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Virgin Australia has equipped its Boeing 777-300ER fleet with inflight Wi-Fi, just one example of the many technological disruptions being embraced, and faced, by aviation. PHOTO ROB FINLAYSON



Oz Choppers' unique niche refurbishing Bell twins p94

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Locked On

• A RAAF F/A-18B 'classic' Hornet conducts engine runs at Townsville.

ANDREW GREEN



Locked On

- Thai Airways 747-400 HS-TGG departs Sydney. Thai is now the only airline besides Qantas to operate the 747-400 to Australia. BERNIE PROCTOR





Locked On

• The first Pilatus PC-24 for the Royal Flying Doctor Service inflight over the Swiss alps.

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Jetgone

The collapse of Jetgo is “intensely disappointing”



• Jetgo has suspended all regular public transport (RPT) flights and entered into voluntary administration. MIKE FORSBERG

Debtgo”, screamed the front page of the *Illawarra Mercury*. The collapse of regional operator Jetgo, which entered voluntary administration on June 1, is headline news not just in Wollongong and the Illawarra, but in regional cities across the country.

At a first creditors’ meeting on June 13 it was revealed that Jetgo had ceased RPT operations (its FIFO charter arm is still flying) with debts of at least \$17 million and potentially as much as \$32 million.

Among those creditors are local council-owned airports, which stand to lose not just prized airline services but, as is the case for Illawarra Regional Airport owner Shellharbour City Council, hundreds of thousands of dollars in unpaid fees and security charges.

It was Dubbo Regional Council which originally tolled the bell on Jetgo’s problems by initiating legal proceedings in May seeking the airline be wound up so it could recover unpaid debts of more than \$270,000.

“The loss of commercial RPT

air services provided by Jetgo to Brisbane and Melbourne is intensely disappointing and a significant inconvenience to the passengers who had pre-booked flights and travel plans,” a Dubbo Council media statement issued on June 1 reads.

“However, in good conscience Dubbo Regional Council could not continue to allow unpaid debts to mount up, debts which were already in excess of \$270,000.”

Of course it is not just major creditors like regional airports (and ultimately their ratepayers) who are hurt by the collapse of an airline, or the reported 10,000 passengers who had paid for flights they had yet to travel on.

It is Jetgo’s 112 staff who are now out of work who are most keenly feeling this corporate collapse.

Facing a sudden lack of income is hugely stressful, and I can empathise with those Jetgo staff now wondering how to make their next rent or mortgage payment.

I imagine too running an airline business in financial distress is also hugely stressful – how are we going to pay our staff next week, what do we tell our suppliers who keep ringing every day seeking payment of overdue bills? – and that that stress contributes to poor decision-making.

And that stress can contribute to clouded judgement over whether to continue trading, perhaps while searching for new funds/investors or hoping to ‘trade out’ of financial difficulties, when logic suggests (and the Australian Securities and Investments Commission demands) that the company be placed into

voluntary administration so that further debts don’t accumulate.

That clearly, is the hardest, but most important, decision a company director can make.

I don’t have any particular insight into Jetgo’s financial situation and its decision-making, and nor do I want to rush to judgement on the viability of its business model of using regional jets on long thin regional routes. At one level it’s fantastic that Jetgo tried to innovate and do something that had not been done before in the Australian airline market.

But often, sadly, there is a reason why it (in this case long-range regional jet services) hasn’t been tried before, because established operators like Qantas, Virgin and Rex can’t make the business case stack up.

And giving it a go is one thing. Accumulating millions of dollars in debt that leaves staff, passengers and ratepayers out of pocket is another altogether.

Sadly, like Ansett, Compass marks 1 and 2, Air Australia/Strategic Airlines, SkyAirWorld, O’Connor Airlines, Brindabella Airlines, OzJet, Skytrans, Macair and many more before it, Jetgo has become the latest casualty of poor decision-making and a brutally tough Australian airline market.

WHERE’S WARBIRDS?

There’s no Warbirds column in this issue of *Australian Aviation* as Dave Prossor has taken some time off for a well-deserved holiday. Also skipping an issue is the newly-reinstated Rotor Torque helicopter news section, but it will return! 🚁

‘That stress can contribute to clouded judgement.’

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Debrief

News briefs from across aviation



• Malaysia-based Malindo Air began daily Kuala Lumpur-Denpasar-Melbourne flights on June 7. VICTOR PODY.

VIRGIN AUSTRALIA NEWS

Virgin Australia said on June 12 John Borghetti planned to step down as chief executive some time in the next 18 months after eight years in the role. His successor will be just the third chief executive since the airline was formed in 2000. Borghetti had “advised the board he will not renew his contract post 1 January 2020”, Virgin Australia said in a statement to the Australian Securities Exchange.

Virgin Australia and Hainan Airlines have expanded their partnership to include the Australian carrier adding its VA code on Hainan’s flights from Sydney to Changsha, Haikou and Xi’an, Melbourne to Changsha and Xi’an, and from Brisbane and Cairns to Shenzhen. Meanwhile, Hainan will

add its HU code on Virgin Australia domestic and trans-Tasman flights.

QANTAS GROUP NEWS

Qantas announced on May 23 it would reinstate a codeshare agreement with Air France for flights between Australia and France via Asia that was dropped six years ago when it forged a global alliance with Emirates. Under the new agreement, Qantas will add its QF airline code on Air France’s daily nonstop flights from Paris to Hong Kong and Singapore. Similarly, Air France will place its AF airline code on Qantas’s flights from Singapore to Brisbane, Melbourne, Perth and Sydney, as well as from Hong Kong to Brisbane, Melbourne and Sydney. The AF code will also appear on Qantas-operated flights

from Sydney to Adelaide, Canberra, Cairns, Darwin and Hobart.

Qantas chief executive Alan Joyce said the airline had scrapped plans to operate a seasonal Perth-Johannesburg service after failing to reach an agreement with Perth Airport over the use of its Terminal 3/4 precinct to operate the nonstop flight. Qantas has planned to fly the route between November and March.

In a case of frenemies coming together for a common cause, Air New Zealand and Qantas have inked a codeshare deal covering domestic destinations on both sides of the Tasman. Under the arrangement Air New Zealand will add its NZ airline code on 85 Qantas-operated domestic services in

Australia and Qantas will add its QF code on 30 Air New Zealand-operated domestic services in New Zealand from October 28 2018. There will also be reciprocal lounge access for eligible frequent flyers.

Jetstar group chief executive Gareth Evans said the codeshare would have no impact on the Jetstar New Zealand domestic operation and the airline group was “fully committed” to that business.

However, Virgin Australia group executive for airlines Rob Sharp said the arrangement was bad for consumers and will have some flow-on consequences on the Tasman. Further, Sharp said Virgin Australia management was considering the question of what role regulators could have.

AIRLINE NEWS

Etihad Airways’ 10-year naming rights sponsorship of Melbourne’s Docklands stadium will end in 2019. It is the latest example of the Abu Dhabi-headquartered carrier’s reduced presence in the Australian market, following confirmation it was ending flights to Perth in October 2018 and downgauging its service to Melbourne.

Air New Zealand chief operating officer Bruce Parton will leave in September 2018 after a 22-year career at the airline. The airline said on May 28 Parton had decided to take a break from corporate life. His role has been split into two parts, with Carrie Hurihanganui to be chief ground operations officer and John Whittaker to be chief air operations and people safety officer.

Meanwhile, Air New Zealand chief financial officer Jeff McDowall says the airline is working towards placing an order with Airbus or Boeing for new widebody aircraft by early 2019. The timetable for the replacement of Air New Zealand’s Boeing 777-200ER fleet was outlined at the company’s investor day in Auckland on June 14. McDowall said the company was “at the tail end” of evaluating the responses to the Request for Information (RFI) process that began in 2018. “We’ve got an opportunity, and a need actually, to replace our 777-200 fleet between the 2023 and 2025 financial years.” McDowall said there were “no bad choices” among the candidates to replace the 777-200ER,



which comprised the 787 family and the 777-X family from Boeing, as well as the Airbus A350 family.

Still on Air New Zealand, the airline has commenced legal action against BP and Z Energy after the fuel pipeline leak at Auckland Airport that left airline schedules in chaos. Both BP and Z Energy said they would fight the claims.

Singapore Airlines’ regional wing Silkair has operated a limited season of charter flights between Singapore and Broome. The first of four trial flights touched down in Broome on May 23. The service was supported by tourism bodies and the local Shire council.

Singapore Airlines’ low-cost carrier Scoot has boosted its sales presence in Australia with the appointment of Kirsty Lucas as national sales and partnership manager. Based in Sydney, Lucas will report to Scoot general manager for Australia Jared Simcox.

Alliance Airlines has commenced charter flights for Japanese travel company JTB as part of a three-year deal signed in April. The first service took place on June 1 carrying 64 passengers from Brisbane to Uluru. Alliance Airlines chief executive Lee Schofield said there were 25 charters planned for the rest of calendar 2018.

Hong Kong Airlines will end flights to Australia from October 20 2018 when it drops its three-times-a-week Hong Kong-Cairns-Gold Coast-Hong Kong service with Airbus A330 equipment. Cairns Airport said in a statement the HNA Group carrier and Virgin Australia alliance partner was ending the flights due to its “changing business strategy in the Australian market”.

Singapore Airlines (SIA) plans to bring Silkair under the main SIA brand and spend \$100 million upgrading the regional carrier’s cabins to offer closer product and service

consistency for passengers. The product upgrades were due to begin in 2020 and include lie-flat seats in business class and seat-back inflight entertainment for every seat.

Still on SIA, the airline group reported a more than doubling of net profit for the 12 months to March 31 2018 at S\$893 million, from the S\$360 million in the prior financial year. Meanwhile, operating profit, which excludes one-off items, rose 70 per cent to S\$1.057 billion, SIA said on May 17. The company said the impact of its three-year transformation program alongside passenger and cargo growth were behind the improvement.

Royal Brunei Airlines (RB) will join an already crowded field offering a one-stop product on the Kangaroo Route between Australia and Europe when it begins nonstop Bandar Seri Begawan-London Heathrow service with Boeing 787-8s from the end of October. The new route would enable it to offer a one-stop Melbourne-Bandar Seri Begawan-London Heathrow option, compared with its current two-stop Melbourne-Bandar Seri Begawan-Dubai-London Heathrow offering.

Regional carrier Jetgo on June 1 entered into voluntary administration and suspended all regular public transport (RPT) flights. McLeod and Partners’ Jonathan Paul McLeod and Bill Karageozis were appointed

• A Qantas 737-800 and Air New Zealand A320 at Sydney Airport providing a backdrop to the announcement of a new codesharing agreement between the two carriers. QANTAS

• Silkair operated the first of four charter flights between Singapore and Broome on May 23. SILKAIR





• Bombardier Business Aircraft launched two new jets aimed at the large category segment of the market in the Global 5500 and Global 6500. BOMBARDIER

joint administrators of the company. While all RPT flights were cancelled, the administrators said Jetgo was continuing to operate some limited charter services. The airline had been planning to commence Brisbane-Karratha-Singapore flights with Embraer E190s later in 2018.

International Airlines Group (IAG) chief executive Willie Walsh says he is hopeful British Airways (BA) will be

able to expand its network in Australia beyond the current sole daily flight to Sydney. "I fully expect BA to continue to have a presence here in Sydney. I'd like to think we could expand back into Melbourne at some stage," Walsh said at the CAPA – Centre for Aviation conference in Sydney on June 6.

Also at the CAPA conference, Cathay Pacific chief executive Rupert Hogg said that with the Australia-Hong Kong air services agreement full on the Hong Kong side, his airline was focused on continuing to upgauge its services between Australia and Hong Kong with larger aircraft, with Airbus A350-900s and Boeing 777-300ERs replacing Airbus A330-300s.

Two former SIA Airbus A380s owned by German leasing company Dr Peters will be broken up and sold for parts. Dr Peters said it came to the decision after it was unable to reach agreements with potential airline customers following intense negotiations. "The market for the A380-800 aircraft type has not developed positively in recent years," Dr Peters chief executive Anselm Gehling said in a statement. The sale of aircraft parts is expected to fetch US\$45 million.

AIRPORT NEWS

Canberra Airport has installed a new Category II lighting system featuring new touchdown and runway centreline lights that it says will allow pilots to reach 100ft off the ground before deciding if they have enough visibility to land, compared with 200ft previously.

Sydney Airport chief executive Geoff Culbert told shareholders at the

company's annual general meeting on May 25 he believed advancements in aircraft technology, particularly the development of ultra long-range jets such as Boeing's 777X and Airbus A350-900ULR would open up new markets for Kingsford Smith Airport. "Sydney as a destination only becomes more attractive as aircraft technology improves and range increases," he said.

A report commissioned by lobby group Airlines for Australia and New Zealand (A4ANZ) has found light-handed regulation of Australia and New Zealand's airports has been ineffective at protecting consumers from higher charges due to their monopoly power. "More effective regulatory pressure is required to prevent excessive profits by airports and return more value to consumers and the economy," the report prepared by Frontier Economics published on May 25 and launched at Parliament House in Canberra said. The Australian Airports Association said in response to the report the current regulatory regime for Australian airports has served airlines, airports, Australian and overseas travellers and the broader economy extremely well.

DEM NEWS

Airbus and Bombardier said on June 8 they had received the necessary approvals to form a partnership on the C Series from July 1 2018. The partnership, which will see Airbus take a majority stake in the C Series program, was first announced in October 2017. It is still unclear whether the CS100 and CS300 narrowbodies will be renamed, as airbaltic chief executive Martin Gauss quipped at the CAPA conference. "We have no idea what our aircraft is called next week. They said they will send us stickers to Riga," Gauss said.

Rolls-Royce said on June 11 it has found a "similar Intermediate Pressure Compressor durability issue" on a small number of high life Trent 1000 Package B engines as had been previously discovered on the Trent 1000 Package C engines. It said an airworthiness directive would require a one-off safety inspection. There were 166 Trent 1000 Package B engines in service.

Still on Rolls-Royce the engine maker announced on May 30 there had been a "trebling of maintenance capacity"



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to support airlines disrupted by the Intermediate Pressure Compressor rotor issue on the Trent 1000 Package C engines. Further, the engine maker said it had introduced an inspection technique where the engines would remain on the wing while the work was done. Also, it said first parts for a permanent fix were expected to be available in late 2018.

Bombardier Business Aircraft launched two new jets aimed at the large category segment of the market in the Global 5500 and Global 6500 at the European Business Aviation Convention and Exhibition (EBACE) in late May. The Global 5500 is designed to fly 5,700nm with a top speed of Mach 0.90 seating up to 16 people. Meanwhile, the Global 6500 had a range of 6,600nm with the same Mach 0.90 top speed and a cabin capacity of up to 17 people. Both are powered by new Rolls-Royce Pearl engines, with entry-into-service expected by the end of 2019.

IATA WRAP

Ticket prices look set to rise in the period ahead as the rising cost of fuel threatens to crimp airline profits.

The International Air Transport Association (IATA) has downgraded its profit forecasts for calendar 2018, with airlines around the world expected to collectively post a US\$33.8 billion profit in the current year.

This latest outlook, published at the IATA annual general meeting (AGM) in Sydney in early June, was down from its previous estimate for 2018 of US\$38.4 billion, as well as a decline from the US\$38 billion in profits earned in the prior year.

The lowered expectations reflected the “significant pressures from rising fuel and labour costs”, with the full year average cost of Brent Crude Oil tipped to be about US\$70 a barrel, compared with US\$54.9 a barrel in 2017.

IATA estimated fuel would account for about 24 per cent of total operating costs in 2018, up from 21.4 per cent in 2017.

“The biggest challenge facing airlines today is this acceleration in costs,” IATA chief economist Brian Pearce told reporters at the AGM.

“The space capacity in the OECD economies has run out this year so we’re starting to see inflation



pressures edge up. This is behind the cost pressures that the industry is facing.

“It will mean that air travel will be more expensive this year than it was last year.”

However, Pearce said the expected increases in fares would be broadly in line with the general rate of world inflation, meaning the real cost of air transport would be “roughly the same”.

The estimated calendar 2018 total profit equated to an average profit of US\$7.76 per passenger and a “thin” 4.2 per cent net margin, which IATA

• The Qantas Group leadership team was all smiles at IATA – from left Jetstar Group chief executive Gareth Evans, Qantas Domestic chief executive Andrew David, Qantas International chief executive Alison Webster and Qantas Group chief executive Alan Joyce.

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• An RAAF KC-30A conducts aerial refuelling trials with a US Navy P-8A Poseidon. US NAVY PHOTOGRAPH
BY LIZ WOLTER

director general and chief executive Alexandre de Juniac described as “not a big number”.

“It is fair to say 2018 is tougher. But the airlines are doing a good job, they are managing a changing environment,” de Juniac said.

Qantas chief executive Alan Joyce said his airline was responding to rising fuel costs through fare increases, revenue and capacity management, as well as the introduction of new aircraft such as the 787.

“What we see is that certainly domestically we think the business can continue to digest oil prices as we have this year,” Joyce said. “We see internationally it depends on market by market.”

“But I have to say, even though we are seeing airfares increasing in some markets and we have made some announcements in New Zealand, our consumers have never had it any better than they have today.”

Qantas domestic chief executive Andrew David added: “As Alan said with fuel where it is you can expect to see some fare increases, but rest assured we will be continuing to drive the efficiency program.”

Association of Asia Pacific Airlines (AAPA) director general Andrew Herdman said carriers’ ability to raise ticket prices would be constrained by the competitive environment.

“Fuel is just over 20 per cent of total costs so if the fuel price is up 30 per cent the fares have got to go up by six or seven per cent just to compensate for that. It is just maths. But you don’t see it,” Herdman said.

“It tells you the market is competitive, airlines have not been

able to pass it on and that means that margins must be being squeezed.

“I think we will see fares rising. That might take a little bit out of the growth rate but I don’t think it is going to be dramatic. I certainly don’t see a major impact on demand.”

IATA BRIEFS

Fiji Airways will be the first airline to join the oneworld marketing alliance under a new affiliate membership category called “oneworld connect”, which offers basic benefits to eligible oneworld frequent flyer members and additional perks for members of sponsor airlines American Airlines, British Airways, Cathay Pacific and Qantas. (Qantas owns about 40 per cent of Fiji Airways.)

Qatar Airways chief executive Akbar Al Baker has apologised for his comments at the IATA AGM closing media conference where in response to a question about his airline being led by a male he said: “Of course it has to be led by a man because it is a very challenging position.” Later, Al Baker issued a statement offering his “heartfelt apologies for any offence caused” by his comments, which he said ran “counter to his track record of expanding the role of women in leadership throughout the Qatar Airways Group”.

IATA’s member airlines passed a resolution calling on national governments to take a cautious approach on privatising airports, instead encouraging governments to “prioritise the long-term economic and social benefits delivered by an

effective airport ahead of the short-term financial gains provided by a poorly thought-out privatisation”. IATA director general Alexandre de Juniac said airlines were yet to experience an airport privatisation that fully lived up to its promised benefits over the long term.

IATA is developing a working paper to gather data on the expected shortages of aircraft maintenance engineers and pilots in the years ahead. Items to be covered included global training capacity versus demand, regulatory requirements and licensing harmonisation among different countries, and roadblocks to a career in aviation such as costs. The data collection was expected to be complete by the final quarter of calendar 2018.

Finally, Korean Air will host the 75th IATA AGM in Seoul to be held June 2-4 2019.

DEFENCE NEWS

The Royal Australian Air Force (RAAF) detachment of F-35A pilots, maintainers and support personnel based at Luke AFB in Arizona recorded the 1,000th sortie of an Australian F-35A on June 4. The RAAF’s 3SQN operates six F-35As at the Integrated Training Center (ITC) where it is embedded with the USAF 56th Fighter Wing at Luke AFB, Arizona.

The Australian Army has begun rolling out the PD-100 Black Hornet Nano unmanned aerial system to its units following a successful trial program. “UAS are a game-changer for the Army, providing enhanced situational awareness for better mission execution for Australian soldiers,” said BRIG Susan Coyle, Commander 6th Brigade and the Army’s only UAS unit, the 20th Surveillance Target Acquisition Regiment.

An RAAF KC-30A Multi Role Tanker Transport conducted a series of air-to-air refuelling trials with US Navy Boeing P-8A Poseidons during a six-week detachment to NAS Patuxent River in Maryland from February 27 to April 14. The KC-30, along with members of 33 Squadron and the Aircraft Research and Development Unit (ARDU), undertook the clearance trials with the US Navy’s P-8A Integrated Test Team from Air Test and Evaluation Squadron Two Zero (VX-20).

INDUSTRY NEWS

The Civil Aviation Safety Authority (CASA) has launched a scholarship for current and aspiring professional pilots in South Australia in honour of its former employee Stephen Guerin. The CASA operations inspector was on board a Rossair Cessna Conquest II that was conducting a training flight alongside Rossair chief pilot Martin Scott and experienced pilot Paul Daw, who was undergoing a check flight, when it crashed near Renmark. There were no survivors.

Federal Parliament's Joint Standing Committee on Foreign Affairs, Defence and Trade has launched an inquiry into the Commonwealth Government's management of per- and polyfluoroalkyl substances (PFAS) contamination in and around Defence bases. The chair of the committee's PFAS sub-committee Andrew Laming said on May 30 the inquiry would examine how the Commonwealth was managing and coordinating its response to PFAS contamination to ensure the best outcomes for those affected communities.

Airservices said on May 29 it planned to roll out the Aerobahn collaborative decision-making platform from Saab Air Traffic Management that aims to reduce taxi times at airports by about seven per cent, or one minute per aircraft, in busy peak periods. The product covers a range of services such as departure management sequencing, traffic flow management and resourcing. The first Australian airports to feature the platform will be Brisbane, Melbourne, Perth and Sydney.

Still on Airservices, the federal government has elevated lawyer John Weber to chairman of the air traffic manager's board for a three-year term, replacing Sir Angus Houston, who steps down after seven years in the role. Weber has been an Airservices director since April 2017, when he was appointed to the board as deputy chair. Separately, current board member Fiona Balfour has been reappointed for a fresh two-year term.

Satellite launch company Arianespace managing director and head of sales for Asia Pacific Vivian Quenet believed

the growing trend in smaller satellites, particularly among universities and entrepreneurs was bringing a lot of new potential customers. "Our challenge is to adapt to these new customers," Quenet told *Australian Aviation* on the sidelines of the Australasia Satellite Forum in Sydney on May 21.

The Australian Government on May 18 announced plans to build a paved runway near the Davis Research Station on Antarctica, which would allow for better access to the continent during the winter months. It said the cost of the proposed new runway would be determined through a detailed business case.

The first Pilatus PC-24 for the Royal Flying Doctor Service (RFDS) has made its first flight, with images of the aircraft released at the European Business Aviation Convention and Exhibition trade show in Geneva in late May. The Perth-based RDFS Western Section has three PC-24s on order, while Adelaide-based Central Section has one on order. First delivery is expected later in 2018. 🇦🇺

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An aviation headset is a substantial investment for any pilot and consideration should be given to the cost vs benefit of each headset. Are you a professional pilot? Are you buying a spare headset for your passengers? Do you fly longer sectors or short hops? Are you in a noisy cockpit environment? There are a number of factors that will influence your decision as a headset can cost anywhere between \$150 and \$1,500.

In this issue we'll be looking at what many consider is the benchmark for professional or career pilots, the Bose A20.

What's the big deal about Bose?

Bose Corporation was founded in 1964, with one of its earliest tasks developing power-regulating

systems for US military jets.

The company says it started development of noise-cancellation after founder Dr Amar Bose went on a 1978 flight to Europe and while using a set of headphones supplied by the airline complained about an inability to enjoy the inflight entertainment due to the loud background noise.

In 1986, Bose applied its noise-cancellation technology to develop headphones to protect the hearing of pilots participating in the first un-refuelled non-stop around-the-world flight in Burt Rutan's Voyager.

Interestingly the development of ANR, or active noise reduction technology, was a two horse race between Bose and Sennheiser, with Sennheiser bowing out of the pilot headset market in 2016.

The Bose A20 headset is popular for the simple reason it strikes the right balance between

comfort, clarity and usability. It's comfortable enough to wear all day and it's quiet enough for almost any type of aircraft.

Let's face it, if it's good enough to wear flying nonstop around the world, it's probably OK for the rest of us!

It's not the cheapest headset on the market, however the price is commensurate with the quality of the standard of manufacture and the day-to-day experience.

We tested the A20 in a Cessna 182Q on one of our "rusty pilot" flights from Maitland in NSW to the Sunshine Coast and back again, total flight time 14.7 hours, and both pilots wore an A20 headset.

For this pilot the experience was flawless. At no point during the flight were the effects of clamping apparent, no requirement to change the batteries, the ability to turn down the intercom to tune

out the instructing pilot's war stories was useful too.

The only issue we found was after stopping off for a pit stop en route was forgetting to turn the ANR back on. Fortunately the headset was also very effective without the ANR, which is good to know if the batteries do happen to expire mid flight.

What makes Bose unique?

Bose is the ANR pioneer. It was the first company to introduce active noise reduction headsets in aviation and it continues to innovate, with the A20 offering 30 per cent greater noise reduction than conventional aviation headsets.

Here are some of the Bose A20's other great features:

A focus on comfort – A quiet headset isn't enough these days – it has to be comfortable too. The A20 has numerous features that make it the most comfortable headset we've worn, including sheepskin cushions and the unique torsion spring that reduces clamping force.

Famous Bose audio – Pilots rave about the Bose's active EQ, which delivers crystal clear audio and rich sound when listening to music and air traffic controllers.

Bluetooth phone interface – It's easy to cancel SAR or update family members with a wireless Bluetooth connection.

Bluetooth audio interface – Wirelessly connect your Bluetooth-enabled device to the Bose A20 to listen to music and hear notifications from apps. Also available is the option to plug in your device with an aux input cord.

Smart audio muting – An ergonomic switch on the A20 control box allows you to choose what auxiliary audio you hear, including automatic muting of aux audio when the intercom is active.

Lightweight design – Weighing in at 340g you'll hardly know the A20 is on your head. The magnesium headband also distributes the headset's weight evenly, ensuring all-day comfort.

High performance microphone – The microphone can also be swapped from the left or right hand side of the headset.

Great service and support – If your Bose headset ever needs service, you can expect fast and friendly service, even years after your purchase.

Warranty – covered for five years and transferable if you decide to sell your headset.

Excellent battery life – Bose's smart shutoff helps provide at least 45 hours of use from just two AA alkaline batteries. 🎧



Back-to-back

Was it easy or was it hard?

'Two seconds! That's a lifetime in the Red Bull Air Race.'

The Red Bull Air Race season may only be eight races long, but when you're based in Australia it's almost like a constantly rolling beast that leaves little time to stop and re-group from one event to the next, such is the travel involved.

But finding time to recap how our last two races have gone – back-to-back wins in France and then Japan – plus looking at what comes next in the season is something our team prioritises. There's a whole discussion there, but in this column, I want to talk about our race in Chiba, Japan. It was our second win for 2018 and the second time we have managed back-to-back air race wins.

The first time was in 2016 when we won in Ascot, England and then Lausitz, Germany. We finished second in the world championship that year.

One question that has been asked of me, is whether or not the win in Japan was easier after winning in Cannes and knowing we had the ability to win?

Simply put, not really.

This year, there are at least five other teams out there with the ability to win a race in their own right (meaning, not relying on luck to get through a round, or other people to penalise themselves out). So, that on its own always puts pressure on us during race day, knowing we have some pretty stiff competition.

When your opponents are that fast,

the last thing you should do is afford them an advantage. So, let's wind back the clock on Japan and discuss how qualifying on the Saturday put us in a tough position and made Sunday's job even harder.

The leadup to qualifying began on the Friday of the race weekend. Unusually we had four flights that day, three test flights and practice session one. All went well, and we learnt a lot from the day and felt we could improve on what were already respectable times.

Saturday rolled around, and we were scheduled for another two practice sessions in the track, followed by qualifying in the afternoon. Realistically, it was another big day with an extra flying session to what we normally have.

As this day progressed, we knew there would be a big change in the winds but were also aware that come race day on the Sunday, this wind would return to what we had seen on Friday, when we were fast. Therefore, we made a conscious decision in qualifying not to change our race line due to the wind.

The reasoning for that was so that I did not change and confuse my thought processes or lessons already learnt. I still believe this was a sound decision.

Saturday practice went well, including topping the leaderboard on one of the sessions – all was looking

good for qualifying. But then it all went horribly wrong when we got to the first really important session of the weekend.

My first run through the track in qualifying felt like it was a rock-solid run, up around my best times for the track. As I pulled out of the track, race director Jimmy DiMatteo read my time to me, and I was two seconds off the pace. Two seconds! That's a lifetime in the Red Bull Air Race and handed a massive advantage to our competitors.

The news was quite a shock to me, as normally my estimates of the time are pretty good, within half a second. It also had me ranked third last! As I reset for the second qualifying run, I was running through everything in my head as to what went wrong. Did I lean incorrectly? Did I mess up the power and prop setting? Did I completely get my start speed wrong? Was the engine losing power?

The bottom line was, I felt I flew well and all I could do at that stage was to try and fly well again and see what happened.

That next run felt just as good, but no better than the first. The problem now was that I clipped a pylon, and I knew straight away my chances of improving my ranking were gone. Pylon hits are worth a three-second penalty. Despite the mistake, I stayed in the track to get the best raw time I could, knowing we needed to collect data on what was going on.

As I pulled out of the track, the raw time was back to what I had expected. It was fast and would have put us second behind qualifying winner Mike Goulian – who was leading the world championship by three points, ahead of me.

The three-second pylon penalty meant I ended up 12th, third last, while our closest competitors sat near the top of the tree. Bugger!

After I landed we had a quick team debrief. I went through my thoughts on what had happened, though admitted I had no idea on what went wrong on the first run. All I could do at that stage was hand over to Pete (tactician Peter Wezenbeek) and Finchy (technician David Finch) to see if they could find a valid reason for the initial slow time.

In action over Chiba. JOERG MITTER/
RED BULL CONTENT POOL



After a few hours, just before we left for dinner, Pete had isolated the exact point where things went wrong, and it was an easy item to fix. We also knew from the second run that if I did not hit the pylon – coulda, shoulda, woulda – we would have had a great time. We still knew it was in us to win the race, but a little more concentration was now needed considering the qualifying result.

What a 12th place in qualifying did though, was throw in a whole new element for the Japanese race – mind games. Our result meant that our opponent in the first head-to-head knockout Round of 14 was Yoshi Muroya, the home-grown hero, reigning world champion, and Chiba air race winner from the previous two years. Oh, and he knocked me out in the Round of 8 in 2017. Brilliant.

The Japanese media had a field day when they saw that Yoshi and I were matched up again. They were calling it the ‘heat to watch’ in the Round of 14. The good news was that Yoshi was looking at our team, equally worried that he was up against strong competition. Like I said, mind games.

After qualifying we went out for dinner as a team with Rowan Willson from OzRunways, one of our highly-valued air race sponsors, and his wife Kristen. Rowan is an ex-RAAF pilot like me, and we discussed the mental challenge that lay ahead on race day and the fact that no matter what happens on qualifying day, the next day is a new one. We also agreed that regardless of what coulda, woulda or shoulda happened, it’s always a little stressful after qualifying.

We compared my result from that day to doing an IRT, or a GFPT on pilot’s course.... you can be blitzing the flights leading up, but it only takes one error on the day to fail the flight.

I went to bed and thought a bit about this concept. I realised that it was exactly the same as being in the RAAF, and my whole career I had dealt with situations like this. Instead of focusing on what could go wrong, and making mistakes, I needed to recognise what could go wrong, but be confident I had a plan in place to deal with not letting that happen, then focus completely on how to do it right.

In the morning, the team and I continued with this mindset... everyone needed to be prepared for a perfect first run. There were lots of media questions about who would win between Yoshi and I, and our response was always “don’t know, can’t control it, all we can do is our best effort”.



The stress disappeared as the Round of 14 neared, and as I taxied out for one of the hardest first rounds I have ever faced, I felt the most relaxed I had ever been.

And that mindset worked.

I flew first in the heat against Yoshi and put down a time that was 0.6 seconds faster than the next best, and over a second faster than everyone else. Regardless of how Yoshi went, I knew we would progress to the Round of 8 as the winner of our heat, or the fastest loser in the Round of 14.

Unfortunately for Yoshi, he made an error and DQ’d himself out of the round.

We always make a point of ‘racing ourselves’, not our opponent. Even though we never got the chance to compare our time to Yoshi that day, we achieved what the team has since referred to as our most perfect run in the track to date.

The highlights reel from Japan will show our winning run in the Final 4

where we raced against Mike Goulian, Pete McLeod and Martin Šonka. It might even show our Round of 8 heat when we raced Spaniard Juan Velarde.

But for our team, it was the Round of 14 that set up our victory and it was our most satisfying flight all day.

So, how can this help you?

No matter what you are facing in the day, if you are starting to get stressed about it, acknowledge that yes, there may be things that don’t go your way.

But always make sure you have a basic plan on how to mitigate those items as best as possible, then focus on what you can control to make it perfect. Whether that be a flying test, a nasty weather day, or something on the home front, focus on the positives and have a plan for the negatives. If you can do that, you will perform better and most likely even enjoy the challenge.

Smoke on, go... 🚀

🚀 Celebrating a hard-earned win. BALAZS GARDI/RED BULL CONTENT POOL

👍 Two in a row deserves a big thumbs up. BALAZS GARDI/RED BULL CONTENT POOL



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Fifty-fifty

We need to address the grass roots to get more women onto the flightdeck

'A fishing boat doesn't change its catch by simply casting its net over the other side of the boat.'

There has been a growing movement discussing the lack of women in aviation. Personally, I am an advocate for seeing such an imbalance addressed as some of the women that have flown the banner to date have done aviation proud. What I find interesting is the promotion of targets of 50 per cent female intakes by some predetermined date.

At what point did the powers-that-be wake up and decide that recruiting women is suddenly an agenda item? Australian women have been doing us proud long before the advent of KPIs and marketing think-tanks. We are familiar with the wonderful exploits of Nancy-Bird Walton as a pioneer aviatrix, but let's not forget the amazing Lores Bonney either. World War 2 saw women ferry everything that the military had to offer, all around the world.

But then things seemed to stall a little. It would be years before Australian women would earn the right to occupy the flightdecks of the major airlines. Christine Davy MBE initially broke that glass ceiling with Conellan Airways, and was also the first woman to hold a first class ATPL. Deb Lawrie won her hard fought case in 1979 and Sharelle Quinn would be the first female captain at Qantas in 1992. It's a long and proud history, but the numbers are still too few.

What the industry is facing is a need for significant change. However, change requires change management and not a lightbulb moment in a press release. Rather than a statement of a target, perhaps we should be asking questions. Why now? Why a percentage goal? Why has it taken so long? A fishing boat doesn't change

its catch by simply casting its net over the other side of the boat – it needs to move into different waters of a different depth. And that takes time.

Regardless of gender, a recent school leaver who reads about the "pilot shortage" might not be suitable, or able, to realign their career aspirations so quickly. Firstly, did they study the required subjects at school and secondly, do they have the means to pursue the career at such relatively short notice? For those who hold positions in airlines, the career choice of a pilot was made well before they sat their final year examinations. Not entirely, but it would seem likely for the majority.

Just as the "pilot shortage" didn't spring up overnight, nor did the gender imbalance, so it is wishful thinking to consider that either can be resolved with the flick of a recruiting department's switch.

This form of change takes time and when it interacts with society at large, it borders on generational change. This means that beyond the good work of advertisements and social media, we need to address the grass roots. So many young women don't even realise that a career as an airline pilot is a genuine possibility.

When a woman pilot achieves a landmark the subsequent media rush can be such that it may appear to project them as a superwoman. The effect of these headlines can sometimes be the reverse in that rather than encouraging young girls, they may actually see the career as beyond them. That's why a solid, broad-based approach is needed.

We need to address the schools, first and foremost. Our pilots need to interact face-to-face with the next generation so that they can see for themselves that they are real people. The career guidance officers are traditionally ignorant of aviation, beyond a Defence Force recruiting brochure. These people form a critical link, so they should also be educated.

It should also not be forgotten that aviation is competing with a variety of careers that have already established themselves as gender-inclusive, hence a greater effort may be needed to win over the mindset. This all takes time.

Failure to address the change

thoroughly could have negative ramifications. It may open the door for the bigoted minority to assert that it was 'jobs for the girls' on the basis of a quota, rather than recognising their true skills and merits. This is an attitude that so many women have worked hard over decades to quash, so it really doesn't need to be given oxygen again.

Having flown with women as an instructor, a co-pilot and a captain over many years, there is no doubting that they can match it with the blokes on all counts. In fact, there are certain instances where women, particularly in their younger years, display a level of maturity and balance that occasionally chest-pumping males with too much testosterone should envy.

There are those who believe that women lack assertiveness. Aside from thinking that these proponents have never been married, one needs to pause to consider how much assertiveness and persistence is needed just to make one's way up the career ladder in a profession where you are so vastly outnumbered.

An airline career has so much to offer applicants regardless of background and gender. Pay levels do not discriminate, nor does a seniority system that is based upon a date of joining. There are also options for carers that can aid in managing an airline career through life's inevitable phases. Lifestyle balance, extended absences and crew rostering are challenges faced by all pilots, but that's part of the job.

Women on the flightdeck in significant numbers has been a neglected issue for decades. Change is overdue, but equally we need to manage that change. We need to let every little girl and boy know in equal measure that they can fly.

Female pilots are wonderful role models for the next generation, but they should not be elevated on too high a pedestal – out of reach. They should be at ground level, eye-to-eye with the female fliers of tomorrow.

And that's exactly how most female pilots I know want to be seen. They don't want to be perceived as an exclusive niche, or a minority group, they want to be regarded as a respected and valuable member of a flightcrew. 🍀

🍀 A growing aviation industry means a growing need for pilots, no matter their gender.
SETH JAWORSKI



Handling the hiccups

From interviews and hold files to training delays

Career hiccups occur for many reasons and right at the moment, some of those reasons are presenting a little differently than they have in the past.

For those of you on long hold files for example, it probably feels as if those reasons are not being communicated effectively, and in turn that naturally leads to frustration. The aviation industry is indeed in flux particularly with regard to recruitment and that makes us all feel a little unsure about what will happen next.

Some airline cadet candidates have reported feeling disadvantaged with the focus on gender equality as part of the hiring criteria, while at the other end of the scale, type-rated pilots with thousands of hours have received the, "your application has not progressed" email.

I will say straight up that most hiccups are manageable, but I also want to assure you that I hear you. Your concerns are real and valid.

While you cannot force an airline to sort out their recruitment, training or human resources challenges you can control your attitude and your plan. After all, the only person you can control is you.

The issues or 'new style hiccups' are compounded by the current climate of airline growth and the high demand for pilots and ancillary staff. Logical thinking would have us believe that some of these issues are less likely to occur because growth is good, it provides opportunities and industry movement.

Agreed... in theory.

The reality? Growth has created a whole bunch of new career challenges. While most are not deal-breakers, your attitude will have a great deal to do with what occurs next in your career. Irrespective of how you are being affected by the current recruitment climate, there are three things that you do have control over and they will affect the next phase of your flying career:

- » Are you taking responsibility for your actions or part in the outcome?
- » Do you have the tenacity and resilience to move forward?
- » Do you have a failure or change management plan?

First up, what does it mean when an

airline rejects you?

Well, it's not personal, really it's not. I cannot stress that enough. I also realise it feels very personal, this is your career, your life. However, they don't know you so it can't be.

Airlines have a set of key criteria by which they assess and rate your application and following that, during the assessment day, they rate your performance on the day. Again, I stress, on the day.

Understanding those criteria is key to preparing effectively and performing well during the assessment day. There are no guarantees but it goes a long way to giving it your best shot.

A rejection post assessment day pure and simply means, at this stage, you have not met enough of the airline's criteria. That doesn't mean that you cannot meet them in future.

If you didn't get a look-in with your application and you meet or exceed the requirements, then that comes down to internal recruitment objectives. These change regularly within an airline. Read the airline's response/rejection notification carefully, quite often it is not a flat out 'no'. Trust me, if it is a 'no' there can be ambiguity about it.

Regardless of the reason for the result, any candidate should have a Plan B firmly in place; you might call it a 'Failure or Change Management Plan'. Plan Bs help regroup and regain some of the control you lost with the rejection. It might look something like this:

- » Ask for feedback from the airline (some will provide this now).
- » Debrief on the result with someone you trust.
- » Accept the areas you need to improve on.
- » Action those areas.
- » Plan to reapply, research new opportunities or progress within your current role (if available).

What if you are stuck on a hold file?

As an industry, hold files are longer than any of us can remember. We are coming up on 12 months in some cases. Feels as if your career is on hold? Of course it does. Remember that a hold file means you have been successful. It also means that the airline has a backlog of training spots

or a lack of resources in that area. We all know the latter is a huge issue right now for most carriers. Ensure you:

- » Keep abreast of the airline's plans.
- » Communicate with them regularly (ask for updates). You might not always get the reply you want but it cannot hurt to ask.
- » Keep your eye on other opportunities.
- » Review your decision every three months, ask yourself; 'how long can I afford to wait?' or 'how long do I want to wait?'

So what about cadetship gender quotas. A well-respected jet pilot who has been mentoring cadet candidates voiced with me concern about the gender equality quotas disadvantaging one sector or the other. His concerns were valid. I countered by adding that encouraging women into the industry is one way of bolstering the pilot numbers coming into aviation. It forms part of the plan to eradicate the experience shortage we currently have within pilot ranks.

He also felt that some women might get a yes, or more relaxed consideration simply because of gender in order to meet those targets. I can understand that, it might happen. However, airline recruitment and training processes soon weed out those who are not 100 per cent committed and motivated.

There are also more cadet programs opening in 2018-2019 than in the previous four years, so there are more opportunities. If you don't succeed in one then have a go at another one and ensure you get the right preparation to improve your chances. My mentor pilot also talked about the cadets not understanding the level of preparation and maturity of approach required.

Cadets, your parents are not being assessed. If this job is for you, and I hope it is, I would like to talk far less often to your parents. I'd like to talk to you, go ahead pick up the phone. No drone-parenting permitted.

Aviation is an interesting space to be working in right now. It has its own peculiar evolving challenges, but it is never dull. While writing this article a theme became clear – communication. It is key to reassessing your career hiccups, delays and frustrations. ☺

'The reality? Growth has created a whole bunch of new career challenges.'

Putting a face to the name. Pinstripe Solutions' Kirsty Ferguson.





Ultra long-haul, ultra big challenge

SEEING THE

SUNRISE

WRITER: JORDAN CHONG

When Singapore Airlines (SIA) reclaims the title for the world's longest passenger flight by distance in October, it will do so with an Airbus A350-900ULR (Ultra Long Range) configured with just 161 seats.

The two-class A350-900ULR will feature 67 in business class and 94 in premium economy class. And no economy seats.

Even with that low seat count, SIA chief executive Goh Choon Phong says there will be days in the northern hemisphere winter when the aircraft will face operating restrictions due to the prevailing winds.

"I think there could be some payload concerns, on the cargo side particularly," Goh told reporters on the sidelines of the International Air Transport Association (IATA) annual general meeting in Sydney on June 4.

"There could be some payload concerns during the winter coming back."

Goh's comments about the A350-900ULR's likely performance on the 8,285nm mission – remember the service does not begin until October 11 – highlights the challenge facing both Airbus and Boeing as the pair races to develop an airframe capable of meeting the ambitious targets within Qantas's Project Sunrise.

That is, flying from Australia's east coast to both London and New York (among other destinations) with what the airline wants as a commercially

Qantas aims to go one step further from its nonstop London-Perth flights operated by Boeing 787-9s to nonstop Sydney-London flights. QANTAS

'I think there could be some payload concerns, on the cargo side particularly.'

GOH CHOON PHONG

viable payload. Sydney-London Heathrow is 9,188nm.

And the clock is ticking.

Qantas chief executive Alan Joyce outlined the Project Sunrise timetable to reporters on the sidelines of the IATA AGM on June 4.

It was hoped the technical evaluation with Airbus and Boeing – as well as consultation with regulators on fatigue management issues and crew rest rules, and discussions with pilots – would be concluded by the end of calendar 2018.

“There’s a lot of parallel processes,” Joyce explained.

Once concluded, the process would then shift to a request for proposal (RFP) with both manufacturers.

The decision on aircraft type would be made in 2019 for delivery in 2022, should the business case stack up.

“I keep on saying if the business case works because there is a lot of logistics,” Joyce said.

Three hundred seats, four classes

And what exactly does Qantas want on board the eventual aircraft to operate these nonstop services?

The answer to that question is still being worked through, Qantas international chief executive Alison Webster told reporters at the IATA AGM.

For now, the ambition was to have a high-capacity, multi-class cabin and “zones” for other inflight activities.

“First and foremost for us, we are now looking at an aircraft configuration that gives us some flexibility and an opportunity for around an over 300-passenger seat count on the aircraft for the economics to be in the right place for us,” Webster said.

“We are clearly still moving around through the final numbers on that because we are also looking at a four-cabin configuration of the aircraft design and again as I said these are all still works in progress.

“No definitive decisions have been made around what will appear on that aircraft.”

Webster said part of the cabin analysis was consideration of different zones on the aircraft for alternate activities during the estimated 21-hour sector on Sydney-London.

However, what those zones would be had yet to be determined.

“In terms of zones, to be honest we’re not even sure what we mean by that yet,” Webster said.

“What we do know is, we want to



• The first A350-900LR for Singapore Airlines completed its first flight in April. AIRBUS

have multi-function capability on the aircraft. This is about reimagining how ultra long-haul travel will take place and we are cognisant that for that period of time on an aircraft we will need to provide options and flexibility for our customers.”

And the research on jet lag on board Qantas’s Perth-London Heathrow (7,829nm) nonstop flight that kicked off in March being undertaken in partnership with the University of Sydney’s Charles Perkins Centre is also expected to feed into the passenger experience on those services to London and New York.

So far, about 20 passengers on the Perth-London Heathrow service have been surveyed through the use of three separate special wearables – two on the wrist and one on the thigh – preflight questionnaires and a tablet device during the flight for them to record their meal choices, mental state and experience.

There was also a post-flight questionnaire asking about matters such as their experience of jet lag and routine after arriving.

“These are the raw materials from which we are going to seek the patterns which will allow us to answer the question, ‘are the things that we’ve done by way of intervention actually

‘No definitive decisions have been made around what will appear on that aircraft.’

ALISON WEBSTER





having an impact and on whom are they working most effectively?” Professor Stephen Simpson, Academic Director of the Charles Perkins Centre, told reporters during a Qantas media event on June 3.

Prof Simpson said the surveying will ramp up over the next 12-18 months, with the number of subjects potentially reaching 1,000 during the next phase of the trial.

Further, the survey could also include other routes beyond Perth-London Heathrow and other aircraft types in the Qantas fleet.

An interesting data point from the survey showed one male passenger recorded zero steps – that is, he did not move at all – during the 17-hour journey between Perth and London.

“One thing I couldn’t believe is how little some people move when they are flying,” Prof Simpson said.

“It’s inconceivable but true. The device was working. The person did have vital signs at the end of the trip so the two obvious explanations were discounted.”

Qantas consulting chef Neil Perry, whose Rockpool Bar and Grill was the venue for the event, quipped: “He must have had a very good bladder.”

One thing I couldn't believe is how little some people move when they are flying

PROF STEPHEN SIMPSON

Boeing says it is close to finalising design work on the 777-8X. BOEING

More broadly, Prof Simpson said initial survey results indicated passengers who tried to maintain a normal routine with sleep, exercise and healthy eating felt better when they got to their destination. By contrast, passengers who “fought” against jet lag were likely to feel worse.

Airbus and Zodiac Aerospace show off lower-deck modules

One idea that has gotten some traction of late is the use of the cargo deck for passenger activities.

In April, Airbus and Zodiac Aerospace announced they would partner to develop and market passenger berths that would fit inside the aircraft’s freight holds.

Concept drawings released by Airbus showed four different zones, comprising a conference room, lounge, kids and family area, and medical care zone.

The pair said these modules would be interchangeable with regular cargo containers and would not affect the aircraft’s cargo flow and cargo loading system.

“An improved passenger experience is today a key element of differentiation for airlines,” Zodiac





The A350-1000 arrives in Sydney during its recent Australian visit. LANCE BROAD

Aerospace Cabin Branch chief executive Christophe Bernardini said in a statement.

The head of Airbus cabin and cargo program Geoff Pinner said the feedback from several airlines to the first mockups had been very positive.

“This approach to commercial air travel is a step change towards passenger comfort,” Pinner said.

Boeing's 777-8X design almost set

Boeing says it is close to finalising the design work on the 777-8X long-range widebody that will be its contender for Qantas's Project Sunrise challenge.

The 777-8X, and larger 777-9X, feature new General Electric GE9X-105B1A engines capable of delivering 105,000lb of thrust, new composite wings with folding wingtips to maintain its Code E rating at airports, as well as in-cabin enhancements such as larger overhead stowage and a wider cross-section.

While the 777-8X is still in development and yet to reach firm configuration, the Boeing website lists the aircraft as having a range of 8,700nm and a passenger capacity of 350-375 passengers. The aircraft is expected to enter service in 2022.

However, the final specifications will only be known after further development of the aircraft design and an analysis of its engine performance. The GE9X engine began flight testing on General Electric's flying testbed in late 2017.

Boeing Commercial Airplanes senior managing director for marketing analysis and sales support Darren Hulst said the program was



✦ Airbus and Zodiac Aerospace are partnering to develop and market passenger berths that would fit inside the A350's freight holds. AIRBUS

“very close” to finalising the design specifications for the 777-8X.

“I mean, we are kind of finalising the design weights and those things but it is pretty close to being firm,” Hulst told reporters on the sidelines of the IATA AGM on June 3.

“We are really happy and encouraged by the pace of development to this point in terms of the schedule, in terms of the technology, in terms of the progress.”

Airbus mulls development of second ultra long range A350 variant

Airbus is putting forward its A350-900ULR – the same one SIA is using for its Singapore-New York nonstop – for Project Sunrise.

While the airframer's chief commercial officer Eric Schulz acknowledged the A350-900ULR of today was not quite up to meeting Qantas's needs, there was work

that could be done to improve the performance of the aircraft.

“The advantage we have is that we have an A350-900ULR ultra long-range which is already flying with Singapore Airlines doing Singapore to the US which is quite similar in terms of trip and operational challenges,” Schulz told reporters on the sidelines of the IATA AGM on June 4.

“The aircraft does a little bit less than what Project Sunrise will require but we know how to drive this.

“We have other developments within Airbus that we will bring to the table at the time.”

One of those developments could be an ultra long-range variant of the larger A350-1000 widebody.

“This is the flexibility we have,” Schulz said.

“The 900 and 1000 are very similar airplanes, they have just the capacity changes so whatever we have been

able to do on the 900ULR clearly we can deploy on the 1000ULR as well.

“We are looking at both options. I am convinced that we have at least one if not two products that could do the mission.”

Airbus has not published seating data for the the A350-900ULR, stating only the long-range variant was capable of flying more than 20 hours and had a range of up to 9,700nm based on a “typical high premium cabin”.

The A350-900ULR features a modified fuel system, which increases the fuel carrying capacity by 24,000 litres (from 141,000 litres to 165,000 litres) over the standard A350-900 without the need for additional fuel tanks. This is achieved through modifications to the layout of the piping and valves within the fuel tank.

There is also a performance improvement package with larger winglets, a slight twist to the wing compared with the standard A350-900, as well as changes to the flap fairing and belly fairing. Max takeoff weight is 280 tonnes.

Meanwhile, the current A350-1000 has a range of 7,950nm, a maximum takeoff weight of 308 tonnes and a maximum fuel capacity of 156,000 litres, according to Airbus figures. It can carry 366 passengers in a typical seating configuration.

Schulz described the discussions with Qantas as an iterative process.

“So at the beginning, Qantas could have the temptation to put many, many seats and then the reality might be a bit different,” Schulz said.

“What we need to understand is these are not markets that exist today.

“These iterations have started but they are far from being concluded.”

Qantas likely to have Australia-United Kingdom nonstop market to itself for now

One-time Qantas shareholder and alliance partner British Airways (BA) is the last remaining European airline flying its own aircraft to Australia.

And with the United Kingdom’s other flag carrier Virgin Atlantic more focused on the trans-Atlantic given its alliance with Delta Air Lines and with Air France-KLM a part owner, BA was seemingly the only one likely to contemplate Australia-UK nonstop flights.

However, the chief executive of BA’s parent company International Airlines Group (IAG) Willie Walsh said there were no plans to follow in Qantas’s footsteps.

“We’re not looking to do direct flights from Heathrow to Australia,” Walsh told delegates at a CAPA – Centre for Aviation conference in Sydney on June 6.

“Codesharing is an option but in terms of using our metal, we’re not considering it.

“Personally, the idea of sitting on an aircraft for 21 hours to get from Heathrow to Sydney, I don’t know, it just doesn’t appeal to me.”

Locally, Virgin Australia too has shown no ambition for ultra-long-haul flights.

While BA was not keen on Australia-UK nonstops, Airbus’s Schulz said there were other airlines aside from Qantas looking at ultra long-haul aircraft.

“There is an interest for other operators who have ultra long-range missions to look at these options and look at these possibilities,” Schulz said.

“I can think of at least three different operators who have, I would

‘I can think of at least three operators who have the kind of ultra long-range mission similar to Project Sunrise.’

ERIC SCHULZ

say, for a part of their network, the kind of ultra long-range mission would be...quite similar to Project Sunrise.”

While Boeing’s Hulst noted the interest in the Boeing 777-8X for Qantas’s Project Sunrise challenge, as well as from Air New Zealand’s ambition to offer an Auckland-New York (7,671nm) nonstop service, in this part of the world, he was keen to point out the 777-8X also needed the flexibility to fulfil a range of missions required from other airline customers.


“Airlines are very focused on an airplane that fits more than just a very small subset of markets, they want an airplane that has versatility; whether you’re Qantas or whether you’re an airline in the Middle East or anywhere else in the world,” Hulst said.

“You want an airplane that’s most efficient in its class and it’s the most flexible in terms of where it can be deployed in the network.

“I would focus less on the ultimate range of the aircraft and focus more on the fact that this aircraft has the most range capability of any airplane, current or future, and it is also more efficient than other aircraft in its class.

“Airlines need the capability but they also need the versatility, you need to be able to deploy it on multiple routes or it won’t make sense, it won’t buy its way into a fleet.”

There have been 326 orders for the 777-X program, comprising 53 for the 777-8X and 273 for the 777-9X, according to the Boeing website.

Meanwhile, Airbus has logged 847 orders for the A350 program, comprising 679 for the A350-900 (including the seven A350-900ULRs for SIA) and 168 for the A350-1000. 

 Qatar Airways uses the Boeing 777-200LR (pictured here at Miami) on Auckland-Doha, currently the world’s longest nonstop air route. ROB FINLAYSON





AIRPOWER DISRUPTION

Australia is building its future air power capabilities around the F-35. What future threats might the fifth-gen fighter face?

WRITER: MAX BLENKIN

As tensions rise over China's territorial claims in the South China Sea, Australia deploys a squadron of F-35A Lightning Joint Strike Fighters (JSFs), to the Royal Malaysian Air Force Base Butterworth.

This is a location very familiar to many Australian defence personnel from decades of deployments, going back to the dark days of World War 2.

For the Australian Defence Force (ADF), this is the first regional deployment of the F-35, an aircraft far better than anything operated by any regional air force. Initial combat air patrols, out into the South China Sea, though nowhere close to the disputed territory, demonstrate F-35's

What future threats will RAAF F-35s face? DEFENCE

knowledge superiority.

Aircraft track People's Liberation Army Air Force (PLAAF) Chengdu J-20 aircraft conducting their own combat air patrols, monitoring and classifying their radar emissions and also those from a variety of air defence radars operating from PLA-Navy ships as well as from the island bases. That's all without registering more than some faint returns on the PLA radars.

But undetected they aren't. As one aircraft makes its final approach to land at Butterworth, a small quad-rotor unmanned aerial vehicle (UAV) zooms into its path.

The pilot avoids a collision – just – but his wingman isn't so fortunate. A second UAV goes straight into his

engine. The pilot safely ejects but a \$150 million aircraft has just fallen victim to a UAV worth at most a couple of thousand dollars.

Worse is to come. As smoke from the burning aircraft rises into the sky, dozens of small suicide UAVs rise from scattered backyards and bush clearings and converge on the base, each carrying an explosive payload about the equivalent of a hand grenade – quite sufficient to damage or destroy an expensive aircraft.

These UAVs are flying autonomously in a swarm, heading to coordinates based on satellite imagery taken in the previous half-hour. Many fall to base defences – electronic jamming and good old-fashioned



gunfire – but enough get through to destroy one aircraft and damage two more.

At a crucial time, a squadron of modern combat aircraft is rendered combat ineffective.

Everyone knows precisely who was responsible but actual evidence is scanty. Recovered UAVs, readily available commercial models, don't carry PLAAF markings and their operators, quite few in number, disappeared the moment their little aircraft were airborne.

Round one goes to the PLA – a classic case of disruptive technology where the traditional exercise of air power was constrained by imaginative application of a new capability.

This scenario is wholly fictitious and it might not play out this way at all. Practically everyone is now aware of the risk of weaponised unmanned aircraft systems (UAS) and much research is being devoted to counter-UAS technology.

This ranges from basic electronic counter-measures – most commercial UAVs operate with common command protocols on known frequency bands – through to kinetic means including net-throwers, guns, missiles and even hunter-killer UAVs and trained falcons. Directed energy weapons defences would appear to have significant potential.

But the risk of a mass UAV attack on an air base is real, as was

'But the risk of a mass UAV attack on an air base is real.'

demonstrated in January when 13 bomb-carrying drones attacked two Russian bases in Syria. Ten headed for Russia's main Syria base at Khmeimim in Latakia province. Another three hit the Russian naval base at nearby Tartus.

This attack, apparently launched by anti-Syrian regime rebels caused no damage or casualties, with all attackers downed, six by missiles and seven by electronic counter-measures.

Russian images of one downed drone show what appears to be a large fixed-wing model aircraft powered by a small petrol engine, armed with small bomblets.

It would appear Russian forces were ready and well-prepared for such



● China's PLAAF is beginning to field the Chengdu J-20 fighter.
ALERT5/WIKIMEDIA

an attack – hardly surprising as the conflict in Syria and Iraq has featured extensive use of small UAVs for tactical surveillance and armed strike.

So, in any future deployment the ADF can reasonably expect to encounter hostile UAS, with the potential for them to disrupt or constrain the freedom of operations we might once have fully enjoyed.

UAS need not even be hostile to be disruptive. How about UAS operated by news organisations transmitting imagery of troop dispositions in real time?

Disruptive technology is scarcely new, although the expression in its modern guise was created by US business consultant Clayton Christensen in an article in 1995. Various iterations of this concept had been articulated by earlier authors.

Disruptive technology is essentially any new technology which stuffs up an existing market or means of operation. There are abundant examples.

The introduction of the automobile in the late 19th century did not end horse-drawn transport, and all that went with it, as early cars were expensive, unreliable playthings of the rich.

What did was the introduction of the Model T Ford in 1908, an affordable and reliable vehicle which introduced motoring to the masses.

More recently, Finnish company Nokia dominated the global market for mobile phones, at one time selling more handsets than any other

company. Then along came the iPhone. Nokia phones still exist but how many do you see these days?

People will always need to get from one place to another and how else could they do it other than aboard a taxi?

Uber showed there was another way, which was frequently cheaper and more convenient, underlining Christensen's fundamental thesis that it wasn't the new technology which caused the disruption – it was the underlying business model which the technology enabled.

For the ADF, rapid technological change and the growing availability of new and inexpensive capabilities to all comers, certainly raises one fundamental question – are we preparing to fight the right war?

The answer probably has to be no, with the qualification that, with a few exceptions, no-one has ever been fully prepared for the war they found themselves fighting.

The US military triumphed over Saddam Hussein in the Kuwait war, a graphic testament to the success of post-Vietnam reforms. Then it got bogged down in insurgencies in Afghanistan and Iraq and had to relearn the lessons of Vietnam.

Australia emerged from Vietnam a seasoned counter-insurgency force, then struggled to mount a stabilisation operation to East Timor because underlying enabling capabilities had withered, seemingly not that important in a period of modest

peacekeeping missions.

It has to be said the ADF is now in good shape, with well-trained capable forces and excellent equipment, either in service or soon to be.

In just about every industry sector on earth and especially in defence, smart people are paid to think hard about future trends. Their success rate is often pretty ordinary, even from people you think would know better.

How's this gem, cited by *Forbes* magazine in a 2015 article, from Microsoft CEO Steve Ballmer in 2007: "There's no chance that the iPhone is going to get any significant market share."

With the rise of a professional military class, there have long been predictions as to how some new technology will revolutionise warfare.

In 1921 Italian air power theorist Giulio Douhet published his treatise on air power, arguing that the bomber would always get past defences and that strategic bombing of a city and its industry would so erode the population's will to resist that capitulation would speedily follow.

With the experience of strategic bombing from World War I and the expectation that future bombers could deliver a far greater weight of bombs, his theory proved highly influential.

The next war proved he was mostly wrong. The RAF discovered early its bombers couldn't always get through and even when they did, they couldn't reliably strike a target even as large as a city. Bombing of cities in the UK

'UAS need not even be hostile to be disruptive.'



and Germany, if anything, boosted the population's will to resist.

So strategic bombing wasn't the disruptive technology it was pitched to be. But there were other disruptive technologies which affected the outcome and had a marked impact on what came later.

Think radar, the jet engine, strategic rockets and first-generation precision weapons.

In the 1991 Iraq war, precision weapons came of age and US air power dominated the battlefield, so completely that it seemed US dominance over traditional adversaries such as the former Soviet Union was assured almost indefinitely.

Yet, as air power analyst Dr Alan Stephens of the Williams Foundation observed, Israel also believed it had absolute air supremacy over its Arab neighbours following its stunning victory in the 1967 Six Day War.

This one-sided victory led Israel to assume its air power would always triumph.

Six years later in the Yom Kippur War in October 1973, Egypt launched its assault over the Suez Canal and Syria into the Golan Heights under an effective ground-based air defence (GBAD) system, comprising latest Russian SA-6 and SA-7 missiles and radar-directed ZSU-23-4 gun systems.

These proved highly effective with Israel initially suffering unsustainable losses. Ultimately Israel won, with a combination of improved measures to suppress air defences and fast-moving ground forces which overran Egyptian and Syrian GBAD.

The enduring lesson is that for all the superiority of Western air forces, with their advanced aircraft, well-trained pilots, knowledge advantage and effective command, control and support, enemy GBAD may again turn out to be shockingly good.

How good? Until there's an actual

conflict which pits western air power against Russian GBAD, we won't really know.

Throughout the Cold War, the Soviets talked up their capabilities. So did many in the West, who didn't know about Russian capabilities and weren't about to say anything which could have reduced their budgets for new equipment.

Eastern Bloc GBAD worked OK in Vietnam but was well outclassed in later conflicts.

More recently Russia has used the Syrian conflict to combat-prove some of its newer equipment, including a pair of S-400 Triumph anti-aircraft missile systems.

Russia has been quite happy to sell these to anyone with the cash, including India, Turkey, Saudi Arabia and also China, where deliveries started in January. There's rising prospects that these will be encountered in some future conflict.

S-400 features an AESA radar and four different missiles with various ranges out to a maximum 400km. Russia claims it can hit anything in the US inventory, including F-22, F-35, B-1 and B-2, plus Tomahawk and

• The Russian S-400, "the most lethal long-range air defence system on the planet"? NOSINT

ballistic missiles. A single battalion carries more than 100 missiles, which is a lot of air defence.

In an article last May about Turkey's proposed acquisition of S-400, *The Economist* magazine described S-400 as one of the best air defence systems currently made.

US commentator Scott Wolff went further.

"Simply stated, of all the surface-to-air threats being faced by coalition air power over Syria, the Russian S-400 SAM, known as the Triumph at home and better known to NATO as the SA-21 Growler is the most capable and lethal long-range air defence missile system on the planet," he wrote on the fightersweep.com website.

Carlo Kopp on the Air Power Australia website said the S-400 was often termed Russia's Patriot but it was in many ways more capable.

"From an Australian perspective the deployment of large numbers of the S-300P/S-400 family in Asia is of major concern. Rapidly deployable, highly survivable and highly lethal these weapons are especially difficult to counter and require significant capabilities to robustly defeat," he wrote.

"The US Air Force currently envisages the F-22A Raptor as the primary weapon used to defeat these capable systems."

Dr Kopp said no Hornet variant or F-35 was designed to penetrate S-400 coverage and their survivability would be no better than legacy combat aircraft.

So Russian GBAD could be the disruptive technology of the next conflict but there are other possibilities.

On the plus side, North Korea – the most likely venue for a major conflict – doesn't have S-400 but it does have

• China's 'carrier killer' DF-21D ground-launched ballistic missile. CHINESE INTERNET





General Atomics' developmental Predator C Avenger points to the future of unmanned combat aircraft. GENERAL ATOMICS

a very comprehensive GBAD based around a domestic missile system similar to the older S-300.

It's not just GBAD. US power projection capabilities are based on its carrier battle groups and China has developed a series of weapons with no role other than to kill US carriers.

That's the DF-21D, a ground-launched ballistic missile intended to target a moving aircraft carrier at a range of more than 1,500km, penetrating air defences at hypersonic speed and obliterating the target with either a conventional or nuclear warhead.

Beijing was apparently stung to develop this weapon system following the 1995 Taiwan crisis, when China reacted badly to prospects that the island nation would elect a pro-independence president.

To defuse the crisis, the US sailed carrier USS *Nimitz* and its battlegroup through the Taiwan Strait in an effective show of force.

Would DF-21D work as claimed? We just don't know. Would Washington take a gamble and sail a carrier battlegroup through the Taiwan Strait or the South China Sea next time a spot of sabre-rattling is needed? Again we don't know. Whether this works or not, China still has a very significant anti-ship cruise missile capability.

It could be that China has mostly achieved its aim of denying free use of these seas to the US Navy.

Since we don't know what we don't know, science fiction provides some

thoughts on the disruptive technology of the future, in particular the novel *Ghost Fleet* by Peter Singer and August Cole.

The premise is a future war between China and the US, which opens with a massive cyber attack which cripples many vital US systems. The advantage of US submarines is eliminated as China has developed a means of detection based on emissions of Cherenkov radiation from their reactors.

F-35s are blown out of the sky – compromised microchips start emitting a radio signal as a homing beacon for Chinese missiles. Chinese anti-satellite weapons destroy US surveillance and GPS capabilities.

The novel also features UAV swarms and naval railguns. Ultimately the US wins, sort of. The book comes highly recommended as a primer on future war.

The recent Air Power conference canvassed some other possibilities. There's artificial intelligence (AI), not an easy concept to grasp as the potential applications aren't that clear and this has a long way to go.

Yet everyone is taking this extremely seriously. Russian President Vladimir Putin went so far as to say whoever becomes the leader in this sphere will become the ruler of the world.

AI, according to the Wikipedia entry, is the ability of a computer system to perceive its environment and then take steps to achieve nominated goals. That's pretty much what humans do all the time but AI

does it faster and on a vastly greater scale.

This has applications in seemingly every area of society – health, finance, transport (autonomous cars and flying taxis) to nominate a few, and certainly the military. The Pentagon's Project Maven aims to use AI to analyse the vast and ever growing amount of intelligence data and imagery from UAVs, satellites and manned aircraft.

AI will increasingly feature in unmanned platforms, whether aircraft, ground or maritime surface or undersea systems.

There is an energetic debate going on in the West about deployment of lethal autonomous systems. So far the answer is no – a human remains in the loop. But our future opponents may not be so constrained and neither might we.

AI, coupled with quantum computing, could revolutionise the battlefield. The decision cycle for an action – termed the OODA loop for observe, orient, decide (which mostly takes the longest) and act – could be reduced to fractions of a second.

AI could well manage a swarming drone attack, involving thousands or tens of thousands of small simple UAVs, directing to nominated targets, bypassing resistance and reinforcing success.

The US has already successfully trialled an autonomous unmanned combat aircraft, the Northrop Grumman X-47B, able to takeoff and land on an aircraft carrier and conduct missions without human involvement.

'The novel also features UAV swarms and naval railguns.'

X-47B and other contenders emerged from the US Navy's Unmanned Carrier-Launched Airborne Surveillance and Strike (UCLASS) program which changed scope several times along the way but finally settled on the unmanned tanker role.

That's certainly useful but the final potential would appear far greater, with unmanned aircraft accompanying Super Hornet or F-35 on strike missions, refuelling, providing extended sensor coverage and releasing weapons at the behest of the manned aircraft.

How long before it would be decided the unmanned aircraft could do all that was needed and possibly better than ultra-expensive manned aircraft and their highly trained pilots – maybe not long at all.

US private sector intelligence group Stratfor says as the power competition between Russia, China and the US intensifies, the emergence of disruptive weapons technologies will drive them deeper into a destabilising arms race.

Increasingly capable missile defence systems will contribute, specifically anti-ballistic missiles.

That goes both ways. Russia views the SM-3 – likely to be eventually acquired by Australia – with grave suspicion, along with the US THAAD and Ground Based Interceptor, as potentially neutralising their nuclear arsenals.

Add to that the new US super-fuze installed on nuclear warheads of submarine-launched Trident ballistic missiles under the decade-long nuclear weapon modernisation program.

This doesn't make the missile itself any more accurate. The fuze detonates the missile warhead at the optimum location to cause most damage to a target such as a missile silo. The *Bulletin of the Atomic Scientists* says that it boosts the killing power of US nuclear warheads by a factor of around three.

“Because the innovations in the super-fuze appear, to the non-technical eye, to be minor, policymakers outside of the US government (and probably inside the

‘By nuclear standards their yield is modest.’

government as well) have completely missed its revolutionary impact on military capabilities and its important implications for global security,” it said in an article in March 2017.

But there's more. The US is looking to field more of what are termed low-yield nuclear weapons, with explosive power of less than 20 kilotons. These are also termed tactical or battlefield nuclear weapons.

By nuclear standards their yield is modest but at the upper end it's still equivalent to the bomb that devastated Hiroshima.

The logic is that large bombs, in the megaton range, would be so catastrophic that their use would be unthinkable and so they pose no effective deterrent, unlike smaller bombs. It's not just the US – both India and Pakistan possess low-yield bombs as do other nuclear powers.

Any use of any nuclear weapon by anyone would be profoundly disruptive to the human race. If it didn't lead to immediate escalation, it would have the effect of lowering the nuclear threshold for next time. 🌐

🌐 The USS *Zumwalt* stars in the techno-thriller *Ghost Fleet*.
US NAVY





HERE COME THE DRONES

From agriculture, Amazon deliveries to aerial taxis, the commercial use of drones is set to explode

WRITER: STEVE GIBBONS



The imagery was outstanding and the endorsement priceless when Crown Prince Sheikh Hamdan bin Mohammed hopped into the cabin of an autonomous passenger drone – flying taxi to you and me – for a five minute flight 600ft above the ground of his beloved Dubai in September last year.

The successful, very public test of the prototype Volocopter, an 18-rotor, German-engineered machine capable of both autonomous and piloted flight, marked another step forward by Dubai in the international race to fully embrace a technology that less than a decade ago was more widely perceived as the realm of the military, the hobbyist, niche commercial camera operator or blue-sky dreamer.

Just seven months later, the

imagery was far less impressive and the implications sobering when a Russian parcel-delivery drone dashed itself to pieces against a wall shortly after takeoff on its inaugural flight in the city of Ulan-Ude. The idea was sound enough: a drone mail service to connect isolated Siberian villages. The reality was a little less so, with the evidence flashed in photo and video around the world.

To be fair to the parcel drone developers there has been plenty of upside, too, with various companies making successful, small-scale deliveries in parts of China, Japan, Germany, the UK and United States. Australian start-up Flirtey, now based in Nevada, Amazon, Google, DHL and the French La Poste are among leaders in further pushing the boundaries.

Volocopter's vision of the future of personal transportation.
VOLOCOPTER

But if nothing else, the crash underlined that for some there is still a way to go in perfecting navigation and training in the operation of even the smallest commercial drones, and that maybe, despite the superb reputation of German engineering, Sheikh Hamdan should be congratulated for his chutzpah: short flight, big leap of faith.

It is clear, however, that the future for both smaller-drone commercial operators and their much larger autonomous passenger vehicle cousins, hinges on greater co-ordination of regulation and development of more sophisticated and co-operative air traffic management systems. Key issues, depending on the size of the drone involved, include beyond



Crown Prince Sheikh Hamdan bin Mohammed takes a five minute flight over Dubai in September last year. VOLICOPTER

line-of-sight (BLOS) operations, airspace navigation, air traffic control integration and, not least of all, collision avoidance.

Until then, full-scale expansion of the industry will be limited to current regulatory frameworks.

The good news is that both industry and key global regulators, led by the US and Europe, either recognise or are beginning to confront barriers to development. Co-ordination and co-operation is now a work in progress.

What's in a name

The terms unmanned aerial vehicle (UAV), unmanned aircraft systems (UAS), remotely piloted aircraft (RPA) or, simply, “drone” are in common use depending either on the specific vehicle type and mode of operation, or country of origin and/or regulation. The common denominator is that when it comes to machines, we are talking about aircraft piloted by remote control or solely by onboard computer systems.

The growth of the drone industry in the past decade has been exponential. In January, US drone registrations (FAA) exceeded one million for the first time, though just over 12 per cent were classified as commercial operators. In Australia there are now 1,310 Remotely Piloted Aircraft Operator Certificate (ReOC) holders on the CASA register, close to double the figures for last year. Holders of a ReOC are both licensed and certified by CASA to conduct commercial operations and employ licensed RPA pilots.

While most of us can be forgiven for thinking drones are a relatively recent phenomenon, history tells a different story. Long-time aerospace strategist and acknowledged RPA expert Peter La Franchi points out that Australian inventor A J Roberts was demonstrating radio-controlled unmanned airships as early as 1912 in Australia. He then took his invention to the United Kingdom with an Australian Government recommendation that maybe he should demonstrate possible military applications to the UK War Office.

Regulation, meanwhile, dates back to 1944 when unmanned aircraft first received coverage under the Chicago Convention on International Civil Aviation, Article 8.

That said, growth has really gathered pace in the past 10 years with the development of off-the-shelf drone packages pitched both at hobbyists and small commercial operators: literally buy the thing in the box, open the box and fly. For Ben Harris, CEO of commercial operator National Drones, that growth has been further spurred by swift technological development.

“Miniaturisation of technology means you can get a DJI [company] drone today for \$1,500 to \$2,000 with a capability similar to a drone that would have cost \$100,000 five years ago,” he said.

While the individual commercial operators have been beaver away in developing businesses aimed at a wide range of applications such



“One day, seeing Prime Air vehicles will be as normal as seeing mail trucks on the road,” Amazon promises. AMAZON.

as commercial photography, aerial mapping, surveying, search and rescue, crop spraying and even mustering, it is the industrial and commercial giants that have grabbed the consumer headlines.

Amazon was one of the early adopters with what is now part of its Prime Air strategy: at one end of the scale it involves a fleet of Boeing 767 freighters and, at the other end, a fleet of parcel delivery drones capable of delivering packages up to five pounds (2.2 kilos) in weight within 30 minutes. Its drone plans have been in the air for more than five years and there are now development centres in the US, UK, Austria, France and Israel.

While there has been some progress with trials in the UK in particular, and speculation deliveries in rural areas could begin as early as 2020 following an easing of European line of sight flight regulations, there is more doubt about a start date for delivery in and

around cities where navigation and safety issues are far more prominent.

None of that is stopping Airbus in its quest to join the automated package delivery revolution. Drawing on the expertise of Airbus helicopters and Airbus Defence and Space, its Skyways project based in Singapore signed up SingPost in April 2017 as its logistics partner to trial small parcel delivery via drones to designated stations on the campus of the National University of Singapore.

The ultimate aim of Skyways is a safe and commercially viable aerial unmanned delivery system for use in dense urban cities, but that doesn't preclude another phase in its development: shore to ship maritime deliveries. Airbus has teamed with Wilhelmshen Ships to trial delivery of goods from the Singapore Coast to ships at anchor.

Skyways drones will fly along aerial corridors to avoid collision while a central ground operations centre continuously monitors flight operations. Initial delivery range will be about three kilometres.

Other companies in the delivery space include DHL (Parcelcopter) and Google (Project Wing) which has trialed package delivery over multiple test flights near Canberra in conjunction with separate trials in the US. Apart from its UAVs, Project Wing integrates an unmanned traffic system that may have implications for successful development of integrated air traffic management worldwide.

Meanwhile Boeing has joined the race closer to home in a joint venture with the Queensland Government to develop and trial UAVs for a variety of roles. The three-year deal, signed in March, covers land, sea and air projects, and includes search and rescue and agricultural applications as well as ocean and land-based monitoring.

Queensland has been particularly pro-active in evolving a strategy for drone management that includes scoping a possible drone test site near Cloncurry, while search and rescue potential has already been thoroughly demonstrated by the Little Ripper system linked to Queensland and NSW surf rescue organisations.

Boeing is also involved as a development partner in one of the most imaginative global projects in terms of scope and scale: Uber Elevate, the ultimate in aerial ride sharing, which would see a vast network of dedicated skyports handling thousands of vertical takeoff

UAV flights carrying up to four passengers at a time over the top of crowded cities.

The sheer weight of corporate giants partnering Uber in the Elevate project should go some of the way to burying scepticism that this should be parked in the realm of science fiction. Bell, Embraer, Boeing, Pipistrel and Karem Aircraft are all involved in the development of electric VTOL aircraft capable of meeting Elevate specifications, while Uber has signed an agreement with NASA aimed at resolving airspace management issues. The Uber timeframe would see trial flights of experimental vehicles around 2020.

Anyone doubting the viability of autonomous vehicles themselves only need look at trials by the Volocopter in Dubai, a machine capable of both controlled and remote-control flight. Volocopter CEO Florian Reuter has said his company hopes to launch a flying taxi service by 2022.

Then there is the equally ground-

'Uber has signed an agreement with NASA aimed at resolving airspace management.'

Uber has signed an agreement with NASA aimed at resolving airspace management issues for its Elevate project. UBER

breaking work undertaken by Chinese company Ehang with its 184 AAV. Ehang's first test flights in China, carrying the company CEO and subsequently local government officials, took place in February in Guangzhou. Ehang has undertaken further tests and demonstrations, also in Dubai, and is pitching for more regular public flights of its single passenger quad-copter later this year.

While these ambitious projects seize the headlines, the current mainstay of the commercial drones industry, in Australia at least, is based around less glamorous pursuits that nevertheless have huge implications for regional economies and asset management.

Gary King, director and manager of Toowoomba-based Universal Drones, specialises in services to regional and rural Australia with a focus on agricultural work, surveillance and inspection, and damage assessment for insurance purposes. King believes that what he calls "the bread and butter" of



Airbus's Skyways autonomous parcel delivery drone made its first flight demonstration on February 8, where it validated its automatic loading and unloading capabilities. AIRBUS.



the drone industry is farm work, and he is convinced drones will help to keep younger people on the farm.

A former military intelligence specialist regularly based in and around the Oakey Army Aviation Centre, King says he chose nearby Toowoomba to establish what he claims is the biggest drone showroom in Australia because of the city's agricultural linkage – close to the produce centre of the Lockyer Valley and within striking distance of the sorghum and grain heartlands of western Queensland.

King extols the virtues of using drones on farms for tasks including crop spraying, spraying in areas inaccessible because of difficult terrain limited more by battery life than the weight of the aircraft, crop stress

● Google's Project Wing trialled package delivery over multiple test flights near Canberra.
X DEVELOPMENT

analysis and crop health including available water levels.

"For example we were involved in a government trial on an olive farm with six spots to cover on the same paddock. The drone took 17 minutes with 11.2 litres of chemical mixture. A tractor over the same distance used 210 litres of chemical and took an hour and three minutes.

"The industry is still developing and there are lots of jobs out there that have never been done before by a drone," he said.

As an example of a recent innovative farm application, he said imagery of a crop can be used to sell to market pre-harvest.

"Sorghum is an excellent example where you have an A and a B class grain. Price can be dictated

by the quality of the sorghum by appearance."

Universal Drones also runs a training school for drone pilots.

"We get a good spread of ages at the school including a lot of older people. We find the best guy to fly a drone on a farm is an older farmer. He's tired – his body can't cope with the tractor and other heavy work. The drone is a great alternative."

National Drones, with offices in Sydney and Archerfield, south of Brisbane, has seen greatest recent growth in asset management using drones, particularly of relatively inaccessible assets such as cell phone and radio tower peaks, and roof inspections.

CEO Ben Harris said more sophisticated drones linked to improvements in software have become a very effective tool for collecting data without having to relocate an aircraft – "3D mapping, volumetric calculations for mine stockpiles, that kind of thing".

He said battery life, a limitation on drone capability, was now starting to improve with some commercial rotor type systems offering 45-60 minutes battery life compared with 30 to 40 minutes previously.

Both King and Harris agree that regulation is the "elephant in the room" of drone development, though both empathise with CASA wrestling with such a complex issue. "CASA is fairly proactive about industry engagement, but for them it is a tough job trying to regulate an industry that changes as you watch it," Harris said.

It is a subject dear to the heart of Peter La Franchi who, apart from his professional life as an executive with MDA Corporation, holds a key management role with Australian Certified UAV Operators Inc. (ACUO) – a wholly voluntary industry association formed specifically to look after the interests of the commercial drone industry in Australia.

"Regulation from an economic point of view can be a great thing. An enabler that can open up all sorts of possibilities. Think, for example, about standards. If you don't have common standards in manned aviation then you have no real means to certify that an aircraft is safe to fly," he said.

"We are still a long way from having standards in the unmanned systems industry ... drones are aircraft. We expect the best of our aviation system and it's up to drones to comply with and to meet stringent safety goals



Bell is one of a number of major aerospace companies developing electric VTOL drones for Uber's Elevate program. BELL

and objectives. That way the skies are safe.”

Safety was a key reason La Franchi and ACUO were critical of a CASA decision to deregulate parts of the industry involving drones under two kilograms – criticism that formed part of its submission to the Senate committee inquiring into RPAs and associated systems, due to report at the end of July.

“Good regulation can do an awful lot to help build the industry. Questionable regulation, such as deregulation with no underpinning safety case, is a very different thing and out of synch with the prevailing trend of all aviation regulation globally.

“There are those who curse us because we have gone out and fought hard for sensible regulation, but history will prove we were on the right side.”

ACUO is in step with commercial operators in recognising the big regulatory gap in Australia around BLOS and has called for CASA to deal specifically with the issue separate to the current Part 101 that covers existing unmanned systems.

La Franchi said rather than develop a Part 102, CASA is working on the basis of exemptions to Part 101 to allow exploratory operations, commercial operations and science missions using BLOS, particularly in remote regional areas – western Queensland, for example.

“For the commercial unmanned systems industry to wholly open up to what is possible, Part 102 is necessary in Australia with corresponding regulation internationally. The upside is that ICAO’s unmanned systems regulatory project has been fast tracked for the past three years. Initial model rules are already out there and by 2019 we are pretty comfortable that there will be an accepted international guide that CASA can base its proposals on.”

Despite the hurdles, La Franchi said CASA has done some great work of late, emerging from a difficult period of strained relations with the aviation industry as a whole.

“We have a lot of confidence in Shane Carmody and the team he has built around himself. We had our annual dialogue with CASA just a couple of weeks ago and it went really well. CASA is coming back to strength and there will come a time again when Australia does lead the world in regulatory terms. Part 102 and BLOS operations is the opportunity,” he said.



Growth in drone usage has been spurred by swift technological development.

NATIONAL DRONES



China's Ehang is developing a passenger-carrying quadcopter. EHANG.

The other great challenge is development of an unmanned traffic management (UTM) system and, as part of its Senate submission, the ACUO said a national UTM is the only long-term viable solution to enable all aspects of drone operations in Australia.

“There is an awful lot of work going on with personal air vehicle technology. The time for that will come. The big question obviously is in certifying what is essentially an overgrown drone to carry people. That’s a challenge for the regulators. Is it technically possible? Completely,” La Franchi said.

“Meanwhile you could have multiple, city-based drone courier services, whether it’s something as basic as pizza delivery or flying blood samples between one hospital and another ... it’s all possible now from a technical point of view. The question is how you integrate that with the rest of the air traffic around you and with the built urban environment.”

One solution is standardisation and refinement of data protocols to provide for integration of drones within the manned ATC network,

from the top of controlled airspace down to the surface of the earth. Current ATC stops at 500 feet, 100 feet above the current drone operating ceiling.

Harris from National Drones agrees and puts it this way: “We have a fixed-wing, petrol-powered system called Penguin B, capable of flying between 10 and 20 hours. How can we safely integrate a system like that into airspace, even class G (uncontrolled) airspace for large area survey work?”

“Nobody out the back of Bourke in their Cessna 172 is going to have ADS-B, so it’s very hard to know where a light aircraft might be. In my opinion when ADS-B becomes mandatory across all aircraft we will go a long way to solving that issue.

“There are some big companies working on UTM, but it needs all the agencies to play along as well. And it requires a very considered approach. Yes, we could apply a band-aid but that will be no good in even 10 years’ time,” he said.

More than a band-aid will be required to fully realise the immense commercial potential of drones. 🚀

INTERNET OF THINGS TO COME?

An early report card for the Internet of Planes

WRITER: JOHN WALTON

Engines that know when they're about to break, notify maintenance engineers, and order parts. Live weather applications that interact with air traffic control to give pilots advanced options. Seats that know who you are and just how much you like to be reclined. Inflight entertainment that remembers where you are and suggests what you might like to watch. These were the promises of the Internet of Things when *Australian Aviation* last delved into the IoT in October 2015 ("The Internet of Planes"), in an article that was filled with much promise of the future.

But are we there yet? Australia's airlines have lagged behind their international comparators in adding inflight internet, even while early benefits of the Internet of Things have arrived before the radomes, satellite dishes and Wi-Fi access points in our skies.

Meanwhile, the IoT itself is evolving, nearly as quickly as the consumer technology it emulates. Three years ago, Amazon's Echo had only just arrived in homes, and Apple Pay hadn't even arrived in Australia. The definition of the IoT we used nearly three years ago aimed to achieve a future where "objects

Aviation is striving to harness the 'Internet of Things'.

ROB FINLAYSON

equipped with electronics, software, sensors and access to a network can transmit information without needing operational input from humans".

Yet, intriguingly, three years later, the definition of the Internet of Things for the aviation industry hasn't changed much – a remarkable achievement from IoT players in an industry where change is a paradoxical constant.

"Rockwell Collins considers IoT to be any device connected to a network that produces or consumes information within the aviation community. We use a definition that essentially allows any device that



senses and reports, or processes data to be an eligible IoT appliance. We do not require the network to be ‘the Internet’,” Joel Otto, vice president of strategy and business development in Rockwell Collins’ Information Management Services division, tells *Australian Aviation*.

“Rather, we define it such that the device must have the ability to transfer data – directly or through a gateway – using the Internet Protocol, or IP.”

Crucially, an internet of things does not have to be on the Internet of Things, the capitalised, proper-nouned latter of which operates on the same set of global interconnected protocols

‘The Internet of Things is a vehicle that transforms connectivity.’

as Google, Facebook, Twitter, email, Amazon, iView, and so on. Providers can create their own interconnected networks and, with the additional security advantages closed networks can bring in the aviation context, this option can look attractive.

A little more formally and in corporate language, Pratt & Whitney’s director of digital technology Sean Pearson defines the IoT as “an interconnected system of devices, software and analytics that captures data about the real world and enables intelligent, proactive actions to be taken that drive better business outcomes and operational efficiencies.

“The Internet of Things is a strategic consideration for Pratt & Whitney, as it can improve customer experiences, operational efficiency and overall profitability of businesses by enabling greater visibility into real-world events and statuses.”

Rolls-Royce, meanwhile, “regards the Internet of Things as a vehicle that transforms connectivity and provides opportunities to deliver passengers more reliably and more efficiently than ever before. It is an enabler of a wider Rolls-Royce vision, that of the IntelligentEngine, which sees a future where the worlds of product and service have become so



closely connected that they are now inseparable. The coming together of product and service, supercharged by digital technology, offers Rolls-Royce a wealth of opportunities to improve the way it provides power to its customers,” the company explains via spokesperson Bill O’Sullivan.

Notably, and despite some rather lofty promises in the early days of the IoT’s applications for the aviation industry, much of its benefits are now being seen as evolutionary rather than revolutionary, particularly by enginemakers, who have been doing the IoT since before it was called the IoT.

“Rockwell Collins doesn’t necessarily see IoT as a big win play. Rather, we see IoT more as a series of incremental value adds that each airline or operator will put in place to enhance the efficiency of their operations or to serve their customers better. It’s clear there is no “magic bullet” application driving the industry to broadly adopt IoT,” says the company’s Joel Otto, “we believe that each airline will chart their own course to apply IoT according to their operational and customer engagement strategies.”

From the airline perspective, meanwhile, Virgin Australia’s chief information officer Cameron Stone defines the IoT as “a growing collection of objects that, through the use of embedded technology, are able to be connected to the internet, allowing interaction and reporting not previously possible. This includes everyday objects that can now be connected to the internet such as vehicles, equipment – and passenger

Rolls-Royce says the Internet of Things promises “The coming together of product and service, supercharged by digital technology”. ROLLS-ROYCE

handling processes, like security and baggage handling – as well as a growing array of sensors and beacons.”

Bringing it back to the basics, technology integrator SITAONAIR’s Portfolio Head for e-Aircraft Pierre-Yves Benain tells *Australian Aviation* that the IoT “is about delivering value from data generated by sensors attached to or embedded into ‘things’. From SITAONAIR’s perspective, “the aviation IoT represents a set of technologies embracing sensors, connectivity, data management and analytics, that are intelligently combined to generate value.”

For some early use cases, the IoT is here already.

At Australia’s airports, “the Department of Immigration and Border Protection is trialling the use of biometric tech at Sydney Airport that will allow customers to be processed by digital facial recognition, iris and/or fingerprints, matched to existing data,” explains Gareth Bridges, director of digital business for Asia Pacific at internet backbone company Equinix.

“Passengers will have the potential to pass through bag drop, border processing, security screening, airport lounge and boarding gate after only showing their passport once for initial verification.”

“Already, the use of facial-recognition technology at Sydney Airport’s electronic gates has reduced the average amount of time people spend passing through Customs from four minutes to 23 seconds,” Bridges explains.

“The use of automated immigration gates and kiosks has increased globally

by six per cent in 2017 to almost 60 per cent. Looking ahead, Western Sydney Airport will have technology that enhances the passenger experience in these and other more unimaginable ways.”

Over the last three years, says Pratt & Whitney’s Pearson, “the opportunities to apply IoT across business processes continue to grow at an exponential rate. The associated costs to extract real-time information continue to reduce.”

Rockwell Collins’ Joel Otto, meanwhile, tells *Australian Aviation* that not everyone is persuaded. “I do believe that the business case for turning certain aircraft equipment into IoT devices has yet to achieve mainstream acceptance.”

Yet Virgin Australia is on board, says chief information officer Cameron Stone. “IoT not only improves the travel experience for guests, but it also streamlines workflows for our ground staff and flightcrews to be able to use technology to provide a more tailored customer experience for our guests and the reach that IoT has will only continue to broaden as technology advances.”

Across the IoT, Stone sees “a growing list of items and opportunities that we might not have seen before.”

For early adopter engine suppliers, the IoT is building on existing work

“The aviation industry has a long-term history with this type of technology. For example, aircraft engines have had connected sensors for a long time,” Virgin Australia’s Stone tells *Australian Aviation*.

Pratt & Whitney’s Sean Pearson

For some early use cases, the IoT is here already.

elaborates: “Pratt & Whitney has been collecting data from aircraft for the last 15 years and offers a successful EHM [engine health management] service called ADEM. This 24/7 service takes advantage of our continuous development of analytics and maintenance recommendations. Thanks to this service, our customers have been able to better manage their fleet and reduce operational event disruptions.”

More widely, says Rolls-Royce’s Bill O’Sullivan, “Airlines have focused on applying digital technologies to improve passenger experience, online revenue generation and back office optimisation with advanced analytics. Fuel and maintenance costs are now more than 50 per cent of airline spend and we look to provide predictive and prescriptive analytics apps, using data fetched from IoT devices, which will help them optimise their operational costs.”

Yet the IoT’s promise remains more than just cutting costs: it’s about these predictions that help to increase reliability, maintain schedules, and improve safety. A key destination on the road to getting there is the concept of a digital twin: a computerised version of, in this case, any particular engine that matches its physical counterpart.

“The ability to diagnose engine issues is important, but even better if the artificial intelligence can determine an accurate remaining useful life for the key components,” explains O’Sullivan. “This allows maintenance and inspection intervals to be optimised. Rolls-Royce is using big data tools and the Operational Performance Digital Twin to merge detailed engine performance data with contextual operational data – such as flight track and dust, sand, ice and other environmental contaminants – to accurately measure component wear and predict life. The Operational Performance Digital Twin further extends this concept to allow optimisation of the near-term and long-term maintenance plan.”

Since February, Rolls-Royce has been consolidating its work in this arena in its IntelligentEngine program, an evolution of its TotalCare service package that debuted in the 1990s.

“In addition to designing, testing, and maintaining engines in the digital realm, the IntelligentEngine vision sets out a future where an engine will be increasingly connected, contextually aware and



comprehending, helping to deliver greater reliability and efficiency,” O’Sullivan says, highlighting three ways in which aircraft will be:

- » Connected – “with other engines, its support ecosystem, and with its customer, allowing for regular, two-way flow of information between many parties.”
- » Contextually aware – “of its operating context, constraints and the needs of the customer, allowing it to respond to the environment

Installing the Wi-Fi radome on a Virgin Australia 777. SETH JAWORSKI

SITAONAIR is focusing on flexibility as the IoT gets going for airline operations. SITAONAIR

around it without human intervention.”

- » Comprehending – “learning from its own experiences and from its network of peers to adjust its behaviour and achieve best performance.”

But despite this pedigree, it may be more the rise in home-based and office-based IoT devices that encourages the aviation industry to do more with the Internet of Things.

The growth in consumer IoT has spurred aviation to do more

It’s not exactly as clear a line as “Alexa, when will VH-OJA require engine maintenance?” or “Siri, what is our regional subsidiary’s current on-time performance?”, but the growth in the number and power of individual and networked devices living in the homes and offices of C-suite and senior management executives in the aviation industry is a key driver behind increasing the adoption of IoT technology among airlines.

Home devices can be used off-the-shelf or adapted for aviation purposes, while aviation-specific devices are increasing in number, complexity and networking ability on a continuous basis.

“Rockwell Collins does see that there are more airlines talking about IoT as part of their connected airplane strategies,” says the company’s Joel Otto, although he notes that “most are still working on the business cases to determine how far to take IoT.”

In fairness, that last sentence could be attributed to many consumer and enterprise IoT devices too, but some surprising darts have stuck to the proverbial product dartboard.

“The rising number of IoT devices



and venture capitalist investment in IoT startups will fuel competition and innovation across the IoT toolchain,” concurs Pratt & Whitney’s Sean Pearson, highlighting that “IoT growth is driven by business and technological factors, decreasing costs of sensors and increasing capabilities of various tech, such as network bandwidth, cloud services and machine learning.”

SITAONAIR statistics suggest that more than two thirds of airlines are currently planning to invest to increase their adoption of IoT in the future.

“This is overdue and represents a huge business opportunity,” says Equinix’ Gareth Bridges. “The data-driven optimisation of traditional processes not only makes for improved safety and security, it delivers economic efficiencies for business – not to mention that it aligns with customers’ shifting expectations.”

Already, the IoT generates more information than the industry can use

Early generations of sensor-enabled aircraft are already generating more data than airlines, their suppliers, manufacturers and the rest of the industry are using, yet finding a single ‘killer app’ has proven elusive.

Currently, says Virgin Australia’s Stone, “IoT is allowing for the aviation community to enhance the customer experience by eliminating the frictions associated with flying. Each opportunity to utilise IoT solutions is attached to addressing a business problem where the technology is really a secondary consideration. Virgin Australia has a number of areas that are looking at using IoT elements to improve the customer experience throughout their journey, like the ability to check flight status information using Amazon Alexa.”

Yet challenges unique to aviation certainly remain.

“For some of our operational areas, power to IoT devices poses an issue so we are looking at some innovative solutions that will increase battery life on beacons and sensors that would make their use more practical,” Stone says.

SITAONAIR’s Pierre-Yves Benain agrees. “The big and understandable barrier to adopting IoT onboard aircraft has been the need to gather certifications before any new technologies can be deployed. For SITAONAIR, we believe industry collaboration, and the creation of open, certified platforms, will be the key to unlocking widespread certified



Pratt & Whitney says IoT growth is driven by business and technological factors, decreasing costs of sensors and increasing capabilities of various tech, such as network bandwidth, cloud services and machine learning. PRATT & WHITNEY

IoT adoption, and its associated benefits.”

It’s also crucial to understand the context of aviation’s disparate, often bespoke, frequently outsourced, and sometimes difficult to update IT backbones — many of which are controlled by data warehousing players. Joining up these disparate systems, which often use different languages, is a tall order.

Commercial powerplant manufacturers are, however, demonstrating that it can be done already, Rolls-Royce’s O’Sullivan reminds *Australian Aviation*.

“Intensive analytics is carried out on data collected from sensors on engines which are then transmitted to Rolls-Royce Aircraft Availability Centres across the globe using a combination of online and offline transmission techniques. With advanced data sciences, Rolls-Royce uses diagnostic analytics to determine usage patterns, provides predictive analytics as insight to determine engine life and also provides prescriptive analytics as foresight to control the engine usage.

“Airlines who have implemented our predictive and prescriptive analytics solutions are able to continue to keep the engines on-wing longer safely and reduce aircraft on-ground situations.”

As airline operations and management functions become more data-driven and more connected, manufacturers and service providers

are creating new sets of tools that can be integrated in existing ops centres and management information systems. General aviation operators, too, have new suites of applications where they can customise notifications for their individual operational needs.

Automating these processes, creating reports that are usable, and translating them between operational and technical specialties, is already showing promise for Rolls-Royce, which launched its Intelligent Insights suite earlier this year. “The first element to be launched is Technical Insight, which benefits both airline technical services teams and Rolls-Royce service delivery specialists as they strive for ever-improved dispatch reliability,” explains O’Sullivan. “It automates the application of Natural Language techniques to process engine maintenance log data, unlocking the potential for a step change in delay and cancellation performance. This data is connected with other relevant parameters in the Cloud, and insights are then delivered via visualisation tools for the line maintenance environment in an easy-to-use app, and via the Rolls-Royce Care portal.”

Yet SITAONAIR’s Belain is clear that aviation is only starting to unlock the power of the IoT. “There are many concepts and trials underway at the moment. We see the biggest growth area in the space being in how the data-value potential of IoT is realised.”

‘Alexa, when will VH-OJA require engine maintenance?’

But does slower Wi-Fi adoption mean Australia is behind the curve?

But how is Australia’s aviation industry measuring up? Airlines in the South West Pacific are lagging far behind their North American counterparts in particular when it comes to getting their aircraft online with inflight internet connectivity, and some of the benefits of the Internet of Things require, well, internet.

The good news for local airlines is that “Rockwell Collins does not see the strong adoption of inflight internet in North America driving high numbers of IoT applications into those airlines,” says Joel Otto from the company’s Information Management Services division.

“The longer lead items in IoT are, firstly, connecting the device if it is not connected, and, secondly, determining how “smart” an aircraft certified device needs to be and updating those devices on the aircraft.”

SITAONAIR’s Pierre-Yves Belain concurs. “So far, inflight internet has been driven by the passenger entertainment segment. We do not perceive a strong relation with IoT today, although this may change in the future.”

With long lead times for selection, testing, provision, installation and entry into service of inflight internet systems, however, airlines are planning for IoT benefits once the planes are online.

“Virgin Australia plans to have all of our B777 aircraft and the

majority of our B737 aircraft fitted with Wi-Fi by the end of 2018, with A330 installation to follow in 2019,” Stone explains. “As guests become more accustomed to using Wi-Fi inflight, the opportunities to provide new products and services to guests that may or may not utilise IoT will increase dramatically. Early planning for these products and services is already underway.”

Coming up next, says Stone, “new aircraft types, such as the Boeing 737 MAX, are arriving with a growing array of sensors designed to increase safety and deliver greater operational efficiencies to the airline.”

Moreover, “the use of IoT to enhance wayfinding and personal communications in the airport is something that is currently underway. We expect to be utilising this, combined with augmented reality solutions by early 2019, on our new app.”

In addition, Stone says, “We have several asset tracking initiatives that utilise IoT elements also underway, for example with our wheelchairs, and a number of programs to look at improved baggage tagging and tracking.”

Key suppliers, too, are bullish on the future for the IoT. From the Rolls-Royce perspective, says the company’s Bill O’Sullivan, “the increase in digital capability is continually increasing – our Airline Aircraft Availability Centre in Derby, UK will soon be receiving more than 70 trillion data points from our large engine fleet every year

‘New aircraft types, such as the Boeing 737 MAX, are arriving with a growing array of sensors.’

CAMERON STONE

and our R2 Data Labs organisation then uses advanced data analytics, industrial artificial intelligence and machine learning techniques to translate that data into new service propositions for customers.”

SITAONAIR’s Benain also remains positive. “As SITA’s connected aircraft experts, we are exploring innovation in a number of areas where the IoT will bring clear value onboard aircraft – from monitoring transported goods and assets inflight and sensing the aircraft environment, to keeping tabs on an aircraft’s condition. As a priority, we are collaborating with airlines’ OEMs and IoT vendors to identify where enabling IoT capabilities will make a real difference.”

It’s clear that the Internet of Things is maturing, but while it has moved beyond the bleeding edge the edge is still sharp and often results in a “wait for it” from prospective customers. Just as not every household is clamouring to talk to Alexa, not every operator, manufacturer or supplier wants every part of their operations online.

If, after nearly three years of study, the Internet of Things were getting its report card, it might read: “A promising future, but must make new friends and apply itself better.”

Clearly, there is more to do, there are more people to persuade, and there are more benefits to show – but it feels like the aviation industry is getting there. 📍

• Virgin Australia plans to have all of its 777 aircraft and the majority of 737 aircraft fitted with Wi-Fi by the end of 2018. ROB FINLAYSON



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Seeing machines



The Seeing Machines camera is typically placed between the primary flight display and navigation display. SEEING MACHINES



EYES IN THE SKIES

As we enter an era of ultra long-haul flying, an Australian company is literally examining how we look at flying

WRITER: OWEN ZUPP

Founded in 1999 at the Australian National University in Canberra, Seeing Machines has grown to employ more than 200 people globally.

The company is involved in developing computer vision technologies which enable machines to see, understand and assist people. Through artificial intelligence analysis of the heads, faces and eyes of operators, such as pilots, the vision platform can monitor a person's attention state in real-time, including their drowsiness and distraction.

Seeing Machines' first commercial solution was delivered to the mining industry with its Driver Safety System (DSS). The DSS was deployed across the world on mining sites where heavy vehicle operators were identified as at a high risk of experiencing fatigue, due to the nature and length of shifts. They were also prone to distraction. This system provides real-time in-cabin intervention, aimed at preventing fatigue and distraction-related driver events.

Due to high interest and industry take-up, Seeing Machines then worked closely with the American Fortune 100 company, Caterpillar Inc, and in 2015 licensed the Off-Road business exclusively to them on a worldwide basis. The next step saw 'Guardian' launched. A version of the Driver Safety System for a commercial fleet of road trucks, it is now protecting the vehicles of over

200 customers globally.

Although the Seeing Machines driver monitoring platform was for automotive applications, it is now being adapted for use across a range of industries, including aviation. Using the investment and experience gained from these other industry sectors, Seeing Machines Aviation is in a strong position to apply the technology to the complex, sophisticated, and highly regulated aviation industry.

The emerging aviation business within Seeing Machines is under the stewardship of general manager Patrick Nolan, and already the company relates that there is strong interest from manufacturers, carriers and operators alike. From the company's perspective, it is seeking to leverage its existing core capability and systems to build solutions that support applications in aircraft, simulators, and consoles that are typically used in air traffic control and unmanned aerial systems (UAS) operations.

How does it work?

If most communication is non-verbal it would seem that a pilot's face can also relay information without a word being spoken. Each renewal of a medical certificate calls for testing of the eye's ability to see, but there may be more to be learnt than merely how far away a pilot can spot an aircraft, or how well they can read the fine print on a chart.

We have all felt the slow blinking of the eyes and ultimately the head nods as fatigue begins to bite as we sit watching Netflix. Similarly, pilots have felt the speed and efficiency of their instrument scan affected by an extended absence from flying, or even a change of cockpit and flight panel design. Conversely, what happens to our scan under periods of high workload?

These issues, and others, raise the question whether we can monitor and quantify such behaviour as it develops? Furthermore, is there the ability to train these behaviours, or even intervene?

These are some of the answers that Seeing Machines is seeking. The technology being trialled to date is non-intrusive, fully automatic and camera-based and does not require the user to wear any form of hardware or sensors.

The current prototype solution being used for pilot and crew training support is a simple (non-integrated) and temporary after-market installation of a small camera and two

'Conversely, what happens to our scan under periods of high workload?'

infrared light sources. The camera is typically placed between the two key instruments, the primary flight display and navigation display, while the light sources are placed on the outer points of the instruments. The arrangement is replicated for both the captain's and first officer's positions. There is additional computing equipment required to run the system, capture data and to provide real-time tracking displays but that is not visible to the pilot.

The technology detects and locates a human face and then tracks in real time without any need for calibration prior to use. It gathers a variety of accurate head and eye-related data, measures, and metrics including precise gaze-tracking, microsleep detection and very accurate measures of pupil diameter.

To track the head and eyelids, the system provides precise detection and measurement of the frontal area and sides of a subject's face and head in real time and returns a comprehensive model of the face that includes the coordinates of all facial features, their current state and their rate of change. This includes a very accurate measure of blink rate and eyelid aperture.

'Eye gaze tracking' is the measurement of where the pilot is looking. By directing a safe, invisible light source at a subject's eye and then using a special camera to track the glint, it can be interpreted to precisely ascertain where or what the subject is looking at. Combining this information with an accurate understanding of the flightdeck

involved, gaze tracking can be used in real time (or recorded and played back) to help assess exactly how the subject is processing their visual surrounds.

Although eye-tracking and related data on its own will not prevent the impact from these identified problems, they stand to provide a new, relevant and rich data source to supplement and optimise the current aviation recruitment, training, and assessment processes with an underlying alignment to safety.

Seeking answers

As with any new form of technology in the aviation sphere, there is a significant process of data collection, analysis and trials involved in developing the system.

Seeing Machines has been conducting this proof-of-concept data collection across a range of flight and air traffic control environments. These include full-flight simulators with multiple carriers and operators from UAE, US, and Asia Pacific, and the training and operational consoles of Australian and UK and Europe-based air navigation service providers. There have also been multiple flights during which pilot alertness data has been gathered.

Emirates, through its Human Factors Group and Emirates Training College, has shown significant interest and commitment to a collaboration with Seeing Machines. The collaboration to date has seen multiple data collections in both part

✦ The collaboration with Emirates has seen data collections using an A380 full-flight simulator.
EMIRATES





task trainers and more recently in the A380 full-flight simulator.

In addition to the partnership with Emirates, there is work underway with several other carriers, expanding to include rotary-wing work, and more recently Seeing Machines says there has been interest in the development of military applications, specifically in the ab-initio pilot training space.

The findings from the first part of the project were primarily focused on the use of the equipment, the methods for data collection and how to use that data. This demonstrated the potential of eye-tracking for pilot training, understanding the requirements of different procedures and to analyse events that occurred from a pilot performance perspective. The second part, recently carried out, was still focused on the use of equipment and data. From this we expect data from specific flight scenarios that will contribute important information about pilot performance in these scenarios.

The data collection was conducted with a view to certain questions. Where is the pilot looking, and does it matter? What does a good scan pattern look like and can you train that? How important is monitoring, do you train how to monitor and in turn, how do you monitor that? And critically, can you detect fatigue during operations? The areas where such data and the associated technology could potentially be utilised with pilots and air traffic controllers are far-reaching, including recruitment, assessment and training, monitoring skills, and fatigue-related impacts.

Seeing Machines has the potential to supply aviation training providers

and instructors with intelligent data that can be used in the selection, training and assessment of pilot candidates, as well as in the continuing training of line pilots. The technology identifies what the pilots are looking at, be that the speed tape, altitude, approach guidance, flight mode annunciations (FMA) and the like at any given point in time during a flying sequence. This information can be further used to identify breakdowns in instrument scans, missed information and even crew interaction from a CRM perspective.

Potential fatigue issues are another growing field of concern within aviation as pilots, air traffic controllers, employers and regulators seek to manage their resources in the safest possible manner. The nature of flight operations means that flightcrew regularly perform complex, safety-critical tasks using highly sophisticated aircraft systems. Furthermore, irregular schedules, long duty periods, early start times, and flying during the body's 'Window of Circadian Low' are all part and parcel of a career in aviation.

Through using the Seeing Machines technology to better understand their pilots' alertness and fatigue state in real time, during flight, the data can in turn be employed by companies to evaluate the effectiveness of various aspects of their operation. They can review their schedule and crew trip design, validate that their FRMS is performing as expected, and identify and mitigate against systemic operational fatigue risks.

The growth of the aviation industry over the coming decades does not

Working with airlines like Emirates, Seeing Machines has been conducting proof-of-concept data collection across a range of flight and air traffic control environments.

ROB FINLAYSON

solely impact airlines and pilots. Air traffic controllers are also affected by the increasing demand on their skill-set, growth in air traffic and rostering patterns that may seem at odds with the human's natural desire to sleep when the sun sets.

In the air traffic control sphere, Seeing Machines' Operator Alertness System can help air navigation service providers and controllers assess alertness and attention state in live operations and consequently provide valuable and timely data to air traffic controller teams. Again, like the pilots, this can potentially support air traffic controllers with more effective resourcing scheduling and decisions.

The potential uses for the Seeing Machines technology in aviation are broad in their range, but quite precise in the data that can be collected. It is apparent that through this data there is the opportunity to optimise the performance of the pilot or air traffic controller as well as the environment in which they work.

Eyes in the sky

As all technologies continue to evolve, it is the interface with the human element that must be continually monitored and assessed and adapted. Unlike our digital creations, humans are not designed to operate at peak performance for 24 hours each day and seven days per week.

It may be some time until the Seeing Machines technology is incorporated on flightdecks around the world, but there is no doubt that this Australian company is at the cutting edge in the way that it is addressing certain human aspects of operating in aviation, not the least of which is recognising and managing fatigue.

Rather than drawing a hypothesis, this technology is going directly to the source – the human – and monitoring performance very closely under a range of conditions, timeframes and environments. The subtle movement of the eye as it busily scans across flight instruments to draw the maximum amount of data has not previously been tracked. And that same eye may hold the earliest clues to a decrease in performance as fatigue insidiously draws down upon the eyelids.

Moving forward means that new solutions must be found to the new challenges that inevitably arise. In the case of human performance in aviation, the key may actually lie in looking very, very closely. 🕒

'The key may actually lie in looking very, very closely.'



NO MORE NET LAG?

Virgin Australia expands Wi-Fi reach to Los Angeles

WRITER: JORDAN CHONG

Virgin Australia general manager for customer experience and product Tash Tobias recently flew home from Los Angeles.

The flight took off late in the evening Los Angeles time, or late afternoon on Australia's east coast.

That meant her children were still in school and would normally be uncontactable from the time the doors closed until the flight landed.

However, the aircraft operating the flight was one of Virgin Australia's Boeing 777-300ERs trialling inflight internet Wi-Fi ahead of the official rollout.

As such, Tobias settled into her seat, enjoyed some dinner and then, once school was over, got online to exchange a few messages with her family before ploughing through a few emails and then getting some sleep.

The Virgin Australia executive said the experience made for a much more relaxing flight and highlighted the appeal for onboard connectivity as not just the exclusive domain of the business traveller.

"These days, there is so much more combined travel, you know business and leisure combined,"

Tobias explained in an interview with *Australian Aviation*.

"The lines are not as clear cut as they used to be and the world is changing and there is a lot more diversity in the people who are travelling for business too.

"And it is just not as clear as business people only want to use it for email and people who are going on holidays want to use social media and stream Netflix.

"There is a lot of crossover between both and we are really pleased to be able to offer that to all our guests."

Australian Aviation spoke to



‘Virgin Australia has partnered with Gogo, using the 2Ku dual-antenna technology.’

supplemental type certificate (STC) that allowed for the modifications.

Virgin Australia officially switched on 777-300ER inflight internet on June 5

The completion of the Wi-Fi installation on the five aircraft used to operate flights from Los Angeles to Brisbane, Melbourne and Sydney allowed Virgin Australia to officially switch on the technology to all passengers on those routes from June 5 and declare itself to be the first Australian airline to offer Wi-Fi on international services.

Virgin Australia has partnered with Gogo, using the 2Ku dual-antenna technology (one for the forward link and one for the return link) for its inflight connectivity, which uses Optus satellites for domestic and trans-Tasman services and Intelsat and SES for its other international flights.

Prior to the official launch, Virgin Australia had one 777-300ER conducting trials with passengers, while private testing was going on behind the scenes on other 777s as they were equipped.

Tobias said the results of the internal testing and passenger feedback had been fantastic.

“We were flying them sort of in private mode so that we could just make sure that everything was working before we allowed our guests to experience the Wi-Fi on board all of the aircraft,” Tobias said.

“The purpose of doing it that way was really so that we could continually refine the offering until we were comfortable with the service that we provided.”

While the level of coverage on the long journey across the Pacific depended on the actual flightpath taken, Tobias said the service was available for the “vast, vast majority of the time”.

Figures from the Gogo website indicated its 2Ku product offered up to 15 Mbps per passenger device, covered 98 per cent of global flight hours and had 98 per cent service availability.

“In the early days it was all about innovation and let’s face it the majority of the early services that were offered were pretty average in terms of speed and connectivity,” Tobias said.

“For us, we’ve waited until we’ve got the right partner to make sure that we’ve got an outstanding experience.”

Wi-Fi to help relieve “net lag”

Research commissioned by Virgin Australia and conducted by

Tobias at Virgin Australia’s Brisbane maintenance hangar on May 16 as the airline’s engineering crew was installing the necessary equipment for inflight internet Wi-Fi on 777-300ER VH-VPH.

On that day, technicians were in the process of installing the antenna on the top of the fuselage just in front of the tail.

And inside the aircraft, there was cabling work going on in the avionics bay and throughout the cabin, with the seats covered up by protective sheets as wireless access points and the onboard router were added.

The installation on VH-VPH was undertaken alongside some scheduled maintenance and was the first time Virgin Australia had completed the Wi-Fi work on its 777-300ER fleet in-house. VH-VPH was at its Brisbane hangar from May 8 until May 24.

The airline’s other four 777-300ERs – VH-VOZ, VH-VPD, VH-VPE and VH-VPF – had Wi-Fi installed in Singapore. Two aircraft were completed in November and December and a further two in January and February.

The installation of Wi-Fi equipment was completed under a

• VH-VPH in Virgin Australia’s Brisbane hangar in May. SETH JAWORSKI

Pure Profile found 70 per cent of Australians admitted to feeling frustrated because they could not access the internet during a flight.

Further, 65 per cent of respondents said they felt overwhelmed catching up on emails, messages and other unread notifications once they landed.

Virgin Australia has termed this inability to stay connected on flights that leads to feelings of stress and fear of missing out (FOMO) as “net lag”.

University of Sydney cyberpsychologist Dr Andrew Campbell said not being able to keep up-to-date with the online world and stay in touch with friends was a “real fear that’s only grown since the introduction of smartphones”.

“Like it or not, staying connected has become an essential part of life for most of us and certainly seems to be where we’re headed as a society,” Dr Campbell said in a statement.

Virgin Australia group executive for airlines Rob Sharp added: “Most of us use our phones on a daily – if not hourly basis – meaning it can be incredibly disruptive to have extended periods of time when you can’t connect with friends, family, colleagues, or what’s going on in the world.”

“We’re proud to be the leader in providing Australians with greater inflight connectivity on international flights.”

Virgin Australia Wi-Fi a mix of free and paid options

On domestic flights, Virgin Australia is offering a so-called standard Wi-Fi free to all passengers, while those wanting a faster connection – for streaming for example – can opt to pay for a high-speed service.

“For us, to help reduce the anxiety our guests feel from net lag has been a real driver of wanting to have a great service for Wi-Fi on all our aircraft,” Tobias said.

“The complimentary offer is really to take care of this net lag that we’ve been talking about.

“So our guests will be able to stay in touch, they will be able to use social media, they will be able to use Wi-Fi enabled messaging applications.

“They will be able to do emails, without downloading really large files. They will be able to do a lot of things they want to do to stay in touch.

“But we are charging guests for higher bandwidth activities like streaming content, particularly on domestic flights because we think that not everybody is going to want that but those who do will be able to have



Images of VH-PPH's Wi-Fi installation. SETH JAWORSKI

the choice.

“That enables us to be able to keep it complimentary for the vast majority of people.”

There will be no free service on international flights, however, with packages for one hour or the entire flight available for purchase.

Boeing 737-800 Wi-Fi rollout continues

Virgin Australia started offering inflight connectivity in April 2017 on its Boeing 737 fleet.

The service began as a free trial on domestic flights on board a single 737-800, which was followed by a

rollout of the technology to the rest of the fleet.

On June 5, the airline said 75 per cent of its 737 fleet would feature inflight internet Wi-Fi by the end of calendar 2018 (as at December 31 2017, Virgin Australia had 81 737 aircraft, comprising two 737-700s and 79 737-800s in its fleet).

Finally, Wi-Fi installation would begin on the airline’s six Airbus A330-200s – which are used on flights to Hong Kong and on trans-continental domestic services – in early 2019.

Virgin Australia’s Brisbane maintenance hangar was expected to

undertake the bulk of the installations on the 737s, which will take about four days per aircraft to complete.

Asked how Virgin Australia would measure the return on investment on its Wi-Fi installation, Tobias said: “The research that we’ve done around net lag and our customer experience overall is the most important thing when it comes to this kind of investment.”

“As an airline we are in the customer service industry and yes we are trying to get people from point to point but are very aware that people have choices and for us the payoff is definitely in guests preferring to fly with us because they’ve had an outstanding experience.”

Further, Tobias said there was a lot of work going on in other ways to take advantage of having a connected aircraft, both from a passenger experience and operational point of view. However, she declined to offer details.

“There are a number of other applications and we are at the beginning of our journey and we’ve got a lot of innovation work going on to determine exactly what the best use of the technology is for us so you are going to have to watch this space,” Tobias said.

“Certainly our ability for our cabin crew, who do an amazing job already, to get even better and to deliver more personalised service than they do now, will only become greater as we get this connectivity on board.”

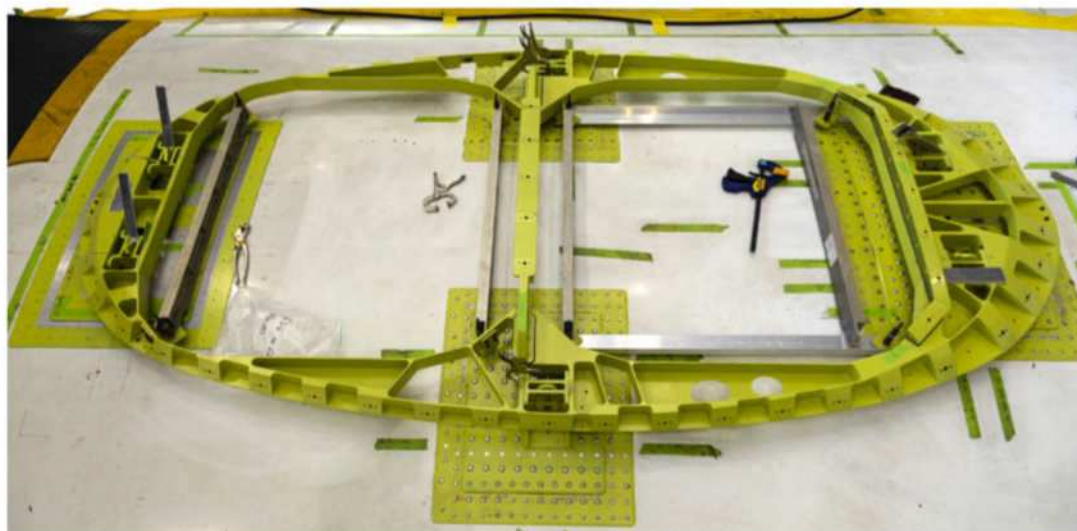
Qantas sets 2020, 2021 timetable for international Wi-Fi

While Virgin Australia is currently the only Australian airline to offer inflight internet Wi-Fi on international flights, Qantas did trial Wi-Fi for a short time on its Airbus A380 flights between Australia and the United States in 2012. However it was restricted to those in first and business class and the reported take-up was low.

In April 2017, Qantas relaunched an inflight internet Wi-Fi service in partnership with ViaSat and nbn Co for domestic flights. It uses Ka band satellites and is a free offering for all passengers.

Qantas chief executive Alan Joyce said the airline has held off on inflight internet Wi-Fi on its international flights because it did not want to have a “sub-standard product”.

“There is a very good reason why we don’t have Wi-Fi at the moment. Because there’s two different bands of Wi-Fi,” Joyce told reporters on



• VH-VPH's radome installation.
SETH JAWORSKI

the sidelines of the International Air Transport Association (IATA) annual general meeting in Sydney on June 4.

“There’s Ku and Ka and Ku is the slower band where you can’t have everybody on the aircraft and you certainly can’t have people streaming. The product internationally is terrible we think. And we’ve tried it with the Ku band.

“Bizarrely if you put the old product, the Ku, on you have to rip her off and put the new antennas, new equipment in to get ready for the new one. That’s the reason we don’t have it internationally.

“We want it to be as good as domestic and we’re a little bit dependent on the new technology.”

As such, Qantas was waiting for the launch of Ka band satellites from ViaSat before considering the rollout of Wi-Fi on its international flights.

“ViaSat have three satellites

• Engineers at work in the avionics bay. SETH JAWORSKI

they are going to launch,” Joyce explained.

“And our region is the last one to be covered by it but we think it will be covered in 2020, 2021.”

The airline said in late May 2018 it had expected to have two of its 12 A330-200s which are predominantly used for domestic services and half of its 75 737-800s fitted with Wi-Fi by the end of June 2018.

And across the Tasman, Air New Zealand commenced trials on its Boeing 777-300ER fleet in October 2017. According to the airline’s website, the 777-200ER fleet was next to have Wi-Fi hardware installed, followed by the remainder of its international fleet comprising the 787-9s and Airbus A320s.

The New Zealand flag carrier has chosen Inmarsat and its GX for Aviation product, which uses Global Xpress Ka band satellite network. •





PUTTING THE GR



GROWLER FUTURE

RAAF to equip
Growler for the future
with AARGM & NGJ

RR IN GROWLER

WRITER: MAX BLENKIN



With the RAAF nearing an initial operational capability (IOC) for its Boeing EA-18G Growler, it is not resting on its laurels. Already, near and longer-term future capabilities for the Growler are being studied.

Determined to stay in “lockstep” with the US Navy as it continues to develop the Growler’s electronic attack capabilities, the RAAF has already committed to two major capability enhancements for its EA-18G.

AARGM

Well before the Growler acquisition, the RAAF had long sought to equip its combat aircraft with an anti-radiation missile (ARM) capability to attack hostile radar systems.

In the 1960s, the RAAF looked at various ARMs to equip its new F-111 strike bombers, including the French Martel AS-37 and the US’s AGM-45 Shrike and Standard ARM.

US forces fired a great number of Shrikes in the Vietnam War with marginal effect, highlighting the shortcomings in this first-generation capability.

The first Shrike was followed by a succession of variants designed to deal with obvious problems, including differing radar bands and the tactical reality that any radar operator spotting an incoming missile promptly switched off. But Shrike was considered too slow, and the warhead too small for assured destruction of the targeted radar system.

Israel found this out the hard way during the 1973 Yom Kippur War. Its Shrikes could target Russian SA-2 and SA-3 missile radars, but had difficulty with the more advanced SA-6.

Both Shrike and Standard ARM were superseded by the AGM-88 HARM (High Speed Anti-Radiation Missile) which was developed in the 1970s and adopted into US service in 1985. Again Australia was interested, and the RAAF Aircraft Research and Development Unit (ARDU) in conjunction with the US Navy China Lake missile test facility conducted carriage and release trials with the F-111 in 1987-88 at a cost of \$1.6 million.

Four inert test missiles were launched from ARDU’s instrumented F-111C (A8-132) into the Southern Ocean under various test conditions, proving it could be done. But at that time there were other priorities, the primary one being the modernisation of the F-111’s obsolete analogue avionics through the Avionics Update

‘But to kill rather than just disrupt enemy emitters, Growler needs an ARM.’

Program (AUP) which ran to 1999.

Instead, an ARM capability would have to wait for the F-111’s replacement with the acquisition of 24 Boeing F/A-18F Super Hornets, delivered from 2009.

Growler is the electronic warfare variant of the Super Hornet, with systems designed to degrade, deceive and deny enemy use of the electromagnetic spectrum, including their radars and communications.

So alluring was the potential of this capability that in May 2013 it was announced the RAAF would instead buy 12 new-build EA-18G Growlers off the Boeing production line (instead of an earlier plan to modify 12 F/A-18Fs to Growler configuration), giving the Air Force a total of 36 Super Hornet/ Growler airframes.

The final Growler arrived in July 2017, and initial operating capability is expected to be declared shortly. They are operated by 6 Squadron based at RAAF Amberley, and the RAAF is currently the only Growler operator other than the US Navy.

But to kill rather than just disrupt enemy emitters, Growler needs an ARM. And well before the first Growler landed, the RAAF had been thinking about weapons, specifically an ARM capability. In 2012, the US Navy signed an agreement with Australia to provide a training capability for HARM and for its successor, the AGM-88E Advanced Anti-Radiation Guided Missile (AARGM).

Last year, the US Defense Security Cooperation Agency (DSCA) announced a proposed Foreign Military Sale (FMS) deal, comprising

up to 70 HARMs, 40 AARGMs, 16 captive air training missiles (CATMs) plus assorted control and guidance sections, support equipment and technical assistance. Estimated cost was US\$137.6m (A\$183m).

Prime contractors for the missiles and associated systems are Orbital ATK and Raytheon Missile Systems.

“The proposed sale will improve Australia’s capability in current and future coalition efforts. Australia will use this capability as a deterrent to regional threats and to strengthen its homeland defence,” the DSCA release stated.

“Australia will have no difficulty absorbing these additional missiles into its armed forces. The proposed sale of this equipment and support does not alter the basic military balance in the region.”

In most recent conflicts in which air power has played a significant role, ARMs have been the first to be employed. Despite being obsolete, in the 1982 Lebanon war, Israel used Shrike ARMs to devastating effect against fixed Syrian air defences in the Bekaa Valley.

In the 1990-91 Gulf War, the US and allies fired more than 2,000 HARM missiles against Iraqi air defences. HARM was also used in the Balkans War, though this conflict demonstrated the challenge in achieving complete suppression of enemy air defences.

One Serb SA-3 missile battery and radar survived the initial air attacks by remaining silent, then on March 27 1999 switched on for just 17 seconds and fired a salvo of missiles, one of which famously hit and shot down

● Carriage and release trials of the HARM on a RAAF F-111 in the late 1980s. DEFENCE





a USAF F-117 Nighthawk stealth fighter.

The biggest innovation of HARM over Shrike was its intelligent radar processor seeker designed to recognise the characteristic pulse repetition frequencies of threat radars in a manner similar to a radar warning receiver (RWR). HARM is also faster (Mach 2+) than a Shrike, with a longer operational range of 150km, close to four times that of Shrike.

AARGM is the next iteration of HARM, and was developed as a joint program of the US and Italy. Commencing in the 1990s, full rate production began in 2012. AARGM uses the same motor, airframe and wings as HARM, but incorporates a new guidance section and modified controls.

The missile is 4.17m long, has a

diameter of 25cm, and a wingspan of 1.12m. It weighs 361kg.

The seeker is an advanced multi-sensor system featuring an active millimetre wave (MMW) terminal seeker, advanced anti-radiation homing receiver, global positioning systems (GPS) plus inertial navigation system (INS). The active seeker is intended to counter radar shutdown.

AARGM can engage traditional and advanced enemy air defences plus other emitting targets should the need arise. In 2015, the US Navy successfully hit a ship, demonstrating a capability to strike moving targets.

The missile receives target information through an embedded Integrated Broadcast System Receiver. It even transfers real-time impact assessment reports back to the pilot or EWO (the Growler's backseater

electronic warfare officer).

Development is continuing, with Orbital ATK unveiling an extended range version in 2016. AARGM-ER features a larger rocket motor, body strakes/chines that provide extra lift, and redesigned tail fins and flight controls to effectively double the missile's range, and will also offer greater effectiveness against emerging and advanced threats.

The US Navy contracted the AARGM-ER's development in January 2018.

"AARGM-ER will incorporate hardware and software modifications to improve AGM-88E AARGM capabilities and meet the approved requirements," NAVAIR's AARGM program director Capt Al Mousseau told *Defence24* in an undated interview. "The development timeline supports an initial operational capability in FY2023."

The US is integrating AARGM onto its Super Hornets and Growlers, while Italy and Germany are integrating it onto their potent Tornado ECRs. It is also planned to integrate AARGM and AARGM-ER with the F-35.

Next Gen Jammer

To complement the hard-kill effects of the HARM and AARGM, Growler also requires a dedicated jamming pod for the non-kinetic part of its mission to

Top - test firing an AGM-88E AARGM from a US Navy Hornet. Above - the AARGM-ER features a larger rocket motor and redesigned missile body. ORBITAL ATK



counter current and future threats on the electro-magnetic spectrum (EMS).

The Growler currently carries the ALQ-99 jammer pods which come in mid-band and low-band configurations.

Despite being continually upgraded, the ALQ-99 was developed in the late 1960s and was first deployed on US EA-6B Prowler aircraft at the tail end of the Vietnam War.

To have remained in service so long, ALQ-99 must do a lot right. But the ALQ-99's technology is analogue-based in a digital age, and reported problems include poor reliability, regular failure of the built-in test facility, high drag resulting in reduced aircraft performance, and interference with the Growler's APG-79 AESA radar.

In Australian and US service, the ALQ-249 Next Generation Jammer (NGJ) will replace the ALQ-99, a limited number of which the RAAF acquired through the Foreign Military Sales (FMS) deal in which Australia acquired its 12 Growlers.

The ALQ-99 is not a single unit which does everything. Depending on the mission, a Growler could carry up to five of the 450kg 4.5m pods on wing and centreline hardpoints, but a typical Growler loadout is two configured for the mid-band of the frequency spectrum, and one for the low-band.

The ALQ-99 stands out for its little nose propeller which is a ram air turbine to generate power, rather than

RAAF pilot FLTLT Todd "Woody" Woodford launches an AGM-88 from a US Navy Growler while on exchange with VAQ-135 in 2016. DEFENCE

drawing power from the aircraft itself. But it was also fitted in a centreline 'canoe' fairing to US Air Force EF-111 Raven jammers in the 1990s.

The baseline Growler came with the familiar ALQ-99 pods plus the onboard ALQ-218 electronic surveillance and electronic attack suite.

But what Growler brings to the fight over the Prowler it replaced in the US Navy inventory is a far superior offensive and defensive capability, a higher performance airframe, plus the benefits of improved maintainability from a newer and younger airframe which is common to the F/A-18F Super Hornet.

From the outset of the Growler acquisition, it was envisaged that Australia would acquire a better jammer as the US Navy replaced its ALQ-99 pods. As the only Growler operator outside the US and at this stage the only other customer for NGJ, it not only seemed fair to contribute to development costs, but also gave Australia input to ensure it is capable of dealing with the kind of threats likely to be encountered in this region.

But development of the new jammer to succeed the ALQ-99 has proven to be challenging, with the US not expecting to see IOC of the NGJ mid-band (NGJ-MB) capability until early next decade, and the follow-on low band (-LB) capability later still.

Australia is definitely interested and is willing to share in the development costs, which are substantial. For a fifth-generation

air force, Growler is a very important capability with nothing remotely comparable in service anywhere in the region.

In November 2017, Chief of Air Force Air Marshal Leo Davies announced the signing of an MoU between Australia and the US for the development of the NGJ, specifically, Australia and the US Navy will jointly develop the ALQ-249(V)1 NGJ-MB capability.

"This is a very important milestone for both nations, one that took four years of communication and collaboration to successfully achieve," AIRMSHL Davies said.

The MoU provides a framework for communication, coordination and cooperation between the US Navy and the RAAF during the engineering and manufacturing development phase. This followed an earlier announcement by Defence Minister Marise Payne at the Avalon Airshow in February 2017 that the government would invest A\$250 million in this development.

"As this is a rapidly evolving area, we will work in partnership with the US Navy to develop the next generation jamming capability, which will ensure that our aircraft remain at the technological forefront throughout their service life," she said.

NGJ is a key element of the ADF's AIR 5439 Phase 6 enhancing Growler Airborne Electronic Attack Capability (AEAC) project. The wide-ranging program has a nominal budget of \$5-6 billion over a two-decade

'Development of the new jammer has proven to be challenging.'

timeframe (2016-2035), and will ensure upgrades to the Australian Growler fleet mirror those of the US Navy.

NGJ has been a long time coming and much of its intended capability remains closely held. In the basic jamming role, it can produce sufficient power in appropriate frequencies to swamp hostile radars.

But more than that, it has been reported that NGJ will also have a cyber-attack capability, using the Growler's and perhaps the F-35's AESA radar to insert data into remote systems. That could have the effect of spoofing a hostile air defence system to conceal inbound aircraft, or show them as friendly, or at a different location.

On F-35, while it's still early days, it has been envisaged that NGJ could integrate directly with that aircraft's onboard systems and not require a specialised aircraft configured for EW.

In 2009 the US Navy invited proposals for NGJ-MB from four companies – Raytheon, BAE Systems, Northrop Grumman and ITT Exelis (since acquired by Harris) – and in 2013 Raytheon was declared the winner.

BAE appealed the decision which prompted a reconsideration but this was dismissed, and Raytheon was reaffirmed as the winner in January 2014.

That contest was for the NGJ-MB solution, initially termed Increment 1. The mid-band is the region of the electro-magnetic spectrum where most current threats reside, and this capability is now designated ALQ-249(V)1.

In 2016, Raytheon was awarded a \$1 billion contract to deliver 15 pods for engineering and manufacturing development, and 14 aeromechanical pods for airworthiness certification. In January 2017 Boeing was awarded a contract to integrate NGJ onto Growler, and the (V)1 version completed critical design review in April 2017. IOC is currently set for 2021.

The low-band capability of the older ALQ-99 was more recently upgraded, and this version is still considered to be tactically relevant. That said, in April this year Lockheed Martin and Cobham were awarded a contract to develop the Increment 2 NGJ low-band (NGJ-LB) system, with IOC scheduled for 2022.

Lockheed Martin said NGJ-LB would provide significantly greater electronic attack capabilities in the

lower frequencies against modern threats. Those modern threats could include HF radar systems able to detect and track low observable aircraft such as the F-35 and the B-2. Increment 3 will be a high-band capability not currently provided by ALQ-99, but is yet to be funded.

Raytheon says NGJ provides significantly enhanced electronic attack capability to the warfighter. "In general, the threats – typically radars – are becoming more adaptable and agile; meaning, if you try and jam them one way, they can change their way of operation to avoid being jammed," a company statement reads.

"NGJ provides additional capability and flexibility through both hardware and software implementations that address these modern threats. NGJ is also expandable to handle threats as they evolve in the future. This flexibility and expandability does not exist in current systems."

Raytheon says its mid-band NGJ was built with a combination of high-powered, agile beam-jamming

'It has been reported that NGJ will also have a cyber-attack capability.'

techniques and cutting-edge solid-state electronics.

"Raytheon's NGJ-MB effort will provide the most reliable, dependable and affordable system to deny, degrade and disrupt threats while protecting US and coalition forces," the company promises.

"NGJ will enable aviators to complete their mission with greater effectiveness and enhanced personal safety."

The well-regarded website defenseindustrydaily.com said the broader aim of NGJ was to develop a more cost-effective airborne electronic attack system with better performance against advanced threats.

That will be achieved through expanded broadband capability for greater threat coverage against a wider variety of radio frequency emitters, faster collect-analyse-jam loops, more flexibility in terms of jamming profiles which could be changed in flight, better precision within jamming assignments, and more interoperability. 📍

📍 Flight testing a NGJ-MB under a Gulfstream testbed aircraft.
RAYTHEON





RANGER

Flying the Bell 505 Jet Ranger X

WRITER: MICK CULLEN



**'The visibility
is amazing.
There is perspex
everywhere.'**



I didn't need to be asked twice when the opportunity to jump in on a ferry flight of Bell's brand-new 505 Jetranger X came up in late May.

The new five-seat short light single fills the void in the Bell (note, just 'Bell', the company dropped 'Helicopter' from its name in February) product line left when production of the ubiquitous Bell 206B JetRanger, which dates back to 1962, ceased in 2010. Its successor features an all new five-seat cabin, Garmin's impressive G1000H avionics suite and a 504shp Arrius 2R turbine – this is not your father's JetRanger!

I first had the chance to inspect the 505 at the Rotortech expo on the Sunshine Coast, where it was hard to escape the thought that it looks, well, different. I think it's the combination of the shorter skids and downturned nose that somehow messes with what you expect a helicopter to look like.

But, in my experience having spent some time with the machine, people warm significantly to it, and I think the challenge for Bell is to get the machines out for people to see and touch.

The 505 that I had the opportunity to fly in was VH-HRH, one of four 505s currently in Australia. Two are with Nautilus Aviation in north Queensland, one is in Western Australia and VH-HRH is a privately-owned machine based in Sydney.

• The Nautilus Aviation Bell 505 on display at Rotortech features pop-out floats. PAUL SADLER

Another two are expected on the Australian register soon for 12 Apostle Helicopters in Victoria.

VH-HRH was completed in December 2017 and it had just 26 hours on the airframe when Bell's Australasian business development director Daniel McQuestin had repositioned it to the Gold Coast Airport from the Sanctuary Cove Boat Show, for our flight south to Sydney.

New helicopter smell? Oh yeah!

From the inside, out

Apart from the new helicopter smell, my second immediate reaction to the cabin was, 'thank goodness they got rid of the broom closet'. The biggest wish of any tour operator using B206s is to improve cabin room and visibility by removing the central control runs going through to the ceiling. Thankfully the 505's cabin is a completely open space with its two+three seating configuration.

Indeed the visibility is amazing. There is perspex everywhere. This is probably the feature that people will walk away remembering. Pilots and operators will spend a lot of attention going over performance figures and costs. But for the average passenger visibility is what they will notice the most. The windows come down to only a few inches off the cabin floor all the way around, while the rear seats are lifted up slightly above the seat height

of the front seats, allowing those in the back a better view forward.

The seats themselves? Well they are helicopter seats, so nothing to get too excited about. The Nautilus Aviation 505 at Rotortech had a more basic seat option, while our Sydney-based machine had an upgraded option with thicker padding in the rear seats and two-tone leather finish.

The Bell website has a page where you can demo the wide range of seat colours available – black, black, tan and grey. No cherry red! But they certainly seem comfortable enough and I've got nothing negative to say about them from jumping out after two two-hour hops.

The more utilitarian version of the seats can fold up to provide more cabin floor space. They also can be detached from the rear wall and will fit in the baggage compartment or left on the ground for a load lift if the weight saving is needed.

Busy tour operations will need some vigilance to remind passengers not to put their bags and gear under the seats. It is a tempting space to put something out of the road but is needed clear for the seats to stroke down correctly under a heavy landing.

The forward seats are fitted on rails to move fore and aft, but must be in the full forward position for flight, with the pedals then adjustable for leg length.



There is plenty of head room. From my time in the Army I remember a number of taller pilots scraping the ceiling of a Kiowa (the military B206) once they had their helmets on. No issues here. The only things mounted overhead are the fuel shutoff, rotor brake, a nav light, hooks for headsets and the airconditioning vents.

Surprisingly, the cabling for the fuel shutoff and rotor brake and electrical wiring is exposed in its roof slots. For passengers sitting in the rear seats this is probably masked slightly by the aircon vents blocking their view of it, but it does detract from the feel of the aircraft finish.

The bolt heads on the roof holding the upper hydraulics cowling on are plainly visible and there is no cabin carpet or noise insulation material to finish over the bare cabin frame roof as a standard Bell fit as yet.

The cabin floor is completely flat. The one we flew had a locally manufactured carpet inlay added after purchase. The more utility version seen at Rotortech had a bare hard deck floor with a very military look and feel to it. The only fittings to break up the flat deck of the cabin are the seat rails for the front seats, dust/FOD boots of the collective and cyclics, a flight manual/map storage holder, the FRAHM vibration box between the

seats and a small fire extinguisher.

The main cabin doors are monsters compared to the older B206 design, with the one door for access to both the front and back seats. But from the front seat you don't have to reach right back to be able to operate the internal handle, instead there are two internal latches to open the door. For the front seat you reach back level with the rear of your seat and the passengers have another one further rear again that is easy for them to reach.

The doors need a pretty firm pull or a bit of a swing to get up the inertia to engage the pins. The top locking pin at the rear of the door has a white visual mark to indicate if the latches are fully in. Some neck twisting from the front seats is required to check that latch as it is a long way back. The amount of visibility out the door's huge window is fantastic with it coming down to only a few inches off the ground.

The door mounts and gas strut look fairly sturdy but the doors have so much surface area that I would be concerned in stronger winds or if another machine was landing anywhere nearby.

I should note I have a few concerns about how I would go in a water ditching situation from the front seat in the 505. These mainly centre around the size of the door and the

'Thankfully the 505's cabin is a completely open space.'

forward seat position.

There is no door jettison function to pop the doors prior to entry or during the initial escape, and the size of the door could make it difficult to force open against outside water pressure pushing against it. The door opening latch is not in the position it is in many aircraft where you can slide your hand almost directly sideways and find it – you do have to reach backwards and down to actuate.

I would want to sit there and practise to build up some muscle memory. Sliding your seat rearwards to exit would also be an important part of practise drilling to provide a bigger space to pull yourself through. Sliding the seat back would also help with locating the door latch.

(A pop-out float option is an available fit and is certified for use.)

Meanwhile, the rear of the cabin has a quarter door or clamshell door on the left side only, which can be swung out and rearwards to provide full access right to the back wall of the cabin floor for bulky items.

Behind the main cabin wall is a 18cu ft (0.5m³) baggage bay, accessed by a 56cm (w) by 42cm (h) door, just big enough to sneak in a large hardshell suitcase.

It affords a pretty big continuous volume, which is important given the

Great visibility is a highlight of the 505. BELL



warning about using space under the rear cabin seats with passengers.

But there is no access to the baggage area from inside the main cabin. The rear cabin wall is a structural item which the passenger seats hang off and it looks like the designers have left it intact rather than have that internal/inflight access to the baggage area.

Finally, you can dial your baggage weight up on the Garmin 1000H and it will calculate centre of gravity (CoG) – more on which later.

Drivetrain

While the 505 sports an all-new cabin, its drivetrain – main rotor blades, transmission, tail rotor drive shaft, tail rotor gearbox and tail rotor assembly – is borrowed from the 206L4 LongRanger. (Where we put the aircraft to bed in the hangar in Sydney it sits right alongside a LongRanger which makes the comparison very easy. Visually the components look completely interchangeable and familiar.)

The lighter weight of the 505 slung under the LongRanger's blades provides a reduced disc loading. In terms of flight characteristics rotor inertia and tail rotor authority is similar to current model LongRangers.

The completely exposed tail rotor gearbox looks out of place with the rest of the helicopter, even if passengers are unlikely to notice and it does make inspection easy. And Bell does have an aerodynamic tail cone kit in development.

The 505's vertical fin looks identical to the current 206L4's, while the underslung-mounted horizontal stabiliser was arrived at after a number of positions were trialled during testing. It does look like an afterthought but no doubt it is easy to fit and remove and there are no spars protruding through the tail boom.

The horizontal stabiliser's reverse aerofoil design, like in almost all helicopters, produces a downward force on the tail in forward flight resulting in a more level attitude and increased forward CoG range. It has a slotted leading edge which is a new feature to the Jet Ranger design which acts to delay airflow separation at higher angles of attack that the horizontal stabiliser might experience in a climb.

The other notable tail section hardware feature is the vibration dampening counterweights. These are square plate weights mounted to the end of the tail boom with a stiff



VH-HRH at Armidale. MICK CULLEN

wire coil bracket that work to dampen airframe vibration. This would also be the attachment location for any ballast weights and being so far back on the tail allows for very small weights to be used to adjust center of gravity.

Skids

The skids and crosstubes are pretty standard construction. The skids are comparatively short while the toes cant in a little at the front as they angle up and are topped by a flat step to assist with entering the cabin.

The Nautilus-owned Bell 505 on display at Rotortech was fitted with popout floats and the rear skid extension, which gives the skids more 'normal' looking proportions. A high skids option is expected at the end of 2018, which will provide another 15cm of lift.

From the pilot's seat the toe ends are behind your seating position – in line with the rear of the front seats. To see them in the hover requires a small head tilt outboard and a glance slightly rear.

Startup

Getting started and going is very simple, thanks to the Garmin 1000H multi function displays and the Safran Arrius 2R's dual FADEC (full authority digital engine control) system.

Once power is on the G1000H takes about 10 seconds to complete its internal boot and system test. Then the next step is to enter passenger and cargo weights into the weight and balance page (it pulls in fuel quantity from the fuel sensor). This page is very similar to a number of mobile or tablet apps which allow you to wargame different loading configurations vs CoG and AWW limits.

After a control check and clearing the area starting the engine is just a matter of selecting the engine switch to on. From here the FADEC takes over with no pilot input needed – fuel introduction, throttling, hot start shutdown are all handled by the system. The engine start takes approx 40 seconds to idle. If it is a consecutive start after a short stop then the FADEC will motor the engine if needed to cool before igniting.

(It will be interesting to see if there are insurance premium reductions over older machines now that pilot experience and turbine hours no longer have a bearing on hot start protection.)

There is a small amount of ground bounce evident that is cleared by pulling in a little collective or repositioning the cyclic.

With hydraulic control checks out of the way you then select 'fly' with the thumb switch on the collective head. Five seconds later you are at flight RPM.

I was able to learn more about the 505's FADEC setup after a subsequent chat with Alan Whitten, a field rep for Safran Helicopter Engines Australia. He explained that the dual channels are continuously online, and that at each consecutive start the primary active FADEC alternates. If a start cycle fails to complete for any reason and is aborted by the system then it will automatically go for one more start attempt before calling it quits.

In the event of the active FADEC channel suffering a high or low side failure the changeover to the standby channel is almost instantaneous and no RPM change would be seen, Alan indicated. Surge and flameout protection is handled automatically by the system but it won't limit fuel

on the high side to protect the Arrius engine – if you keep demanding power above the published limits then it will keep trying to match should you decide that's the most important thing at the time.

I loved the checklist actions for an inflight restart: bleed air (heater) – off; throttle switch – fly; engine switch – off; then back on again. Simple.

Engine shutdown is on a 30 second idle cool down timer and 'OK for shutdown' is displayed on the MFDs to let you know when you are good to select the engine to 'off'.

Garmin glass

Transitioning to the G1000H from steam-driven cockpits will be the main gap training required for many Australian pilots given our aged light helicopter fleet. The aircraft is quite straightforward but the multifunction displays are a big jump from the B206 (even if the G1000 itself has been used in the fixed-wing world for over a decade!).

The right hand display was set to show an artificial horizon above a horizontal speed indicator with airspeed and altitude ticker tapes to the side. This was overlaid on top of a 3D terrain representation from a map database which gives a 'synthetic vision' (an optional upgrade) look ahead of the aircraft. Looking between the terrain in front outside the aircraft and at the graphical representation it matches it very closely.

The left hand display was set to the engine page most of the time providing a large digital representation of a power gauge and rotor RPM. Power is displayed on the digital arc (power situation indicator) as per cent with 100 per cent being max continuous power and then a yellow arc showing five minute takeoff power range. As soon as you pull into the yellow a timer appears showing the elapsed time in the arc.

Torque, MGT (measured gas temperature) and NG figures are shown with a green box around the current limiting parameter. The power display smoothly blends between whatever is the engine limiting number at the time, making power and engine management incredibly easy.

At other times in the flight we used the map mode to skirt around Evans Head and Williamtown airspaces, pull up airfield frequency information, look at weight and balance scenarios and used the terrain database to visualise higher terrain ahead. Future versions



will have external data capability to pull in weather.

It almost feels like cheating after coming from older machines when the MFDs continuously display your fuel burn, expected landing fuel in lb, expected landing weight and the fuel margin. But I'm not complaining!

Finally, a radar altimeter is another optional extra that is available but not fitted to this 505.

Flight controls and handling

The collective head is a very simple affair. It has the two position throttle switch – idle/fly – and that is it. The cork looking handgrip where the throttle normally would be located is purely a handgrip and doesn't twist.

The cyclic heads on this machine just had a ICS/radio trigger and on the right hand side a TCAS warning cancel button. Hook or float-fitted machines would have their appropriate switches modded on.

The controls are... well... firm. You can release your grip on them and they don't feel like they are going to move away (yes – friction was off). They are noticeably firmer than anything I've flown before. It is not that they are hard to move but you do have to push it to make an input rather than using your fingertips (cyclic).

In cruise I would sometimes get into a wallowing motion in roll where I was looking for that middle position but just overshooting each time. Similarly with pedals vs power changes there is not a lot of control feedback through the feet.

There were times I was still overshooting for balance or not putting enough pedal in even approaching Sydney at the end of the day. I'm sure you would get used to it and it makes for a stable platform for

• The G1000H is a big advance on the panel found in the B206.
MCIK CULLEN

the most part. I just wouldn't mind a little bit less resistance.

As a counterpoint, a pilot that jumped in at our transit point of Armidale apparently had no problems keeping it in balance, so maybe that just talks to my skills! But a Nautilus pilot confirmed the stiff control feeling in its 505s and in the machines used at the Bell factory course.

There is no cyclic trim motor, the firmness of the controls masks any pressure that you would need to trim out is my guess. Dan indicated an autopilot is a future planned option.

I didn't fly in the hover or make any of the approaches so I can't talk to those regimes but in flight it handles pretty standardly as far as rates of roll, pitch and yaw go.

Dan demonstrated a practice forced landing prior to arriving at the Armidale circuit. Again it feels pretty standard for a B206 with auto speeds in the flight manual of 60-70kt. Entering auto is done by selecting the throttle switch on the collective to idle. There is a fair displacement of right pedal needed in the entry, and I didn't see what the rate of descent stabilised at. As it is a B206L4 drivetrain with a lighter helicopter underneath the autorotation characteristics should be quite docile.

In our case switching the throttle back to 'fly' joins the needles in about two seconds and Dan climbed away.

The stop at Armidale provided a chance to see the 505's power margin at work, given Armidale is Australia's highest city airport at 3,556ft elevation. Temperature on the ground was 13 degrees and the locals had much thicker jackets on than the one I brought with me!

With full fuel and four POB the aircraft was approaching maximum all

'The controls are... well... firm.'

up weight. Dan pulled into a vertical climb at max continuous power and was holding 1,000ft/min on the VSI before transitioning away several hundred feet above the field.

Departing for Sydney again with full fuel but just the two of us onboard we again easily climbed vertical with a left pedal turn at 1,000ft/min climb using less than max continuous power before transitioning to forward flight on track.

VNE, cruise figures, vibration and performance

A frequent point of debate in online forums is the 505's published VNE and whether it is an aspirational marketing figure, how bad vibration is at speed, what people will normally cruise at and the fuel burn at speed.

It is certainly very easy to get close to VNE with full fuel and two people onboard without pulling above MCP. The G1000 calculates VNE on the fly depending on outside pressure and temperature. For us it ranged between 134-128KIAS on the flight. This is displayed on the IAS ticker tape as a red line and the airspeed text turns yellow as you approach it.

This aircraft was fitted with an (optional) FRAHM vibration dampener between the front seats. This is a sealed black box with spring loaded weights that acts to dampen – as the name suggests – in-flight vibrations. It can be removed for a 12kg weight saving.

As you increase speed above 115kt towards 125kt+ there is definitely an increase in vibration. But it is no way a limiting factor that would make me want to back off for that reason. You can still hold and read a map and

'Most people will aim around the long-range cruise of 113kt IAS.'

write without any issues. Holding a pen by the tip horizontally against the cowling you can see it bounce at the other end.

If it wasn't VNE-limited at that point you would comfortably be able to fly faster in terms of vibration. It is still slippery at that point too with even a small rate of descent sliding the speed up towards the limit. I forgot to check the amount of forward cyclic travel remaining, but it didn't grab me as an issue.

In terms of hard figures – 20mins out of the Gold Coast airport on track to Armidale at 2,000ft (QNH 1024, 15 deg OAT and 1,422kg) we had 115kt IAS at 210 lb/hr fuel flow. Dropping that to 113IAS gave us 200lb/hr.

Dan suggested that most people will aim around the long-range cruise of 113kt IAS and 200lb/hr for flightplanning.

The AH showed a pretty steady negative 2.5-3 degree nose pitch for all the cruise flight we did on the day. The cabin feels flat and level in cruise even at the high end of the speed range (front seats have a slight rear tilt while back seats are mounted vertical to the cabin rear wall).

Our ETA into Sydney was starting to approach last light and we had a significant fuel margin so for the last 20 mins of the flight we comfortably sat at 125kt IAS along the coast below 1,500ft with a 250lb/hr fuel flow at just below max continuous power. Vibration was nothing uncomfortable and I really only mention it to address concerns that people had.

Using the above figures you can do some quick calcs to come up with a 2 hour 23 minute endurance with 30 minute reserves and range of

270nm. Dan expects a future aux tank for the cargo compartment will give around another 30 minutes of fuel.

Using VH-HRH's flyaway weight with optional extras (AC, leather seats, avionics upgrade, Frahm vibration kit, rotor brake, second VHF radio and aftermarket carpet floor) and at full fuel of 262kg there is 733lb or 333kg of internal payload. Lifting with five people at 90kg each would see you dropping fuel down to 60 minutes cruise + 30 minutes reserve.

Sling ops

Any sling ops are going to be with the left door off as there is no bubble window fit. I am not sling-endorsed but I can't see any issues with looking out and down. There is no chin bubble for those used to looking through that for a mirror for hook-up. The mirror add-on kit was not fitted to our machine but mounts to the side of the frame abeam the tail rotor pedals looking rear and under.

The hook is rated for 907kg. When loading externally the MAUW increases by another 360kg. Seats and doors can be quickly stripped out to reduce weight onsite. And to achieve the max-rated load of the hook on a one-off lift you'll need to strip as much as you can and be on a minimal fuel load. The 505 isn't alone in that regard.

Taking HRH's figures above completely as is, full fuel, an 80kg pilot and discounting any weight for cargo hook fittings (333kg payload – 80kg pilot + 360kg external MAUW increase) give a 613kg lift. Then start stripping equipment and fuel out for extra realism.

The outside of ground effect hover ceiling at max external gross weight

Sticker price for a new Bell 505 is around US\$1.25 million. BELL





• Bell 505 and Robinson R44 at Rotortech. PAUL SADLER

of 2,030kg is approx 3,500ft at ISA conditions at takeoff power (5 mins). The 1,000ft/min vertical climb out of Armidale at close to max internal gross weight (1,670kg) with max continuous power is at least promising in terms of the extra power margin still left.

Dan indicated that a NZ operator conducting fertiliser spreading operations has set its aircraft up in a utility config and is regularly lifting with 725-775kg external loads and have gone up to 850kg on the hook.

Cost

The upfront cost for a Bell 505 including normal options for Australian customers and conditions and which includes one week of Bell factory pilot training will see you looking around the US\$1.5 million mark.

Bell sales material includes an operating cost table showing a US\$441.14 per flight hour running cost. Conklin and de Decker's Aircraft Cost Evaluator puts it at US\$472 per hour, compared to US\$588 for a Bell 206L4, US\$628 for the Airbus H130, US\$494 for Airbus H120 and US\$377 for the Robinson R66.

Bell offers OEM Standard and Premier maintenance care plans which push the 1,000hrs/3yrs warranty out to 2,000hrs/3yrs and

include such things as priority access to parts. On the Premier plan one of the advantages is that Bell will send you the parts for a scheduled servicing in advance based on your flying rate to minimise downtime.

Major component times are listed in product specs for the Bell 505 and available off the website. Component times are still part of a Lead-the-Fleet extension program and as flight hours are accrued on the Bell training aircraft (likely to be the highest hours) and fleetwide, then additional life may be added to components.

Routine scheduled maintenance includes a lubrication servicing every 50 hours and inspections at every 100 hours.

Wrap up

What a great way to spend the day by flying down the east coast in a brand new helicopter and learning more about it on the way.

The 505 is a very nice update to the Jet Ranger family with some major standouts. The huge amount of perspex all the way round gives a sensational unobstructed view paired with the open single area cabin. The fifth seat helps a lot with tours and charters in keeping couples together.

The dual-channel FADEC is turbine engines on easy mode. It is

going to be great for private pilot owners and low-hour tour pilots. Hopefully there are lower insurance premiums or minimums that flow from this. Having the one power gauge that incorporates multiple limits frees up a lot of attention too.

The additional 360kg maximum external gross weight increase means that when you are operating at the lower internal only gross weight there is going to be an excess power margin available at Australian elevations.

The new external cabin shape and short skid combo will still be a talking point for a while. How much it matters to prospective passengers or if they will care is debatable. For industry types I think once more are flying in country and people get to see them more often that the cabin shape will become more familiar and normalised.

I'm not at this stage a fan of the stiff control feel but that might be something you get used to with extra time in the seat.

I'd jump at the chance to get another flight and it's great to see more technology find its way into smaller helicopters in an age of smartphones, self-landing rockets and electric cars.

If you see a 505 landed somewhere near you, you really do want to make the effort to go take a look inside. 🚁

'It's great to see more technology find its way into smaller helicopters.'

IN THE BLINK



Pel-Air revisited Part 4

WRITER: BEN COOK

Continuing our review of the Pel-Air ditching, this issue we look into the complex influence of ego and power in determining the outcomes for those affected by the accident. Karen, the flight nurse on board that fateful night, discovered how various egos associated with the investigation process influenced and clouded proceedings, and made her life a living hell.

First, Karen provides her view of life after the accident, then we offer insights into the roles of governance bodies during the investigation. We also suggest red flags so you can recognise and respond to your own ego-driven decision-making for better performance.

The fragility of life: Karen's world

There is a light breeze surrounding me as I soar gracefully over beautiful green fields. On my right I can see the coastline and a brilliant blue ocean, the sea looks calm and soft and I can hear the gentle tones of the sea as the waves roll onto the sand.

I'm in complete control. I have a sense of happiness, exhilaration, and calm, and am able to easily manoeuvre myself around the horizon. It's as if I'm not in an aircraft – I'm flying, soaring like an eagle with a free-spirited energy I've not experienced for a long, long time. It's like returning to a childhood holiday: warm, calm and relaxed. If only I could stay in this happy place, completely at peace,

satisfied, carefree...

Now where am I? What is all this pain? I am closing my eyes in a desperate attempt to go back to that happy place. I cannot get back there; the pain is increasing, my body aches, yet I'm slowly regaining conscious thought.

It is dark, I am cold, scared and confused. It was a beautiful dream but now I'm back to reality, the constant pain is still there, it never (expletive) goes away and my life is now consumed by it. The same (expletive) process, fighting the system, constant anger, grief, frustration and yet another sleepless night.

Lying awake, I'm watching the clock count down to take me from

OF AN EYELID



now (it is 2am) to daylight, and I'm contemplating whether I can do this anymore. Can I keep up this fight? Is there any way I can go back to my dream and remove the pain? There are options but the consequences for my son and daughters would be lifelong. I have a sense of guilt for even thinking such thoughts. For goodness' sake, I've spent a career caring for people – it is my fundamental purpose and destiny in life.

My name is Karen, and I'm the flight nurse who survived the Pel-Air ditching at Norfolk Island.

I will never again be able to experience the joys associated with the freedom of flight.

My life changed in the blink of an

eyelid. Literally overnight, almost nine years ago, life as I knew it changed forever. I no longer have the normal sense of purpose that comes with an exciting aviation job: the deep satisfaction of performing meaningful work that you care about, the camaraderie, friendships, the excitement of not knowing what you will be doing day-to-day, or which destination is next for a medical evacuation. I miss the laughter, the sense of purpose, and the workplace banter that is unique to air ambulance and aviation operations. For me, each day is now a struggle, a constant grey landscape where I no longer gain the deep satisfaction that I once had with life.

As a single mum I worked harder

than many, raising my three children while also completing university studies to shape a better life for my kids. Overnight, my income went from just over six figures to \$37k. The struggles were huge: financial stress, three kids to take care of, seven operations, battling to make sense of the regulatory process, the accident investigation, and fighting through the courts. And on top of that, having to deal with insurance companies that took every step to make life as difficult as possible for the survivors.

Just like air crash investigators, it is ironic that I now use the words 'if only I had known in hindsight'! Had I known there were inadequate safety regulations for air ambulance I would

'My life changed in the blink of an eyelid.'

Being a flight nurse should be a rewarding career. AA ARCHIVE

not have flown. I had no idea we were not protected by robust legislation, that it was acceptable for smaller operators to venture into complex, back of the clock, short-notice medical retrieval operations with limited oversight and company standards. Those same companies paid the aircrew small wages in comparison to larger organisations, which inevitably meant the levels of experience were substantially lower and the turnover of crew high, resulting in more challenges when undertaking these more complex tasks.

And after all these years the facts get blurred and I get tired.

My journey has been horrific: trying to penetrate what feel like walls of deceit, erected by several people with very large egos. Again, it is ironic that air crash investigators often mention a need to understand your own bias, or that of a collective team, to make sure the investigation process is not adversely influenced. In my case, I feel egos have heavily influenced many processes to make life difficult; at times, unbearable.

I will never fly again, not because I'm scared of dying in a plane crash but because I'm scared that if I survived I could not bear to live through this hell again. The treatment has been nothing short of cruel and disgraceful, and sometimes I do not know how I have survived for this long.

But one thing I can tell you, I am the epitome of a strong, independent woman. And I will not give up this fight, not until the energy and the exorbitant amount of taxpayer resources (Senate enquiries, independent reviews, a second investigation, court cases, etc.) lead to enhancements to the Australian aviation system to prevent you and your loved ones from ever experiencing the same.

Egos and failed governance

Ego can be described as a person's sense of self-esteem. Everyone has an ego, it is a natural facet of our humanity. The way we invest our egos has major implications on the way we act, what we believe, and how we respond to adversity such as criticism, insults and failure.

It is also worth noting that the ego largely stems from one's personal experiences. For many people it is challenging to view issues or results rationally if their beliefs are clouded too deeply in their ego. One must always be open-minded to change and criticism. For some, this proves very difficult.



File image of the ill-fated Westwind at Sydney Airport. AA ARCHIVE

Looking back on the Pel-Air Norfolk Island ditching as the then human factors manager for the Civil Aviation Safety Authority (CASA), there are many memories that make it feel like it all happened yesterday.

At the time, at the very top of CASA there were very firm and clearly held views on the cause of the accident right from the start, even before the Australian Transport Safety Bureau (ATSB) had commenced its investigation.

One strongly held view was that the investigation process should focus primarily on the pilot, and why would anyone be wasting their time with other systemic findings, as in the end it is only the pilot who can decide whether he or she is fatigued and unable to conduct a flight.

That outlook contradicted the fatigue science and best practice available at the time. Fatigue is insidious, hence the crew themselves can lose the ability to self-assess. This is why it is so critical to have robust organisational and supervisory support mechanisms to further monitor pilot performance, particularly when conducting ad hoc, aeromedical evacuation flights.

And another view dismissed the importance of software to support crew flight planning.

Both those outlooks came from personal experience rather than an informed basis. They do not demonstrate an open mind seeking to understand how organisational culture

effected this serious accident.

Within CASA there was also a culture of fear amongst middle and senior managers. This can have detrimental effects within any organisation, particularly when the communication flow is in one direction (down) and messages are changed when moving back up to ensure they meet the expectations of more senior personnel.

And making matters worse, an audit of CASA's processes just prior to the accident by the International Civil Aviation Organization (ICAO) and/or the Federal Aviation Authority (FAA) was critical of several internal CASA processes, including the quality of training of CASA staff.

In my mind this was potentially feeding the need to deflect any further adverse findings away from CASA back to the operator, and in this case, the aircraft captain. There was enough scrutiny of CASA's own processes without the addition of an ATSB accident investigation report that had clear evidence within the CASA Pel-Air Special Audit of systemic failures with CASA oversight.

Yet, for the first investigation this information was not included or considered relevant by the then Commissioner of the ATSB.

The investigatory policy was robust, yet senior managers unwittingly contributed to a flawed investigatory process right from the start, and confusion reigned. Egos clearly led to failed governance, ultimately



leading to the following findings by the Transport Safety Board of Canada after completing an independent review of the ATSB:

- » An early misunderstanding of the responsibilities of CASA and the ATSB in the investigation was never resolved...
- » ...this misunderstanding persisted throughout the investigation, and as a result, only two ATSB interviews were conducted with managers and pilots of the aircraft operator...
- » ...errors and flawed analysis stemming from the poor application of existing processes were not mitigated...

Recognising ego and power

For Karen, the outcome of failed Australian aviation governance is a shattered life. Other more recent examples of the impact of ego and power have been seen through the ongoing banking sector royal commission, where the lives of many Australians have also been destroyed.

So, what can you and I do to protect ourselves?

Leveraging from the work of a long-time mentor of mine, Dr Tony Kern, the author of a number of aviation books, including *Blue Threat: Why to Err is Inhuman* and *Going Pro: The Deliberate Practice of Professionalism*, ego and power is identified as a known violation producing condition that requires careful consideration and

‘Keep in mind that as individual human beings we are limited.’

management in the aviation industry.

If allowed to grow, it can become a belief that the violator has the skill and stature to do the job better outside the boundaries. It is particularly dangerous because it lives inside most high achievers.

Somewhere in our lives, most of us will admit that we have moments where we think we are smarter than the people who wrote the rules. This may or may not be true, but it is a dangerously irrelevant question when it comes to compliance.

Here are a few red flags from Tony’s work to warn us when our egos start to get in the way:

- » You find yourself being defensive about an idea or plan and taking it personally when someone disagrees with your ideas. This often leads to noncompliance to prove yourself and your idea can lead to mission accomplishment.
- » You routinely make a point of showcasing your brilliance, as in ‘those rules don’t apply here because...’
- » You view colleagues as rivals and are willing to bend the rules to ‘one up’ them.
- » You disagree with someone simply because you did not come up with the idea first.
- » You prematurely criticise policies or procedures that get in the way of your goals without considering their value.

Keep in mind that as individual human beings we are limited, and when we continually compare ourselves to others in an attempt at ego gratification, we often end up looking foolish and unprofessional by our wilful noncompliance.

And this process can start as you become more confident with experience. As an example, when you first learn about longer radio calls from air traffic control (ATC), hopefully the guidance has been to write the message down on a kneepad before reading the information back. You carefully and neatly write it down, pause to collect your thoughts and then read the information back clearly, but not too quickly, to ensure ATC also have the time to process (check) that you have received the correct information.

But, as you gain more experience and confidence there is the propensity to perform this process from memory with an urge to read the information back quickly, just to let ATC and others know that you are highly proficient. Wow, how did you

remember all that information and read it back so quickly? You must be very good at what you do.

If you allow this to become your new habit pattern, then no surprises that somewhere down the track you will make an error. Perhaps you’ll be levelling off after takeoff at 3,000ft when in fact you were meant to level off at 2,000ft.

The most professional aviators instil good habit patterns. I admire the slight pause from operators at airfields in between making their readback to ATC because I know they are taking the time to write down and process the information more accurately than the over-confident quick talker, who is also the type that is known for taxiing the aircraft a little too fast.

Furthermore, keeping your ego calibrated – being able to acknowledge your flaws in both your personal and professional life – also builds trust.

High performance and self-awareness

For any high performer you should always be open to change and improvement because the world is constantly changing. Investing your ego into beliefs to the point where you cannot change them in the face of evidence is one of the most foolish things you can do. It is critical to always keep yourself open-minded to new information and facts.

Take the time to consider the points above, particularly anytime you show signs of being defensive when receiving feedback from others. Similarly, if you start to blame the system (it was the fault of ATC, you did not brief me properly, it is not my fault) then you are entering a phase in your career that can be difficult to overcome.

High performers remain open to considering better ways of doing business; the process of seeking good habit patterns breeds a higher level of self-awareness. And good self-awareness, from my experience, is the most critical factor in understanding your own limitations and what you are truly capable of. With this you can consistently make better decisions to operate within your own personal boundaries of performance.

Working hard at improving self-awareness, always seeking to improve your personal habits and techniques while accepting feedback openly is positioning you to become a lifelong learner and a great leader, unencumbered by ego. 🧠

Next issue in our final article of this series, the focus will be on the importance of trust.

BIG

IN
JAPAN



Japan Airlines, already in the budget sector with partner Qantas, surprised with its decision to launch a new low-cost carrier. Will it threaten Jetstar Japan, their existing offering? Despite some reports to the contrary, the answer is a definite “No”.

WRITER: TOM BALLANTYNE





When the news began to filter through that Japan Airlines (JAL) – still on the recovery trail after its spectacular A\$33 billion bankruptcy in 2010, the biggest collapse in the country’s history – was intending to launch a new low-cost carrier, eyebrows were raised at Jetstar Japan’s base at Tokyo’s Narita Airport. Initially, the plan wasn’t clear. After all, JAL was already the majority stakeholder in Jetstar Japan with partner Qantas Airways and it was now the biggest budget operator in the Japanese domestic market.

Jetstar management had no need to worry. The new no-frills offering, yet to be named, will launch in 2020 with two Boeing 787 Dreamliners and its target is economy-minded travellers on medium to long-haul routes from Asia, Europe and the Americas.

That, in fact, will be a help rather than a hindrance to Jetstar. Why? Because Qantas’s Japanese budget sector pacesetter has a totally different game plan from its rivals. While most

● JAL’s new long-haul LCC will use Boeing 787’s. ROB FINLAYSON

JAL’s new LCC represents a prospective traffic bonus rather than a threat.’

scramble to expand their international networks, throwing more and more capacity into big growth markets such as China and India, Jetstar Japan has a heavy focus on domestic operations. That is where it continues to expand, feeding not only on local traffic but the growing number of inbound tourists feeding onto its flights from international destinations. Because of that, JAL’s new LCC represents a prospective traffic bonus rather than a threat.

“If you look at us, especially compared to some of the other LCCs in the market, we’ve got the same product but we’ve got different strategies,” explains Australian Nick Rohrlach, chief executive adviser and executive director at Jetstar Japan.

“We have been very focused on domestic. We just recently announced a new route to Nagasaki. We opened Miyasaki last year. We are opening domestic ports much faster than we are opening international and what we are seeing is a lot of stimulation in the secondary markets...we will definitely

have more in that domestic sector.”

Rohrlach isn’t saying international is not important but points out a growing number of inbound tourists are arriving into Japan and connecting onto Jetstar for local flights.

“You look, especially during Chinese New Year, all of our flights are heavily focused on a lot of Chinese tourists flying around domestically as well. We play a role there in growing these smaller cities. That’s been our focus and I think that will be our focus, certainly for the next few years.”

The strategy is clearly seen in its network. While it has 12 domestic destinations it has only four international routes, to Manila, Taipei, Hong Kong and Shanghai. The single Chinese destination clearly delineates it from rivals. Between them, for example, ANA’s Peach and Vanilla operate nearly 20 international routes.

Given that Japan’s internal air traffic is mature – the country actually has a declining population – Jetstar’s strategy may seem strange. But it is the inbound market that holds the

Scoot followed suit with flights from Singapore to Osaka and on to Honolulu.

For Rohrlach and the team at Jetstar, the more foreign visitors the better because it represents a mouth-watering prospect. He has a strong background in strategic planning, starting his career in Australia's Department of Finance and Administration, then spending several years in The Boston Consulting Group in Sydney and Dubai before joining Qantas, where he became head of strategy and planning.

It hasn't all been plain sailing. He was executive vice president of the ill-fated Jetstar Hong Kong, which ultimately failed to get an operating licence. But he went on to take on the job of Jetstar's executive manager of customer and strategy, in charge of the overall customer experience and business roadmaps of all Jetstar-branded airlines across the group; Jetstar Airways (Australia and New Zealand), Jetstar Asia (Singapore), Jetstar Japan and Jetstar Pacific (Vietnam), before taking up the Tokyo post in September last year.

He says things are going well at Jetstar Japan.

"We are still Japan's number one LCC and have just taken delivery of our 22nd (Airbus A320) aircraft. We've had two years of profits now and have confirmed a couple of months ago that our first half

'We've got the same product but we've got different strategies.'

NICK ROHRLACH

(the financial year is the same as Australia's) was a record profit so hopefully we will be able to announce something similar for the full year in a few months time as well. Overall for us we see great growth in the business and great profits as we are coming up to our sixth anniversary. It's pretty positive all round."

That may be so but Jetstar does have challenges ahead, although it has put some behind it. Qantas and JAL initially each held a 33.3 per cent stake, with the remainder in the hands of Mitsubishi Corporation (16.7 per cent) and Century Tokyo Leasing Corporation (16.7 per cent).

In November 2013, Qantas and JAL each injected A\$66 million of fresh capital, with both lifting their shares to 45.7 per cent. Then, in November 2014, the two agreed to inject a further A\$66 million. These fresh injections were required to keep the carrier going but their confidence in the future has certainly paid off.

There are a number of budget operators in Japan but the market is dominated by Jetstar and LCCs of the rival All Nippon Airways (ANA) group, Peach and Vanilla. ANA announced recently that in 2020 it will merge Vanilla, which it wholly owns, with Peach, after increasing its stake in Peach from 67 per cent to 77.9 per cent at a cost of up to \$107 million. The new entity will be called Peach. Will that knock Jetstar off its market-leading domestic perch?

"No," says Rohrlach. "The first thing is we have a 50 per cent marketshare, so even when Peach and Vanilla merge we will still be bigger than the new Peach domestically. We will make sure we try to protect our number one domestic position. Obviously, they have a lot more international routes so we are actually behind both of them anyway in that sector so that will just take them further ahead of us from an international marketshare perspective. But we feel comfortable with that.

"Obviously, I'd prefer them not to merge but I don't get a say in it. Our main response will be to do what has worked for us, which is again a primary focus on domestic and I'm quite confident we will hold our position by doing what we've done so far, which is growing our existing routes and ensuring we have the best network and frequencies but then also looking for those new opportunities to secondary cities. Over the next few years we will be looking to add

promise. Already attracting more than 20 million inbound foreign tourists annually, the Japan National Tourism Organization has an ambitious target of lifting that to 40 million by 2020, the year of the Tokyo Olympic Games.

After the Olympics, the government's aim is to attract 60 million visitors a year by 2030. It may not be so ambitious. It recently announced that the estimated number of foreign visitors to Japan from January to April this year topped 10 million, with growth at the fastest pace on record. It is expected that LCCs from China, South Korea, Taiwan, Hong Kong and South East Asia will be one of the key drivers of this growth.

One of the reasons JAL may have decided to get in on the long-haul LCC budget game is that a growing number of foreign players are entering its market in that space. For example, in June last year Malaysia's AirAsia X launched flights from Kuala Lumpur through Osaka to Hawaii. Then, in December, Singapore Airlines'

Nick Rohrlach is chief executive adviser and executive director at Jetstar Japan. JETSTAR





a few more domestic points as well. Hopefully through that process in a few years' time when the new Peach emerges we'll still have the biggest and best domestic network."

There has also been a culture shift in the attitude towards budget flying in Japan. Many analysts predicted it wouldn't succeed because the Japanese were too accustomed to the powerful full-service offerings of JAL and ANA, which had dominated the market for years.

"That sort of headline was in every other market too," says Rohrlach. "They said that in Australia back when Virgin Blue came in 1999. I think every market goes through that initial hesitation phase and then there are always, almost like a new technology, early adopters.

But we're right now into what I describe as the maturity stage. It is quite common now for people in Japan to fly LCCs. Is it everybody's cup of tea? Of course not. Certainly, there are still people who hold out just in the same way that some people still prefer to go to bank counters."

Today, Japan's low-cost sector holds around 12 per cent of the market. Government forecasts predict this will rise to 30 per cent by 2030.

"I am sure like any forecast you can probably find a range of people who

✚ Low-cost carriers comprise only 12 per cent of Japanese domestic air traffic. ROBB FINLAYSON

have slightly different views to that. But as far as Jetstar is concerned we assume that is probably about right," says Rohrlach.

"The only thing that might hold us back in Japan is probably infrastructure."

As in many other countries around the region, major airports are heavily congested and suffer from slot constraints. However, Narita has recently announced it is expanding its terminals, lengthening its second runway and adding a third runway. Both Narita and Osaka now have LCC terminals and Nagoya is building a similar facility. Besides, away from the big hubs at Tokyo and Osaka, where Jetstar is venturing into many secondary locations, the congestion is nowhere near as bad.

International expansion certainly isn't off Jetstar's agenda but it is being extremely cautious on that front.

"We've got the Shanghai route at the moment. We are facing competition from the other end in a lot of cases, so that includes Chinese LCCs coming in. We just have to pick the right battles. It is a matter of finding a market that will respond well to the Jetstar product, where we believe we can get the demand at the right price," says Rohrlach.

"Shanghai works for us. As a

result, we probably haven't gone to every single Chinese city. There's a lot of demand out there but it's got to be profitable. We are being selective. We are always looking at whether the next aircraft is going to be used domestically or internationally and so far most of those have gone to domestic. We will take it as each aircraft comes up and seeing where the right market is. So far, we have seen more domestic opportunities than international, including China."

In terms of fleet, Jetstar's business plan commits to 28 aircraft by next year, although it isn't set in stone.

"We have said publicly we are committed to 28 aircraft by 2019. We have a different style," Rohrlach says. "They (Peach and Vanilla) talk about bigger numbers and longer term. We don't discuss numbers beyond then but obviously we are going to look to grow and that alone would say that with my target of staying number one domestically we will have to do more than 28 aircraft. We were looking at that plan anyway, independent of the merger.

"Frankly, there is actually enough room for both of us. We'd both have to grow quite a lot just for the industry to get close to that 30 per cent marketshare forecast. I think

the biggest thing here is how we grow ourselves as opposed to what competitors are doing.”

Peach currently operates 19 A320s, with four more to come and an order in place for 10 A320neos. It has said it plans to boost its fleet to more than 50 post-merger and to add more routes as it looks to expand into medium-length international flights. Vanilla has 13 A320s.

Another key to future growth for Jetstar is going to be a significant expansion of its codeshare and interline arrangements, critical to expanding the feeder traffic it needs from international markets. At present, it only has three codeshare agreements, not surprisingly with Qantas, Japan Airlines and American Airlines. There are also a number of interline pacts with other foreign carriers.

Rohrlach says Jetstar Japan wants to replicate the highly successful strategy of its sister operator, Jetstar Asia in Singapore, which has a swathe of codeshare and interline agreements with full-service carriers ranging from Qantas and Emirates, to British Airways, Air France, Lufthansa, Turkish Airlines and China Southern Airlines.

“We have the biggest domestic

network out of Narita, even bigger than JAL or ANA, because this is our home base and domestic focus. We see a few hundred passengers a day coming across not only our codeshares but also our interline connections. For Jetstar Asia they play a massive role in Changi obviously. We’re a few years behind that but we are seeing the same demand from other foreign airlines. The growth of other airlines coming in is all good for us because as Narita expands and other full-service airlines come in we would hope very much to replicate Jetstar Asia’s success in that sense.”

Would Jetstar ever consider venturing into long-haul itself?

“We look at all sorts of different things but given all the constraints in Japan I think the bigger opportunities for us are really going to be in domestic and really making sure that we stay number one as we get to 30 per cent LCC penetration,” he says.

While the future looks bright, no-one is pretending there won’t be challenges ahead.

“Probably for the next year but also out to that 2030 view there are always going to be constraints,” says Rohrlach.

“The first thing of course is the resources generally here in Japan.

‘Responding to that resourcing challenge in smart ways is probably challenge number one.’

NICK ROHRLACH

We talk about it a lot. It is a declining population. Then of course aviation has very specialised resources. There is a lot of press attention on the pilot shortage. That’s a global problem obviously but here in Japan it is actually much broader than just pilots. For us, finding the right talent and the right resources at the right price is a challenge. It’s hard enough for any LCC but I think it is going to be particularly hard in Japan.

“Also, this is a country which is usually a very good adopter of technology so it is now incumbent on us to meet that human capital challenge with IT and stuff like that. We’re trying to drive things like on-line check-in and kiosk usage. We are the first LCC here that allows you to check-in on your mobile phone and go straight to the gate. Those sort of things are even more important here than in other markets around the region. Responding to that resourcing challenge in smart ways is probably challenge number one, two and three on the list.

“Probably the second constraint obviously is airport infrastructure... this is obviously not China... we’re not able to throw up an airport in a year. This will be a really big challenge for Japan generally.”

• Jetstar Japan now operates 22 A320s. JETSTAR



OUT OF SIGHT

New Zealand pushes boundaries with commercial drones

WRITER: DENISE MCNABB

New Zealand's commercial drone market is booming, largely thanks to a collaborative approach by its Civil Aviation Authority.

Its Part 101 consultation rules and Part 102 unmanned aircraft certification has resulted in 108 unmanned aerial vehicles (UAVs) receiving certification in the past few years.

More than 400 commercial UAV users are registered on the website of their national body, UAVNZ.

UAVNZ chair Andy Grant said if a commercial operator is able to demonstrate a safe way of bringing a drone business to market then the CAA is very open to discussing and accommodating new developments.

As the market for commercial applications opens up in a wide number of fields, be it agriculture, mining, search and rescue, urban planning or anywhere where an unmanned vehicle can go where it is risky for manned vehicles and where it makes economic sense, New Zealand's commercial operators are jumping in.

Now the focus is on technology and applications for flying beyond the line-of-sight (BLOS).

A report commissioned by Callaghan Innovation, a government organisation tasked with making New



Zealand business more innovative, estimated last year that flying drones out of the operator's line of sight could provide economic gains of up to NZ\$190 million annually to the country's farming, forestry and energy sectors.

Last year Taranaki drone company Drone Technologies controlled remotely an unmanned aircraft in New Zealand's first "beyond line-of-sight" CAA-approved flight to inspect a 30km section of power transmission lines in the Rimutaka Ranges near

Wellington for electricity utility, Transpower.

Managing director Ben Plummer said the flight demonstrated the importance of beyond line-of-sight in industry and agriculture, in risky conditions, delivering parcels and medical supplies to remote locations or communities in crisis.

For the trial the drone had the same procedures, safety checks and planning as a manned flight, including a flightplan, getting permission to operate in that airspace at that time,

'New Zealand's commercial operators are jumping in.'



and intensive training for the pilots for the 54-minute flight.

More tests are in the pipeline.

The country's air traffic controller, Airways New Zealand, Graeme Sumner said that New Zealand's regulatory environment and relatively uncongested airspace made the country an attractive option to safely support more complex operations and facilitate new entrants.

It has developed a nationwide unmanned aerial vehicle (UAV) traffic management system which

would enable drone activity across New Zealand airspace through a safe integration into the national air traffic network. Some South Island drone pilots are putting its AirMap drone traffic management platform through trials that involve how to plan flights, seek authorisations and get information about the terrain they are operating in.

The next phase is tracking tools that enable accurate monitoring of UAVs once they are beyond the pilot's line-of-sight and detect and avoidance

capabilities to keep them safely separated from other aircraft.

Australian Aviation talked with three innovators in the New Zealand UAV commercial space.

University of Canterbury (Christchurch)

Canterbury University's Wireless Research Centre and Spatial Engineering Research Centre are attracting interest from universities around the world wanting to collaborate on drone projects.

📍 Inspecting the Auckland Harbour Bridge by drone. ASSET INSIGHT



A strong drawcard is its 100sq km CAA-designated restricted UAV testing range with a ceiling of 1,000 metres at Birdlings Flat, 30km from the city. There, post-graduate students test everything from sensing systems to algorithms that autonomously evaluate the suitability of a landing site prior to a safe landing, to radio frequency. They have tested positioning technology to determine precise positioning during landing and takeoff and a UAV platform that autonomously records a forest's "cutover" geographic edge for accurate tree harvesting.

Japanese collaboration

The Royal Society of New Zealand and The Japanese Society for the Promotion of Science jointly gave NZ\$60,000 recently to a collaborative project by the university's Wireless Research Centre and Japan's Yokohama National University to develop a device that enables multiple drones to communicate with each other while flying over a natural disaster area. The task was to collect

Flight testing to identify paddock plant health and animal crop availability. WIRELESS RESEARCH CENTRE, CANTERBURY UNIVERSITY

'Now the unis are seeking \$200,000 to bring the project to market.'

information about the status of people buried under rubble so they could potentially be triaged for rescue.

The futuristic technology revolves around body area Wi-Fi networks where interconnected devices are implanted, attached or carried by a person, be it a mobile phone, exercise wristband or in the fabric of a garment. The research focused on ways those network signals could be located by a swarm of drones so first responders on the ground could find survivors quickly.

Fred Samandari, director of the university centres, said the drones picked up signals even if connections were damaged, to indicate whether a person was dead or alive. It adds another layer to drones kitted with thermal heat imaging for detecting people at a distance in search and rescue operations.

The device was tested in non-emergency situations in the first phase of the project.

Now the universities are seeking an additional NZ\$200,000 to bring the project to market.

Canterbury's students have also been researching ways UAVs can withstand elements and air pressure when collecting samples such as water or volcanic ash in hard to reach places and returning with them in one piece.

"We needed to make sure the samples collected were secure and that they didn't end up splashing all over the place," Samandari said.

Forests

The centres designed a drone to monitor hotspots in bushfire situations for the government's forestry research institute, Scion.

Scion has been at the forefront of publicly and privately funded trials of UAVs flying beyond the line of sight for the evaluation of tree harvesting and relaying tree health and pests in forests using interchangeable remote-sensing technology.

"We're definitely aiming for a future beyond visual line of sight," Samadari said.

"Here in NZ aviation authorities are extremely open. They really want to liberate the industry.

“At present when trees are cut the contractor gets paid after a certain period of time based on an estimate, but owners want a clear understanding of where the cut was. “UAVs can see deterministically where trees are cleared and what is still standing.”

Partnering with Lincoln Agritech, a research and development subsidiary of Christchurch’s Lincoln University, the university has also used drones to determine the health of crops, using three or four drones that automatically start recharging after returning from their mission.

Also with Lincoln, it has developed special antennae for UAV fixed-wing and quad and opti helicopters to withstand the harsh environment of Antarctica. The drones fly over the sea where piloted helicopters can’t go to measure ice shelves.

“They need just enough protection but enough time to fly before the propellers start freezing,” Samandari said.

“You want to make sure payload is as little as possible down there, but if something unexpected happens you need features that will always bring the UAV’s back because nothing can be left behind. You can’t tether as that is limiting so we have a separate operator with another UAV taking measurements from different angles and monitoring the other.”

They university has also worked with meteorological companies such as New Zealand’s National Institute of Water and Atmospheric Research (NIWA) on UAVs that can rise more than 10,000 metres above the ground for weather monitoring.

They’re attached with “intelligent” balloons to bring craft back safely.

Other projects include work with Airbus at its Blenheim base and with Zephyr Airworks, the New Zealand arm of Californian-based Kittyhawk, presently trialling Cora, a self-piloting electric air taxi for a global launch from New Zealand in a few years’ time. Confidentiality agreements preclude Samandari revealing details, but he said it is “exciting”.

Nearly all students are post-graduates ranging in numbers each year from 12 to 40 plus two to three overseas interns. As a research centre it doesn’t do qualifying courses such as drone pilots.

Skybase.aero

Christchurch-based Skybase.aero is not yet a year old but its business delivering commercial drone solutions

with real-time awareness is growing exponentially. Its new testing range will also take its technology beyond the line-of-sight.

Co-founder, Michael Read, a former Royal Australian Air Force pilot, moved to New Zealand three years ago to work at jetpack start-up Martin Aircraft Company before setting up Skybase. The other co-founder, San Francisco-based Alex Flemming, an aviation, defence and security stalwart, procures the technology for Skybase’s platforms.

Read is not long back from signing a surveillance contract in South-East Asia. Details are still under wraps, but he said it would require rapid scaling of the business. He’s prepared, thanks to a partnership as well as investment money from US-based MAG Aero, an established company largely in the defence arena. MAG has more than 900 experts across five continents doing intelligence, surveillance and reconnaissance (ISR) real time operations, training and technical services for manned and unmanned fixed and rotary-wing operations.

Skybase is focused on commercial opportunities, but Read said the relationship has enabled it to deliver

‘Beyond the line-of-sight is the next area of growth in the drone market.’

military-level services at a fraction of the cost of the big military providers.

The data links and long-endurance/long-range ability assembled on drones raised the overall capability of a client’s businesses, he said.

“We can access these capabilities by virtue of the team’s background in military, manned aviation and unmanned technology and the integration of world-leading assets to meet and exceed technical and market challenges.”

Flying beyond the line-of-sight is the next area of significant growth in the commercial drone market and Read said Skybase is ready.

Test zone

Like Canterbury it has created a CAA-restricted drone test zone for BLOS trials near Alexandra in Central Otago, chosen because of its high number of sunny days and low winds.

Read said it required a large amount of work with the CAA, but said it would have been impossible to get it up as quickly as it did elsewhere in the world.

“We’re starting to attract a lot of international attention from companies wanting BLOS applications

• A Skybase UAV being used for flying beyond line-of-sight.

SKYBASE.AERO





for their commercial drones,” he said.

“New Zealand is a first-world country that is highly respected around the world. Operators can come here to test our data link and fully instrumented test range year round.”

Skybase is also one of the companies about to start trials with the country’s air navigation service provider, Airways NZ, to show how it can be interoperable with its system.

Read said being a data provider is about a mesh network – the ability to send information to platforms with multiple pathways without any loss of bandwidth.

“You can’t have people talk about delivering a payload and using BLOS unless you have a high-quality network. We literally have the world’s best airborne mesh network with up to 100 MB of data.

“We have a CAA Part 100-compliant safety management system, a full set of operating procedures, arguably the most advanced regularity system in the Asia Pacific region; we all come from aviation backgrounds and we have our own compliant test facilities.

Skybase data is also fully encrypted in-house, eliminating the risk of exposure by outside contractors.

The revenue stream from airborne data comes from aerial mapping to surveillance in sectors from mining to road projects, stockpiles, land design, urban planning, working with fire and environmental agencies and tactical operations with the police.

● Aerial mapping with an Altus unmanned helicopter. ALTUS INTELLIGENCE

‘Kiwis go really well in the innovation space doing more with less.’

MICHAEL READ

Doing good

Another focus is the global “Drones for Good” humanitarian work. Skybase will work with UNICEF in Vanuatu in September delivering vaccines using high band connectivity either through a radio frequency, satellite, 4G or a relay node.

“With our powerful network we can be sitting on a laptop in Christchurch controlling one of our drones in South-East Asia in real time and we can also log into the picture of the drone on a mobile phone. In a tactical situation you can have real-time pictures without interfering with any other network. You can also send voice and video data to anyone with a smart phone who has a VPN login.

“The reason we established business in New Zealand is because of our relationship with the CAA and its forward thinking nature,” Read said.

“It was a stroke of genius for CAA to write the Part 102 regulations as performance-based rules. It requires the industry to prove to the regulator how it is going to keep [their drone operation] safe as opposed to the CAA being prescriptive.

“We can run technology through traditional aviation systems to work out whether it meets the intent of the regulators.”

Skybase is looking for PhD students to work with its staff of 13. Kelvin Barnsdale, Canterbury University’s former senior research engineer in the Spatial Engineering Research Centre is also on board. He specialises in electronic systems in harsh environments.

“Kiwis go really well in the innovation space doing more with less, but often need help to scale overseas,” Read said.

Any future funding would be to do with scaling, but it was revenue that grew the business.”

Altus Intelligence

The drone hardware manufacturer with its unique gas-fired parachute and beyond the line-of-sight capabilities was founded in 2014 by Shaun Mitchell (chief executive) Simon Morris, Ryan Cadwallader, Michael Long and Gareth Prentice. Altus has grown rapidly from its Hamilton headquarters. Last year it opened its Altus Made in the USA office in Cartersville, north of Atlanta in the United States, bringing the total number of staff to nine.

It was initially a service provider, adapting drones for specific needs, primarily in the mapping and survey field as well as some aerial photography and cinematography. After finding a shortage of commercial grade, rugged and reliable sensor-friendly equipment for clients’ specific needs Altus started manufacturing its own unmanned aircraft. When they found themselves competing on the service side with customers who bought their equipment they decided to concentrate on the hardware.

With China controlling 70 per cent of the world’s UA manufacturing, small companies like Altus can’t compete on price so the point of difference had to be around capability, applications, robustness and support.

Business development manager Simon Morris said inspections are the fastest growing commercial application for drones, ranging from powerlines to forests and crops.

This has put the company's focus firmly on developing beyond the line-of-site craft. Altus is the first company in the US to get a FAA waiver for its helicopter drone for powerline inspection for its client, Xcel Energy, a utility company with more than three million electricity customers. The hybrid machine it is developing is presently using a battery with three hours of charge, powered by a small petrol motor.

"Traditionally, powerline inspections are done with helicopter pilots using binoculars. It's very expensive and they can miss things," Morris said.

"We've done 80km, stringing three of these together but we want to do it with one.

"We're taking a full size aircraft approach to maintenance and inspection of these craft.

"These are people's investments and we want to keep them going as long as possible."

Morris, a former air force pilot who has also done geospatial mapping for the army, says the team had seven years' experience in the field before forming Altus.

That experience, along with a collaborative relationship with the CAA helped the company get a foothold in the US. It sold one of its Delta X8 drones to US broadcaster

CNN for aerial news-gathering then partnered with CNN for 18 months on one of three FAA Pathfinder projects, evaluating unmanned aircraft systems for safety and functionality in the field, particularly loss of line-of-sight control, and ranges up to 200km.

Morris said commercial drone ownership in the US was cumbersome because it required every owner of a drone weighing more than 2kg to be registered whereas in New Zealand, an organisation could be certified for drone operations. But with the introduction of the FAA part 107 US commercial drone operators were now leapfrogging countries like New Zealand in the technology stakes, he said. Hence the Altus US division.

"When we hit the ground in the US they were amazed how much experience we had. We are really good at finding new applications," he said.

"Customers tell us what the application is and we'll put it on the best vehicle, building up from a base platform. Each wants something slightly different and we can do that in-house."

When the New Zealand Police came knocking that opened the door to a new development – a gas-propelled parachute.

"They wanted a craft that could safely reconstruct the scene after road accidents, and for search and rescue," Morris said.

If anything went wrong with the craft they wanted it to be able to land safely without damaging people or the craft itself.

"When you have \$200,000 of

'We have to be flexible and fast moving and to do that we need to bring new products.'

SIMON MORRIS

laser scanners hanging up in there, mitigating harm gets you preferential rates from insurers."

Developing a chute with a tiny cylinder of compressed carbon dioxide instead of explosive detonators was the groundbreaker. It activates quickly after the failure of two autopilots and catches the weight of the drone. Apart from the insurance advantage it can be transported safely on manned aircraft and eliminates the risk of fire on the ground.

The project was initially shelved because it was not viable to keep craft at Altus until the police needed them. But now Altus is on the shortlist in a new tender round after the police decided they need their own drones after all.

Altus was created on the back of NZ\$1 million raised through the team's own funds, support from a Northland surveyor, and from friends and family.

It's now on the lookout for a venture capitalist to fund the next development – an IP licence in the US where the marketplace is the most active. Manufacturing and the research and development will remain in New Zealand.

"We have to be flexible and fast moving and to do that we need to bring new products," Morris said.

He said the Australian market was largely untapped for the company but it was talking to large enterprises across the Tasman with the intent of forming a partnership instead of growing the market itself. 

 Lifting logs by drone in a Northland forest. ANDY GRANT/ASSET INSIGHT 





READY TO RESPOND

ExecuJet highlights the strengths and opportunities of Australian MROs

WRITER: STEVE GIBBONS

Visualise a sleek Bombardier Global 5000 finding a brake fault during a transit landing at Maroochydore on Queensland's Sunshine Coast – more than 500 flying miles or 1,000 kilometres by road from its key service centre in Sydney.

Worse than that, it transpires that the fault has caused significant damage to the main landing gear requiring the wiring harness to be replaced prior to the ongoing flight in, well, just 72 hours, with the additional challenge that there is little of the required equipment on site.

With the clock ticking, the problem has to be sorted, the aircraft jacked up and post-repair landing gear retraction tested.

In order to meet the customer's

72-hour schedule, a set of Bombardier Global jacks and other relevant ground support equipment is loaded on to a hire truck and driven by two technicians from Sydney to the Sunshine Coast over a period of about 14 hours.

Meanwhile a crew of maintenance engineers is flown in to the Sunshine Coast with hand-carried parts dispatched from Bombardier HQ in Canada via Sydney Airport. Hangar space is secured and a ground power unit trucked in separately from the Gold Coast.

Maintenance engineers work through the evening and into the next day to replace the landing gear wiring harness, before testing and releasing the aircraft to service-capability,

just two hours ahead of the target timeframe.

It was all just another day (or two) in the office for mobile repair teams from Sydney-based ExecuJet, a global company offering everything from charter to aircraft management, fixed base operations (FBO) and, in this case, comprehensive maintenance, repair and overhaul (MRO).

The story is a good example of service levels attributed to ExecuJet for aircraft on the ground at remote locations, and is part of the reason why its Sydney base was awarded first place in the Bombardier 2017 International Authorised Service Facility Excellence Awards.

At the same time it is representative of a service industry



that operates largely under the mainstream media radar compared with the activities of major airlines.

Much of the headline focus in recent years has been around Qantas and Virgin MROs in Brisbane, Sydney and Melbourne, and controversy around a shift of some heavy maintenance to offshore contractors, involving claim and counter-claim about labour costs, de-skilling, and safety issues.

That has served to exclude a genuine success story: the growth in MROs catering for turboprop, business jet and rotorcraft fleets allied to charter companies, businesses and individuals.

It includes key players such as Hawker Pacific, BAE Systems and

Airflite, as well as specialists lesser-known to the wider community such as Flying Colours (the aircraft painters based in Townsville), or helicopter-specific operators such as ProRotor based on the Sunshine Coast.

It's a competitive business. A recent comprehensive University of New South Wales report into the future of MROs in Australia, backed by the Australian Research Council, identified more than 260 MROs dealing with the general aviation sector and a further 84 third party MROs involved in work on both general aviation and larger aircraft types, including componentry and as agents for OEMs.

ExecuJet recognised potential in the Australian market in 2000: a

unique combination of the nation's long distance geography between major service centres, the projected sustained growth of air traffic alongside general economic growth in the Asia Pacific, and at that time a relative shortage of MRO operators working in its particular, business jet service niche.

It took just three years from start-up in Johannesburg in 1991, with just a single Learjet, for ExecuJet to convert recognition of a gap in the South African corporate jet service sector to a fully integrated turnkey business in conjunction with a Bombardier aircraft sales franchise.

From there, growth has been exponential. Now headquartered in Zurich, ExecuJet operates in Africa,

'Yes, really optimistic. More than at any time in past months.'

GRANT INGALL

Asia Pacific, the Caribbean, Europe, Latin America and the Middle-East offering aircraft management for private and commercial registered aircraft, aircraft charter, aircraft maintenance, aircraft completions management and fixed base operations.

Grant Ingall was engineering manager with Australian Jet Charter, a Sydney-based aircraft management and MRO, when ExecuJet came calling in 2000 with ambition to expand into Australia. It bought the company and within a year Ingall had been promoted, first to GM, maintenance, and then to the key role he still holds today: maintenance director, Asia Pacific.

He is passionate about the business and equally optimistic about the outlook for MRO in the region given the size of the fleet and network he represents, and the growing technological refinement and global reach of corporate jets under ExecuJet service agreements.

“Yes, really optimistic,” he said. “More than at any time in past months. Growth has been steady.”

“The industry is seeing lots of pre-owned business jet sales and lots more are coming into the country. Business and corporate jet ownership is getting rid of that “tall poppy” reputation and, as more people fly around in these types of jets, usage is becoming more accepted.

“It is literally down to the size of the country. That is why individuals who need to do business, and can afford it, are buying larger aircraft with larger range – not only across Australia, but from here to the United States direct, for example.”

It is an optimism backed in part by the statistics. While a breakdown of corporate and business jet MRO is difficult to extract from overall figures, the Australian Research Council-backed report puts global third-party MRO value at more than \$84 billion with projected growth to \$100 billion by 2024.

Separate Asia Pacific Economic Cooperation (APEC) figures covering all types of MRO show projected growth in the Asia Pacific region alone (excluding China) of 5.3 per cent over the next five years to 2023, while IATA statistics highlight the fact that Asia Pacific’s share of global MRO is now the equivalent of Europe and North America.

The APEC forecast shows Asia Pacific ranks fourth in terms of growth behind China, India and the Middle-East.



● Bombardier’s Global 6000 demonstrator visits ExecuJet’s Essendon Airport facility. VICTOR POOY

In other words, it’s big business in this part of the world.

For ExecuJet Maintenance Australia, the MRO arm of the Asia Pacific operation, it means regular, current responsibility for 70 aircraft based “locally” from 20 different aircraft types, and 55 maintenance staff supplemented by contract labour across four separate maintenance bases: the Sydney headquarters, Melbourne (Essendon, established 2006), Wellington (2011) and Perth (2012).

On top of that, Ingall said ExecuJet is a service centre for four of the big bizjet manufacturers.

“What that means is that we are part of their network. We cover any visiting jets into this region: Australia, New Zealand and the Pacific islands. If there are any breakdowns, or they need any support, we will help them.”

ExecuJet also deals with regular visits from Asian customers inspecting its heavy maintenance capabilities. To underline its wider regional reach, a base was established in Kuala Lumpur in 2009, with a staff of around 40, with a similar number employed outside Beijing. The company also has an FBO in Bali.

“We do cover everything from basic line maintenance and servicing tasks all the way up to the heaviest checks you can get on the types we look after: full capability, except for full strip and repaint and heavy interior workover which would need to be contracted out,” Ingall said.

An additional key component is the capacity to dispatch mobile repair teams to remote locations. This may be for an aircraft grounded for maintenance reasons, or instances where sending engineers is more cost-effective than flying the aircraft under scrutiny to a maintenance base.

Grant Ingall: “If you get a problem in a remote location we would co-ordinate to see what parts are required. Depending on the location, and if it is not cost-effective to fly to one of our maintenance bases, one of our guys might hand-carry parts in. In

extreme cases we will charter aircraft to fly in with parts. An incident in Kangaroo Island (off the coast of South Australia) is one I particularly remember.

“Every second day we will work on a visiting aircraft. Sometimes we are lucky enough for it to be on our front door in Sydney or Melbourne. But other times it could be Cairns or Canberra or anywhere, and we have to react to that.

“For example, a problem with a Gulfstream might be referred first to its headquarters in Savannah before it is relayed back to us. We have to be ready to respond as needed.

“You just don’t know what’s going to happen from day to day,” Ingall said.

Far more basic services include servicing and interior and exterior cleaning, pre/post flight inspections, adjustment of tyre pressures, oxygen system, nitrogen system, and hydraulic level checks, more complex component maintenance, spares supply, and sales support.

The current OEMs under the ExecuJet Australasian authorised service centre umbrella read like a pantheon of the corporate jet market: Hawker 700, 800 and 900 series; Bombardier Global Express, Challenger, Learjet; Gulfstream GIV, GV, G450, G550, G650; and Embraer Phenom 100 and 300, Legacy 500, Legacy 600.

Then there is service on engines: Honeywell TFE731, HTF7000, APUs; Rolls-Royce BR725, BR710 series; General Electric CF34 series.

And avionics: Honeywell, Rockwell Collins, Satcom Direct, Artex Emergency Locator Transmitters.

According to Ingall, ExecuJet also has the capability to support Dassault Falcon and Textron Aviation (Cessna and Beechcraft) products. In the hierarchy of streams of ExecuJet operation, he ranks regular aircraft based in Australia as number one, then visiting jets, and then heavier work the company seeks, and quotes for, in the wider Asia region.

As an example of the reach in the region and beyond, current

‘We have to be ready to respond as needed.’

GRANT INGALL

airworthiness authority certifications include CASA CAR 30 and Part 145, FAA and NZ CAA Part 145, Bermuda DCA and Indonesian Directorate General of Civil Aviation Part 145.

Ingall said that in terms of base operations, there are similarities between business jet activity in Sydney and Melbourne while Perth has an inclination towards fly-in/fly-out charter operations, and MRO on turboprops (up to 50 per cent of the Perth business) such as Bombardier Dash 8s and Beech 1900s.

As a further service, ExecuJet Spares also operates a Sydney depot as a third party logistics provider for Bombardier commercial and business aircraft customers. Approximately 16,000 stock lines are operated 24/7 to support Bombardier's customers in both routine and "aircraft on ground" scenarios. The facility services both local and international locations with shipments expedited as required.

Much has been made in recent years about comparative labour costs between Asia and Australia in the maintenance space, vis à vis the onshore and offshore competitive environment. Ingall believes that while this might be particularly pertinent to heavy maintenance operations for airlines, any potential imbalance is not quite so clear cut in the corporate jet market.

"It really isn't like that in the bizjet world. Our main competition in Asia would be the OEMs themselves. For example, Bombardier has an operation in Singapore, and then there are the Asian-based MROs.

"At the same time, Jet Aviation and Hawker Pacific cover the Asian region.

"We compete on a global level really. Some of the aircraft we maintain do go to the United States and Europe regularly, so sometimes they may have the option to do the work there. Particularly, we might lose out if they want to do paint work at the same time, for example.

"But what we find is that (Asia) labour rates are US dollar-based and certainly not the lower rates you might experience in the heavy maintenance or airline world. Given the exchange rate the way it is, our Australian dollar rates are very favourable. With an even playing field or better, we have been fortunate to attract quite a bit of work out of Asia."

Ingall said ExecuJet is targeting further growth out of the Asia region.

"That said, the biggest challenge is just the distance – the ferry costs involved. But if it is worth it for the

customer to do it, we offer both good service and reliability. We get things out on time, we do everything we can to stick to our promised turn times and offer an excellent experience to the customer."

Regional spare parts logistics overcomes any issue allied to a lack of spare parts manufacturing in Australia.

"We (ExecuJet) are largely looking after the mid-sized to large business jets. Quite simply we go straight to the manufacturers. The OEMs, to varying degrees, do place high use key spares in regions, some in Australia for same day service, and some in Singapore. Worst case is an overnight supply flight from Singapore.

"Unlike an airline, where you have a large inventory of stock for your whole fleet, it doesn't make sense for the operators of one or two aircraft to have a huge investment in holding their own parts. So they rely heavily on these spare parts provision programs.

"If they are under warranty, same difference. The required parts have to come from the OEM. If they are out of warranty, and not on a supply program, ExecuJet, through its worldwide network, will shop around the supply chain for the best prices."

The largest business jets under current maintenance by ExecuJet are the Gulfstream G650 with capacity for 19 passengers, a MTOW of 45,178kg and a maximum range of 7,000nm, and the Bombardier Global Express 6000 (capacity 17 passengers, MTOW 45,132kg and a range of 6000nm).

Looking ahead there is something of a paradox between projected growth in MRO services and the increasing reliability and technical sophistication of aircraft types. Ingall accepts manufacturers are making a concerted

'That said, the biggest challenge is just the distance – the ferry costs involved.'

GRANT INGALL

effort to reduce maintenance costs by extending frequency of required maintenance.

"Where we would have been doing 150-hourly checks 10 to 15 year ago, they have been extended out to 200-hourly or more. But what you tend to find is that some of the newer types might have teething problems, though they do have the advantage of more sophisticated diagnostics which makes identification easier.

"Some of the bizjets are at the cutting edge of equipment and advancement."

Which raises the complex issue of engineering qualification and training in an environment subject to fierce competition from offshore competitors, particularly in the heavy maintenance sector.


Ingall has an obvious pride in the ExecuJet process: "All of our licensed engineers attend factory training schools or courses the OEMs recommend. Typically they will do an initial course of between six and eight weeks training overseas at the manufacturer – it's extensive and good quality.

"For the new generation of engineers coming through, they are quite fortunate to be working on these new types of aircraft. Something new every day."

At the same time, Ingall accepts he has concerns coincidental with reports of a looming engineering skills shortage.

"It is for that reason we are going out of our way to put on apprentices fairly regularly. We have two who started in Sydney this year, one in Perth and we will start one in Melbourne as well.

"I just want to keep the young guys coming through." 

 Every other day ExecuJet finds itself supporting visiting business jets. SETH JAWORSKI



TWIN TIME

Oz Choppers' unique niche refurbishing
Bell 212 and 412 medium twins

WRITER: MICHAEL SERENC



Growing demand for refurbished Bell medium-lift helicopters is seeing Oz Choppers make an impact across domestic and international markets.

The Mudgee, NSW-based business is investigating the potential of expanding to a second on-site hangar as operators continue to source twin-engine Bell 212 and 412 helicopters for firefighting and utility operations.

The steady growth has been almost 10 years in the works for Oz Choppers owner and veteran pilot Mark Rogers, who sources machines from across the globe for complete overhaul.

“There are plenty of 212s and 412s for sale but there generally aren’t many for sale at the standard that we’re putting out,” he said.

“It’s a strong utility helicopter and we know the Bell product very well.”

We fix it, you fly it

Founded in 2009 by Rogers and his wife Kate, Oz Choppers was originally established as the maintenance and refurbishment arm of the couple’s main flying business, Commercial Helicopters, which they subsequently sold to Armidale-based Fleet Helicopters in 2014.

“Oz Choppers was just busy maintaining all our Bell aircraft and refurbishing our own in-house fleet. We always had machines going through a refurbishment program,” he said.

After refurbishing the first of three Bell 212s bought from a South Korean operator in 2011, Rogers received a chance request from Kestrel Aviation owner Ray Cronin in August 2012 to buy a 212 for a firefighting contract.

“I didn’t have any intentions of selling them initially but with Ray needing a machine that kicked it off,” he explained.

“Then Ray needed a second 212 with pretty much the same specifications, so I did another up for him.

“What those sales did was show us there was a market for the type of machine we were putting out – a stripped back, freshly painted and upgraded medium-lift platform.”

The success of the first two refurbished Bell medium twins to an external operator has since attracted both domestic and international interest, including Papua New Guinea-based operator HeliFix (two 212s), Alaska-based Northern Pioneer Helicopters (one 412), Germany’s Agrarflug Helilift (one 412) and a slew of local companies.



Oz Choppers recently sold its 12th refurbished Bell medium twin to Orange Helicopters, a 212 that will be used predominantly for firefighting operations.

Rogers said utility work, such as sling loading and crew transport for mining operations and firefighting formed the bulk of customer requests.

Perhaps one of the unique factors about Oz Choppers is its method of

➤ New avionics are installed in-house by sister company Airborne Avionics. MARK JESSOP

➤ Oz Choppers strips out the airframes, rebuilds and repaints them. MARK JESSOP

sourcing and refurbishing helicopters before they find a buyer.

But Rogers said that strategy was a calculated risk, given the current market demand for Bell medium twins.

“We found out pretty quickly with Kestrel wanting to buy a couple of them that there was a market for both types and there still is,” he said.

A plentiful parts supply chain was another advantage operators were attracted to when it came to both 212s and 412s.

“That why people are buying them because nothing else really fits the bill. A lot of the fire contracts are for that type of helicopter,” Rogers said.

“We’re not spreading the love too far between different types. We’re just really focused on the 212 and 412 market.”

Diamonds in the rough

For Rogers, sourcing the right heli for a refurbish comes down to both a solid network of brokers and workable logistics.

Indeed, there’s few places in the world the veteran operator won’t go to for a good deal, with Rogers listing South Korea, Germany, Japan, Sweden, Australia, New Zealand, Brunei and Alaska as places where he’s found several Bell twin mediums and in years gone by, JetRangers and LongRangers.

“Every country has its challenges and the more times you have to organise the logistics, the better you get at it,” he said.

“You get a bit of a network going.





Refurbishing a Bell twin takes around six months.
MARK JESSOP

Anyone who does this for the first time in trying to get a machine out of a country, it's a learning curve."

Rogers' Alaskan adventure sourcing a 412SP proved an interesting challenge.

"We were hoping they could drive the helicopter down from Anchorage in Alaska via road freight to Seattle and then ship it back to Australia because you can't ship it direct from Alaska. Of course, the roads were frozen so we had to get another smaller ship to take it from Anchorage down to Seattle," he said.

"There's all of these little logistic nightmares but you've just got to take your time and work through it. There's lots of traps."

A helpful seller is another factor in ensuring a smooth export back to Australia.

"That has a big bearing on how things flow," Rogers said.

"What becomes hard is when you first have to send the aircraft via somewhere else to get it onto a ship back to Sydney.

"As part of the deal, we'll dismantle the aircraft, pack it into boxes and put the hull and tail boom in protective wrap to get it ready for export back to Australia. We'll assist as much as we can."



Oz Choppers has sold three Bell 412 PT6T engine units in 2018 alone. MARK JESSOP

'We strip these machines out and make them as light as possible.'

MARK ROGERS

Just like new

Once an aircraft arrives at the hangar for refurbishment, the next challenge begins for Rogers and his team of engineers, painters and avionics technicians.

Oz Choppers' hangar includes an overhaul workshop, avionics hub, spare parts room, quarantine room and temperature-controlled paint shop custom-built to fit the 212 and 412.

"We strip these machines out and make them as light as possible. Utility-wise we make them as good as they can be for that role," Rogers said.

"We like to take six months to do a machine, so we try and do a couple a year. We don't want to oversupply

the market and that way we put out a good product."

About 15 modifications and upgrades are made to each heli that goes through a refurbishment at Oz Choppers, on top of a five yearly/3,000 hourly inspection.

The aircraft is first stripped backed to a bare bone cabin with anything no longer required that adds weight removed, such as old wiring, radio systems and brackets for support equipment.

Internally, new, lighter avionics, including some glass cockpit upgrades, are installed in-house by Rogers' other Mudgee-based company, Airborne Avionics.

Externally, Oz Choppers installs a 12-piece inspection panel kit that improves access for engineers, DART Aerospace high skirts, a vertical reference bubble window, FastFin Tail Rotor enhancement and stability system, wire strike protection and door gauges for long-lining (sling) operations.

The aircraft's paint is also stripped and replaced with a generic white scheme ready for sale.

Rogers said the weight savings can be as much as 300kg depending on the machine and what further modifications a buyer may need,

such as a belly tank for firefighting operations.

“300kg is a pilot and half an hour of fuel so it’s a substantial amount,” he said.

Lift off

The steady success of Oz Choppers’ refurbishment program is now seeing the company embark on a period of expansion.

Rogers revealed to *Australian Aviation* that he is in the process of purchasing adjoining land to his current hangar to potentially build a second hangar housing Oz Choppers’ growing Bell medium spare parts inventory.

The investment, which would be worth approximately \$1 million if realised, would essentially be a mirror image of the company’s existing 1,110m² hangar which was completed in 2009. It will also allow Oz Choppers to bring all of its spare parts on site after years of housing them at two additional hangars offsite.

“This year alone we’ve sold three Pratt & Whitney engines for 412s. We’ve got a huge inventory of Bell medium parts. That’s the area where



we’re going to expand,” Rogers said.

“My thoughts here are that with the extra room I can purchase additional helicopters to have ready for the refurbishment process and potentially look at pushing more helicopters through refurbishment if the market is calling for it.”

Another part of Rogers’ expansion plans would be for Oz Choppers to have a fully refurbished 412 airframe available that could be exchanged with

a customer’s airframe that required refurbishment.

“Basically, for a customer with a helicopter that is in need of a refurb, we could offer an airframe fully overhauled with their paint scheme and all the upgrades in exchange for their airframe and an agreed amount of funds,” he said.

“It then becomes a quicker process of swapping a customer’s ‘running gear’ over from their existing airframe to the overhauled one.”

The additional hangar would also give space to house fixed-wing aircraft that are being maintained by sister company Airborne Avionics, as well as space for specialised work aids, such as engine and transmissions stands.

If eventually built, the additional facility would position Oz Choppers as a major refurbishment and parts distribution hub in Australia for Bell medium twins.

“We’d like to stick with this niche market that we have built up,” Rogers said.

“The 212 and 412 aircraft are versatile, reliable and well supported by Bell. I think we’ll continue on with what we’re doing.”

➔ A ‘new’ Bell twin arrives at Oz Choppers. MARK JESSOP

➔ VH-NBN, a newly-completed Bell 212 for Orange Helicopters. MARK JESSOP





KEEP 'EM SEPARATED

Drones throw up challenging airspace and infrastructure issues

WRITER: KEITH TONKIN

Individuals and large multi-national corporations all over the world are devising increasingly sophisticated recreational and commercial uses for drones, bringing with them new and different airspace and infrastructure needs. With that many issues will arise in the near and medium term to safely and efficiently accommodate this very different type of airspace user.

Drones are already used extensively across a range of commercial and parapublic activities, from search

and rescue, fire management and emergency response, to aerial photography, aerial agriculture including spraying, plant analysis and vegetation crop mapping, to environmental research.

Generally these operations are within visual line of sight with relatively small payloads.

But in urban areas of the future we expect to see networks of autonomous aerial taxis, large parcel delivery drones, single or two-seat personal use drones in our backyards, drone

ambulances responding to medical emergencies and the list goes on.

In the regions, drones will be used for any purpose that makes a task safer, more efficient or simply could not be done any other way.

Drones can conflict with the safe operation of airports and aircraft landing areas (ALA), therefore the Civil Aviation Safety Authority (CASA) generally prohibits the operation of drones within areas of airspace where civil aircraft operate. Drones are not allowed to operate within 3nm

• How will the drones of the future operate within controlled airspace? VOLICOPTER

(5.5km) of a controlled aerodrome. For non-controlled aerodromes, including aircraft landing areas, CASA excludes drone operations from on or above runways or taxiways or in the approach and departure paths of the aerodrome.

Most small drones do not have the payload capability to carry avionics that would allow them to operate in controlled airspace and interact with the broader air traffic management system. At the moment they're allowed to operate in only a small volume of airspace just above the ground (and not near controlled airports as above).

It seems reasonable to expect to be able to identify and control a drone in the same way as other controlled airspace users, so the development of a drone traffic management system (commonly called UTM, or UAS traffic management system) that interacts with the national air traffic management system will be an important medium-term objective to enable a greater scope of operations for these drones in more congested airspace.

Larger drones carrying heavier payloads beyond visual line of sight for extended missions is the next significant frontier for commercial and emergency services drone operators. With all the known limitations of the see-and-avoid principle that has long been the foundation of collision avoidance for visual flight rules operations, there is an understandable reluctance by regulators to allow unfettered beyond visual line of sight operations.

Part of the problem is that we need to know where the drone is in three dimensions and where it is going so that its path can be deconflicted with other airspace users and vertical obstructions. That means the drone needs to know its geographical location and elevation and be able to transmit this information to the operator, via a communications network.

And we all know that our telecommunications networks (think mobile phone or VHF) do not provide 100 per cent coverage. So wherever extended beyond visual line of sight operations are planned, a comprehensive network of receivers/transmitters are required to connect the operator to the drone in real time.

For most of us, the thought of using a drone for evil purposes is abhorrent. But in places of conflict and civil unrest, drones are being used to gather intelligence and deliver weapons. Due

to their size and ease of deployment, drones are a simple but effective tool for people seeking to cause harm to others. And that means we need to have the ability to detect and disable drones if they operate where and in ways that they shouldn't. There are various counter-drone technologies available today, and development continues, much in the same way as counter-air operations developed alongside the introduction of new aircraft capabilities.

Some counter-drone capabilities rely on interrupting electronic signals being received by the drone. This disruption of the electromagnetic spectrum needs to be carefully considered, coordinated and controlled to avoid unforeseen consequences, particularly in highly populated areas.

Drones are now becoming widely used in urban areas for recreational and commercial activities and are set to become part of an increasing problem for urban planners dealing with volumetric spatial requirements.

In terms of urban planning, integrating the use of drones for business and recreation while maintaining aviation safety is becoming an important consideration for future planning and design as well as economic development outcomes.

The increasing use of drones, with their expanding scope of operations and increased range and payload, will need to be considered in all relevant legislation and regulations, including urban strategies and planning provisions.

Drone operations facilities (variously called 'droneports', 'drone zones' or other such names), like airports and helicopter landing sites, will also need restrictions on the height, form and extent of the

'Drones are set to become part of an increasing problem for urban planners.'

built environment to protect flight paths and prevent building-induced turbulence. They will also need to be designed to prevent potential impacts to wildlife and not adversely affect neighbours with noise, light or other amenity impacts.

The simplest way to achieve this is to incorporate them into the National Airports Safeguarding Framework. They should be protected from incompatible development in the same way that heliports, particularly those on hospitals or other emergency services facilities are protected.

A highly accurate, three-dimensional digital elevation database will be required to ensure that drones can operate without colliding with permanent or temporary vertical obstructions such as buildings, towers, cranes or other structures.

Finally, from a safety oversight perspective, we know that regulations are constantly being devised and updated as new technologies enable different uses and applications for drones. Finding the right level of regulator involvement will always be a topic of robust conversation.

The Civil Aviation Safety Authority has worked hard to ensure that people can operate drones in the greatest practical range of uses while achieving appropriate safety outcomes, and industry should expect this to continue. A positive and constructive relationship between industry and the regulator will serve to advance the interests of all stakeholders as technology develops in ways we could never have imagined. 🚁

Keith Tonkin is managing director and principal consultant of Aviation Projects

🚁 Droneports will need to be designed to not adversely affect neighbours with noise, light or other amenity impacts. AURORA FLIGHT SCIENCES



Traffic

Key aircraft movements from across the region

WRITER: GORDON REID



VH-EBN is the first -200 series A330 to be repainted in the latest Qantas scheme. BROCK LITTLE

QANTAS GROUP NEWS

Qantas ferried A380-842 VH-OQK from Sydney to Dubai as QF6011 on May 16 for planned maintenance and painting in the silver roo livery. VH-OQK returned to Sydney from Dubai on June 2 as QF6012 on completion of the work.

A380-842 VH-OQL ferried from Singapore to Dubai as QF6013 on April 21 for planned maintenance and painting in the silver roo livery. It returned to Sydney from Dubai on May 9 as QF6012.

747-438ER VH-OEG ferried from Sydney to Hong Kong as QF6015 on May 12 for planned maintenance.

747-48E VH-OEB returned to Sydney as QF6031 on May 11 after completing a round-the-world charter for Constellation Journeys. The flight commenced in Sydney on April 22 and took the aircraft to Hanoi, Delhi, Kilimanjaro, Marrakech, New York, Havana and Tahiti.

A330-203 VH-EBN is the first of its type to be painted in the Qantas silver roo livery. On May 1 VH-EBN operated QF37 from Melbourne to Singapore where it was repainted before ferrying

to Brisbane as QF6013 (arriving May 18).

Qantas placed 737-838 VH-VZJ, the former ZK-ZQE, into service on May 30 with the aircraft operating QF798 from Brisbane to Cairns (refer Qantas/Jetconnect below).

A further six Qantas 737s have been repainted in the new silver roo livery with Flying Colours in Townsville: VH-VZA over April 7 to April 24; VH-VZC April 13-30; VH-VZD from May 23; VH-VZE ex Townsville on April 8; VH-VZF from April 24 to May 9 and VH-VZM May 9 to May 24.

Qantas/Jetconnect withdrew 737-838 ZK-ZQE *William Pickering* from service on May 10 after it operated QF120 from Auckland to Brisbane (refer above).

QantasLink/Network took delivery of A320-232 VH-VQU *Red River Gum* in Perth on April 13 after the aircraft ferried in from Seletar as JQ8996. VH-VQU entered service on April 26 when it operated QF2642 from Perth to Karratha.

Jetstar took delivery of A320-232 VH-XJE in Melbourne on March 27 (Traffic/May) and then placed the aircraft into service

on April 5 when it operated JQ576 from Melbourne to Brisbane.

Ex Qantas 767-238 VH-EAQ was delivered to Weststar General Aviation, now registered N2767, in Subang on May 13. On May 21 the 767 arrived in Perth from Subang.

AIRLINE NEWS

In this issue we report the delivery of an A330-200 to Fiji Airways, a Fokker 100 to Alliance and an ATR 72-600 to ANZ Link/Mount Cook. Departures to report are an ATR 72-500 of ANZ Link/Mount Cook and two Beech 1900Ds of ANZ Link/Eagle while a BAe 146-300 of Cobham Aviation was removed from the register.

AirCalin ferried A320-232 F-OZNC as AC1980 from Noumea to Darwin and Kuala Lumpur on May 22 for planned maintenance.

Continuing issues with Air New Zealand's 787-9 'Package C' Rolls-Royce Trent 1000 engines has seen the airline lease a 777-200ER and wet-lease an A340-300.

777-212ER ZK-OKI was registered to Air New Zealand on May 15. This aircraft was built on order for Singapore Airlines as 9V-SVL, which operated it between November 26 2002 and March 1 2018.

Air New Zealand has again wet-leased Hi Fly Malta A340-313X 9H-SUN, with the aircraft returning to Auckland on May 22 from Brussels and Mandalay. 9H-SUN re-entered service with Air New Zealand the same day when it operated NZ10 from Auckland to Honolulu.

787-9 ZK-NZE returned to service on June 1 when it operated NZ101 from Auckland to Sydney, after having been grounded at Auckland since December 5 '17.

Meanwhile, 787-9 ZK-NZG was grounded at Auckland on April 18 after operating NZ178 from Perth to Auckland.

In other Air New Zealand news, 777-219ER ZK-OKD was ferried from Auckland to Singapore as NZ6004 on May 25 for planned maintenance and repainting in the current Air New Zealand livery. It returned to Auckland as NZ6005 on May 28.

Former Air New Zealand 767-319ER ZK-NCJ had been in storage in Alice Springs since February 13 2017, where it was later registered N930WE. On April 21 it departed Alice Springs for Honolulu and Wilmington, Ohio prior to its conversion to a freighter.

Meanwhile, 767-319ERs ZK-NCG and ZK-NCI remain in storage at Alice Springs.

ANZ Link/Mount Cook registered ATR 72-600 ZK-MVR msn 1487 on April 13 before taking delivery of the aircraft in Christchurch on April 18. ZK-MVR's ferry from Toulouse was contracted to Southern Cross, and operating as SXI1809 was routed via Trabzon, Al Ain, Nagpur, Subang, Denpasar, Darwin and Brisbane. ZK-MVR entered service on April 26 when it operated NZ366 from Christchurch to Wellington.

ATR 72-500 ZK-MCF was withdrawn from ANZ Link service on May 6 after it operated NZ5716 from Invercargill to Christchurch. It departed Christchurch for Saigon on May 21 as Southern Cross 1820 with its airline titles and koku removed. Ferrying to Saigon via Brisbane, Mount Isa, Darwin and Kota Kinabalu, ZK-MCF was then prepared for delivery to Novo Air in Bangladesh.

ANZ Link/Eagle Beech 1900D ZK-EAG later VH-OYW had been in storage at Bankstown since October 2016, but on April 12 it departed for the Gold Coast. After overnighing the Beech continued to Apia on its ferry to Peru.

Likewise Beech 1900D ZK-EAP later VH-OYZ had been stored at Bankstown since October 2016 and followed VH-OYW to Peru on May 19 ferrying via the Gold Coast, Apia, Papeete and Easter Island and onwards ferry to Peru.

Alliance Airlines took delivery of Fokker 100 VH-UQA msn 11499 ex OE-LVE at Brisbane on June 4 after the aircraft ferried in from Kupang and Townsville as SXI 1802. The Fokker had been registered to Alliance on February 5.

Fokker 100 VH-UQB 11483 ex OE-LVF was registered to Alliance Aviation on March 28, while Fokker 100 VH-UQF msn 11456 ex OE-LVH was registered to Alliance on May 25.

Fokker 70 OE-LFQ msn 11568, which was delivered to Alliance in Brisbane on March 31 (Traffic/May), was registered VH-NUZ on April 20.

Fokker 50 VH-FKO has returned to Australia after operating passenger charters in New Zealand since September 13



Air New Zealand is again wet-leasing Hi Fly A340-300 9H-SUN.

EWAN BROWN

2017. On May 11 it departed Auckland for Norfolk Island, Brisbane and Auckland.

Fiji Airways took delivery of A330-243 S7-ADB msn 751 at Nadi on April 29 after the Airbus ferried in from Abu Dhabi on April 29 as SEY9778. Later registered DQ-FJO and named *Island of Beqa* the A330, the fourth of type in the Fiji Airways fleet, entered service on May 12 when it operated FJ411 from Nadi to Auckland.

737-8X2 DQ-FJG departed Nadi on May 13 as FJI2007 for Cairns and Seletar for planned maintenance. As FJI2008 it returned to Nadi on May 26 from Seletar and Cairns.

Cobham Aviation/National Jet Express cancelled BAe 146-300 VH-NJL from the register on

May 17, a day after its cabin and cockpit section were removed for transport to the South Australian Aviation Museum where they will be placed on display.

VIRGIN GROUP NEWS

Virgin Australia named 737-800 VH-YWD *Tinamirakuna* at a ceremony held at Launceston on June 1.

E190-100IGW VH-ZPA, which departed Brisbane on January 9 2017 on ferry to Nashville, was cancelled from the Australian register on April 4. On April 5 it was placed on the US register as N14800.

E190-100IGW VH-ZPB, which departed Brisbane on November 28 2016 on ferry to Nashville, was cancelled from the Australian register on May 21. On

May 24 the E190 was placed on the US register as N216NC.

E190-100IGW VH-ZPK was ferried from Nashville to Lake Charles, Louisiana on May 18 for painting.

Virgin Australia Regional Airlines took delivery of former Tigerair Australia A320-232 VH-VNJ in Perth on April 7 after the aircraft ferried in from Clark Field and Darwin as Tiger 9003. VH-VNJ had been painted in Virgin Australia colours while in the Philippines and entered service on May 2 when it operated BHP mining charter VOZ9339 from Perth to Coondewanna.

Tigerair A320-232 VH-VNQ ferried from Melbourne to Darwin and Clark Field on February 1 where the aircraft was cancelled from the register on April 24 on



Ex Tigerair A320 VH-VNJ has now joined the Virgin Australia Regional Airlines fleet. BRENDEN SCOTT

Falcon 7X N818TL flies into Sydney in late May, a month after being delivered to Network Jets of Auckland. BRENDEN SCOTT



its sale in India. On April 28 and now registered to Indigo Airlines as VT-IHR the A320 ferried from Clark Field to Bangkok and New Delhi.

A320-232 VH-VNG departed Melbourne on May 2 as TGG9002 on ferry to Darwin and Clark Field for planned maintenance before returning to Melbourne via Darwin as TGG9003 on May 15.

REGIONAL AIRLINE NEWS

In this issue we report the delivery of an EMB-145LR to JetGo while departing were two DHC-6-300 operated by Fiji Link.

Air Rarotonga planned to take delivery of Saab 340B+ N368CL msn 340B-368 in late May.

Fiji Link ferried ATR 72-600 DQ-FJX as FJA2003 from Nadi to Nelson on May 29 for planned maintenance with Air New Zealand Regional.

Fiji Link has terminated its lease on DHC-6-300 DQ-PSD and on March 23 it departed Nadi on ferry to the United States.

DHC-6-300 DQ-PSE has also terminated its lease and on May 25 it departed Nadi on ferry to Majuro, Honolulu and Santa Maria/California where it arrived on May 29.

Hevlift Australia (Fixed Wing) Pty Ltd of Brisbane became the registered operator of ATR 72-600 VH-FVM effective April 23.

Hevlift (PNG) ferried DHC-6-300 P2-KSM from Cairns to Honiara on May 7 and after overnighing it continued to Tarawa, where it commenced a three-month lease to Air Kiribati.

JetGo took delivery of ERJ-145LR N14923 msn 145318 at Brisbane on April 13 after the aircraft ferried in from the US via

Nome, Petropavlovsk, Sapporo and Davao City. However, since its arrival the aircraft has remained static.

On June 1 JetGo was placed in voluntary administration. At the time ERJ-135LR VH-JZG was parked at Sydney, where it had been since March 25; ERJ-135KL VH-ZJE was parked at Townsville, where it had been since March 26; while ERJ-135KL VH-ZJG was at Brisbane, where it had been parked since April 14.

ERJ-135LR VH-JGB and ERJ-145LR VH-JGR are still operational and are available for charter.

BIZJET NEWS

In this issue we report the delivery of a Global Express, a Falcon 7X and a Learjet 31 and the departure of a Global Express.

Global Express VH-OFX msn 9104 was registered on April 3 with the holder Mitchell Air of South Melbourne, Victoria and the operator Australian Corporate Jet Centres of Essendon Fields, Victoria. It was delivered to Essendon from Halim on April 17.

Falcon 7X N818TL msn 15 was delivered to Network Jets at Auckland on April 29 after arriving from Springfield, Illinois and Hilo.

Learjet 31 VH-LPX msn 31A-144 ex JA01CP was placed on the register on April 5 with the holder Astra Aerospace of North Nowra, NSW and the operator GoJet of North Nowra. VH-LPX was delivered to Nowra on April 22 after arriving from Ambon and Darwin.

Sovereign VH-VPL, which was operated by Twentieth Super Pace Nominees of Southport, Queensland, has been sold to

Skyline Aviation of Napier, New Zealand. On May 19 VH-VPL departed Essendon for Napier. It was registered ZK-RXD to Skyline Aviation on May 22.

New production Global 6000 C-FWVU msn 9817 was noted at Montreal/Trudeau on May 10 with the registration VH-YAI.

Palmer Aviation Global Express M-ATAR reportedly has been sold. Ownership of the Global was transferred to FAI Asset Management on April 19 and on May 14 it was flown from Norwich, UK to Nuremberg, Germany. M-ATAR was then cancelled from the Isle of Man register on May 25.

Global 6000 N796GL has operated a demonstration tour of Australia, arriving in Sydney from Xiamen on May 4. It later visited Perth and Essendon before departing Brisbane for Shanghai on May 11

Citation M2 N902MZ has also operated a demonstration tour with the aircraft first noted arriving in Darwin from Denpasar on May 5. It later visited Ceduna, Archerfield, Sydney, Essendon, Maroochydore and Cairns before departing Darwin for Denpasar on May 13.

The first two Pilatus PC-24s for the RFDS/Western Operations have been noted at Stans, Switzerland on May 3 - HB-VSF msn 105 which is the prospective VH-VWO and HB-VSG msn 106 which is the prospective VH-KWO.

Falcon Air Falcon 20-F5 VH-PNY arrived back in Sydney on May 16, resplendent in an attractive new colour scheme, after maintenance in the US. It had ferried via Guam and Cairns.

In turboprop news the RNZAF has taken delivery of two King Air 350i aircraft. VH-ZPG msn

FL-962 departed Cairns for Brisbane on May 25 and after overnighing continued to Lord Howe Island and Ohakea where it became NZ2351.

King Air 350i VH-ZPE, meanwhile, had been delivered to the RNZAF at Ohakea on March 23 (Traffic/May), and was cancelled from the register on May 8 prior to it being allocated the RNZAF serial NZ2353.

FERRY FLIGHTS

Baron G58 VH-KJV departed Port Macquarie for Lord Howe Island and Norfolk Island on April 19 before continuing to Kerikeri and Ardmore on April 20.

After completing its demonstration tour of Australia (Traffic/May) Cessna 208B/EX N5420C departed Jandakot for Newman, Kununurra and Darwin on April 6 and after overnighing continued to Kupang.

Cessna 208 VH-NUQ msn 208-00550 was registered to West Coast Seaplanes of Broome on May 10 and arrived there from Denpasar on May 23.

Travira Air Cessna 208/FP PK-TVN arrived in Broome from Kupang on May 20.

On May 31 Cessna 172S VH-ZEJ departed Toowoomba for Longreach and Darwin before continuing to Balikpapan on June 2.

Diamond DA-40 N360TX msn 40-723 arrived at Archerfield on May 28 from Denpasar, Darwin and Mount Isa.

Found FBA-2C3/FP N883MX was noted at Ardmore on May 5. Helio U-10 C-GZZL was noted at Jandakot on April 13.

PAC 750XL ZK-KDI msn 206 (Traffic/May) departed Hamilton on May 24 on the first leg of its ferry flight on delivery to the Papua New Guinea Defence Force. Routing via Ardmore, Kerikeri, Norfolk Island, Lord Howe Island, Gold Coast, Rockhampton, Cairns and Horn Island, it arrived at Port Moresby on May 29.

PAC 750XL ZK-KEJ msn 220 departed Hamilton for the Gold Coast and Toowoomba on April 7 on delivery to Poland (Traffic/May).

RAAF Pilatus PC-21s HB-HWM callsign PCH46P and PC-21 HB-HWN callsign PCH47C arrived at RAAF Base East Sale on April 23 after ferrying in from

Stans, Switzerland via Denpasar, Darwin, Alice Springs and Adelaide. They were later allocated the RAAF serial numbers A54-013 and A54-014, respectively.

Not quite a month later they were followed by PC-21s HB-HWO callsign PCH48R and HB-HWP callsign PCH49T, which arrived at East Sale on May 21 after ferrying in from Stans via Denpasar, Darwin, Alice Springs and Adelaide. They were later allocated the RAAF serials A54-015 and A54-016, respectively.

PC-21 HB-HWT, the future A54-020, was noted at Stans in late May featuring a Roulettes paint scheme with a stylised 'R' on its tail.

Former RFDS PC-12/45 VH-ZWO, which had ferried from Sydney to Auckland and Fielding on November 10 2017, departed Fielding for Auckland on May 17. After overnighing the PC-12, which still carried its RFDS titles, departed for Pago Pago, Christmas Island, Hilo and Van Nuys where it arrived on May 21.

Abel Aviation PA-28-181 VH-BVN departed Archerfield for Lord Howe Island on May 19 before continuing to Kerikeri on May 20.

TBM700 N700BK arrived in Darwin from Denpasar on May 5 before continuing to Archerfield on May 6. It was later noted at Rockhampton, Bundaberg, Emerald and Moree before arriving in Essendon on May 14.

MAF Airvan 8 VH-MFM arrived in Darwin from Gove on May 16 and after overnighing continued to Dili.

Jetprop DLX CC-AQZ arrived in Darwin from Kupang on May 13 before returning to Kupang on May 15. The Jetprop DLX is an after-market PT6A turbine conversion of the PA-46-310P.

HEAVY METAL

French Air Force A340-211 F-RAJB/81 as Cotam 2 arrived in Sydney from Singapore on April 30 and departed to Noumea on May 3.

French Air Force A330-200 F-RARF/240 as Cotam 1 arrived in Sydney from Singapore on May 1 before departing to Noumea on May 3.

French Air Force Falcon 7X F-RAFA/68 as Cotam 5 arrived in Sydney from Singapore on



Ex Qantas 767-238 VH-EAQ, now registered N2767, arrives in Perth from Subang, on May 21. DYLAN THOMAS

May 1 and departed to Noumea on May 3.

K5 Aviation A319-115/CJ D-APGS callsign 'Kay 51' arrived in Sydney from Narita on April 24 and departed to Honolulu on April 27.

Antonov Airlines An-124 UR-82027 as ADB2405 arrived in Newcastle from Johor Bahru on May 2 before departing on May 3 to Melbourne and Papeete as ADB257F/ADB2457.

Ukraine Air Alliance An-12BK UR-CAH as UKL5020 arrived in Perth from Halim on May 20 before returning to Halim as UKL5021 on May 21.

Ukraine Air Alliance An-12BP UR-CAK arrived Sydney from Surabaya on April 7 and the same day departed to Darwin and Jakarta. UR-CAK later arrived in Perth from Halim on April 11 before departing to Padang on April 12.

Emirates 777-31H A6-EMQ as UAE2546 arrived in Alice Springs from Dubai on May 4 and on arrival it was placed in temporary storage.

Omni Air International 777-2U8 N828AX as OAE309 arrived in Darwin from Guam on

April 21 before returning later the same day to Guam.

Vim Airlines 777-212(ER) VP-BDR arrived Brisbane from Alice Springs on April 23 and departed to Rio on April 24.

United Arab Emirates 787-9 A6-PFE as Amiri Flight 5 arrived in Sydney from Christchurch on May 7 and departed to Canberra and Singapore on May 9.

Atlas Air 767-375ER N649GT as GTI8277 arrived in Darwin from Guam on May 23 before returning to Guam as GTI8276 on May 24.

Talos Aviation 757-23N M-RISE arrived at Port Hedland from Al Maktoum on May 1 before departing to Kuala Lumpur and Al Maktoum on May 3.

US Air Force 757-23A/C-32B 24452 callsign 'Finny 72' arrived in Cairns from Pago Pago on May 13 and departed to Paya Lebar on May 15.

P-8A A47-007 was delivered to the RAAF at Edinburgh on May 4 after arriving from Boeing Field, Honolulu and Pago Pago.

Donghai Airlines 737-800 B-7100 as EPA62234 commenced operations into Darwin from Shenzhen on May 30.

737-7BC/BBJ N835BA arrived in Sydney from Boeing Field and Honolulu on June 3 before continuing to Melbourne on June 5.

Beijing Airlines 737-79L/BBJ B-3999 arrived in Sydney from Guangzhou on May 4 before returning to Guangzhou on May 5.

Avjet Corporation 737-7EG/BBJ N8767 arrived Perth from Nadi on May 4 and departed to Dubai on May 6.

ACM Air Charter 737-7AU/BBJ VP-BJZ arrived in Sydney from Xiamen on May 25 before continuing to Adelaide on May 27 and Fuzhou on May 28.

US Air Force 737-7AFC/C-40C 05-0932 callsign Spar 24 arrived in Cairns from Halim on May 29 and departed to Wellington on May 31.

Air Bridge Cargo 737-46Q(SF) VQ-BVF as VAS9262 arrived in Canberra from Halim, Darwin and Alice Springs from April 17 and after overnighing departed to Alice Springs, Darwin and Subang.

Western Global MD-11F N546JN as WG8449 arrived in Darwin from Honolulu on April 12 before departing to Guam as WG449 on April 13. 🇺🇸



ACM Air Charter BBJ VP-BJZ in Sydney in late May. LUKE MCDERMOTT

Know your aircraft

The incalculable value of a pilot's tech library



• Flight manuals are invaluable in getting to know your aircraft's systems. TEXTRON AVIATION

In the flying game a pilot cannot know enough. Having ready access to technical information is a must in order to know more, to learn and to refresh.

As a flight instructor I have a small library of how-to-fly type publications, which gets added to on occasion. I also have something in the order of over two metres of flight manuals, owner's manuals, information manuals and pilot's operating handbooks.

The titles have changed over time. The early ones were slim and the later ones much thicker. Some are paperback format while others are in A4 size.

The one for the Piper Cub is all of 30 pages. A Beech A36 Bonanza flight manual is a hefty book size.

Some of the manuals are pertinent to the aircraft that I fly or have flown. Others are for aircraft that I plan to fly, while others again are simply manuals that I tripped over and acquired with the aircraft type being on my wish list.

The manuals come from all sources – pilot shops, second-hand book sales and of course vendors that sell aircraft manuals or copies, typically via the internet.

When I expect to fly a new aircraft make or model I am keen to know as much as I can about the aircraft before I step into it. I will go on the net and

see if I can acquire a copy of the FAA Type Certificate Data Sheet. This can give me information about an aircraft that may not be in the aircraft flight manual. Then there is the aircraft flight manual itself – or whatever is the name given to it at the time the model first took to the air.

One thing that a manual is good for is to get to know the systems. The electrical system, the hydraulic system, weight and balance, the fuel system and, if a retractable, the undercart system. In particular how to get the gear up and down normally and in an emergency. For the fuel system how many drain points are there?

I can recall the story of an ag pilot with over 16,000 hours in a Cessna Agwagon who had an engine failure on takeoff, due to water in the fuel. When asked did he check the reservoir drain he said he did not know there was one there.

For any complex aircraft it is vital to have the aircraft manual close at hand in case one has a problem and needs to know more. It makes no difference if the aircraft is a Beechcraft or a Boeing.

In addition to the aircraft manual collection I also have a collection of manuals that cover such things as trouble-shooting, engines, avionics, weather, aviation medicine, CASA publications, GPS, etc.

And for most aircraft that I fly or have flown I will also make up an information card and keep it in a semi-rigid clear plastic holder. On that I record such things as the V speeds and the usable fuel. On the reverse face I note things of interest about the aircraft model, things that do not get mentioned in the aircraft manual and are the sort of things that one learns from flying the type or from a quality endorsement or checkout of that model aircraft.

For example in a Piper retract the gear lights may be very dim to non-existent during daytime with the panel lights on. In a Cessna 205 30 degree flaps is better to use than 40 degrees due to the high sink rate. Beware the mid windscreen-mounted compass that can rake your head in a P.68 as you clamber into the pilot's seat. In a low-wing aircraft you expect airframe buffet at the stall as the turbulent air over the wings spills over the tailplane. In a high-wing Cessna you can also get airframe buffet with the flaps full down as the airflow spills off the flap trailing edge and over the tailplane. In a Cessna 172 the left tank fuel level typically goes down at a faster rate than the right tank. The left tank air vent directs air into that tank only. In a PA-22 Tripacer the master switch is under the left seat.

These self-made information cards are great to refresh what I need to know about an aircraft, especially as I get involved in ferry flights across Australia of many different kinds of GA types. For planning purposes it is vital to know typical cruise speeds, fuel burn rate and useable fuel quantities. Another question is do I need flaps or the fuel pump on for takeoff?

Having the information card to hand – I usually stow it in my flight bag – when I do not have access to the paperwork in the aircraft has often proven invaluable.

Knowledge when you need it takes preparation and planning. And the foundation of that knowledge is a pilot's tech library. 📖

'It is vital to have the aircraft manual close at hand.'

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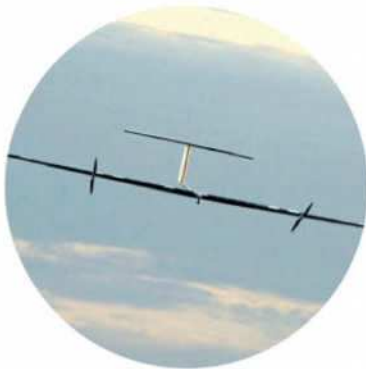
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Water bird

A Sandringham to the Snowy Mountains

In the 1960 and '70s the Short flying boats of Ansett Flying Boat Services were an impressive sight on Sydney Harbour. Operating to Lord Howe Island plus on charter flights to Australian and Pacific island destinations, they were the last of a proud line of large four-engined Short flying boats to have operated in Australian skies, commencing with the Qantas Empire Boats of the 1930s.

These aircraft were Sandringhams VH-BRC *Beachcomber*, formerly ZK-AMH *Auckland* with TEAL and obtained by Ansett in May 1950, and VH-BRE *Pacific Chieftain*, which would suffer from severe cyclone damage during an overnight stop at Lord Howe Island on July 3 1963; plus converted Sunderland VH-BRF *Islander*.

To replace VH-BRE, which would be stripped of useful parts before being scuttled in the waters off Lord Howe Island in December 1963, Ansett purchased RNZAF Sunderland 5, NZ4108, which arrived at Rose Bay on December 18 1963. After a substantial modification it emerged as VH-BRF and conducted a maiden proving flight on September 28 1964.

Although both VH-BRC and -BRF were identified on the Australian civil aircraft register as Short S.25 Sandringhams, VH-BRF's bulbous nose set it apart from earlier Sandringhams, which were modified from the military Sunderland configuration by Short and Harland in Belfast.

In 1970 the looming retirement of the Sandringhams, and thus the end of the large flying boat era in Australia, prompted the NSW Branch of the Aviation Historical Society of Australia (AHSA) to arrange a

charter flight. Members were keen to experience flight in a large flying boat and an itinerary was planned to offer something different so it would have wide-ranging appeal. Demand for the 42 seats saw the charter fill quickly with AHSA members, Sunderland veterans and some trout fishermen visiting their choice angling destinations.

On November 28 1970 this writer joined fellow AHSA members assembled at Rose Bay for an 0800hrs departure. Boarding VH-BRF the roomy cabin was comfortably arranged reflecting the layout of a roomy bygone era. The four Pratt & Whitney R-1830 Twin Wasps were started with engine power checks conducted while we were still tethered to the mooring dock.

After completion of checks the Sandringham was cast off and taxied to the eastern side of Rose Bay. Full power was applied prior to lining up and VH-BRF churned out of Rose Bay in a slicing arc of foam and continued down the Harbour towards the Sydney Harbour Bridge.

Takeoff in a large flying boat is an exhilarating experience. Acceleration seems slow as water drums against the side until the aircraft gradually starts to rise and we were skimming along riding on the hull's step with the evocative sound of the Twin Wasps delivering takeoff power. The foaming water turned to a fine spray as we lifted off and climbed over Rushcutters Bay.

A flightdeck visit saw a chat with the technical crew, Captain Keith Mansfield, First Officer Ron Harrison-Williams and Engineering Officer John O'Brien. It was a beautiful day with a cloudless sky and just a light mist out to sea. The instruments revealed we had levelled out to cruise at 1,500ft with an indicated airspeed of 120kt.

The flightplan provided for a coastal cruise at 1,500ft as far as Moruya then a climb inland to 7,000ft to clear the Great Dividing Range. It was interesting to see the captain using an Ampol road map (remember Ampol?) to identify the coastal towns to the listening passengers.

After breakfast passengers set out to explore the Sandringham

visiting the downstairs and upstairs compartments. There were handrails near viewing windows not adjacent to seats and we found incomparable views could be had even from the toilet window! The forward unlined baggage compartment was noisier and colder than the cabin and we reflected on what conditions on a long wartime Sunderland patrol must have been like.

Arrival over Lake Eucumbene, which is the main storage area for the Snowy Mountains Scheme, revealed a vast glistening blue expanse of water that when full, contains about nine times the volume of Sydney Harbour.

As the aircraft alighted (Captain Mansfield informed us flying boats don't land, they alight) on the water the effect was spectacular as water momentarily engulfed the widows as the aircraft settled onto the water. A launch then took the Sandringham in tow and secured it to a mooring buoy.

We had an enjoyable weekend touring many diverse sights in the Snowy with an overnight stay in Adaminaby. Visits to Jindabyne, Thredbo, Yarrangobilly Caves and the Tumut 1 power station buried 1,200ft beneath the surface, were among some of the items on a packed itinerary with our coach covering 480km over the weekend. It's a lovely and diverse part of Australia and well worth a visit.

Late on Sunday afternoon we assembled at Eucumbene's lakeside, including the trout fishermen who had been absent from our activities. We transferred by launch to our waiting Sandringham and lifted off at 1644 after a 43 second takeoff run and climbed over the ranges to initially cruise at 5,000ft and then to 7,000ft after obtaining clearance with an arrival at Rose Bay at 1811hrs.

The careers of the graceful Sandringhams sadly came to an end in 1974 after the construction of a runway on Lord Howe Island to enable land-based services, with both aircraft sold to Antilles Airboats of the Virgin Islands.

Today both aircraft can be seen on display, with VH-BRC at the Solent Sky Museum in Southampton in the UK and VH-BRF now residing at Kermit Week's Fantasy of Flight museum in Polk City, Florida. 🍷

'Flying boats don't land, they alight.'

🍷 An islander in the alps. VH-BRF *Islander* moored on Lake Eucumbene on November 28 1970 with the rolling hills as a background. The lake is possibly the highest, if not the highest, altitude of water at 3,800ft, where a large four-engined flying boat has conducted operations. ERIC ALLEN



Economy basics

Qantas declines no-frills tickets... for now

It seems like every month or so another full-fare, full-service airline announces that it is launching a “basic economy” fare product to compete with the rise of low-cost carriers, especially the new breed of low-cost, long-haul airlines like Jetstar’s 787 operation, Singapore Airlines’ Scoot, Norwegian Air Shuttle, and so on.

Locally, Air New Zealand has been offering a basic economy model on its Australia and Pacific Island network under the Seats to Suit branding since 2010, with four initial categories of travel on its all-economy Airbus A320 international aircraft: Seat, Seat + Bag, The Works (adding movies, a doggy-dish airline meal and seat selection), and Works Deluxe (adding a free middle seat, an extra bag and priority ground handling).

The airline later rolled out Seats to Suit on the domestic network in 2011, but doesn’t offer Works Deluxe there – and has fiddled with the premium end of its pricing on widebody trans-Tasman services from Auckland too, adding premium economy and business fares as options on those flights, although it hasn’t gone basic economy on long-haul services.

Even Qantas has been mooting the idea via a survey, highlighting its trans-Tasman network as a potential target, taking the temperature of an advisory panel on whether passengers fancy “unbundling” the Qantas economy experience: notionally paying less for their basic ticket but adding on “extras” like luggage, meals, movies, seat selection and so on for an extra fee.

(That “notionally” is in there because, as a general rule, the airlines overseas that have introduced basic economy fares only reduced fares at the very start of their basic economy experiment, lifting them to the old regular economy pricing after people stopped paying attention, and then trousering the price differential between basic and regular economy.)

In other words, as Air New Zealand put it when introducing domestic Seats to Suit fares in 2011: “In the vast majority of markets our lead-in fares will be reduced with the introduction of a Seat fare level”.

This strategy has worked well for US airlines in particular, with American,



Delta and United all firmly entrenched in the world of basic economy. Not only do they get to pocket the “upgrade” fee to what passengers used to expect as a minimum, but it also helps them in the race to the bottom of the fare barrel on flight price comparison websites, which have been slow to make it clear exactly what passengers are buying, and where the cheapest comes first.

Basic economy helps when filling up planes too. Clearly, there are passengers whose priority is getting the absolute lowest fare: that much is clear from the low-cost carrier competition. If full-service airlines can serve this market with the less desirable middle seats at the back of their aircraft – while at the same time making the experience of passengers willing to pay a little more for a little more service a little better by giving them more chance to secure a window or aisle – that’s all for the good.

But it seems that the market isn’t so hot on having an unbundled Qantas experience after all. “We have no intention on unbundling our fares,” said a Qantas spokesperson.

The wider context in the passenger experience world is that more passengers are flying on budget airlines, driving prices down and making passengers ask, entirely reasonably, what they get for their money. The Asia Pacific region is filled with low-cost carriers offering a fair service for a fair price, with less-nimble established flag carriers struggling to keep up with the pricing Joneses – not

to mention the Fernandeses (AirAsia), Kiranas (Lion Air) and Gangwals (IndiGo) – and often the convenience factor as well.

The rise of the independent contractor economy, where more passengers are paying for their own work travel, and the fall in the number of larger companies that see business class as a good investment, plus the fact that low-cost carriers often operate a very tight ship in terms of schedules, have also meant that they are becoming increasingly attractive to business travellers.

Moreover, beyond the rise of the long-haul, low-cost carriers, the airlines formerly seen as beyond-the-pale budget cattle-trucks by many experience-sensitive passengers are no longer quite so unpalatable. Internationally, some of them, like AirAsia X, WestJet and Eurowings, even offer business class seats competitive or superior to the products on full-service carriers.

At the end of the day, full-service airlines have created their own problems in many ways. Qantas’s dual-branding strategy, while effective, has meant that many Australians’ primary (or even only) Qantas Group option is on Jetstar. If airlines make the no-frills, nothing-included experience people’s default expectation, then they can’t turn around and complain that passengers aren’t willing to pay for what used to be the base-level of passenger comfort and amenities. ❁

❁ Air New Zealand has used Seats to Suit across the Tasman for years, but new codesharing partner Qantas seems unlikely to follow suit.

‘This strategy has worked well for US airlines in particular.’

Devotion to duty

Pilot Officer Rawdon Middleton, VC



The 11,500 men of the RAAF who fought as part of the RAF's Bomber Command in World War 2 comprised only two per cent of all Australians who enlisted, but accounted for 20 per cent of all combat deaths.

So it seems extraordinary that only one of those airmen, Pilot Officer Rawdon Hume Middleton, was awarded a VC.

Modest and reserved, Middleton worked as a jackeroo before enlisting in the RAAF in October 1940.

Following training in Australia and Canada, he was posted to fly Short Stirling bombers with the RAF's No 149 Squadron.

On November 29 1942, Middleton – known to his crew as 'Ron' – was tasked to attack the Fiat works at Turin in Italy. The quiet Australian was so highly regarded that three gunners had stayed on with him even though they had completed their tours.

By the time Middleton's Stirling 'H for Harry' had climbed to 12,000ft

to cross the Alps, it was using an excessive amount of fuel. Weaving through the mountains and unsure of his position, Middleton was on the verge of abandoning the mission when the front gunner called out, "[Turin's] there, look to starboard".

Far to the right the crew could see the city, illuminated by flares and bomb bursts. Aware that pressing on might leave insufficient fuel to get back to England, Middleton nevertheless told his crew, "We're going down".

Flying through heavy flak, Middleton had just identified the target when a shell burst in the cockpit, wounding both pilots. The bomber plunged into a dive, its wings and fuselage continually hit by shrapnel. As the co-pilot pulled the aircraft out of the dive only metres from the ground, Middleton recovered consciousness. He resumed control, pressed on with the bombing run, and successfully attacked the target.

Despite dreadful injuries – his right eye had been shot away leaving the bone completely exposed, and his lower body was severely wounded – Middleton remained at the controls while the co-pilot's wounds were dressed.

Middleton considered diverting to North Africa to avoid the return climb over the Alps, but he was determined to get his men back to England and instructed them to jettison everything they could: armour plating, camera, oxygen bottles, ammunition, flares, seats, fire extinguishers, sextant. The navigator used an axe to chop off anything which was not essential and could be thrown overboard.

The smashed windscreen exposed both seriously wounded pilots to an icy blast. Standing between them, the front gunner kept a lookout and set the compass. Other crew members checked the dinghies, uncertain whether they would even reach the Channel. Middleton asked the crew not to talk to him unless it was essential, as it was desperately painful for him to reply.

Once the plain of France had been reached the crew could have bailed out but Middleton was determined to keep his men out of German hands.

'H for Harry' battled on towards England.

Still there was no respite: over northern France the Stirling was suddenly coned by 12 searchlights and light flak hit the wings. Although severely weakened by his injuries Middleton threw the aircraft into violent evasive manoeuvres.


At last the French coast came into view, simultaneously, the engineer told Middleton he could guarantee five minutes of fuel but not ten.

In a voice thick with pain and exhaustion, Middleton instructed his crew to prepare to bail out and asked for his own parachute to be passed to him: in retrospect, his wireless operator believed that that was "no more than a gesture to reassure us" as Middleton must have known that he was "too far gone" to get out himself.

Against the odds the Stirling made it over the Channel. As the aircraft crossed the coast of England five of the crew bailed out while two stayed behind to help their grievously wounded captain. Middleton turned the Stirling back over the Channel in an attempt to ditch. The aircraft crashed into the sea, killing all three men. The bodies of the front gunner and flight engineer were recovered the following day but Middleton had been incapable of escaping and his remains were not found.

Two months later his body would wash ashore near Dover. He would be buried in St John's churchyard, Beck Row, Suffolk, with full military honours.

As the wireless operator later recounted, "No-one will ever know what was going on in Middleton's mind in those last few moments ... During the return home there were many opportunities for us to abandon the aircraft and for Middleton to live. But he preferred that we, his crew, should not fall into enemy hands. That was the kind of man he was."

Middleton was posthumously promoted to pilot officer and awarded the Victoria Cross. The citation concluded with an inspiring valedictory: "His devotion to duty in the face of overwhelming odds is unsurpassed in the annals of the Royal Air Force." 

Below – Air Commander Australia, Air Vice-Marshal Steve Robertson and Suzanne Pierpoint, Rawdon Middleton's great niece, unveil a plinth in Pilot Officer Middleton's memory at RAAF Base Wagga last November. Bottom – A RAF Bomber Command crew with a Short Stirling bomber, similar to that flown by Rawdon Middleton and his crew. DEFENCE & IWM



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House cleaning

HNA Group is restructuring, but what does it mean for Virgin Australia?

Who controls Hainan Airlines, the flagship operation of China's HNA Group, which paid A\$159 million for a 13 per cent stake in Virgin Australia back in 2016?

That's the question that has been puzzling observers in recent times as HNA, based on Hainan Island – China's very own version of Hawaii – attempts to navigate its way through a morass of debt, the result of a A\$65 billion acquisition spree over the past three years.

It's something that has been at the centre of speculation for months, including rumours of impending bankruptcy and failure to pay wages to staff at some of its dozens of subsidiaries.

Apparently, Hainan, China's fourth largest airline, is no longer under the control of HNA... and that's official. Xu Jun, the carrier's president, has told investors that Hainan's State-owned Assets Supervision and Administration Commission (SASAC) now controls the airline through its stake in Grand China Air Co Ltd. Grand China, headquartered in Beijing, was formed in 2007 under the initiative of Hainan Airlines itself to merge its operations with other HNA Group subsidiaries Shanxi Airlines, Chang An Airlines, and China Xinhua Airlines. It is, you might say, a parent.

What has been happening at Hainan has, until now, been rather opaque, to say the least. What is known is that HNA's ambitious investment strategy has been unravelling and it is now undertaking a major restructuring to raise cash by selling equity and real estate assets amid a government crackdown on debt among some of the country's biggest conglomerates.

Since the start of this year, it has agreed to sell close to A\$20 billion worth of real estate in Australia, New York and Hong Kong, along with shares in Deutsche Bank and Hilton Worldwide Holdings. Significantly, however, none of its aviation-related assets have been put on the chopping block.

While Xu told investors during a conference call the SASAC was now in control, it seems that isn't the end of the matter and that the restructuring could lead to a further change of hands.

"The company is currently communicating, negotiating and proofing its asset restructuring plan, and there is a possibility that the actual controller of the company could change. It will ultimately be determined after the plan is approved by the relevant authority," he explained.

Whatever happens, the developments mark a significant change in the history of Hainan Airlines. How long that will take is uncertain. The airline was founded by Chen Feng, a former government official who went on to establish the HNA Group and now chairs both companies. Early investors in the airline included George Soros, the billionaire financier who at one point controlled a 25 per cent stake in the carrier. He has since sold out.

Of course, the reason this is all relevant to Australia is HNA's interest in Virgin Australia and whether what is happening actually has any meaning.

The answer, at least for the time being, is probably "no". It seems likely that whatever eventuates and whoever controls the airline they will want to maintain profitable network

links. And Virgin chief executive John Borghetti doesn't seem to be having any sleepless nights over it, although he will certainly be keeping one eye on developments. He told this columnist recently he is more than happy with both his Chinese partners – the HNA Group and the Nanshan Group, a privately-owned Chinese conglomerate whose interests include Qingdao Airlines, both of which now own around 20 per cent of Virgin.

"I have no concerns. The relationship is exceptionally good with both Chinese partners and HNA having been instrumental in assisting us through Hong Kong Airlines to operate through Hong Kong. We wouldn't be doing it if we didn't have them as a partner because we wouldn't have feed," he said.

"All I can say from our side is that they have proved to be exceptionally good shareholders, very supportive."

With flights already operating from Melbourne to Hong Kong, Virgin will launch from Sydney to Hong Kong in July. Then there is the new codeshare agreement with Hainan Airlines, covering Hainan codesharing on Virgin Australia domestic flights, and Virgin placing its code on Hainan flights to Sydney, Melbourne, Brisbane and Cairns.

And VA also recently tied up a long-term agreement with HNA-owned Gate Gourmet, the global airline caterer.

"They have other companies that we use so the synergies and benefits are good. Nanchang likewise are a terrific partner and we are very pleased to have them. I do think we are quite privileged to have them with us."

Borghetti is enthusiastic about how well sales for its Hong Kong flights are going.

"To a large extent it's because of Hong Kong Airlines and the HNA Group. I think that had it not been for them we wouldn't be going to Hong Kong."

Whether or not there is a shareholding the codeshare arrangements with Hong Kong Airlines and Hainan Airlines will remain critical to both sides as the number of Chinese visiting Australia and the number of Australians visiting China continues to surge. 🌏

'The answer, at least for the time being, is probably "no".'

✚ Virgin Australia and Hainan Airlines announced a new codeshare agreement in June covering Hainan China-Australia flights and Virgin domestic services. SETH JAWORSKI



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To be part of this program, you need to be an NGN member, willingness and ability to travel to attend the presentation night and any travel needed to complete the industry experience program.

More details on this year's program to come. Make sure you are on our mailing list to keep up to date.



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The Association is an independent, not-for-profit membership based organisation whose primary aim is to contribute to the long-term health of the Australian aviation & aerospace industries.

A/AA Partners



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Regional challenges

Supporting the success of new entrants



The June announcement that JetGo had entered voluntary administration was a blow for our regions, with scheduled passenger (but not charter) services by the airline suspended immediately.

A relatively new entrant, JetGo's RPT services had been welcome additions for many regional centres on the east coast, and the airline had shown great vision launching jet RPT services to communities not currently served by an airline, with Illawarra being a good example.

Here, JetGo launched the first airline services for the airport in several years. They proved popular, with passengers making the most of the ability to fly direct to Melbourne or Brisbane.

It shows services like these have strong potential to deliver for airlines, while creating economic opportunity and vital connections for the community.

It is therefore very important that the industry does not lose sight of the

very positive changes the airline has delivered.

However, the news also confirmed what many of us already know: attracting and retaining new services to the regions is tough.

With many regional centres only served by one airline, the market power of existing operators makes it challenging for new entrants. It is a challenge many of our members know only too well, and one that's not easily solved, especially for those airports trying to make the case for new services.

The current Senate enquiry into the operation, regulation and funding of air route service delivery to rural, regional and remote communities is examining the issue of regional air routes and airfares.

In the AAA's submission to the inquiry, we shared member feedback that some regional airports had been asked by airlines to reduce charges off the back of a threat to withdraw services. That's a reflection of the

challenges regional airports face when their revenues are being squeezed, and the difficulty airports have in creating space for a more competitive landscape.

The inquiry process may provide some insight into how we can support the success of new entrants in the regional market to ensure our communities remain connected and thriving for years to come.

For now though, our impacted members have focused on reinstating services as quickly as possible.

They may need to look to other airlines to meet their community's needs – and they may need to once again make the case for their communities.

When they do, they will be looking to existing operators to step up to the plate. It is only through genuine partnership between regional airports and the airlines that serve them that we can ensure sustainable air services over the long term.

Our regions depend on them.

'They may need to once again make the case for their communities.'

Alert and alarmed

Counting the costs of new regional airport screening

On federal budget night the aviation industry learnt that the government will introduce enhanced screening procedures for all passengers and their baggage at a number of additional regional airports. This news was surprising, and the timing of the announcement disappointing, especially given the excellent intelligence-driven, risk-based approach applied to regional airport security over the past several years.

By way of argument, a review of the current National Threat Assessment would most likely highlight that the current targets of choice are to be found in mass gatherings. Mid-city streets and boulevards, large shopping centres, train stations, ferry terminals, major airport check-in areas etc, and this has driven increased security in places such as central Sydney and Melbourne.

We suggest that a much lower number of people waiting at a rural airport for their air service, based on

the current threat assessment, would not rate as an attractive mass gathering target!

While the total costs of this proposal are yet to be calculated by the Department of Infrastructure and Regional Development, the whole expense needs to be considered and not just the once-off capital expenditure to purchase the high-tech scanning and surveillance equipment and systems.

The RAAA is concerned that ongoing costs – the employment and ongoing training costs for specialised staff – will quickly outweigh the initial purchase and installation costs.

Any additional increase in regional airfares to offset these costs would be unsustainable.

Instead, the only fair and reasonable way to fund this proposed policy is for the costs to be shared equally by every Australian domestic air traveller, or the public purse. Given that the people most likely to benefit from the 'warm glow of security' are the population at

large, the funding source should be the latter – consolidated revenue.

However, as the RAAA continues to support both a secure and viable regional airline industry, we suggest that perhaps the best way forward as a reasonable and acceptable compromise would be to examine and adopt the American approach. The US has the ASSIST (Airport Security System Integrated Support Testing) program, whose goal is to strengthen the aviation system by establishing the best possible security solution in the unique context of that airport's location. I would also add to the airports' location... "and its operational environment".

This approach would be aligned with a risk-based and intelligence-driven regime that would be broadly supported by the aviation industry.

The regional airline community would welcome any form of consultation with government policy and decision-makers on this emerging financial threat.

FROM THE REGIONS

MIKE HIGGINS
CEO – RAAA



'This news was surprising.'

The three dragons

The power of mixing with your peers



The AAAA Convention underscored the importance of professionals getting together to improve safety, learn new skills and to celebrate what a great career aviation can be.

Dr Tony Kern (a speaker at previous AAAA Conventions) talks about the 'three dragons' of ignorance, apathy and isolation – 'don't know, don't care, just leave me alone'!

Conferences, training days and other events address the three dragons in one fell swoop. It is surprising how positive you become simply by mixing with other professionals, seeing new equipment or hearing a new take on an old problem.

This year, Sidney Dekker gave a great presentation that challenged listeners to think of not who is responsible, but what is responsible when things go wrong. Alan Corr from the US delivered a workshop on spraying excellence that really got the

discussion going, and delegates heard from aircraft manufacturers and a wide range of trade exhibitors.

But inspiration doesn't stop at good speakers – AAAA recognised great contributions to our sector. The Ray Mackay Award for a lifelong contribution went to Harley McKillop who has trained, mentored and helped hundreds of application pilots over many years. The Professional Pilot Award went to Craig Patton for his unselfish development and sharing of safe scooping sites for the Fireboss firefighting aircraft. The Leland Snow Innovation Award went to Balmoral Engineering for its development of a high quality, low-cost powerline marker, while AAAA president Stephen Death received the Midcontinent Award for his contribution to AAAA.

AAAA also looks forward at these events and this year Kaddie Crosby was awarded the Col Pay Scholarship

to assist with attaining an application rating.

Even the Deputy Prime Minister tweeted "Aerial application is invaluable to the productivity of Australian agriculture and the delivery of emergency services. Congratulations to all the award winners at the AAAA gala dinner tonight."

Undervaluing the power of mixing with your peers is common, but self-recognition as a professional is critical to lighting a fire under your career. Real industry professionals search for opportunities to learn and engage.

If you see yourself as a professional with a commitment to learning, you can start by simply participating in the regular fare of relevant and fun events run by your association or professional body.

With the quality of speakers and the tailored content on offer, all you have to do is register and turn up. 🍀

'Undervaluing the power of mixing with your peers is common.'

Taking flight

Rotortech 2018 a great success

There has been plenty of recent discussion surrounding the state of the helicopter industry in terms of growth and activity, but if the interest levels demonstrated by participants at Rotortech 2018 is any measure of our sector's engagement and willingness to grow, then we are in good health.

With 996 registered delegates (an almost 10-fold increase), 78 industry booths, helicopter static displays and three days of informative presentations ranging from night firebombing operations to interactive sessions with senior CASA executives and the CASA Director of Aviation Safety Shane Carmody, the event's success was evident.

The keynote speaker Chuck Aaron held court with 400 people packing the presentation hall to hear about and watch footage of his stunning helicopter aerobatics demonstrations using his highly-modified BO 105. Vision from both inside and outside

the helicopter gave a realistic sensation of being thrown around the sky with some in the crowd feeling slightly uncomfortable, especially with Chuck's stunt of 20 consecutive barrel rolls with a full glass of water poised above the radio stack not spilling a drop. If you've seen the James Bond movie *Spectre* you've seen Chuck in action, in the stunning flying sequences above Mexico City's Zocalo Square.

Rotortech served to highlight a diverse industry on the move serving communities across Australia, from agriculture to emergency medical retrieval, firefighting, offshore transportation, policing, tourism, Antarctic science and exploration, mining sector support, critical utility infrastructure construction and monitoring, with other activities too many to list. No other aviation sector stretches across such a broad range of capabilities.

Rotortech also hosted the inaugural helicopter awards dinner with a

sold-out crowd of over 250 people. The dinner saw presentation of the Pilot of the Year (Roger De Souza), Engineer of the Year (Trevor Breed), Crewman of the Year (Trent Owen) and Support person of the Year (Maria Coutinho) awards. All were nominated by colleagues for providing long-term, dedicated and outstanding service to the helicopter industry.

These helicopter industry awards will now be an annual event to recognise and reward individuals who serve our important industry above and beyond the norm.

Let's take Rotortech's success as our platform on which we drive forward until the next conference in 2020 – it sets the example of how our combined strengths will help us through the regulatory changes ahead.

Finally, the AHIA would like to thank the organisers, presenters, exhibitors, delegates, volunteers and everyone involved in Rotortech 2018 who made it an outstanding success. 🍀

AHIA TORQUE
RAY CRONIN
DEPUTY CHAIR – AHIA



'Rotortech served to highlight a diverse industry on the move.'

What flying bug?

Aviation is rarely presented as an attractive and achievable career option

‘Children need exposure that highlights the joy of flying.’

Aviation’s representation in mainstream media and education, or lack thereof, is inhibiting females from realising that becoming a pilot is within their capabilities. One cannot simply catch the “flying bug” if your environment never delivers the inductive conditions.

I am a young student pilot who has recently commenced commercial pilot licence training from an ab-initio level. I also hold a Bachelor of Aviation from Griffith University and am one of the executive leaders underpinning the MATES student development program. Unlike many of my peers, I have come from a completely non-aviation family.

I fell in love with the concept of flying on my first flight to Sydney when I was five years old. However, it was not until a decade later that it became apparent that becoming a pilot was actually possible. The lightbulb did not go on until I went on a flight with a female captain. It was not that I thought females were incapable of being pilots, but it was that I never even knew it was within my means.

The much-discussed and debated lack of females in aviation does not

stem from women believing that they are incapable of being a pilot. It stems from failing to realise it as a viable option. I grew up believing that the profession of being a pilot was one that was particularly difficult to get into, which required the highest levels of academic prowess and a substantial monetary footing to support the endeavour.

Realistically, direct exposure to aviation for students of any gender from non-aviation families is more or less restricted to the occasional exotic holiday, or what they see on TV or in movies. A pilot personality sporadically appears in television, predominately as an authority male figure of privilege. There is rarely anything in mainstream media that brings the concept of being a pilot back down to earth, that makes the role appear relatable and paints it as achievable. Children need exposure that highlights the joy of flying. It is, after all, that feeling that caused all of us to catch the bug in the first place.

Becoming a pilot needs to be seen as a realistic consideration for a young student. That starts with receiving early-enough exposure in the education system to begin to identify a career in aviation as one worth considering. Early enough for the student to catch the bug. Wait for a fluke external factor to introduce the idea and it may well be too late.

The career itself has excellent benefits and benefits are important to this generation. Many high-achieving students have exacting expectations when it comes to their prerequisites in an occupation, and many of these marry up nicely with the profession of being a pilot.

Generally, pilots are well paid, with many career paths including the opportunity to travel the world. They work in a challenging environment completing dynamic tasks. Pilots can also progress onto a wide variety of aircraft types with opportunities diverse enough to fit anyone. Aside from a fear of flying, there is little to stop a driven student considering an aviation career as an option once they know about it. It is aviation awareness and industry-specific education that are the limiting factors.

In my experience, aviation

awareness was even lower in a female-only school environment. I have had this discussion with many of my colleagues at university. Those who have come from a similar girls’ school background are in agreement. They reached their decision to become a pilot outside the support and career guidance their school provided.

In recent years, girls’ schools are making an active effort to promote STEM to their students. I was taught about the degree options pertaining to the niche, yet growing, STEM market, the pay scales you could achieve and the career progressions. We had these lectures every year. They were broad conversations and a variety of options from multiple universities were encouraged. However, in my experience becoming a pilot was just not raised.

Aviation is rarely presented as an attractive, realistic and achievable career option in neither mainstream media nor a student’s education. This is undoubtedly the largest barrier inhibiting females from believing that they can strive for and become an airline pilot.

In light of the ever-present pilot shortage, I am thrilled to say that media is finally beginning to back a shift in public perception. One that engages youth to consider and enter the aviation industry. The pilot crisis is now widely advertised. New schemes and opportunities are available, including esteemed airline level cadetships and defence force opportunities being promoted as financially and educationally attractive. But more work must be done in mainstream media to remove the notion that being a pilot is an exclusive career option.

There must be exposure at a grass roots level in a student’s education if the bug is ever going to latch on. If the pilot shortage really is as bad as it is proclaimed, then the entire aviation industry across the globe needs to see this shift.

If we believe being a pilot is the best job in the world, then why doesn’t the whole world know it? 🐛

Are you a young aviation professional with a story to tell? Email us your 800-word story pitch to mail@australianaviation.com.au.

Author Kate Richards (right) with fellow Griffith University aviation students Abby Toten and Monica Gradwell. NICK MULLER





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AWHERO

The AWHERO is a leading-edge Rotary Unmanned Aerial Vehicle (RUAV), designed for maximum reliability, maintainability and operational flexibility.

Designed for operation in the harshest environments, on land and at sea; the dual-use AWHERO features a modular payload configuration, ensuring capability across the medium-range civil and military mission spectrum, including: ISR/ISTAR, border surveillance, vessel detection and monitoring, migration monitoring, piracy and smuggling, mapping and environmental monitoring.

Inspired by the vision, curiosity and creativity of the great master inventor – Leonardo is designing the technology of tomorrow.



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