Vol. 24 No. 9 November 2017 orientaviation.com

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# CONTENTS\_\_\_\_

#### **COVER STORY**

22



#### COMMENT

7 Bombardier back from financial brink

#### ADDENDUM

- 8 Career pilot takes top job at Malaysia Airlines
- 8 Government weighs re-launching MH370 search
- 8 Hong Kong Airlines executive to run HK Express
- 9 Air fares in the Philippines 77% cheaper than a decade ago
- 9 Government lends support to new Hong Kong aircraft leasing and aviation finance association

#### **NEWS BACKGROUNDERS**

14 Bombardier deal adds heat to subsidy battle



18 Digging deeper at China's OEMs

#### **MAIN STORY**

10 Infrastructure overload morphing into crisis



#### **INDUSTRY ADDENDUM**

- 27 Airbus takes control of Sepang Aircraft Engineering
- 27 SIA Engineering and Air India Engineering sign MoU
- 27 European MROs to service CFM Leap engines
- 27 Airbus teams with Nordam for A320neo P&W engine build up
- 27 ExxonMobil establishes scholarship in China



- 28 AAR explores blockchain implementation
- 28 FlightSafety International promotes distinguished air force veteran
- 28 Rapid rise through the ranks for AJW Group's Tom De Geytere

#### **INDUSTRY INSIGHT SPECIAL REPORT**

- Aircraft engine Asia-Pacific market: an update 30 Engine business booms in Asia-Pacific



- 30 Single aisle engine market accelerates
- 30 Mixed fortunes for wide body propulsion manufacturers
- 32 3D printing revolution
- 33 Electric engines on horizon
- 33 Global engine market enjoying unlimited growth

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# **Bombardier back from financial brink**

The industry was caught off guard last month when it was revealed Airbus had become Bombardier's White Knight with its planned purchase of 50.01% ownership of the Canadian C Series single aisle jet programme. The new structure of the programme is scheduled for completion in the second half of this year.

Airbus had entered into discussions with Bombardier about investing in the Canadian company in 2015 but Airbus CEO, Tom Enders, decided to end the dialogue. The general view was that Airbus was no longer interested in buying into Bombardier.

As a result, Bombardier has been struggling for buyers for the C Series. Its search included Mainland aerospace manufacturer, COMAC.

While Airbus and Bombardier might be very happy with the restructured ownership of the C Series programme, Boeing definitely is not. Immediately after Enders said Airbus planned to open a Final Assembly Line (FAL) for the C Series at the A320 facility in Mobile, Alabana, it cried foul.

It alleged the new Mobile FAL decision was intended to circumvent duties of 300% the U.S. will impose on Bombardier for the sale of 75 C Series jets to Delta Air Lines. Boeing has called the Delta deal price dumping because the Canadian jet series programme has been so heavily subsidized by its government.

Whether Airbus will avoid the tariff is open to question. But for the industry in general it is important that an aircraft many experts regard as an excellent product – and which has not recorded a sale for more than 18 months - will have a new lease of life.

Analysts have said that many airlines, particularly in the Asia-Pacific, have not ordered C Series planes because of the programme's precarious financial position. Now, with financial stability restored and with Airbus' strong sales and support team marketing the jet, it is hoped more carriers in the region will follow Korean Air's lead and add the C Series to their fleets.

For Boeing, in a region where single-aisle jets are the biggest sellers and will continue to be in coming years, the heightened Airbus presence in the single aisle market is a challenge. With the new Bombardier jet in its stable, Airbus can compete with the big selling B737 MAX 8 by squeezing it from below with the C Series and from above with the A321neo.

Some analysts have suggested Boeing may counter Airbus' Bombardier investment by increasing its co-operation with Embraer. The Brazilian manufacturer's new E-Jet family is a natural competitor to the C Series.

An Airbus/Bombardier versus Boeing/Embraer sales battle in the lucrative Asia-Pacific would be an interesting contest.

If such a structural shift in aircraft manufacturing did come to pass it would be good news for the region's airlines. They would expect to negotiate better deals with the manufacturers as they compete for orders for single-aisle region's fleets.

**TOM BALLANTYNE** *Chief Correspondent* Orient Aviation Media Group

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# ADDENDUM

## Career pilot takes top job at Malaysia Airlines

Malaysia Airlines Berhad (MAB) quickly appointed a successor to Peter Bellew after the Irishman accepted Ryanair's offer to return to his former employer as chief operating officer.

The new MAB group CEO and executive director-designate is **Captain Izham Ismail**, a 38-year veteran of the airline who has worked as the group's chief operating officer during Bellew's tenure. His promotion took immediate effect on October 20. Captain Izham is the fourth Group CEO in last four years in a period that has seen MAB run by two consecutive foreign bosses, Christoph Mueller and then Bellew.

"Captain Izham will assume his role as GCEO from December 1, 2017 upon the departure of Peter Bellew who is currently on administrative leave," an MAB airline statement said.

Captain Izham began his Malaysian Airlines career as a pilot. He rose through the ranks to become director of operations, then chief executive of MAS Wings and most recently as the successor to Bellew as COO.

It is no surprise that MAB's owners, the Khazanah Nasional Berhad sovereign wealth fund, decided to appoint a local to the job. "Bellew's departure, if anything, has merely accelerated our plans to localize



the leadership of MAB," **MAB chairman, Nor Yusof**, said in an e-mail to the carrier's staff.

"I am proud that he is our own internal home grown talent and I am confident he will be able to take the airline further forward and ensure the turnaround plan is met. We are now in our third year of the five year MAS Recovery Plan and it is timely for us to appoint a Malaysian to see it through to the finish line," Nor said.

Izham is elated by the appointment. In a statement he said: "I am humbled and at the same time ready for the challenge. We are on track to a full and complete transformation as outlined in the 12 point MAS Recovery Plan (MRP). I am looking forward to working with my MAB colleagues to make this airline the pride of the nation again."

Chairman Nor urged staff to rally around the new CEO. Flights must continue to take off and land on time and staff must continue to provide sincere and genuine Malaysian Hospitality across every customer's touch point, he said. "We have weathered many storms together as a family and we will come back stronger and better than ever."

To ensure a smooth transition, a Board Executive Committee will be in place for six months, led by chairman Nor, the airline said. ■

## Air fares in the Philippines 77% lower than a decade ago

Speaking at an International Air Transport Association aviation (IATA) day in Manila last month, the association's **director general, Alexandre de Juniac**, said that in 2016 air fares in the Philippines were 77% cheaper than they were in 2006.

"Over the same period, the number of destinations served directly by the Philippines increased from 40 to 55 and passengers travelled almost tripled from 24 million to 64 million," he said.



De Juniac was making the industry's case against advocates of air fare caps in the Philippines. "Airlines offer a wide variety of fares at different price points to satisfy customer needs. Introducing government imposed fare caps would likely have the unintended consequence of reducing deeply discounted fares. If airlines cannot charge a premium for ultimate flexibility, then covering costs will likely lead to a rise in average fares," he said.

De Juniac also urged the Philippine government to avoid implementing a tourism tax and abandon a proposed Green Fee. "The proposed Green Fee is misguided and should be abandoned. Governments through the International Civil Aviation Organisation (ICAO) have agreed to a global approach to climate change. There is CORSIA, an agreed carbon offsetting and reduction scheme for international aviation," he said.

"The cause of sustainability is best served by the Philippines supporting this global approach and volunteering to participate in CORSIA. See Shooting for stars, page 21. ■

# Li Dianchun anointed new HK Express president

Former Hong Kong Airlines chief commercial officer, Li Dianchun, is the new president of HK Express, effective from October 31. Li will be responsible for the day-to-day management of the low-cost carrier, but also will work closely with executive chairman, Zhong Guosong, in formulating strategy and operational expansion.

A HK Express statement said: "among the priorities for Mr. Li in his new role will be strengthening communication between staff and management as well as enhancing





management efficiency and operational stability."

Li has worked in a variety of senior positions in the aviation industry in the last 20 years, including network planning, market operations and management. ■

## Hong Kong gets serious about aircraft leasing

Hong Kong made it clear it was on a mission to build the Special Administrative Region into an aviation finance hub with the aircraft lessors and aircraft leasing managers.

Association president, **Stanley Hui**, said the introduction of Hong Kong's tax regime for the aircraft and aviation finance sector could capture up to 18% of the market in the next two decades.

"With our many established advantages, the industry's concerted efforts and the government's clear policy support, we are optimistic this could be achieved," he said.

"This is just the beginning. Let us all work together to build and grow aircraft leasing and financing into Hong Kong's



coming out party of the Hong Kong Aircraft Leasing and **Aviation Finance Association** on November 1. In her speech at the packed official ceremony, Hong Kong's top government official, chief executive, Carrie Lam Cheng Yuet-ngor, said that as a global financial centre and international aviation hub, Hong Kong possessed several favourable conditions necessary to thrive as an aviation hub including a free economy, rule of law, sophisticated legal services and a strong pool of talent in financial services and aviation.

She said that since December 2015, the withholding tax between China and Hong Kong has been 5 % and now a dedicated tax regime has been enacted in Hong Kong that provides profit tax concessions for qualified new economic driver, and most importantly, a new home for aircraft leasing companies around the world." ■

# Asia-Pacific carriers dominate top ten ratings poll

In 2017, eight of the **top ten** airlines in the world, as assessed by Airline Ratings. com, are Asia Pacific carriers. Only Etihad Airways and Virgin Atlantic made the list from elsewhere across the globe.

They are Air New Zealand (1), Qantas Airways (2), Singapore Airlines (3), Virgin Australia (4), Virgin Atlantic (5), Etihad Airways (6), All Nippon Airways (7), Korean Air (8),



**Cathay Pacific Airways** (9) and **Japan Airlines** (10).

"To be named in the top ten, airlines must have achieved a seven star rating safety rating and demonstrate leadership in innovation for passenger comfort," the ratings company said.

"We are looking for leadership and airlines that innovate to make a real difference to the passenger experience, particularly in economy class. In our evaluation, we will also consider the audited website feedback from passengers on our website and other reputable websites such as **CNTraveller.com**.

"Whether number 1 or number 10 these airlines are the best of the best – the elite in aviation. They are the trendsetters and the benchmark by which all others are judged." ■

## Malaysia considers restarting search for MH370

The Malaysian government is considering offers from three private companies to resume the search in the Indian Ocean for missing Malaysia Airlines flight MH370, the B777 which disappeared in March 2014. At least one of the bidders, Texas-based Ocean Infinity, has said it does not have to be paid unless the aircraft is found.

Malaysia's Transport Minister, Liow Tiong Lai, confirmed Infinity and two others, Dutch firm **Fugro** and an unidentified Malaysian company, had submitted proposals that were under discussion. "We won't be deciding anything now on embarking on a new search," Liow told reporters on the sidelines of an event in Kuala Lumpur. "We have to discuss it with the companies. It will take some time as they are detailed discussions."

MH370 vanished on March 8, 2014, somewhere over the southern Indian Ocean on a scheduled flight to Beijing from Kuala Lumpur. It had 239 passengers and crew onboard. Its disappearance has become one of the world's greatest aviation mysteries.

Some floating wreckage has been found and identified as coming from the aircraft, but Australia, Malaysia and China decided to call off a US\$159.16 million two-year search for the plane in January, despite protests from the families of passengers on the lost aircraft.

Liow said the proposals would be presented to the other countries in the tripartite committee - China and Australia - before a decision to resume the search was made.



# INFRASTRUCTURE OVERLOAD MORPHING INTO CRISIS

When the region's airline leaders met in Taipei last month for the 61st Assembly of Presidents of the Association of Asia Pacific Airlines, the threat of an infrastructure crisis and more costly airport security measures dominated the discussion. Chief correspondent, *Tom Ballantyne*, reports from Taipei.

ndustry leaders gathered in Taipei last month once again warned governments that the aviation faced an infrastructure crisis and that in the Asia-Pacific several airports were close to crisis operating conditions. "We are headed for an infrastructure crisis. I believe an infrastructural crisis everywhere in the world can only be averted with coordinated efforts to address deficiencies. We must remind our governments of basic infrastructural needs, which is sufficient capacity and technology in line with our developments and affordability," the International Air Transport director general and CEO, Alexandre de Juniac, told delegates at the China Airlines hosted assembly.

"In many ways, the Asia-Pacific is ahead of the game with major hubs investing in expansion, but Bangkok, Manila and Jakarta are among airports that need major upgrades," he said. "Chinese air traffic management struggles to cope with growth. And high costs at India's privatized airports are burdening the industry.

De Juniac said the 34 million jobs and \$700 billion of economic activity supported by aviation in the Asia-Pacific were expected to more than double in the next 20 years. "But the realisation that these economic benefits are at risk



#### IATA campaigns against private ownership of airport monopolies

IATA director general and CEO, Alexandre de Juniac, said in a press briefing at the AAPA Assembly of Presidents in Taipei last month that many governments see privatization as a solution to gain revenue and funds, but airports perform better in public hands.

"We have seen disappointing experiences with airport privatization. The primary focus of airports is to support local prosperity as an economic catalyst. In private hands, shareholder returns are top priority and we have seen cost increases in privatized airports like Paris and Sydney.

"We need robust regulation to balance private and national interests, and we have not seen any long-term success story." He said airlines had no issue with injecting private sector mentality into the operation of any airport. "But our conclusion from three decades of largely disappointing experiences with airport privatization tells us airports perform better in public hands. The primary focus of airports should be to support local and national prosperity as an economic catalyst."



in the region does not address the long-term challenges of sustainability, infrastructure and regulatory harmonization," he said.

IATA's latest 20-year air passenger forecasts that 7.8 billion passengers will travel in 2036, almost twice the four billion passengers expected this year. More than half of that growth will be in the Asia-Pacific, with the region accounting for 2.1 billion new travelers in 2036.

Even with traffic at today's levels, panellists at the Assembly pointed to the daily difficulties their airlines faced from delays caused by congestion that were irritating increasing numbers of passengers and higher fuel costs.

Major hubs across the region are operating well beyond full capacity. One of the worst affected cities is Manila, where two runways are limited to handling 40 movements an hour. Speaking during a "Market Growth and Infrastructure Challenges" panel in Taipei, Philippine Airlines president, Jaime Bautista, said his home hub airport was designed to handle 30 million passengers annually, a level it reached in 2012.

This year the airport is coping with a forecast 42 million passengers. "At PAL alone, we expect to carry 15 million passengers this year and 20 million by 2020. With airport infrastructure limitations we are not really sure if we will meet our targets," Bautista said. Already, he added, the airline's ability to grow had been affected.

China Airlines strategic planning department general manager, James Chung, said some of the issues could be addressed by smarter management, including better integration of resources. "For instance, under airline alliances, carriers using the same business model should be accommodated in the same terminal," he said.

A primary motion passed at the China Airlines hosted AAPA assembly urged Asian governments to coordinate investments in aviation infrastructure, including airport runways, terminals and air navigation services to keep pace with growth and also to deliver operational efficiencies and a reduction in emissions, noise and waste.

At congested and slot constrained airports around the world, of which close to 40 are in the Asia-Pacific, the AAPA assembly called on governments to ensure optimal use of

## Airlines bearing burden of enhanced and discretionary security rules

Also under the spotlight at the Taipei assembly were the numerous problems caused by discretionary and unco-ordinated security measures. The latest examples were the new security rules the U.S. has imposed on all inbound flights that came into effect in October.

The new rule can subject any passenger travelling to the U.S. from any airport in the world to additional interviews at check-in or at the boarding gate. All personal electronic devices also must be inspected. In Taipei, De Juniac said the industry understood security threats to aviation were made regularly, but in this case the U.S. government had not shared any specific information about new risks before it imposed the October rule.

"What we have seen is very strange. Unilateral measures announced without any prior consultation. That is something that is very concerning and disturbing," he said.

The Association of Asia-Pacific Airlines (AAPA) director general, Andrew Herdman, said the new security measures for flights to the U.S were a "significant cost and a training burden" for airlines. A globally coordinated security approach made more sense than having destination-specific requirements, he said.

"They must add screening staff, find dedicated space for additional screening of passengers on affected flights, allocate longer time windows at gates for each flight and train employees to conduct the extra screening. The result is lower gate utilization, a potential knock-on effect on airline on-time performance and extra cost," he said.

"Who provides the extra manpower and facilities? Who pays for it? Ultimately, it will be the passengers. We are concerned that people rarely sit down and work out the costs; I don't think the costs have been estimated, but they are significant. A globally coordinated security approach made more sense than having destination-specific requirements," he said.

# MAIN STORY



Mitigation measures need to be proportionate so unnecessary disruption is avoided. There has to be a balance. We are doing it for the assurance of the passenger and to serve their needs. We need global standards and global harmonization, but what we are seeing contradicts that. What we have is destination security

> Andrew Herdman Association of Asia-Pacific Airlines director general

scarce airport capacity by managing slots in an independent, fair and non-discriminatory manner.

"Airspace modernization is a global challenge with the objective of deploying new technologies to improve both airspace utilization and further enhance safety performance. Failure to make the necessary investments and operational improvements in Air Traffic Management (ATM) infrastructure and services to keep pace with air traffic growth will lead to adverse consequences for the travelling public and the wider economy," the AAPA said.

The Association urged governments to think beyond national borders and commit to the development and implementation of enhanced Asia-Pacific air traffic flow management systems."

Airlines also want improvements to the system of airport slot allocations. In 2017, almost half of all passengers fly through 179 slot-coordinated airports, of which 37 are in the Asia-Pacific, the AAPA said. "Although overall slot coordination is managed in accordance with global principles, a number of governments and slot coordinators have deviated from these processes, adversely affecting the efficiency and predictability of airline operations to the detriment of the travelling public.

The association urged governments and slot co-ordinators to allocate slots in an independent, transparent, fair and non-discriminatory manner in line with International Civil Aviation Organisation's (ICAO) guidance to ensure a single, globally harmonised process.

Airlines also are disappointed in the slow progress of a Seamless Asian Skies, which has been hampered by national interests in the region. "It is about changing operational procedures," said the AAPA's Herdman. "Unlike a centralized flow control in Europe, Asia is a different mechanism and is more complex. You have to overlay that with individual institutional arrangements and operational practices to deliver the results."

Despite challenges on several fronts, the region's airlines continue to grow. The latest AAPA statistics, for September, reported double-digit air freight volume growth, a sign that the freight business, which had been in the doldrums since the global financial crisis, is continuing its strong recovery. Freight volumes carried by Asian airlines over the first nine months of the year were up by 10.7% year-on-year.

"The global economy is in pretty good shape, with encouraging growth in both international air passenger and cargo demand seen this year," said Herdman. Improvements in global trade sentiment had delivered robust 10% growth in air cargo volumes so far this year, "a welcome development for Asian carriers which account for nearly 40% of global air cargo traffic".

## **Taxing times**

Despite past exhortations, more taxes have been imposed by various countries on international air transport and via air passenger charges, airlines said. Several of them can be categorised as taxes on the sale or use of international air transport which contravenes International Civil Aviation Organization (ICAO) policies on taxation, the Association of Asia-Pacific Airlines (AAPA) director general, Andrew Herdman, said.

A number of governments have recently introduced or increased taxes on air travel including Australia's Passenger Movement Charge, Malaysia's Advance Passenger Information (API) charge and Sri Lanka's Embarkation Tax, the association said.

"AAPA renews its call on governments to carefully consider the overall economic effects of putting additional financial strain on the travelling public and on the aviation industry and to refrain from increasing the burden of aviation levies in any form. The Association goes further in calling on governments to avoid the imposition of unjustified or discriminatory taxes on international aviation, in contravention of ICAO policies," it said

"AAPA carriers operating in the world's most competitive markets have continuously innovated and adapted their service offerings to satisfy the ever-changing demands of the global travelling public, whilst maintaining the highest safety standards," said Herdman.

"Whilst these achievements are certainly celebrated, the ever-growing burden of restrictive government legislation, increasing taxes and charges and the lack of shared vision for the industry hold back the potential of Asia's carriers to fully contribute to the social and economic development of the region."

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# Bombardier deal adds heat to subsidy battles

Airbus' surprise announcement last month that it would take control of Bombardier's C Series jet program stunned industry observers, including Boeing. Chief correspondent, *Tom Ballantyne*, reports on the impact the investment will have on the world's aircraft manufacturers.

he stunning Airbus-Bombardier partnership for the C Series program guarantees the

future of the new airplane, kills off the A319 and thrusts a big stick up Boeing's tailpipe," said Scott Hamilton, the founding principal of a North American aviation consultancy, after it was announced that the Toulouseheadquartered manufacturer is buying 50.01% of the Canadian rail and aircraft builder.

Certainly, the Airbus investment revives the fortunes of the new aircraft type, particularly in Asia where the C Series' only customer is Korean Air's with an order of 10 of the planes.

Just as significant is speculation Boeing may counter Airbus by forming closer ties with Brazilian aircraft manufacturer, Embraer. Teal group analyst, Richard Aboulafia, said: "the world has two top-tier air framers and two second-tier air framers. Airbus and Bombardier are now allies. This greatly increases the likelihood of a stronger Boeing-Embraer alliance as a response."

Boeing and Embraer already work together on runway safety and alternative jet fuels. Their partnership has deepened in recent years to include Boeing's commitment to joint sales and



support of Embraer's KC-390 military aircraft.

Boeing has made it clear it was not happy with the Airbus buy in of the C Series programme. It accused Airbus and Bombardier of attempting to circumvent a decision by President Donald Trump's administration to hit the C Series aircraft with import duties of 300%.

The duty imposition followed Boeing's complaint that Bombardier had sold 75 C Series jets to Delta Air Lines for "absurdly low prices". The Seattle plane maker said the Airbus-Bombardier agreement is a "questionable deal between two heavily state-subsidized competitors to skirt the recent findings of the U.S. government. Our position remains that everyone should play by the same rules for free and fair trade to work".

The terms of Airbus' majority investment included a new C Series final assembly line at Airbus' plant in Mobile, Alabama, where it now assembles A320s. Whether that decision would allow the partners to avoid the hefty tariff was not clear at press time. A U.S. government fact sheet on the matter said the duties would apply to C Series jets "regardless of whether they enter the United States fully or partially assembled".

The October agreement was concluded very quickly, given the complexity of negotiations. Airbus chief executive, Tom Enders, said discussions with Bombardier had started in August.

There had been reports the Canadian company had been in touch with a small group of Chinese state-owned enterprises about a C Series holding, including the Commercial Aircraft Corporation of China, or COMAC. The Mainland aerospace manufacturer has built China's first single aisle commercial



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NEWS BACKGROUNDER

jet, the C919. Both COMAC and Bombardier declined to comment.

For Bombardier, the Airbus partnership was a massive boost to the future of the C Series. Bombardier reportedly spent more than \$6 billion in development costs on the jet and had to rely on Canadian government assistance to complete the project.

Apart from the Delta deal of 18 months ago, Bombardier has not received a major order for the aircraft. Bombardier chief executive, Alain Bellemare, said the joint venture would double the value of the C Series program, to \$4 billion.

The company's chief financial officer, John Di Bert, said Bombardier had agreed to provide \$350 million for the C Series in the first 12 months after the close of the deal, with completion of the transaction expected in the second half of 2018.

It is hoped the new arrangement will jump start orders for the jet in the Asia-Pacific. Founder of Malaysiabased Endau analytics, Shukor Yusof, said airlines in the region have held back from placing orders for the Canadian plane because Bombardier's weak financial position placed the C Series program in jeopardy.

"Potential buyers of the C Series are given comfort now that Airbus will be a major shareholder. It will ensure stability in the program," he said. The Ranging from 100 to 150 seats, the C Series is highly complementary to Airbus' existing single aisle aircraft portfolio, which focuses on the higher end of the single-aisle business (150-240 seats).

aircraft also will benefit from Airbus' powerful sales network and support throughout the region.

Bombardier head of structured finance, Marc Meloche, said several Chinese lessors, who were largely looking for sale-and-leaseback opportunities, had issued term sheets in support of C Series deliveries.

New Mainland rules that require Chinese airline startups to operate at least 25 smaller regional jets before graduating to bigger aircraft have fueled hopes of Chinese demand for the C-Series.

Under the new shared ownership, Airbus will provide procurement, sales and marketing and customer support expertise to the C Series Aircraft Limited Partnership (CSALP), the entity that manufactures and sells the C Series.

To close the deal, Airbus will acquire a 50.01% interest in CSALP and Bombardier and Investissement Québec (IQ) will own approximately 31% and 19%, respectively. Airbus pointed has out the single aisle market represented 70% of future global aircraft demand.

"The world class sales, marketing and support networks Airbus brings to the venture are expected to strengthen and accelerate the C Series' commercial momentum. Additionally, Airbus' supply chain expertise is expected to generate significant C Series production cost savings," Airbus said.

Airbus' Enders said: "The C Series, with its state-of-the-art design and great economics, is a great fit with our existing singleaisle aircraft family and rapidly extends our product offering into a fast-growing market sector.

"I have no doubt our partnership with Bombardier will boost sales and the value of this program tremendously. Not only will this partnership secure the C Series and its industrial operations in Canada, the U.K. and China, but it also will bring new jobs to the U.S. Airbus will benefit from strengthening its product portfolio in the high-volume single-aisle market, offering superior value to our airline customers worldwide."

The agreement was an

about-face for Enders. He halted negotiations for a tie up with Bombardier two years ago. Analysts viewed the deal as a triumph for Airbus that turns the C Series from an attack on U.S. jobs, as Boeing has complained, to a job creator in Alabama, a key Republican state.

It is believed the arrival of the C Series at Airbus signaled the end of the line for the A319, which has not posted a sale for five years. Airbus is expected to pressure the key B737 MAX 8 model by squeezing it from below with the C Series and from above with the popular A321neo.

The joint venture gives Airbus access to a technologically advanced, fuel-efficient design that could form the basis of its challenge in the highest volume jetliner sector for years to come, saving billions in development costs.

It will put pressure on Boeing, which is only now embarking on plans for a new short-haul model. It has been estimated that piggy-backing on the C Series could save Airbus \$10 billion in development costs.

Enders said it was too early to speculate on whether the plane would form the basis for the company's next short-haul offering, but he acknowledged it was likely Airbus would take cues from the Canadian aircraft's cockpit design and advanced aeronautics.

Regardless of the development boost for Airbus, the near-term ramifications for Boeing may be severe, with Airbus now able to bundle the C Series, which typically seats 108 to 130 passengers, and the larger A320 into a single offering.

Also it should not forgotten that China's C919 is on the horizon and new narrow bodies from Russia and Japan will eventually join the battle to win orders in a market worth some \$125 billion a year.



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# **Digging deeper in China**

China's drive to become a major commercial aerospace manufacturer is quickening. Europe's Airbus and North America's Boeing have joint aviation ventures on the Mainland and Russia is building a wide body jet in partnership with China.

hina and Russia have agreed on their individual roles in the production of their joint venture CR929 wide-body commercial jet. The Commercial Aircraft Corporation of China (COMAC) will design and manufacture the fuselage. Russia's United Aircraft Corporation (UAC) will devise and produce the wings. The joint venture company is known as the China-Russia Commercial Aircraft International Co. Ltd.

The latest development plans for the CR929 - the C and R stand for China and Russia, respectively, 9 is the largest single number and means long-lasting in Chinese and 2 references the joint partnership – were revealed at the recent Aviation Expo China.

A member of the CR929 design team, Chen Yingchun, announced at the exhibition and conference that the new jet would have a range of up to 12,000 kilometers and was expected to be flying at customer airlines by 2027.

The latest CR929 developments were made public within a few days of Airbus' inauguration of its Tianjin A330 Completion and Delivery Centre (C&DC), a facility built adjacent to its successful nine-year-old A320 Final Assembly Line.

In the same week, Boeing and COMAC revealed more details about the U.S. plane maker's first overseas completion and delivery center being built in



Zhonshan in eastern Zheijiang. The joint venture is funded with registered capital of US\$55 million. Boeing has invested \$33 million for a 60% equity in the project and COMAC will pay \$22 million for the remaining 40%.

And there may be more Sino-foreign joint ventures on the way. Embraer chief executive, Paulo Cesar de Souza e Silva, said in Singapore last month that the company will consider establishing a commercial-aircraft factory in China down the line.

Earlier this century, the Brazilian company built its E-145 regional jets in Harbin, in a joint venture with the Harbin Aviation Group and the Harbin Hafei Aviation Industry Co. Embraer then switched to manufacturing its Legacy 650 business aircraft in Harbin until the plant closed in 2016.

Silva said Embraer would wait for the rollout of its first

E195-E2 aircraft in 2019 before it deliberates on plans for China. "We may consider it if we have the right partner and enough interest in our jets. In the next 20 years, we see potential in China for a little bit more than 1,000 aircraft of the size that Embraer manufacturers. We have 80% of that market."

China and Russia announced their plans for their joint venture in May, but gave no details of the project at the time. Now they have disclosed the main design center will be in Russia but that Shanghai will have its own design office. Each partner will take half of the work and send design staff for exchange visits on a non-scheduled basis between the two project centres. Some 51% of the aircraft will be made of composite materials.

The CR929 could have four configurations: 280 seats in three classes; 291 seats in two

classes; 310 seats in a tight three class plane or a 416 seat all economy layout, said Chen. The new aircraft will target airlines in China and Russia as well as other Asia-Pacific markets.

"It's competing models will include Airbus'A330 and A350 and Boeing's B787. Currently, we are selecting suppliers worldwide," he said. "By the end of the year, we are likely to open tenders for the aero engine. Rolls-Royce and General Electric are expected to bid. We are also trying to develop engines ourselves together with Russia."

Chairmanship of the joint venture will alternate between China and Russia every three years. Each country will hold four seats of the eight board director seats.

Ironically, the venture may open up more business for Airbus in China. The Toulouse manufacturer holds 30% of the Haifei Harbin Manufacturing Centre (HMC), a joint venture with Chinese partners in Harbin, Northeast China.

The company manufactures composite elevators, rudders, maintenance doors and belly fairing parts for the A350 XWB and is the sole supplier to Airbus for these components. It also assembles elevators and rudders for the single-aisle A320 family.

In June, the facility delivered its 1000th A320 rudder. The head of HMC, Olivier Guillon told Orient Aviation in Beijing in September that there is potential to produce composite parts for Professional airport management made by Fraport

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companies other than Airbus, including the CR929.

"Until now, we did not have a clear direction on this topic, but from the top management of Airbus they are now ready to consider any opportunity," he said.

Construction of the Boeing/ COMAC completion centre and a separate delivery centre owned by Boeing will carry out cabin installation, painting, flight testing and aircraft maintenance.

COMAC, manufacturer of China's first narrow-body jet, the C919, said the project will broaden international cooperation between China and international manufacturers and optimize the environment for the growth of the civil aircraft industry in China.

"Zhoushan and Seattle

are located at each side of the Pacific Ocean. In the past, most people living in Seattle didn't know about Zhoushan, but now they come to work here. Our completion center has linked us together," said COMAC president, He Dongfeng.

Boeing is scheduled to begin delivering its B737 MAX planes directly from Zhoushan to Chinese domestic airlines by

# Spicejet deal highlights Bombardier's change of fortunes

October was a landmark month for Bombardier. It agreed a Memorandum of Understanding that will give Airbus majority ownership in its C Series programme. It continued its battle against threatened U.S. duties for its Delta deal and it confirmed the largest order in its history for the Q400 turboprop. Chief correspondent, *Tom Ballantyne*, reports.

nly days after the U.S. Department of Commerce announced it would impose up to 300% in duties on Bombardier's C Series jet programme, the Canadian manufacture had some much better news. India's Spicejet fully committed to another 50 Q400 turboprops, an order that was announced at the Paris Air Show in June.

Valued at US\$1.7 billion at list prices, Spicejet's order for the extra-capacity 90 seat Q400 is the most lucrative deal the manufacturer has secured for the aircraft type. The purchase agreement, which will make the airline the first in the world to operate the larger seat version, was for 25 Q400s and purchase rights on another 25.

"I am sure this fresh order

will help us further enhance connectivity to smaller towns and cities and help us realize prime minister Narendra Modi's vision of ensuring that every Indian can fly," said Spicejet chairman and managing director, Ajay Singh.

"Spicejet operates India's largest regional fleet and always has been a firm believer in the growth story of India's smaller towns on the country's aviation map. We will strive to keep the momentum going in the times to come " "We are very proud to firm up this agreement with SpiceJet. It is another demonstration of the Q400's unique versatility. This repeat order will not only increase the Q400 aircraft fleet in the fast-growing regional market in India and in the Asia-Pacific, it will launch the high-density 90-passenger model," said Bombardier president, Fred Cromer.

In the meantime, Cromer still has to find some sort of resolution to the ongoing dispute



the end of next year. The centre will have a maximum delivery capacity of 100 planes a year.

In its most recent 20-year forecast, Boeing said China would require 7,240 planes, valued at almost \$1.1 trillion, in the next two decades. Seventy-five percent of the future fleet would be narrow bodies as full-service and low-cost carriers expand their regional networks.

with Boeing, the consequence of a Delta Air Lines order for 75 firm and 50 optional C Series CS100 and CS300 aircraft in 2016. Bombardier is scheduled to begin delivery of the planes from next year.

Boeing has alleged Delta is acquiring the aircraft at far below cost and that subsidies from the national Canadian government and the Quebec government facilitated the Delta order.

The sale happened as Bombardier was suffering through huge cost overruns for the C Series and at a time when no orders were in sight. The aircraft manufacturer overspent billions of dollars in manufacturing the CS100, and had to write down \$4.4 billion on the aircraft.

In 2015, the Canadian government provided \$3.4 billion in support, including \$1 billion from Quebec's provincial government, which took a 49.5% holding in the C-Series in return. All of that, Boeing alleged, added up to huge subsidies. Ironically, Boeing has always said it does not regard the C Series jets as competition. However, the largest model has around 100 seats , which positions it in the same category as some of Boeing's smaller narrow bodies.

The penalty imposed by the U.S. Department of Commerce on Bombardier will only take effect if the U.S. International Trade Commission (ITC) rules in Boeing's favour. A final decision is expected in early 2018.

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# COVER STORY

# SHOOTING FOR STARS

Philippine Airlines' chequered times will soon be behind it as president and chief operating officer, Jaime Bautista, drives the carrier's fleet and network expansion towards a five star rating in 2020.

> By chief correspondent, Tom Ballantyne

hilippine Airlines (PAL) is facing the same threats as its full service rivals across the Asia-Pacific, including fierce competition from budget carriers and unprecedented capacity being thrown into the market by Gulf airlines, forcing yields down.

PAL also is severely constrained at its extremely congested Ninoy Aquino International Airport (NAIA) home base, which is curtailing operational efficiency. Just as serious are the negative travel advisories issued by 11 countries that advise their citizens to be cautious about travelling to the Philippines because of a protracted guerilla war centred around the southern Philipines island of Mindanao.

Despite these political and practical problems, PAL president and chief operating officer, Jaime Bautista, is pushing ahead with a fleet modernization plan that will greatly improve profitability and help PAL achieve formal recognition as a five star airline

The biggest challenge for Bautista in reaching his goals is Manila's NAIA. Its four terminals, designed to handle 30 million passengers annually, last year processed 42 million domestic and international travelers.

"That is why they are all very congested. It causes delays not only for PAL but for other airlines. Operations wise, because of this infrastructure, there are many disruptions and many cancellations. We have to address these issues because if we want to be a five star carrier our on-time performance (OTP) should be comparable with other airlines," Bautista told Orient Aviation from Manila.

"If these external factors are not addressed our OTP will be the lowest among our peers. In an AAPA (Association of Asia Pacific Airlines) report I think we had one of the lowest OTPs. Largely, the reasons for the low ratings were factors beyond PAL's control: airport congestion, air traffic congestion and, lately, several typhoons that hit the Philippines."

As an interim solution, Bautista has asked the government for permission to build a \$400 million, 89,000 square meter terminal (equivalent to 200 basketball courts) next to Terminal 2 at NAIA. It will allow PAL to consolidate its flights from three of the four airport terminals under one roof. Designed to handle 12 to 15 million passengers a year and equipped with aerobridges that will take up to 17 wide-bodied and single aisle jets, it will unlock the traffic log jam, but it is not, as PAL knows, the ultimate solution.

"We can make it a world class international terminal. We could move all our international flights to this terminal and use terminal 2 for domestic operations," Bautista said. "If we are allowed to build this annex our code share partners also could operate from the terminal."

If the government approves the plan, it will be a feather in the cap of the veteran airline boss, who is well into his second stint as the airline's president. He stepped down from the top job after tobacco tycoon, Lucio Tan, sold 49% of PAL to San Miguel brewery and its boss, Ramon Ang.

Management control went with the deal, although Tan remained as PAL chairman once ownership changed. Under

San Miguel management, the airline went downhill. In 2014, Tan, whose love of the airline is legendary in the Philippines, bought back control of the carrier for \$1 billion, twice the amount Ang had paid for its shareholding two years earlier.

Bautista was immediately restored as PAL's boss. He quickly set about turning around the carrier. He ordered new, fuel efficient single and double-aisle aircraft, deferred some deliveries and benefitted from the lower fuel prices of recent years.

As a result, PAL reported profits in 2014 and 2015, but capacity adjustments remained necessary. The carrier deferred five of 10 A320 deliveries, initially scheduled to arrive in Manila in 2015, as its domestic and regional network threatened overcapacity.

Two years on, PAL is on the cusp of one of the most significant fleet revamps in its history. The carrier operates 82 aircraft, including 20 at its domestic budget subsidiary, PAL Express. Its fleet is made up of A320s, A321s, A330s, A340s and B777s.

Next year it will begin accepting 30 A321neo and six A350s, which will replace its six AA340s. By December this year, PAL Express will be flying four new Bombardier Q400 turboprops, part of a 12-strong order for the type.

Two B777-300ERs will arrive at the carrier by the end of the year, that will increase the type in the fleet to 10 and allow the carrier to replace its A340s from Manila to London. Bautista said the A340 is "not really a very good product. It is an older plane and the IFE is not that good. Hopefully, the B777s can attract more passengers from London", he said.

In the first quarter of 2018, three A321neos will arrive at PAL. From June, Rolls-Royce powered A350-900s will begin

# Gulf carriers want more flights from Manila

"There is overcapacity in the market. Emirates, for example, operates 21 flights a week between Manila and Dubai and the market is really small," PAL president and chief operating officer, Jaime Bautista told Orient Aviation.

"What they do is carry passengers to other destinations. It affects our flights to the UK. The other Middle East carriers do the same. They take passengers going to Europe, to Africa and even to the U.S.

"This morning there was news that Emirates wanted to call another ASA (Air Service Agreement) meeting with the Philippines to increase their entitlements to Manila. They operate to Cebu and Clark, but they still want Manila which is very congested. Emirates even wants to operate the A380 to Manila."

Another annoyance is the ability of U.S. airlines such as United Airlines and Delta Airways to use wide-ranging sixth freedom rights through the Philippines, although Bautista said PAL has maintained its market share on U.S. routes. "Foreign airlines are getting a good share of that market and they are offering very cheap fares," Bautista said.

# COVER STORY



311703

well publicized production delays at Airbus have delayed the planes' arrival by three months.

"Then we will receive one each in August, September and December," Bautista said. The new planes will increase capacity by around 10% over the A340s, which have 295 seats against 354 on the A350s. PAL plans to carry 20 million passengers annually by 2021 with a fleet of 96 aircraft.

"We will phase out 18 older aircraft and take delivery of 27 brand-new airplanes," he said.

The arrival of the long-haul aircraft not only brings significant economic benefits to PAL, it will allow the carrier to fly non-stop Manila-New York at full capacity. "We should be able to carry the required number of passengers without doing a tech stop, especially returning to Manila, which is against the wind," Bautista said. "We also will fly this aircraft to Vancouver and we are looking at Chicago and Seattle."

"This aircraft (the A350) can be a good aircraft for developing long-haul markets. We will look at Europe. Maybe in 2019, after we accept the next two A350s coming in that year." The A321neos will clear the way for the launch of nonstop services to Brisbane, Delhi, Perth, Mumbai and Sapporo and increase flights to Melbourne and other Asia-Pacific destinations.

PAL, like many of the region's carriers, has been hit by market conditions and competitive pressures. While it has been doing better than many of its peers, Bautista said it is "in the same boat" as everyone. The carrier is seeing "ever higher load factors compared with last year, but we are not making money", he said.

"The next quarter will be a difficult one for us because it's the low season. Hopefully, Christmas will generate more PAL's trans-Pacific capacity, already increased by nearly 30% in the last 12 months, should expand another 50% as Manila to New York and Toronto are upgraded to nonstop, Cebu-Los Angeles is resumed and Chicago, Houston or Seattle are launched

> Jaime Bautista Philippine Airlines president and chief operating officer



revenue and [we will] report a small profit."

PAL has reported a US\$32 million net loss for the first half of this year, to June 30, a reversal of a \$92.2 million profit for the same period a year ago. Fuel costs increased 73.6% and the carrier operated additional flights during the period. Losses were recorded despite a 17.7% increase in revenue in the six months, to \$542.4 million, up from \$460.8 million a year ago.

Passenger and cargo growth, increased ancillary revenue and more flights and new routes pushed up cash flow, but costs rose 32% outweighing the cash flow improvement.

PAL has been doing its share to decongest NAIA while stimulating air travel to the Philippines. "We are building up a new network of local and regional flights from Clark, Cebu, Puerto Princesa, Davao, Caticlan and Kalibo," said Bautista, who added PAL continued to invest in the latest technology to speed up passenger processing and aircraft turnaround times.

"We are mounting new flights from Cebu to Bangkok in December, adding to flights from Cebu to Japan, Korea and Singapore. We did fly Cebu-Los Angeles, but we have temporarily stopped the route until we take delivery of the A350.

"It's another destination the A350 can serve. We tried the A340 on that route, but coming back we had to stop in Guam many times. We decided to wait for the right plane and make the route a profitable operation."

One market that is doing well for PAL is China. "Shanghai is doing very well. In Xiamin we are doing well. Hong Kong and Macao are good markets, but Guangzhou is a very challenging market for us," he said.

"We have charter flights to Chengdu and flights from other smaller Chinese cities to Kalibo (on Western Vasayas island) where Chinese tourists go on to Boracay. On the other hand, we are experiencing some challenges in Japan. Flights are being cancelled because of the Mindanao [guerilla war] situation."

More and new planes are only part of PAL's product development. It is spending \$80 million reconverting eight A330s from an all economy 414 configuration to 311 seat business, premium economy and economy cabins.

"We have refurbished four of the A330s. They are flying to Melbourne, Sydney and Honolulu. With the completion of the remaining four by the end of this year we should be able to introduce this aircraft to Japan, Korea and Thailand and really improve the product," said Bautista.

With the arrival of the new fleet, this reconfiguration is part of Bautista's goal of winning five stars from airline ratings group Skytrax, which was expected to conduct an audit of the airline at press time.

"Our timetable is to get four stars this year. Five stars are really difficult. We are giving ourselves until 2020 to get the fifth star. I am very optimistic that we should have a fourth star this year. We have implemented so many improvements in service, our systems and the fleet, including the refurbishment and reconfiguration of the A330s. And once the neos and A350s arrive, that will be a big help," Bautista said.

There is another potential development on the horizon for PAL: selling equity to a foreign investor. Bautista was coy about suitors when he spoke to Orient Aviation, but he confirmed PAL "is still in discussion" with possible interested parties.

"It's not easy to find foreign investors at this time, but we are talking to one group who have really given a sign of good interest. They have investments in other airlines," he said.

"The biggest challenge for us is our ability to grow. We have ordered so many aircraft in the hope that the government will improve airport and aviation infrastructure," he said.

"The development of this infrastructure is quite slow. So how should we maximize the utilization of our planes and how can we efficiently operate these aircraft in this situation?

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![](_page_25_Picture_4.jpeg)

# INDUSTRY ADDENDUM

# Airbus takes control of Sepang Aircraft Engineering

Airbus, which has partially owned **Sepang Aircraft Engineering (SAE)** since 2011, has bought all remaining shares in the Kuala Lumpur MRO. As a fully owned Airbus subsidiary, SAE is part of the Airbus Customer Services network and is a key element for Services by Airbus growth in the Asia-Pacific.

![](_page_26_Picture_3.jpeg)

"Since its creation in 2007, SAE has established a strong reputation in the MRO market for on-time and reliable performance, said **Head of Services by Airbus, Laurent Martinez.** "Our ambition is for SAE to be a leading MRO in the region by becoming an innovation flagship for Airbus commercial aircraft."

SAE has a floor area of 50,000 square metres, two hangars and a staff of 500. One hangar can accommodate six single aisle aircraft or two wide bodies. The second hangar, opened in September, has the space to complete maintenance checks on two A320s at any one time.

SAE also provides overhaul of aircraft components and spare parts and technical support for Malaysia A400M military aircraft. ■

# SIA Engineering and Air India Engineering sign MoU

SIA Engineering Company (SIAEC) and Air India Engineering Services Ltd (AIESL) have signed a non-binding Memorandum of Understanding to collaborate on MRO services in India. The two MROs will offer line maintenance and ancillary services at several Indian airports to domestic and international airlines as well as engineering training.

SIAEC CEO, Png Kim Chiang, said: "We are delighted to enter into this collaboration with AIESL to expand in the Indian market. It will allow SIAEC to offer our integrated MRO and Technical Support solutions to airline customers."

AIESL CEO, HR Jagannath, said: "The SIAEC collaboration will enhance our services to existing airline customers and expand our market exposure to domestic and foreign airlines operating in and out of India." AIESL, established in 2004, is 100%-owned by Air India and is the biggest MRO in India. ■

## Airbus selects Nordam for A320neo P&W engine build up

Airbus and family-owned Nordam have agreed that the U.S. aerospace manufacturer will supply the engine build up system for A320neos equipped with Pratt & Whitney PW1100G engines.

The engine build up system integrates the engine to the aircraft by a series of electrical, hydraulic, pneumatic, fire detection and bleed systems. Nordam will design, integrate and deliver the specified combination of wires, brackets, anti-ice valves, tubing and other components to Airbus Final Assembly Lines in Toulouse, Hamburg, Tianjin and Mobile. ■

## European MROs to service CFMI LEAP engines

Engine manufacturer, **CFMI**, has awarded European headquartered MROs, **AFI KLM E&M** and **Lufthansa Technik** contracts for overhaul and maintenance of its LEAP propulsion product line. CFM has three facilities in the U.S., Brussels and France that have LEAP capability to support the engine's entry into service. The third party shops will provide additional LEAP-1A and LEAP-1B capacity as the engines enter service with airline customers.

**CFM International president and CEO, Gael Meheust**, said last month: "We have just passed the one year anniversary of the LEAP

![](_page_26_Picture_18.jpeg)

entry into service. When these engines have to be overhauled, our customers will have a choice." The first LEAP-A powered A320neo flew with Turkey's **Pegasus Airlines** in August last year. At press time, more than 20 airlines are operating aircraft equipped with LEAP engines.

CFM is a 50/50 joint venture between GE and Safran Aircraft Engines and is the world's largest manufacturer of commercial aircraft engines. ■

## ExxonMobil establishes scholarship at Chinese University

Multi-national oil conglomerate, **ExxonMobil**, has established a scholarship program with **Tianjin's Civil Aviation University of China (CAUC)** for students of aviation, beginning this year. The multi-year bachelor program will support candidates intending to follow a career in engine propulsion and aviation systems.

A CAUC panel will competitively select the scholarship winners from a pool of candidates that must been in the top 10 per cent of their high school graduation class and have also achieved reached a sufficient

#### EgonMobil @ \*##

obil Civil Aviation University of China Scholar 中国民航大学埃克森美孚奖学金

![](_page_26_Picture_26.jpeg)

competence in English to study the course. Industry forecasts agree there will be a need for 260,00 new aviation technical staff to support airline expansion in the next two decades.

"ExxonMobil is a trusted and reliable supplier of high quality lubricants and fuels to the aviation industry," said ExxonMobil vice president of aviation and marine GBU, Exxon fuels and lubricants, Nancy Carlson. "In this instance, our efforts to promote excellence in aviation go well beyond the tarmac and into the classroom. We look forward to seeing the impact these students will have on our industry."

**CAUC president, Doug Jiankang,** said: "We aspire to have a progressive collaboration with ExxonMobil and believe this award will help contribute to the development of the Chinese aviation industry."

Founded in 1951, the CAUC operates under the control of the **Civil Aviation Administration of China** and is estimated to provide up to 20% of key aviation personnel working in China's aerospace industry.

It has working ties with ICAO, IATA, Boeing, Airbus, the major engine manufacturers and industry research centres across the globe. ■

# AAR explores ways to implement blockchain

Application of the new technology blockchain is moving to the aviation MRO industry, reports North American industry media. "Currently, we are investigating ways to ensure part traceability and compliance using distributed ledger technology, which is called blockchain," said AAR senior vice president for intelligent solutions, Andy Schmidt.

This is a long way from the present system where everything is done manually using paper, he said, with all customers required to have paper documentation to trace a part. "In simple terms, blockchain requires consensus among trusted parties to permit transactions. It allows trusted parties to share compliancy data and improve safety, efficiency and waste in the MRO industry."

Schmidt said AAR is looking at SafeFlights, which is developing a consortium blockchain where OEMs, MROs, suppliers, airlines and governments can participate and update blockchain as a part moves from entity to airframe."

#### PEOPLE

## Flight safety promotes distinguished air force veteran to vice president simulation

Global flight training company, **FlightSafety** International, has appointed **Scott Goodwin** from general manager simulation to **vice president simulation** at the New York headquartered group. Goodwin joined FlightSafety International as deputy director special projects in 2014 and was promoted to executive director in 2015. He will have overall responsibility for the design, manufacture and support of FlightSafety's full flight simulators and other advanced technology training devices.

![](_page_27_Picture_13.jpeg)

"We are pleased to promote Scott," said **FlightSafety executive vice president**, **Ray Johns**. "He has the experience, leadership qualities and business skills required to strengthen FlightSafety's position as a world leader in the design, manufacture and support of simulation products."

Goodwin is a highly experienced pilot with more than 3,500 hours in a variety of aircraft. He served with the U.S. Air Force for 30 years, retiring in 2013 with the rank of brigadier general. He was director of operations for the U.S. Air Mobility Command and oversaw the training and evaluation of more than 20,000 flight crew personnel operating 1,300 aircraft worldwide.

He holds a bachelor of aeronautical engineering from the U.S. Air Force Academy and a master of science in mechanical and aerospace engineering from Princeton University where he was a Guggenheim Fellow. Additionally, Goodwin has a master of arts in national security and strategic studies from the U.S. Naval College and was a senior executive fellow at Harvard University's John F. Kennedy School of Government.

FlightSafety International is a professional aviation training company and a supplier of full simulators, visual systems and displays to commercial, government and military organisations. The company provides 1.4 million hours of training every year to pilots, technicians and other aviation professionals from 167 countries and independent territories.

#### Rapid move up the ranks for AJW Group's Tom De Geytere

Global component and repair company, the AJW Group, has announced Tom De Geytere has broadened his role at the company to chief sales officer. Previously, he was managing director of the group's Singapore office.

De Geytere, who spent more than four years running Bulgarian carrier, AirVia, will oversee parts and sales support and the group's engine divisions as well as leading business development in Asia, Africa, the Middle East and the Commonwealth of Independent States.

"Since joining AJW, Tom has developed strong relationships with our customers in the Asia-Pacific. We are experiencing high demand in these growth markets. It was a natural decision for us to deploy his skill set across the company so it benefits our customers more widely, AJW president and CEO, Christopher Whiteside said.

![](_page_27_Picture_23.jpeg)

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![](_page_28_Picture_5.jpeg)

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# INDUSTRY INSIGHT SPECIAL REPORTA

# Engine business booms

The Asia-Pacific will to lead the world in aircraft engine orders and deliveries in the next two decades. Demand for engines powering single aisle aircraft remains strong, but the appetite for very large aircraft engines is diminishing.

#### **Dominic Lalk reports**

![](_page_29_Picture_4.jpeg)

he most recent global fleet forecasts of Airbus and Boeing give the "Big Three" engine manufacturers

the reason to dream big. The Asia-Pacific will require a minimum of 29,500 new aircraft in the next two decades, up to 60,000 turbofans for single aisle lines and up to 23,000 engines for larger wide body aircraft. Revenue from spares and replacements will come in over airlines' initial purchases of the engines.

At a price tag of US\$12 million for Pratt & Whitney's geared turbofan (GTF) and US\$14.5 million for GE/CFM International's rival LEAP, the single aisle engine market should be worth up to US\$870 billion to 2036.

GE's GE9X, which will exclusively power the wide body B777X programme, is the biggest and most expensive engine in the market. It has a unit cost of US\$41 million, which extrapolates into a market valued at US\$940 billion for large turbofans over the forecast period. Between them, the cost of the engines needed for the two main aircraft sectors of the market will be a staggering US\$1.81 trillion in engine revenue

The single aisle engine sector is dominated by Pratt & Whitney and the CFM joint venture. Rolls-Royce has a firm grip on engines for wide bodies, although its two American rivals are competing for business in that sector.

The Engine Alliance and International Aero Engines joint ventures appear to have peaked. They are not pursuing new turbofan lines, but have said spare parts sales are still strong and that they are expected to remain so for the next decade.

# Single aisle engine

Pratt & Whitney have spent more than US\$10 billion and more than 20 years to develop the geared turbofan (GTF), which uses an internal gearbox to slow down the fan. Rolls-Royce is committed to a geared design, the UltraFan, by 2025. GE and CFM are working on their own proprietary solutions.

The GTF is being sold on its ability reduce fuel burn by 16%, lower emissions by 50% and reduce noise by 75% compared with past generation engines. The engine manufacturer has had serious teething problems with the GTF, which has lost it business to CFM's competing LEAP engine.

Despite Pratt & Whitney's best efforts, some of its customers are "not happy" with the situation. IndiGo Airlines president, Aditya Ghosh, said in August: "We continue to have a high number of engine removals and sufficient spare engines have not been available. Regrettably, there have been days when we have had to ground as many as nine A320neo due to lack of spare engines." He added the operational disruptions were "quite challenging".

In contrast, CFM has sold ten times as many LEAPs for Airbus' A320neo Family as its rival. But Pratt & Whitney can still recover its lost ground. Of the approximately 5,200 A320neo on order, 2,200 will be powered by LEAP and 1,500 will have GTFs, which leaves 1,500 aircraft without

# **Mixed fortunes for**

![](_page_29_Picture_19.jpeg)

# in Asia-Pacific

# market accelerates

an engine choice at press time.

GTFs are the exclusive engines for the Bombardier C Series, Mitsubishi Regional Jet (MRJ) and Embraer's second-generation E-Jets. Boeing's competing B737 MAX series is powered solely by the LEAP.

More than 175 hours of ground testing have been completed for the next-generation GTF, which is now in development. It promises another 2% reduction in fuel burn. "Opportunity exists to further reduce the fan pressure ratio and combine it with a short inlet. We are looking at how to further optimize the work split through the engine. We are also exploring development of higher temperature materials and higher efficiency components," Pratt & Whitney said.

The "ultra-high bypass fan design" is said to have a "significantly higher" bypass ratio than the 12.2:1 ratio in the current PW1100G, the company said.

"The success of this ground test is an important step in taking our GTF engine technology to the next level," said Pratt & Whitney vice president of technology and environment for the engine market, Alan Epstein. "We are working to make sure the next generation GTF engine—already a gamechanger—remains on the cutting edge of performance and sustainability." The next generation

![](_page_30_Picture_8.jpeg)

GTF will compete against a higher thrust version of CFM's LEAP engine. The most powerful LEAP produced today, a -1A for the A321neo, is rated at 31,160lb thrust. CFM is confident it can push it to 50,000lbs for future A320neo and B737 MAX series, with a design based on the existing CFM56 series—the most widely used engine in the industry. The CFM56 series flies with more than 550 airlines. About 2,400 aircraft are powered by the series at any one time. The new LEAP offers 16% efficiency savings by using more composite materials and achieving higher bypass ratios.

# wide body propulsion

The wide-body engine market is dominated by GE's CF6 that equips A330s, the GE90 for B777s and the GEnx for the B787s. Rolls-Royce Trent 1000s are on B787s and the Trent XWB powers A350s. The Trent 700 propels the A330ceo series and Pratt & Whitney's PW4000 family of engines is manufactured for A330s and B777s.

GE is focusing on the development of the GE9X for the B777X series, which is scheduled to enter commercial service with Emirates Airline in 2019. Certification testing will commence in May. With almost 700 GE9X engines on order, the GE9X will be in the 100,000lb thrust class and will have the industry's largest front fan at a 134" diameter.

The engine will be 10% more fuel efficient than the current generation B777 GE90. It is scheduled for flight testing on GE Aviation's flying testbed by year end. At the Derby headquarters

of Rolls-Royce in the U.K.,

the manufacturer is relishing the "very smooth entry into service" of the Trent XWB with the A350 programme and also preparing for the next-generation engine scheduled for entry into service from 2025.

For Rolls-Royce, the future is its Advance and UltraFan engine designs, with the first run of its Advance3 demonstrator engine in the works. The demonstrator will test a new engine core, attached to a Trent XWB fan system and a Trent 1000 low pressure turbine that will deliver at least 20% better fuel burn and CO2 emissions than the first-generation Trent engine.

The same core is also part of the UltraFan engine design that will be available from 2025. It will deliver power for high by-pass ratio engines with a geared design similar to the GTF.

Just months after trials began Rolls-Royce said testing on the power gearbox has broken the world record as the most powerful aerospace gearbox in existence when it reached 70,000hp in tests at its dedicated facility in

# **INDUSTRY INSIGHT** SPECIAL REPORT ASIA PACIFIC AIRCRAFT ENGINES: AN UPDATE

Dahlewitz, Germany two months ago.

In partnership with Liebherr-Aerospace, the U.K. engine maker is developing manufacturing capability and capacity for the UltraFan at its Aerospace Transmission Technologies joint venture. Rolls-Royce's chief technology officer, Paul Stein, said: "Setting this record is a great achievement for the team. Our Power Gearbox technology is central to the success of the next generation of Rolls-Royce jet engines."

Rolls-Royce has supported three "first flights" in the last twelve months: the Trent XWB-97 on the A350-1000, the Trent 1000 TEN for B787-10 and the Trent 7000 for the maiden flight of the A330neo on October 19.

The 68-72,000lb thrust Trent 7000 delivers a step-change in performance compared with its predecessor, the Trent 700, which is the most popular engine choice for the A330ceo. The Trent 7000 will improve specific fuel consumption by 10%.

All 'Big Three' engine makers confirmed to Orient Aviation they were talking with Boeing about the potential supply of engines for the under-study "New Midsize Airplane" (NMA) that could enter commercial service from 2025.

The focus will be on a 250-270-seat, 5,000nm range

wide body jet that would sit between the B737 MAX 10 and the B787-8. The NMA will be equipped with composite wings and fuselage. Qantas Airways said in October it was "very keen" on the NMA. Other Asia-Pacific airlines have expressed a strong interest in the proposed plane. Boeing's NMA will compete with Airbus' A321neoLR, a fast-selling aircraft that will be available next year.

# Electric engines on horizon

The industry is looking more seriously at the viability of electric and hybrid-electric propulsion aircraft. Electric propulsion is a reality, but is restricted to powering very small aircraft. Airbus has outlined a technology roadmap that leads to a narrow body-sized hybrid electric demonstrator in about 20 years.

Boeing has teamed up with JetBlue's Technology Ventures to fund Zunum Aero, which is designing a hybrid-electric business aircraft and a 50-seat regional jet to fly in the early 2020s.

"Gradual progression of electric and hybrid-electric aircraft from small planes to large planes will require technology advances in multiple areas, which include energy storage, electrical machines, power transmission, power electronics, control systems, materials, thermal management and multi-scale modelling tools," said deputy director for research and engineering at NASA's Glenn Research Center in Cleveland, Dr Ajay Misra.

![](_page_31_Picture_14.jpeg)

# 3D printing revolution

![](_page_31_Picture_16.jpeg)

GE Aviation adopted an out-of-thebox approach to engine technology from 2003 when the giant manufacturing conglomerate developed a new fuel nozzle, which was critical to reducing fuel burn and emissions. But turning the game changing design into reality required the welding and braxing together of 20 parts.

GE began a top secret project with Morris Technologies to produce the fuel injectors of the fuel nozzle using 3D printing – or additive manufacturing. Morris employees had to sign confidentiality agreements if they were working the nozzle prototype.

Today, that fuel nozzle sits in the engines of the LEAP family. The GE/Morris Technologies partnership developed the 3D printing process to mass-produce the 19 fuel nozzles in each LEAP engine, with the interiors made additively of cobalt-chromium, the same material used to make hip replacements. In prototypes, GE found the material wildly capable, which is when the then CEO of GE, Jeff Immelt, and current GE Aviation vice chair and GE Aviation president and CEO, David Joyce, decided to take up 100% of Morris Technologies.

In 2015, GE launched the GE93, a turboprop engine produced with more than one-third additive components. Additive design processes have enabled its engineers to make parts with improved weight and durability that have improved fuel efficiency and performance capability.

By 2016, these experiences led GE to commit to being a "vertical" business as a provider of additive machines, materials and application engineering expertise to several industries, from aerospace and automotive to medical and luxury goods.

At Rolls-Royce, additive manufacturing is used to produce larger aircraft parts. Rolls built the world's largest 3D-printed aero engine structure, the front bearing housing, for the Trent XWB-97 engine that powered the Airbus A380 flying test bed in November 2015. The front bearing housing used in the test flight was 1.5 metres across, half a metre deep and contained 48 titanium aerofoils.

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# INDUSTRY INSIGHT SPECIAL REPORTA

# Engine market enjoying unlimited growth

In Airbus' latest global market forecast, the Toulouse manufacturer raised its 20-year forecast from last year's 33,070 to 34,900 jets, valued at US\$5.3 trillion. Seventy one per cent (24,810) of the aircraft will be single aisles. It foresees demand for 8,690 twin aisles and 1,410 very large aircraft (VLA) such as the A380 or B747-8.

Boeing was more optimistic. The U.S. manufacturer predicted 41,030 new airplanes will be needed in the next two decades, valued at US\$6.1 trillion, with single aisles the fastest growing market thanks to low-cost carrier demand and air passenger expansion in Asia's emerging nations. It estimated the Asia-Pacific would need 29,530 new narrow bodies, a 5% increase over its 2016 forecast. The wide body segment will require 8,210 passenger aircraft, with a wave of potential replacement demand beginning in early 2020 – a significantly lower tally than the Airbus forecast.

# GE

CF34: 3, 252 aircraft with 261 operators CF6: 1,649 aircraft with 209 operators GE90: 1,112 aircraft with 73 operators GEnx: 481 aircraft with 51 operators

![](_page_33_Picture_9.jpeg)

# **Rolls-Royce**

Trent installed base (in service and in storage) 2016 year end = approx 1400 engines 2025 year end = approx 3300 engines

![](_page_33_Picture_12.jpeg)

![](_page_33_Picture_13.jpeg)

# CFM

Asia Pacific Region (including China) CFM56-5B powered CFM56-7B powered LEAP-1A powered LEAP-1B powered

Aircraft In service	Aircraft On order
1293	67
2310	95
32	793
7	1022

# Pratt & Whitney

Engine Sum of number types of engines		Engine Sum o types o	m of number of engines	Engine types	Sum of number of engines	Engine Sum of n types of e	um of number of engines	
GP7200	40	PW1000G	114	Hainan Airlines	6	China Eastern Airlines	180	
Widebody Jets	40	Narrowbody Jets	106	Hong Kong Airlines	12	China Eastern Airlines Jiangsu	32	
Korean Air	40	Air Astana	2	Japan Airlines	32	China Southern Airlines	336	
		ANA-All Nippon Airways	10	Jin Air	8	Chongqing Airlines	28	
IT3D	4	China Southern Airlines	14	Korean Air	142	Citilink Indonesia	12	
- Narrowbody lets	4	GoAir	16	Lion Air	4	Government of Australia	2	
Indian Air Force	4	Hong Kong Express Airway	′s 6	Malaysia Airlines	36	Hong Kong Express Airways	36	
indian / in Force		IndiGo	50	MIAT - Mongolian Airline	es 2	IndiGo	220	
ITED	97	Sichuan Airlines	4	Republic of Korea Air For	ce 4	Jetstar	122	
	02	Tianjin Airlines	4	Shanghai Airlines	10	Jetstar Asia	36	
Afelen Ain Fanan	02	Regional Jets	8	Silk Road Cargo Business	2	Jetstar Japan	42	
Algnan Air Force	3	Mitsubishi Aircraft Corpora	ation 8	Singapore Airlines Cargo	28	Jetstar Pacific	34	
AIRFAST Indonesia	8			Uzbekistan Airways	16	Juneyao Airlines	30	
Astro Air International	2	PW2000	18	Vietnam Airlines	10	Nepal Airlines	4	
Express Air	2	Narrowbody Jets	18	V2500	2200	PAL Express	10	
Far Eastern Air Transport	16	Asia Pacific Airlines	4	V2500	2398	Pan Pacific Airlines	4	
FitsAir	2	Raya Airways	2	Narrowbody Jets	2398	Philippine Airlines	38	
Indian Air Force	8	Tajik Air	2	Air Astana	26	Philippines AirAsia	4	
Indonesian Air Force	8	Uzbekistan Airways	10	Air Bisnkek	2	Royal Brunei Airlines	12	
Jayawijaya Dirgantara	6	PW4000	576	Air Busan	46	Scoot	46	
Kam Air	10	Widebody lots	576	Air Calin	4	Shaheen Air International	26	
My Indo Airlines	2	Air Astana	570	Air Cuilin	110	Shenzhen Airlines	/8	
Raya Airways	6	Air China	20	Air Guilin	0 20	Sichuan Airlines	168	
Sigma Airlines	3	Air China Cargo	12	Air Magau	30	SlikAir	26	
Sky Capital Airlines	2	Air Hong Kong	8	Air New Zealand	54	Sky Angkor Airlines	4	
South East Asian Airlines (	SEAIR) 2	Air India	16	Air Sooul	00	Thai Smile	10	
Vision Air International	2	Air Niugini	2	Asiana Airlinos	54	Tianiin Airlings	40	
vision / international	2	ANA-All Nippon Airways	60	Avia Traffic Company	J4 1	Tigoroir Austrolio	24	
IT9D	12	Asiana Airlines	50	Rangkok Airways	4	Tigerair Taiwan	20	
Widebody lets	12	Biman Bangladesh Airlines	2	Bassaka Air	+0	Viotnam Airlinos	114	
let Asia Airways	2	Cathay Pacific	24	Cambodia Angkor Air	6	Virgin Australia Pogional Airlino	c 4	
Kam Air	2	China Cargo Airlines	4	Canital Airlines	80	Victora	, 4 26	
Uni-top Airlines	8	China Southern Airlines	60	Cathay Dragon	46	West Air (China)	26	
			Grand To	tal: 3244				

![](_page_34_Picture_0.jpeg)

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