneur Clem Newton-Brown.

He says vertiports are the "elephant in the room" when it comes to the AAM sector. "I work on the basis that if all these [developers] are going to achieve what they are promising investors, they can't do it without vertiports," he says. "But no city has really looked at this issue from an urban planning perspective. Using existing helipads is one thing, but for sales to take off it depends on us being able to take people directly to the shopping centre or the office block."

At Avalon, Newton-Brown plans to release drawings of his vertiport and "vertipad" concepts, which include design features that he says deal with the hazards of downwash and outwash from an eVTOL aircraft's blades, making it possible to have a much smaller landing zone than a conventional helipad. "We're going beyond pretty pictures on a website," he jokes.

Newton-Brown has raised about A$1.5 million ($940,000) through microfunding but is looking for investors to scale up the business. His hope is to eventually license his intellectual property to other would-be vertiport developers in Australia and beyond. He is confident that his country will be one of the first to

In December, Stralis conducted its first hydrogen-electric-powered propeller spin on a ground demonstrator called Clyde

Stralis Aircraft

The Vertiia's cabin can accommodate a stretcher with two medical staff

AMSL

embrace urban air mobility. "You tend to get quicker decisions [from regulators and other public bodies] in Australia," he says. "We are fast adopters of new technology."

Established names in the eVTOL sector view Australia as an early and enthusiastic market for their products. They include Boeing-backed Wisk, which last year signed a memorandum of understanding with Airservices Australia, the government agency responsible for air traffic management, to explore how eVTOL aircraft, including its uncrewed, four-seat Gen 6, could be integrated into Australian airspace.

"Australia is an exciting market, with significant cities, many of which are looking at the future of their transport infrastructure," says Catherine MacGowan, Wisk's Asia-Pacific director. "Also, from a regulatory perspective, CASA and Airservices Australia are looking closely at this sector, and they have already been very innovative with UAS [uncrewed air systems]. It's an enabling environment."

Unlike most other eVTOL developers, which aim to launch their products as piloted aircraft, Wisk made the "strategic reason to go straight to autonomy and tackle this with the regulator", she says. Wisk is also working with the Federal Aviation Administration on US certification and hopes to begin its flight test campaign this year.

Wisk will show a scale model rather than its mock-up at Avalon, and offer show-goers a "virtual reality experience", where, by means of a VR headset, they will be able to be "inside the aircraft flying across Brisbane. The choice of city is significant as Wisk believes Brisbane wants to launch environmentally friendly air taxi operations in time for the 2032 Olympic Games as part of its "legacy".

Joby last August formally launched its certification campaign in Australia. "We're incredibly excited about the potential for air taxis to offer new and more sustainable ways to travel around Australia's global cities," founder and chief executive JoeBen Bevirt said at the time. Two months later, Joby met CASA and other international regulators for "a week of technology famiilarisation" and will "continue to engage with them as we move closer to receiving our FAA type certification".

Eve has also been working with CASA on a "strategic regulatory roadmap" for urban air mobility. "We see Eve and UAM as a natural progression of our investment in Australia's aviation infrastructure dating back to 1978 when Embraer's EMB-110 Bandeirante began operating in the market," says Eve chief executive Johann Bordais. "We have been at the forefront of supporting the evolution of UAM in Australia through partnerships with local industry and policy leaders since 2021."

In December, CASA released an updated version of its Remotely Piloted Aircraft Systems (RPAS) and Advanced Air Mobility (AAM) Strategic Regulatory Roadmap, first published in 2022, which is part of a wider initiative aimed at "safely and efficiently integrating emerging aviation technologies and systems into Australia's airspace and civil regulatory framework" over the next 10 to 15 years.

The roadmap lays down likely scenarios over short, medium, and longer terms. Over the next two years, it predicts, rising demand will mostly come from the light cargo industry, particularly operators of RPAS offering delivery services. Between 2027 and 2029 CASA anticipates to be certificating piloted AAM aircraft by type, with applications for vertiports and other supporting infrastructure, and the potential of new services to "remote and hard-to-reach communities".

By 2030, CASA expects there to be "expansive access to lower-level airspace" for RPAS, with supporting regulations in place. "Technologies enabling extended visual line of sight and beyond visual line of sight operations in shared airspace, across both urban and rural environments, will be commonplace," it predicts. Data will help improve safety and training requirements will change "as more complex operations introduce new technologies and increasing levels of automation".

Meanwhile, it expects the AAM sector to "continue to mature" to include "multiple scheduled passenger transport applications supported by safe and efficient transport routes". It adds: "The first fully autonomous aircraft may be introduced on a limited scale."

Finally, by the mid-2030s, the regulator expects "higher numbers of RPAS...operating in the airspace", with advancements in technology blurring the lines between RPAS, AAM and traditional aircraft. "Hybrid designs will emerge...[and]...as the AAM sector grows, we will see highly automated vehicles entering service on a small scale, gradually expanding over time," it forecasts.

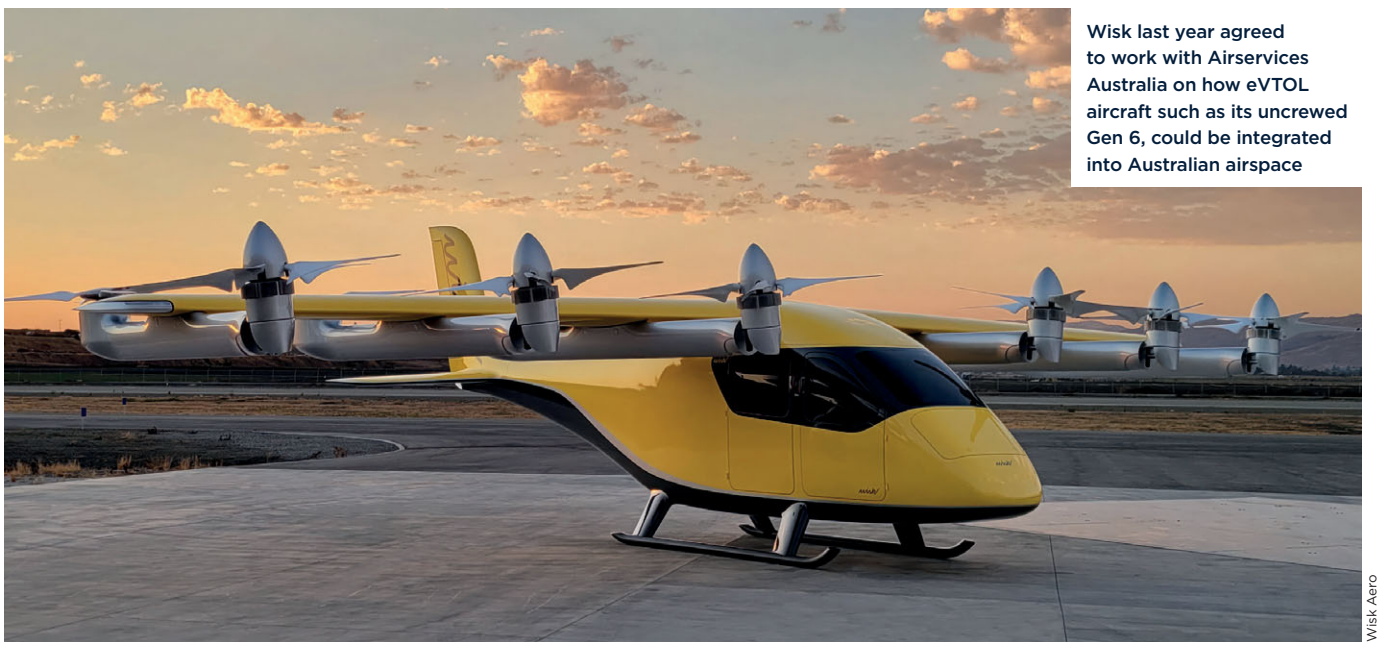
Australia's neighbour New Zealand has also embraced the AAM sector, with its national carrier leading the way. Air New Zealand (ANZ) plans to trial battery-electric aircraft on short-range cargo flights this year with a view to replacing its entire ATR 72-600 and De Havilland Canada Dash 8 Q300 domestic regional fleet with electric-powered aircraft during the 2030s.

Around the middle of this year, ANZ plans to start operating Beta Technologies' Alia CX300 conventional take-off and landing electric aircraft on short routes from the city of Hamilton, and between the capital Wellington at the bottom of the North Island to Blenheim, a town across the Cook Strait at the top of the South Island. As the crow flies, the distance is around 50nm (93km).

Early flights will carry dummy payloads to simulate loading and unloading processes and will be flown by Beta pilots with ANZ flightcrew also in the cockpit, but a "single-pilot procedural environment". The airline wants to "get the regulator comfortable" before making an application for authorisation to begin commercial cargo flights, says Jacob Snelgrove, a former pilot and ANZ's sustainability lead, who is leading the project. "The plan is to crawl, walk, and then run."

Unlike Europe, New Zealand's highway and rail network is limited – a journey from Auckland to Invercargill at the bottom of the South Island can take 24h by road and ferry – so air travel is essential to connect cities and smaller communities both with cargo and passenger flights.

ANZ, says Snelgrove, has a "commitment to decarbonising" and that the airline's regional network – three-fifths of its flights are under 350km on turboprops – means there is "a significant proportion of routes that could be done by new technology aircraft". As the national carrier of a nation with an abundance of renewable energy sources, "we have to be the ones to make this happen", he says.



Wisk last year agreed to work with Airservices Australia on how eVTOL aircraft such as its uncrewed Gen 6, could be integrated into Australian airspace

Wisk Aero

ANZ plans to start operating Beta's Alia CX300 on a trial later this year

Beta Technologies

Joby is one of several overseas eVTOL developers engaged with CASA and other regulators

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Leonardo C-27J

The original cutaway of the then-Alenia Aeronautica C-27J appeared in *Flight International* in 2007. The Rolls-Royce AE2100-D2A-powered transport has its origins in a 1990s Alenia and Lockheed Martin project to update its G.222 predecessor. Sixteen services operate the C-27J, including the RAAF's 35 Sqn with 10

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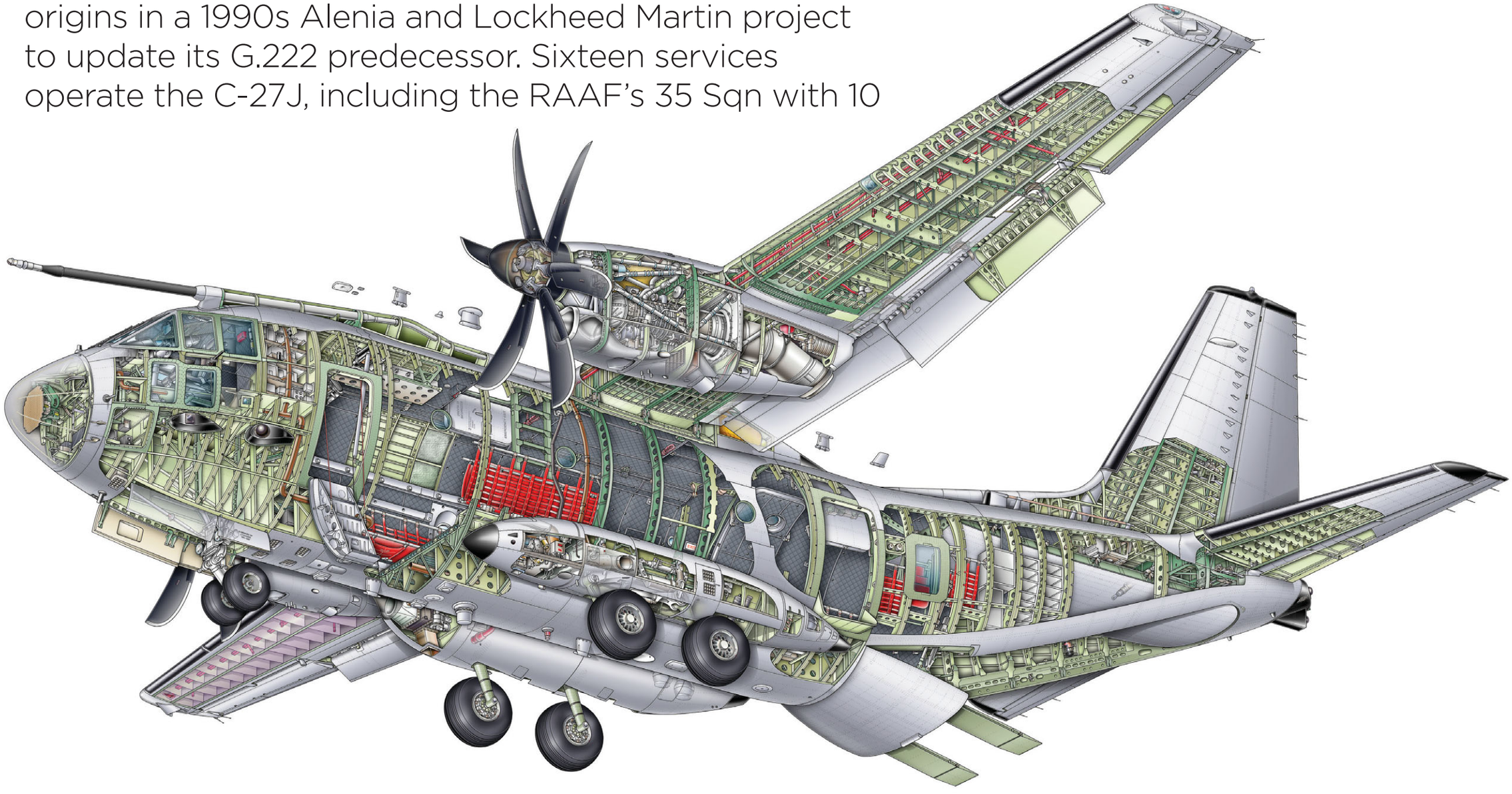
Cutaway drawing by Tim Hall



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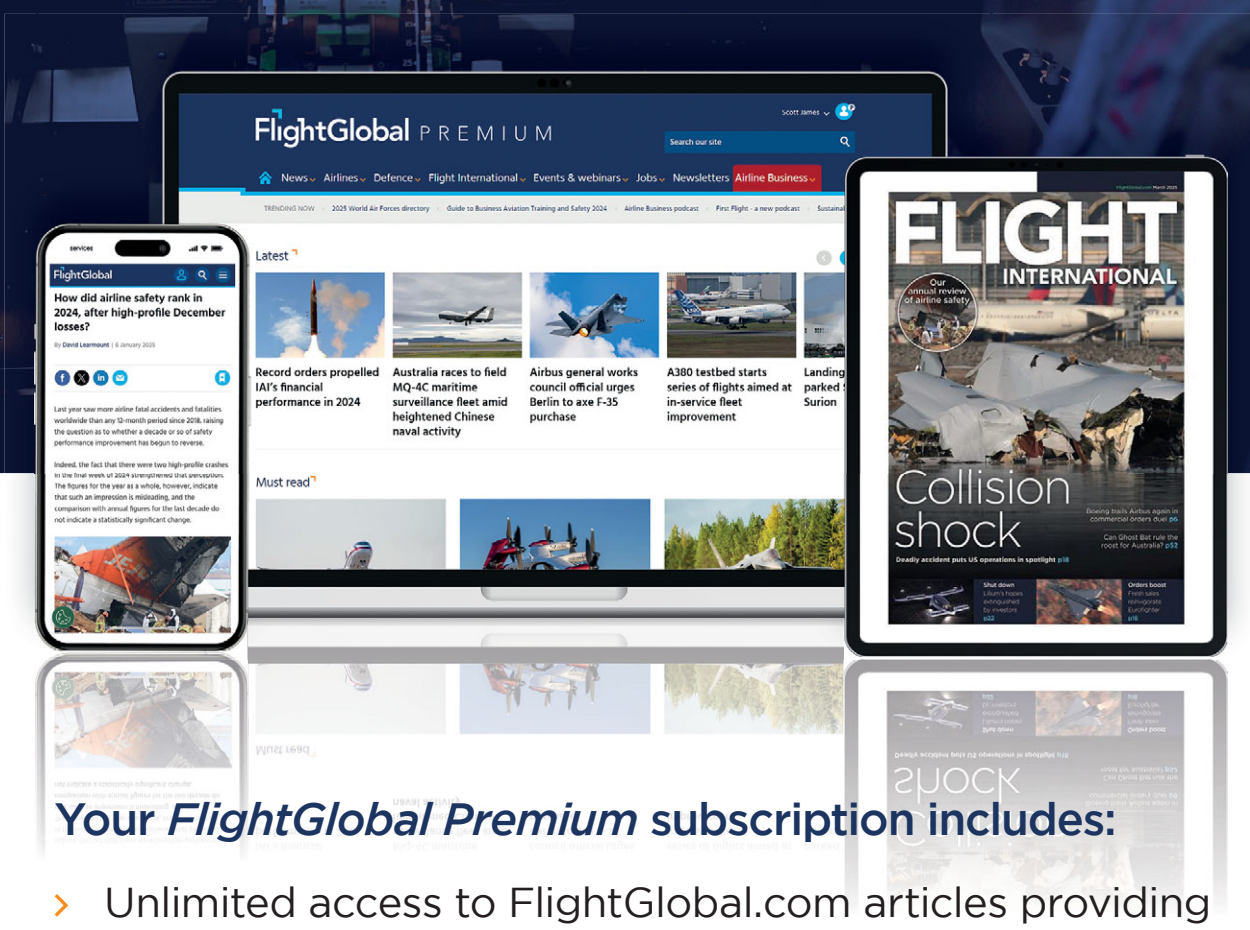

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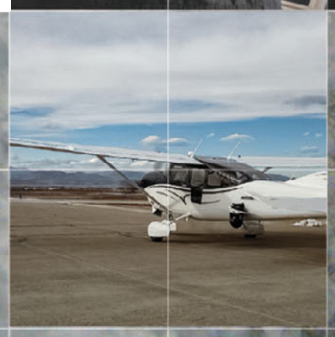

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