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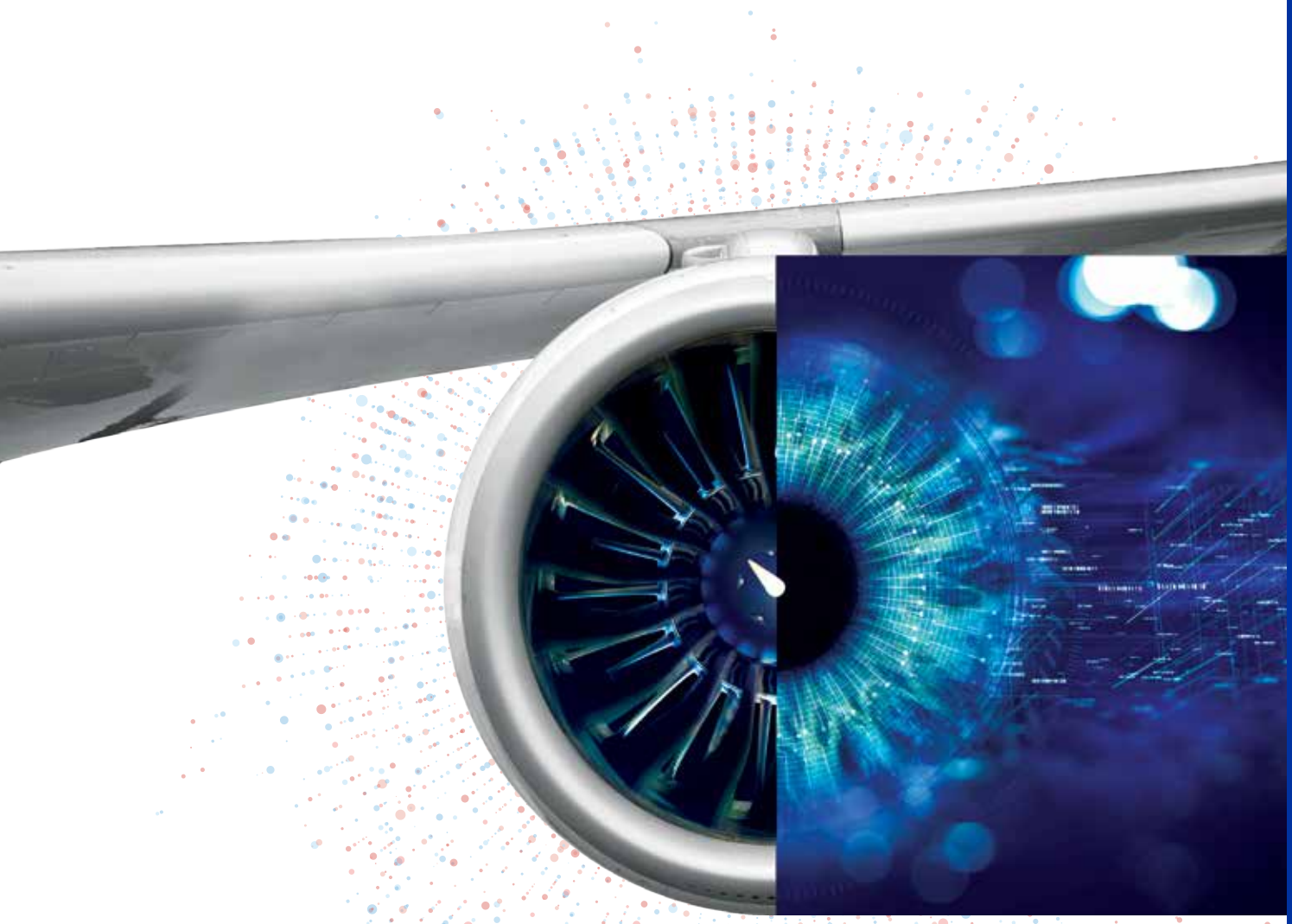

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A different Singapore Airshow

It is unusual for an international air show to conclude without a single order from major airlines, especially in a region forecast to control 42% of the commercial aviation market in the next two decades. But it happened last month at the 2018 Singapore Airshow.

In 2014, airlines wrote orders for new jets worth $32 billion at the biennial show. Two years ago, they signed up for new planes valued at $12.7 billion.

The fact of the matter is that in 2018 Asia-Pacific carriers had already finalized purchases for their fleet upgrades in the short to medium term. They are now readying to accept a long line of new airplanes from manufacturers.

On the Mainland, China Southern Airlines, the region's largest carrier, has 296 jets on order, including B787-9s and A350-900s. China Eastern has ordered 257 planes and Air China 172.

Pacesetter Singapore Airlines has 49 B787-10s and 20 B777-9s coming its way and there are hundreds of narrow-bodies being readied for delivery to low-cost carriers in the region, including the AirAsia Group, India's IndiGo and Lion Air in Indonesia.

Other Asia-Pacific airlines, such as Air New Zealand and the Qantas Group, are assessing next generation aircraft that will facilitate their network expansion. Their choices and consequent orders will not be decided until year end or in 2019.

This year's Singapore Airshow was significant in that it revealed the industry is a different beast from a decade ago. The region's carriers, and their peers worldwide, have become far more analytical in their fleet planning.

Happily, the cycle of capacity shortfall, booming orders and overcapacity, followed by cancellations and deferrals appears to be history. It would be overstating the case to say the industry has entered a period of unrestrained financial rationality, but for the first time in many years it was business written by the services and digital sectors of OEMs that dominated the headlines in Singapore.

Come Farnborough in July we will find out if Singapore was simply a pause in orders as airlines assess their needs for future network development. ■

TOM BALLANTYNE
Chief Correspondent
Orient Aviation Media Group

Good times roll on for Qantas Group

The **Qantas Group** has reported a strong interim pre-tax profit of US$761.7 million for the six months to December 31, 2017. Only its international arm turned in a pre-tax profit decline of 5.5%, to $173.3 million.

Despite higher fuel costs, a competitive domestic market and international capacity overkill, "**Qantas Domestic** had a record result, the **Jetstar Group** had a record result and **Qantas Loyalty** had a record result", said **Qantas Group CEO, Alan Joyce**, at the results announcement in Sydney. Qantas International held its own in a market that is producing some extremely low air fares, Joyce added.

"We met, or exceeded, all the targets of our financial framework. Debt is towards the bottom of our target range. Every division is returning more than its cost of capital. We generated a record amount of operating cash flow and free cash flow was almost three times higher than the previous first half," he said.

Joyce said the international arm has reported a good result given higher fuel costs and increased competitor capacity in the market. This is "an important transition year" for Qantas International, he said, and forecast it was setting up for a bright future.

"The airline is welcoming the Dreamliner [into its fleet] and making key changes to its network, including hubbing through Singapore and Perth," he said.

"It is taking some routes from Emirates on the Tasman and starting the unique Perth-London service, which will be the first non-stop direct link between Australia and the UK. These changes will generate material benefits from fiscal year 2019 and the early signs are very positive."

The international operations of low-cost carrier, Jetstar, generated strong earnings, helped by the favourable operating costs of the B787-8, although the LCC lost an estimated $10 million from the disruption caused by the Bali ash cloud in the closing months of 2017.

Jetstar's portfolio of joint venture airlines in Asia was profitable, driven by its operations in Japan and Singapore as well as significantly improved results at **Jetstar Pacific** as excess capacity in Vietnam moderated.

Looking ahead, Joyce said the airline is broadly positive about trading conditions and the prospects for consumer demand. "After several years of turning around this business, Qantas has a lot of momentum behind it. Consistent financial performance gives us the headroom to plan for the future. We're vigilant about maintaining that performance and we are excited about what is ahead," he said. ■

Qantas to train 500 pilots at its new academy

*Separately last month, Joyce announced the **Qantas Group** would establish a training academy to train up to 500 pilots a year at an existing airport in regional Australia. The **Qantas Group Pilot Academy**, which will be funded by an initial investment of US$15.6 million, will open its doors to students in 2019.*

"Boeing estimates the world will need about 640,000 more pilots in the next 20 years, with 40% of them required in the Asia-Pacific." said Qantas Group CEO, Joyce. "That level of demand makes the academy important not just for Qantas, but for Australian aviation more broadly so that all parts of the industry have access to qualified pilots in a country that relies so heavily on air transport.

"Over time, we see potential for the academy to become a competitive advantage for Australia in the region. It could train pilots for other airlines and grow into the largest academy

of its kind in the southern hemisphere."

The academy will initially train around 100 pilots a year for direct entry into the Qantas Group, including Jetstar and regional carrier, QantasLink. "Depending on demand from other parts of the aviation industry, this could grow to 500 pilots a year on a fee-for-service basis," Joyce said.

Qantas also wants to address the chronic gender imbalance among pilots in an industry where 97% of pilots are male. "If we're leaving out almost 50% of the population in our search for the next generation of 640,000 pilots, clearly we are not tapping into all the talent available. As an industry, we need to do a much better job of encouraging women to become pilots and take up what is an exciting career path," Joyce said.

Last year, Qantas announced the Nancy Bird Walton initiative, named after the pioneering female Australian aviator, to improve on its 5% proportion of female pilots. It commits the Qantas Group to a 20% intake of qualified women in the 2018 Future Pilot Program with the goal of females making up 40% of cockpit crew in the next decade.

Joyce said Qantas will partner with one of several existing training providers in establishing the academy and will consult governments at all levels about the location of the training facility. The Qantas Group sources pilots from a mix of new graduates from existing flying schools, pilots from general aviation and the military and from commercial airlines.

This is expected to continue in order to provide the different levels of experience needed by the carrier. An additional program to help mentor and recruit the 'best and brightest' aviation students from five Australian universities was announced last year. The group has more than 3,500 pilots and plans to recruit another 350 by year end. ■

Norwegian seeking Asian partner with view to marriage

Wanted: An Asian no-frills airline to partner with rapidly expanding **Norwegian Air**, which has been flying London-Singapore for six months. The ambitious LCC, which attracted considerable industry interest when it launched its first long haul low-cost flights in 2013, has confirmed "the door is open" for exploring expansion elsewhere in the Asia-Pacific, including Australia.

Norwegian said in a statement that as an ambitious airline with huge aircraft orders "it is no secret that we have plans to expand globally". It has 160 jets on order and already is flying 119 B737-800s with eight more to be delivered and six B737MAX8 that will grow to 110 of the type when all orders are filled. It also has eight B787-8s and 15 B787-9s in its fleet with 18 more -9s committed and an order for 30 A321LRs.

Based at Fornebu in Norway and operated by Norwegian Air Shuttle, Norwegian Air UK is a fully owned subsidiary of Norwegian Air Shuttle which launched to Singapore from London Gatwick last September. "Our Singapore-London flights continue to perform well. The door is open to exploring potential ways we can cooperate with other low-cost carriers that would offer passengers onward connections to other parts of Asia and places as far as Australia," an airline spokesperson said last month.

In February, the carrier launched the UK's first low-fare route to South America, a non-stop service from London Gatwick to Buenos Aires. A month earlier, it set a record for the fastest transatlantic flight in a subsonic passenger aircraft from New York to London. The journey was completed in just over five hours. The Norwegian B787-9 reached a top speed of 776 miles per hour (mph). As the aircraft sped across the Atlantic it benefitted from an extra strong jet stream that at times reached a speed of 202 mph. The official time for the 3,458 mile journey was five hours and 13 minutes, 53 minutes faster than expected. ■

Asia-Pacific airlines and governments unite to fight cyber threats

The **Association of Asia Pacific Airlines (AAPA)** is strengthening airlines' defenses against cyberattacks with the formation of an alliance with regional governments. Supported by non-AAPA airline, the **Qantas Group**, the new partnership includes the **Australian Department** of **Foreign Affairs and Trade**, **Singapore's Ministry of Transport** and the **Civil Aviation Authority of Singapore (CAAS)**.

The threat of cyberattacks on airlines, airports and other aviation sectors has been an increasing concern in recent years, where there is close to universal agreement that it is not a matter of "if" an attack will take place but "when".

The AAPA said the public-private partnership will run a series of capacity building interactive workshops with the first of them held in Singapore last month. Participants included representatives from regulatory agencies, airlines, airports, service providers, suppliers and academia.

Each workshop focuses on risk awareness, strategic planning, strengthening resilience and fostering networks to position the Asia-Pacific as a global leader in aviation cyber resilience.

Issues highlighted at the Singapore workshop were:

* *Aviation safety and security is built on a network of trusted relationships*
* *Growing digital connectivity attracts increased challenges and vulnerabilities*
* *Wider regional understanding needed about the shared cyber risk environment*
* *Building more resilient systems that focus on response and recovery to re-establish business continuity*

AAPA director general, Andrew Herdman, said at the Singapore workshop: "Although our cyber security defenses may be robust, it is never enough. In the long-term, system breaches and break-ins are inevitable. Therefore, on cybersecurity, it is essential to work cooperatively together to strengthen our collective resilience through shared intelligence and technological innovation.

"The AAPA is committed to working in partnership with other aviation stakeholders to develop, implement and enhance strategies for strengthening cyber security and resilience of the aviation sector."

Australia's Ambassador for Cyber Affairs, Tobias Feakin, who also spoke at the Singapore workshop, said: "This public private partnership model is an essential element of successful cyber resilience, which will provide the enabling environment for this region's booming connectivity and growth." ■

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Digital innovation centre stage at Singapore Airshow

Global original equipment and service companies chose February's Singapore Airshow to showcase their new focus on digital MRO, artificial intelligence and investment in training, technology and manufacturing. Chief correspondent, Tom Ballantyne, reports.

It was not surprising the closing press conference at the region's biggest show, in Singapore in February, was cancelled.

"Companies are becoming confidential on transaction values and the number we have will not be meaningful," said the show's managing director, Leck Chet Lam.

He was right. With none of the big aircraft manufacturers announcing any sales of commercial jets, the only announcements were from Bangkok Airways for four ATR 72-600 turboprops, at list prices of $100 million, and an $80 million sale of a Honda business to European air taxi operator, Wijet.

Of more significance, considering demand for pilots in the Asia-Pacific, was the $74 million purchase by Chinese Flight Training specialist, Fanmei Aviation Technologies, of 152 Piper Aircraft training planes. It was the biggest order in the history of the U.S. company.

Fanmei president, Don Li, said the new aircraft will be a "key element" in China's general aviation roadmap as the country's commercial passenger market expands. Piper President and chief executive, Simon Caldecott, complimented Fanmei for "establishing a prestigious pilot development program to meet the growing need for exceptionally trained airline flight crews", adding that the synergy was a "wonderful opportunity for both organizations as we work collectively to help address the global pilot shortage".

At the last Singapore Airshow in February 2016, deals valued at $12.7 billion were signed with airlines and suppliers. At the 2014 show, purchases committed hit $32 million. But this year, show analysts said, many full service and low-cost Asia-Pacific carriers had placed large orders for jets over the last five years. Airbus and Boeing in particular have record backlogs of aircraft orders.

Airbus estimates more than 14,000 aircraft, including freighters, are required in Asia to 2036, some 42% of world demand. But airlines are being cautious. They fear overcapacity. Endau Analytics' Shukor Yusof added that weak profitability was to blame for the declining appetite for more new planes at the region's airlines. "Although the traffic numbers in Asia point to huge growth, the reality is that profit margins are thin. It's harder to make money," he said.

The real action in Singapore this year was among the sales teams for MROs and

Singapore government invests US$47 million in university aerospace research

The Civil Aviation Authority of Singapore (CAAS) announced during the Singapore Airshow that it would extend its collaboration with Singapore's Nanyang Technological University for another five years by investing up to US$47 million in artificial intelligence and data science research.

In the next five years, the partners will conduct research into air traffic management solutions in five areas: Artificial Intelligence (AI) and Data Science; Urban Aerial Transport Traffic Management and Systems; Regional Air Traffic Management Modernization and Exploratory Studies of Emerging Technologies and Talent Development, with a focus on innovation.

tracking and communications systems, particularly Air Traffic Management systems that are designed to manage the largest aircraft market in the world.

During the show week, the International Air Transport Association (IATA) and the Civil Aviation Authority of Singapore (CAAS) signed a Memorandum of Collaboration (MoC) to establish a Global Safety Predictive Analytics Research Center (SPARC) in Singapore. The MoC was signed by IATA director general and CEO, Alexandre de Juniac, and the director general of CAAS, Kevin Shum.

SPARC will utilize predictive analytics to identify potential aviation safety hazards and assess related risks by leveraging the research capabilities in Singapore, and operational flight data and safety information available under IATA's Global Aviation Data Management (GADM) initiative.

End users across the aviation community can work collaboratively at the system level to address and implement appropriate safety measures to mitigate risks or prevent the occurrences of safety hazards. The first area of focus for SPARC will be runway safety, such as runway excursions, which are the most frequent category of accidents in recent years, IATA analysis has revealed.

"The accident investigation process will continue to be a fundamental tool in improving safety. However, as the number of accidents declines, we need to take a system-based, data-driven, predictive approach to preventing accidents, including analyzing the more than 10,000 flights that operate safely every day. The Singapore Government and the CAAS have been strong partners of IATA and we look forward to working with them through SPARC to help to take aviation safety to an even higher level," said de Juniac.

Shum said the establishment of SPARC in Singapore is especially timely given the anticipated doubling of air traffic in the Asia-Pacific by 2036. "SPARC's predictive data analytics capabilities will help the aviation sector in Asia-Pacific and better anticipate, prioritize and address safety issues more effectively," he said.

In the MRO sector, there was more evidence that original equipment manufacturers (OEMs) such as Boeing and Airbus are continuing to make inroads into the aftermarket sector. With forecasts that the Asia-Pacific MRO market will be worth $22.7 billion annually by 2027, that is hardly surprising.

At Singapore, Boeing signed nearly $1 billion in new service deals, including with Singapore Airlines to use Boeing's Electronic Logbook on its B777 and B787 fleets, a landing gear exchanges contract with Japan's All Nippon Airways and a partnership with China Southern Airlines and Guangzhou Aircraft Maintenance Engineering Company to develop services for the Boeing Global Services (BGS) program.

Airbus, which is reporting double digit growth in its Services By Airbus aftermarket division, announced the establishment of a new customer services center at its Airbus Asia headquarters at Singapore's Seletar Aerospace Park. The center adds to its existing regional presence, which includes Malaysia-based acquisition, Sepang Aircraft Engineering, and its Heavy Maintenance Services Singapore joint venture with SIA Engineering.

Singapore Airlines MRO arm, SIA Engineering, was also busy. It finalized a joint venture with GE Aviation for GE90 and GE9X overhauls, following an initial announcement of the initiative at the 2017 Paris Air Show.

GE Aviation also announced plans to build a facility to manufacture GE9X engine parts in Singapore, growing its presence in the components segment, which accounts for the largest MRO market in the region in 2018, at 33%.

Pratt & Whitney, through its Pratt & Whitney Eagle Services Asia business, expanded its offering in Singapore by launching full services for the Engine Alliance GP7200 that powers A380 aircraft. The U.S. subsidiary, which previously carried out low pressure compressor module overhauls on the engine, plans to conduct its first full service on the widebody engine this year.

Britain's Rolls-Royce chose Singapore to showcase its IntelligentEngine strategy, which will change the process of its design, manufacturing and servicing of its engines. "We see it as being almost as big a shift as it was to move from the piston to the gas turbine. It's almost a new way of thinking," Rolls-Royce's marketing senior vice president, Richard Goodhead, said. ■

Singapore broadens FAA cooperation

In early February, the Civil Aviation Authority of Singapore (CAAS) said it would deepen its co-operation with the U.S. Federal Aviation Administration (FAA) by signing revisions to the Bilateral Aviation Safety Agreement – Implementation Procedures for Airworthiness (BASA-IPA) on the sidelines of the Singapore Airshow.

The enhancements follow the launch of the U.S. – Singapore Joint Aviation Steering Committee (JASC) in December 2017. Co-led by the FAA Administrator and the CAAS Director-General of Civil Aviation, JASC manages and strategically guides technical collaboration of aviation initiatives between the two bodies.

Areas of focus are international aviation safety, regional cooperation and development, air traffic management, environment, and cybersecurity.

The revisions to the BASA-IPA simplify and remove some issues for achieving airworthiness approvals and they will save airlines money.

"The removal of the limitations will now allow airlines to undertake a comprehensive supplemental type certificate package of modifications for cabin, mechanical and electrical systems, as well as the in-flight entertainment system. This will certainly help airlines reduce lead times and costs of cabin retrofit programs," said Singapore Airlines senior vice president engineering, Lau Hwa Peng.

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Red tape to go promises Vietnam's regulators

By chief correspondent, Tom Ballantyne

Vietnam is forecast to create a boom in new domestic airlines as traffic numbers soar in a market served by only four scheduled carriers. Industry insiders estimate at least six more airlines will be required to satisfy accelerating commercial passenger demand.

New entrants preparing for the challenge include Vietstar Airlines, Tân Cảng Airlines and Bamboo Airways, with the latter already party to a Memorandum of Understanding with Airbus for A321neo jets. Bamboo hopes to launch operations next year, dependent on government approval of its Aircraft Operators Certificate (AOC).

Vietnam has a fleet of 180 aircraft operated by Vietnam Airlines, Jetstar Pacific, Vietjet and Vietnam Air Services Company (VISC). The country's

Ministry of Transport (MoT) wants to expand this number to 220 aircraft in two years and to 400 by 2030.

The MoT recently forecast annual passenger growth of 16% to 2020 and 8% a decade later. Passenger numbers will increase to 64 million passengers in the next two years and to 131 million in 2030, it said.

Statistics from the Vietnam National Administration of Tourism have reported that 6.5 million Vietnamese travelled overseas in 2016, a figure expected to surge by 9.5% in the next five years.

In February, the MoT completed a 2018-2020 draft plan for the country's aviation industry and also outlined a vision for the sector to 2030. Details of the plan have not been disclosed. The ministry is collating industry feedback on its works before submitting the draft plan to the country's department of prime minister.

Analysts familiar with the draft strategy said it contains conditions that will make it difficult for new airlines to be established, including demanding investment processes in addition to the three to four years it now takes to secure an AOC.

Congestion at some Vietnamese airports also is a hurdle. Government authorities already have postponed issuance of permits to Vietstar Airlines because of congestion at Tan Son Nhat airport. Tan Cang and Viet Bamboo Airlines have not submitted their documents to the Ministry of Planning and Investment, a process necessary for the start-ups, which make it unlikely they can be approved for take-off before 2021.

At a meeting last November deputy prime minister, Trịnh Đình Dũng, said adjustments were necessary to create a framework for future airline expansion. ■

COMPENSATION MOUNTS AS MORE ENGINE FAULTS EMERGE

It has been a rough twelve months for most of the world's major jet engine makers as problems continue to surface on engines that power the world's airline fleet. Chief correspondent, Tom Ballantyne, reports.

Pratt & Whitney's new PW1100G GTF (Geared Turbofan) engines, which power Airbus' latest single aisle A320/321neo, took a turn for the worse last month when the U.S. Federal Aviation Administration (FAA) issued a formal warning that the power plants posed a potential shutdown risk. The announcement followed a similar decision by European regulators earlier in February.

In an airworthiness directive, the FAA cited a knife edge seal fracture in the engine that could lead to an engine stall, consequent inflight shutdown and rejected takeoffs.

On February 22, Pratt & Whitney announced it had released a revised configuration as a remedy for a knife edge seal on the High Pressure Compressor (HPC) aft hub.

"The solution is based on a design with which the company has significant experience and this solution has all the necessary regulatory approvals. Pratt & Whitney has begun implementing this solution and production engine deliveries incorporating this change will begin in early March," the engine manufacturer said.

If that was a concern for Pratt & Whitney, there was no sign of gloating across the Atlantic in Derby, England, where rival Rolls-Royce also has its troubles. In December, it had to issue an advisory that some of its Trent 1000 engines on B787-9 airline fleets required maintenance sooner than previously indicated because of corrosion issues.

It forced Air New Zealand to cancel several international flights and also to ground some of its 11 B787s. Problems with the engines had caused two of the carrier's flights to be aborted. One flight from Auckland to Tokyo had to turn back to home base when the plane experienced shaking and registered strange noises.

Last year, some Rolls-Royce engines on the B787s of All Nippon Airways 787s were taken out of service because of turbine blade corrosion.

For airlines operating the new aircraft, these incidents are serious issues that disrupt schedules, force flight cancellations and reduce revenue. For aircraft manufacturers, Airbus and Boeing, while they are not responsible for the engine purchases, the incidents are doing them persistent brand damage.

To date, 113 Pratt & Whitney powered A320neo family aircraft are flying with 18 customers.

One airline seriously impacted by the Pratt & Whitney problems is Indian low-cost carrier, IndiGo, which has more than 400 of the aircraft on order. It said it has been forced to replace faulty Pratt & Whitney engines on its jets in 69 cases over the last 18 months.

There had been three occasions when engines shutdown during IndiGo flights and three other cases when flights were

cancelled after engine issues were identified. Other big Asian customers for the neo are AirAsia, with 304 on order, Lionair with 113 and VietJet with 42.

So what has gone wrong? Pratt & Whitney has been transparent in its reaction. It said in February that the company had implemented an "engineering change" in the middle of last year that was intended to improve the durability of the knife edge seal on the high pressure compressor aft hub on a limited number of the GTF engines.

Engines that incorporated this change entered revenue service on customer aircraft beginning in December 2017. "In late January and early February of this year, four of these modified engines did not perform as anticipated," it said. It added that defective engines are installed on about 32 aircraft across the world.

"The current population of impacted engines is 43 engines installed on 32 aircraft, of which 21 aircraft have one engine with the modified configuration and 11 aircraft have two engines with that configuration. There are also approximately 55 such engines delivered to the Airbus final assembly line, which are now awaiting installation on customer aircraft. Pratt & Whitney is working with Airbus to implement the remediation plans set forth in its all operator transmission," it said in a statement.

The engine maker said that in coordination with Airbus it is presenting a proposed mitigation plan to regulatory authorities for a modified configuration. "Pratt & Whitney will be in a position to provide greater detail around the remediation plan and impact, if any, on its 2018 delivery plan, once the regulatory authorities address its proposed solution," it said last month.

Airbus, which ended 2017 with a record order backlog and delivered more jets than ever despite the engine issues, is promising 20% growth in earnings this year. Announcing the company's full year results last month, chief executive, Tom Enders, said Airbus was working on measures to gain control over the engine issue.

"The A320neo ramp-up remains challenging and requires engine suppliers to deliver in line with commitments," he said, and added the impact on deliveries of the latest turbine issues is under assessment.

The latest issue relates to a seal Pratt replaced after an earlier version exhibited durability issues. Fixing the glitch is "not rocket science", Enders said, and confirmed the U.S. engine marker appeared to have identified the root cause of the malfunction. Deliveries of modified engines should start from April.

Airbus 320neos equipped with a rival power plant made by the CFM International alliance of General Electric and France's Safran are also behind schedule, due to less serious "maturity" concerns. Enders said, Airbus would still look at increasing the production rate of the neo to 70 jets a month from the planned 60 aircraft. "We're expecting to deliver another record number of deliveries in 2018. Of course we need engines for these aircraft, but I am confident our partners will not let us down," he said.

> "We're expecting to deliver another record number of deliveries in 2018. Of course we need engines for these aircraft, but I am confident our partners will not let us down"
>
> **Tom Enders**
> Airbus CEO

The latest Rolls-Royce Trent 1000 engine problem was not the first hiccup in the program. Introduced into service seven years ago, the engine has had several adjustments to rectify fuel burn and reliability issues that have pushed up development costs of the turbine.

In 2012, launch customer, All Nippon Airways (ANA), grounded five of its B787s due to corrosion within an external gearbox on the Trent 1000 engines. The component, a gearbox from Hamilton Sundstrand, was replaced for all existing and subsequent aircraft. Last year, it disclosed it would have to replace the turbine blades on the entire fleet of Trent 1000 engines powering the B787 after corrosion and cracking problems were discovered on some passenger jets also operated by ANA.

At its interim results in 2017, Rolls-Royce took an $85 million provision to cover technical costs on large engine programs, just under half of which was related to the costs of replacing the turbine blades on all engines affected — roughly half the installed base of 434 turbines.

The problem with Air New Zealand aircraft is not isolated. Virgin Atlantic revealed it plans to lease up to four A330-200s for at least a year from this month to make up for the fact that some of its B787s have been grounded by Trent 1000 problems.

Rolls-Royce said it is working closely with Air New Zealand (and other carriers) to "minimize this impact and restore full flight operations as soon as possible. This is the continuation of work that started last year to upgrade Trent 1000 engines to the latest standard", it said.

Over three years, Rolls-Royce will replace all Trent 1000 intermediate pressure turbine blades and airlines will replace blades impacted by corrosion with new or minimally used blades in the interim.

Analysts said the good news is the problem has been identified and a solution is underway for both Rolls-Royce and Pratt & Whitney. Now, it has to be decided is who pays the airlines for their lost income and additional expenses and how much they will pay. ■

Philippine Airlines readies for New York A350 launch

Philippine Airlines (PAL) president, Jaime Bautista, last month achieved a goal he has long had in his sights – a four star Skytrax rating for his carrier. The next step for PAL is the launch of non-stop routes to the U.S. and Europe with its new A350-900s.

By chief correspondent, Tom Ballantyne

When Airbus' newest long-range jet, the A350-1000, called in to Manila during an Asia-wide demonstration tour last month, Philippine Airlines (PAL) president, Jaime Bautista, made it clear he would be happy to have the US$366 million aircraft in his fleet.

In a buoyant mood after receiving a four star rating from Skytrax a few days earlier, Bautista told media the airline is spending big money, a forecast $2 billion, to expand its 88 aircraft fleet to 100 planes.

Four A350-900s will be delivered to PAL from June this year as well as six A321neo. The Airbus wide bodies will allow PAL to fly non-stop from Manila to the U.S east coast via the Polar route, and launch more services to Europe. They will replace PAL's ageing A340s.

PAL's first non-stop route to the U.S. will be New York with Seattle, Chicago and a point in Western Europe to follow. PAL also will continue to strengthen its network of services from Clark, Cebu and Davao as part of its "multi-hub" network strategy.

Bautista clearly believes the A350-1000, 40% larger than the smaller -900, would be a good fit for PAL. It accommodates 366 passengers in a three-class configuration and has a range of 14,800 kilometers.

The PAL president said the -1000 has 95% common systems and parts numbers as well as the same type rating as the -900. Carriers elsewhere in the Asia-Pacific have ordered 287 A350s, a third of the 854 ordered worldwide. Asiana Airlines, Cathay Pacific Airways, China Airlines, Hong Kong Airlines, Malaysia Airlines, Singapore Airlines, Thai Airways International and Vietnam Airlines already fly the -900.

PAL operates the B777-300ER, the A340 and the A330 on its longer haul services and the A320 on its domestic and regional network. The arrival of the A321neo – it has 21 in the pipeline – represents a major step forward for the carrier in terms of fuel savings and a longer range capability compared with its predecessors. The first A321 neo will fly the new Manila-Brisbane non-stop service.

PAL will be the first Asian airline to operate a narrow-body airliner equipped with 12 full-flat Business Class seats. All 168 seats in the aircraft's two cabins – business and economy - will have in-seat video monitors, another first for PAL's single aisle aircraft – and free WiFi. The A321neo will also fly non-stop from Manila to Sapporo, New Delhi and Mumbai. ■

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DIGITALLY DRIVEN

Air New Zealand overcame serious disruptions to its operations in 2017 as it went head to head with new competitors. Despite these challenges, the carrier continues to report record annual profits built on innovation and service. Chief correspondent, Tom Ballantyne, reports from Auckland.

Air New Zealand chief executive, Christopher Luxon, has every reason to be satisfied with the performance of his business. "We are having a really good year. Another good year, which is really fantastic," he told Orient Aviation in Auckland last month.

On the other hand, he was quick to point out that the last year, while good commercially, presented the carrier with plenty of challenges. As well as several new competitors flying into New Zealand, the carrier had to manage periods of extreme weather, overcome disruption to its flying schedule from a ruptured fuel line at Auckland Airport and ground some of its B787-9 Dreamliners because of problems with their Rolls-Royce Trent engines.

Despite these setbacks, the carrier reported a US$276 million after tax profit for the year ended June 30, 2017. It was a decline of 17% over the previous year, but the results were still the second biggest profit for the carrier in its history.

Last month Luxon reported another impressive interim profit, to December 31, 2017, of US$237.7 million. While the results were slightly lower than the $256.8 million profit it reported for the same period a year ago – as higher fuel prices dampened profits – Luxon said the airline group was on track for its second highest profit in the company's history for the full year to June 30.

"The domestic market continues to show strength driven by the New Zealand economy as well as inbound tourism. We will increase capacity by approximately 6% across our regional and jet services to support that demand over the second half of the financial year," said Luxon.

"It's been quite a challenging 24 months to be honest," Luxon told Orient Aviation. "Last year was all about dealing with lots of new competitors. We had 10 new competitors show up in twelve months in New Zealand.

"But the business was highly resilient.

We fought back and were highly competitive, which was great. All the work of the previous five years stood us in good stead. It is why we were very proud of the results despite the pressure we had competitively." Among the newcomers flying into an already crowded market were Qatar Airways and Chinese carriers Sichuan Airlines, Hainan Airlines and Tianjin Airlines.

Last September, the challenge was more immediate, to say the least. Thousands of airline passengers were stranded in Auckland after a pipeline burst that was the only conduit for jet fuel to Auckland airport.

"These are issues outside our control, but it is the culture we have built [at Air New Zealand] and the speed and agility of our reactions that allowed us to deal with them. The fuel pipeline rupture was incredibly frustrating," said Luxon.

"We had to run the airline for two weeks on 30% of fuel. Our flight operations people arranged to uplift fuel from other ports. How we managed fuel stocks and how we managed flying again was a pretty impressive response."

Just as serious was the news in December that some of the airline's 11 B787s would have to be grounded. Rolls-Royce had to inform Luxon, in the lead up to the peak Christmas travel season, that the Trent 1000 engines that powered the airline's B787s required premature maintenance. Worse still, Rolls-Royce said, no replacement engines were available.

The fault, which centres around corrosion of intermediate pressure turbine blades, is effecting B787 fleets worldwide. "We've had really good transparent conversations with Rolls-Royce. We also have very good engineering and maintenance resources here in New Zealand," said Luxon.

"We have worked our way through the issues incredibly well. We realized that if we were to deliver our peak summer schedule when the engines could not be serviced as quickly as we would have liked we had to find other aircraft. We hired two A340s from Hi Fly, a Lisbon-based wet leasing specialist, which we have been operating between Auckland, Sydney and Perth."

The A340 is hardly a fuel efficient replacement for the B787, but Luxon said it was much more important that the airline's customers could travel as planned during the peak summer period. "Within a week of reaching the agreement, we had the planes here and operating," he said.

"It was a phenomenal effort from all our people that made that happen. Think about the network implications, the customer communication tasks and all the logistics that actually made that come into being."

Air NZ and its subsidiaries operate 106 aircraft of which 56 fly mainline operations: 30 A320s for domestic and short haul international flights, eight B777-200ERs, seven B777-300ERs and eleven Dreamliners that service the carrier's long haul network.

Mount Cook Airlines, a domestic subsidiary carrier, flies 27 ATR 72s and Air Nelson operates 23 Bombardier Q300s in New Zealand. Two more B787s and four A321/320neo will arrive in the Air NZ fleet this year as will four more ATRs.

The airline is proceeding through an assessment process with Airbus and Boeing as it considers replacement of its B777-200s. The A350, the B787-10 and the B777X are being considered.

Like Alan Joyce, his trans-Tasman Qantas rival, Luxon is extremely interested in the opportunities new generation jets offer for ultra long haul flying. But unlike Joyce, Luxon is not interested in flying non-stop to London.

"For us, Europe is best delivered through our alliance driven network. It operates to London via Los Angeles. But we have a real source of competitive advantage in linking Asia to South America, two big, growing and emerging parts of the world. We are seeing that already in our traffic flows starting to come out of Asia into South America and South American goods travelling through Auckland on their way to Asia. We also are seeing huge growth from this strategy around Australia, through New Zealand and onto the Americas."

Ground-breaking advertising campaigns featuring Dave the Goose and more recently, Pete the Kiwi, have promoted flying on Air New Zealand to North and South America from Australia via Auckland. They have been a huge success.

"It's going superbly well," said Luxon. "In the last three years, we have built a much stronger presence in Australia. We are the number one corporate reputation company in Australia, which is unusual for a foreign company to have that title.

"We have expanded our sales presence across all the states. We have a compelling story that says if you are in Adelaide why not jump on a Dreamliner, come through Auckland and then transition out to Buenos Aires, to Houston, to Los Angeles.

"To give you a feel for it, probably 40% of our traffic to Argentina is Australians. Twenty five per cent of our traffic to Houston would be Australians. It's been a great source of extra volume in a country of five million people to tap into a much larger market."

Air NZ's fleet has an average age of seven years and is one of the youngest in the world. "Our network is 30% bigger than it was five years ago," said Luxon. "It is affording us some opportunities and connectivity that have not been tapped.

"For us, to go from Australia through New Zealand out to the east coast of North and South America is very promising. To be able to connect China and Southeast Asia through Auckland to South America also is very promising. Being three hours closer to the Americas than the eastern seaboard of Australia means that yes we think there is a huge opportunity for us to do launch into the east coast of North America and also South America. As we go through the B777-200 Request for Information and Request for Proposal, as we look for a replacement for those aircraft, this is very much in our thinking."

As for the increased competition, Luxon said 2017 was the most competitive 12 months in the seven years he has been at Air NZ, but the airline is handling it. "We have started to see much more rational behavior over the Tasman, which is really fantastic because there was over-capacity sitting there," he said.

"The American carriers have reduced their services to New Zealand. And yes, the Chinese have come in, but a lot of the Mainland traffic is from secondary and tertiary cities, which impacts us less. We have built a pretty good business model for China where we have gone after upper middle-class travelers."

Partnerships are a key plank in Air NZ's strategy. Apart from its greater China partners, it works closely with Star Alliance partner, United Airlines. into North America. "We have Virgin Australia and the Singapore Airlines relationship, which is huge for Europe and for Southeast Asia.

"They are a great set of JV partners for the markets we need to service. We have relationships with Aerolineas Argentinas and All Nippon Airways and a bunch of other players around the world. We have the set of partners we want. With an alliance driven network we have both skin in the game and the ability to support each other in our home market, under the blessing of the competition authorities. It is a really good outcome," he said.

Unlike many airlines who complain they are carrying more passengers for less yield, Luxon begged to differ. "It has not been our experience. If you look at our monthly statistics, we've had an improving RASK (Revenue per Available Seat-Kilometer) situation for the last year. It has been a very big focus for us, getting the revenue mix right and where possible making sure, as fuel costs rise, that we try to recover that through our RASK. Yield has been moving in a very positive direction."

Luxon strongly believes digital technology improves customer outcomes, simplifies the business operationally and helps it commercially. And when it comes to customer service he is not shy about his views.

"When you are airline of the year for five years in a row, when you're doing lots of things within an airline world incredibly well, we're not being arrogant but we don't think there is heaps to learn from other airlines about customer service," he said.

"We think there is a lot more to learn about serving customers from celebrity cruises, from Zappos (an online shoe and clothing shop based in Las Vegas, Nevada), from Four Seasons, from Disneyland. We are much better to go to those places because they have much higher levels of service than airlines."

Luxon has sent Air NZ hospitality teams to Disneyland where they saw the magic band the theme park uses to manage traffic through the park. "We actually stole it because we are a big believer of nicking things with pride. We actually repurposed that as our Air New Zealand Air Band," he said.

"It is used for unaccompanied minors travelling with the airline. It's highly anxious putting your kid on a plane under 12 years old and sending them off to see your grandparents in Sydney from Auckland. We have an unaccompanied

Seeking China's wealthy travelers

"We are interested in the free and independent traveler, not the group traveler. You can fill planes up with different customers, but without the right margin structure and economics, there is a real problem. Your planes are full but you are losing money flying to China," said Air New Zealand CEO, Christopher Luxon.

Over the last five years, Air NZ has changed the whole set of wholesalers and retailers it deals with in China. "We go after wealthy 30-year-old couples and wealthy middle-class families. Eighty per cent of the passengers on our flights spend eight days or more in the country, which is almost as much as U.S. tourists' daily spend," he said.

"It's a much better mix for us. They also are customers with limited annual holidays - two weeks a year – and they want to start their holiday on an Air New Zealand flight interacting with Kiwis. They have consciously chosen Air New Zealand over Chinese mainline carriers. This is how we have margined up our business and how we got the economic model right."

New Zealand was the first country in the world to sign a free trade agreement with China and Luxon wants to deepen the airline's presence on the Mainland. It flies daily to Shanghai and has a revenue-sharing joint venture (JV) with Air China on daily flights to Beijing from Auckland. As well, it has a JV with Cathay Pacific Airways between Hong Kong, Shanghai and Beijing.

minor bracelet that sends five text messages to the parents in Auckland and five text messages to the grandparents sitting in Sydney. The kid has a cool band which helps us operationally because it digitizes. We know exactly where everyone is so we can track everybody.

"Commercially, our customers have come back and said we love the service so much. They will pay a premium for that and a service fee for that. It is a situation of high anxiety. It is a pain point in the customer dealing process. We have used technology and innovation to solve that problem."

None of this, Luxon insisted, has anything to do with replacing people with technology. "For some things, the technology gets you through the process quicker, faster, with more accuracy," he said. "It means that rather than leaving our people behind a desk where you line up and check in, we can have our people circulating, concierge-style, around the kiosk who ask 'Sir, can I help you?'

"We have a lot of flexibility and we think we can augment the service we offer. Its not a cost-cutting exercise where you use robots or machines to do the jobs humans can do. It's an end.

"We need everyone doing all the jobs we possibly want done because we have higher standards of customer service and operational efficiency as well as goals for commercial revenues and commercial performance. It's a combination of human and automation working together."

When Luxon joined Air NZ in 2011 as group general manager for the carrier's international arm, he had chosen to quit his high powered position as president of Unilever Canada, a US$1.4 billion business, and return to his native New Zealand.

When he arrived at the carrier, he was not exactly enamoured with the airline industry in general and was critical of some of its traditional practices. "From when I started [at Air New Zealand] to today, airlines have become more like proper businesses rather than excuses for poor performance which is what they kind of were," he said.

"There's still a lot of that around, a lot of incrementalism and lot of calcified paradigms that sit out there that people don't challenge. Having said that, in the last five or six years the industry has become commercially orientated, much more rational and thoughtful about what they can control in their business.

"The history of airlines is they have not faced up to the shortfalls of their business model with the sufficient regularity that you would do in a normal business. So sometimes airlines get what they deserve because they just have not been innovative enough and they have not evolved their business model. The market has changed around them and these are just the basics of how you constantly have to be dynamically tuning up the business.

"We have built a business in the last six years that can deal with fuel at higher levels or low levels, or God forgive a fuel pipeline or any engine issue. That's just the stuff that happens in any given year. If you have a really great culture, really good people and a really great executive team you can deal with it." ■

Air New Zealand's digital vision

High on the agenda of Air New Zealand CEO, Christopher Luxon, are innovation and the application of digital technology across the entire business. "We have about 700 people in our digital team. We want to be the most digitally advanced airline in the world and also one of the most digitally advanced businesses in Australia and New Zealand," he said.

"We are well on that pathway, but there is a lot more we want to do in the next few years. We think this is a big strategic agenda that needs to be planted and seeded really well and that it wil pay off in five, ten or fifteen years."

The array of Air NZ trials with new technology is astounding. Last August, in conjunction with the Commonwealth Bank of Australia, it conducted a five-day experiment that utilized Chip, the bank's social humanoid robot. It interacted and assisted Air NZ customers to check in and also assisted staff and passengers at the airport gate in Sydney before boarding.

The airline also is testing Google Pexil Buds, which are wireless earpieces that allow Air NZ staff to speak in English to a foreign language speaker and have the exchange instantly translated into the other language. "With language as a barrier, [Pexil Buds] allows us to engage with that customer. The frustration and the pain point are minimized by technology," Luxon said.

Twelve months ago, the carrier launched Oscar on the airline's website, where it began testing the waters of Artificial Intelligence (AI). Oscar answers customer queries and learns as it goes.

"It has been going incredibly well," said Luxon. "It's learning 900 new questions a day.

"There's a whole spectrum of technology available. We don't want to run everything as a bog standard airline doing incrementalism. We have a bigger and better vision of where we want to go."

Last November, Air NZ announced it would explore Blockchain technology, a secure ledger database that records and stores every transaction by all parties participating in a transaction and eliminates third parties such as banks and payment processors.

Luxon told Orient Aviation the trial is at a very early stage, but potential applications for cargo and baggage tracking, retail, distribution and loyalty program opportunities are being assessed. Air NZ also has a mobile app that scans and saves the passport information of passengers and sends a timely reminder for the document's renewal. Every month around 550 customers turn up at the airport with an expired passport.

Also under review is the elimination of physical baggage tags on luggage by employing computer chips in bags. "Why do we put bag tags on bags? We've been doing it for 75 years. No one questions the paradigm, but it's a pain and a hassle for the customer to go to a kiosk or to an agent and put a bag tag, a physical piece of paper, on a bag," said Luxon. "In the 21st Century it does not make any sense. We need to disrupt and take these pain points out and the frustrations away from customers."

> For us, there are no insurmountable challenges, headwinds or tailwinds. It is about our strategic agendas of sustainability and digital innovation. They are big fixation points for us

Christopher Luxon
Air New Zealand chief executive

One global slot system for all countries

Airline operations are threatened with chaos in some Asian airports unless a slot allocation system is established the International Air Transport Association (IATA) predicted in a recently published study. Chief correspondent, Tom Ballantyne, reports.

Airport capacity and airline demand for access to airports cannot keep pace with each other, said Head of Worldwide Airport Slots for the International Air Transport Association (IATA), Lara Maughan. "Without a process of allocating available slot capacity we will see chaos, with more aircraft than stands being offered and more passengers than terminals and their systems can handle," she said.

Speaking at a recent briefing in Geneva, Maughan painted a gloomy picture of what lies ahead at many of the region's airports as passenger numbers double in the next two decades to 7.2 billion annually. Aircraft flying the world's skies also will almost double in the same period, Airbus and Boeing forecast.

"There is no doubt we are entering a period where capacity availability is going to impact the ability to serve predicted demand. This significant gap between capacity available and capacity demand needs to be managed," Maughan said.

She said a system should be established that only allows carriers with slots to fly. IATA is convinced that its Worldwide Slot Guidelines (WSG) is the answer to fair and equal management of future slot allocations.

"The WSG provides a reasonable solution that promotes competition and has enabled the birth of the low-cost carrier at many slot controlled airports," said Maughan. "We have initiated the WSG Strategic Review with Airports Council International (ACI) and the coordinator community to revise the areas [of slot allocation practice] that need updating," she added.

The worsening slot situation is reflected in the number of airports that are resorting to slot co-ordination to cope with the pressure of passenger traffic. The number of slot co-ordinated airports continues to grow in every region. IATA said that at November 30 last year there were 189 Level 3 Slot Co-ordinated airports worldwide and 122 Level 2 airports that are less congested airports with some peak congestion. China has 21 slot coordinated airports.

The airline body said: "Realistically, there could be another 100 airports declared full in 10 years –that's 50% growth. In the worst case scenario, we could have more than 300 slot coordinated airports in 10 years," said Maughan.

There is by no means universal industry agreement about the direction airport slot

Peak and off peak pricing not favoured by airlines

IATA said peak and off-peak pricing would not replace slot allocation. Instead, it would charge airlines for using infrastructure in the hope of encouraging carriers to use off-peak periods at airports. Maughan said the peak and off peak pricing model does not work in practice because market demand dictates schedules.

Other difficulties with the model are:

* Airlines are incentivized for high utilization of their fleet and can't avoid peak flying, especially on long haul sectors which have the added complexity of night restrictions.
* ICAO guidance has shown that peak/off-peak charges have been ineffective in prompting airlines to reschedule flights to less congested airports.
* Capacity constraints should not be used to increase airport revenue. The solution has to be completely revenue neutral.
* Slot constraints limit the ability of airlines to modify the schedules. Cost reduction by operating off-peak is attractive but is unachievable due to demand, schedules/slots, connections and global network.
* It redistributes costs between different airline users arbitrarily.

allocation policy should take. Apart from IATA's preferred slot coordination policy, other solutions to resolve airport congestion include peak/off-peak pricing and slot auctions.

IATA said peak and off-peak pricing would not replace slot allocation. Instead it would charge airlines for using infrastructure in the hope of encouraging carriers to use off-peak periods at airports.

Maughan said the peak and off peak pricing model does not work in practice because market demand dictates schedules.

Slot auctions, another suggestion system, would penalize airlines that don't have the funds or the influence to acquire the landing slots they need to serve their network.

Administrative Allocation through Slot Co-ordination is the preferred model for slot allocation, usually following the WSG process. It involves an independent and neutral coordinator who reviews the operations of previous seasons.

Airlines that have achieved 80% usage of each slot series retain it through historic precedence. New slot requests are considered against available capacity. At least 50% of the capacity pool is directed to new entrant airlines.

Administrative Allocation takes place globally according to a timetable to ensure airlines receive their slot allocations at the same time. It allows carriers to match slots to their planned schedules and put their seats up for sale.

IATA said the process ensures airlines can enter new markets without additional entry costs and that slots are allocated free of charge, a huge benefit to the passenger as it does not load up air fare prices.

The usage requirement also ensures scarce capacity is not wasted, with airports achieving 98% utilization and also allows airlines to operate in markets where demand exists. There is no favoring of certain airlines, business models or their ability to pay.

"It is not perfect, but is altogether a better option than the others on the table," said Maughan, who added finding a perfect solution is almost impossible, especially when it must work worldwide.

Other factors that must be considered in future slot allocation systems are:

** At some of the most congested airports in the world, there are huge numbers of slot requests that cannot be immediately met. They are waitlisted and managed during the season. Where possible, ad hoc capacity is allocated to applicants. It is not unusual for a seasonal waitlist to have 60,000 requests.*

** The number of slots to be allocated is staggering. In a week at London Heathrow 9,500 slots are allocated for airport operations.*

** The process of allocation must consider runway movements, terminal constraints of check-in, security, gates, baggage reclaim and aircraft stand availability for different aircraft sizes.*

** The airlines need to match the slots they hold to fleet rotation and crew rostering as well as matching a slot at both ends of the journey to satisfy schedule requirements and onward connections.*

** Operating restrictions and bans on night flights are increasing and are restricting the feasibility of operations between airports, particularly for long-haul Asian journeys that depart late at nght and arrive in Europe as airports open.*

Maughan said: "A lack of capacity still remains the critical issue and none of these [present systems] solve the problem. Responsible investment in infrastructure needs to be forthcoming and now. Maybe if governments could make the difficult decision to agree to expansion as soon as we'd like it, I could happily be without a job well before my very distant retirement." ■

Slot auctions a short term solution

Another proposed solution, Slot Auctions, is in vogue at some airports, but it is uncertain they will stand the test of time. "They may seem like an ideal solution as a market-based measure to achieve absolute efficiency in allocation. They would be a scarce commodity that could be sold to the highest bidder which maximizes economic benefit. Perhaps not," said Maughan.

"Recently, China experimented with the idea by putting a selection of slots on the market at Guangzhou Baiyun airport and it also ran a slot lottery at Shanghai Pudong," she said. "It has not been repeated."

The feeling among airlines was that market distortion would be rife. Airlines with slot co-ordinated bases would be most hurt by having to pay for all their slots while some of the world's largest carriers would only be paying for slots on 10%-20% of their operation.

Slot auctions would also dramatically change the business. Marginally profitable routes would be destroyed, which would eliminate the social benefit of connecting remote communities with larger cities.

Providing leisure travel at reasonable prices would be a huge challenge for airlines, especially low-cost carriers, when they are confronted with enormous payments for slots on top of airport charges.

> "No airline wants to be dealing with these cumbersome [slot] systems for planning their operation and securing growth in new markets. They want to serve the demand, with schedules and fares that are attractive and competitive"
>
> **Lara Maughan**
> IATA head worldwide airport slots

LEAP engine veteran moves up at CFM

LEAP program director with the **commercial engine division at Safran, Sebastien Imbourg**, has succeeded Francois Bastin as **CFM executive vice president**.

Bastin, who has served in the role since early 2015, has been appointed as **executive vice president of commercial engine programs at Safran Aircraft Engines**.

As a member of the CFM executive team, Imbourg will be responsible for overseeing programs carried out by CFM, the company said. Along with his counterpart at **GE, Allan Paxson**, he also will be a primary interface between the joint venture partners.

CFM, headquartered in Ohio, has delivered nearly 33,000 CFM56 and LEAP engines to airline customers worldwide and is one of the most successful aircraft engine suppliers in aviation history. The company was formed in 1974 and the joint venture agreement extends to 2040. ■

SIA Engineering and GE Aviation form joint venture

Asia-Pacific MRO, **SIA Engineering (SIAEC)**, and **GE Aviation** have announced they will form an engine overhaul joint venture in Singapore; a confirmation of their initial announcement in June last year. The Singapore listed MRO will hold equity of 49% in the company and GE Aviation 51%.

The GE90 engine powers the B777-300ER and the B777-200LR. The GE9X is the sole engine for Boeing's new B777X aircraft. "The new joint venture will ensure our GE90 and GE9X operators have access to high quality maintenance, repair and overhaul facilities," **president and CEO of GE Aviation Services, Jean M. Lydon-Rodgers**, said. ■

ST Engineering invests in IFE connectivity

ST Engineering subsidiary, **Singapore Technologies Electronics Ltd**, has agreed to form a joint venture with **SatixFly UK Ltd**, to increase the Singaporean company's access to the high growth commercial aviation connectivity market.

The new company will be set up in Britain and will develop a state-of-the art satellite antenna system that will deliver high quality IFE to the aircraft cabin. ■

Asiana signs five-year A380 MRO with Lufthansa Technik Philippines

Lufthansa Technik Philippines and **Asiana Airlines** have signed a five year-agreement to provide base maintenance for the South Korean carrier's A380 fleet; an extension of previous MRO on Asiana A380s. The MRO will conduct 14 checks, starting this month.

"During previous checks on our A380s, Lufthansa Technik Philippines has shown sincerity and dedication to the campaign, which ultimately led to our decision to award them the contract," **Asiana Airlines general manager aircraft and supplies purchasing, Dong Jun Shin**, said.

Asiana's six A380s are scheduled to undergo light to heavy maintenance from March this year to 2022. The Philippines MRO also will carry out modifications on the doors, flap tracks, wing tips, engine feed fuel pump systems and other structural repairs on the six aircraft.

Asiana Airlines, headquartered in Seoul, has a fleet of 82 long and short haul aircraft that fly to 64 international and 10 domestic destinations in 23 countries.

Separately, **Lufthansa Technik Shenzhen** is strengthening its capabilities in component repair and composite repair as well as engine repair. The MRO has 600 employees and the capability to support the A350, the B777 and B787. For 2018, capability will include thrust reverse actuators, hydraulic pumps and batteries.

In February, the facility was approved as the first MRO service provider for the **Commercial Aircraft Corporation of China (COMAC)**, with work commissioned on the Chinese manufacturer's **ARJ21** engine nacelles and components. ■

Honeywell seals deals with Eastar and Lion Air Group

Last month, U.S. headquartered aerospace conglomerate, **Honeywell**, signed its largest Asia-Pacific contract to supply auxiliary power units, in fleet terms, with Indonesia's **Lion Air Group**. It also extended its contract to supply and service its wheels and brakes for **Eastar Jet** in South Korea.

The Lion Air Group agreement will cover 620 aircraft, run for 17 years and include aftermarket services. The group's subsidiaries include **Thai Lion Mentari**, **Malindo Airways**, **PT Batik Airways** and **PT Batam Aero Technic**.

In the same week, at the Singapore Airshow, Honeywell and budget carrier, Eastar Jet, extended a contract to supply wheels and brakes to the 27 aircraft South Korean low-cost carrier for another five years.

The extended agreement will include

exchange, repair and overhaul services for the 11-year old domestic and regional carrier, which is based at Gimpo International airport in Seoul. ■

Thales and Singapore to develop Next Gen ATM solutions

Global Aerospace, Transport, Defence and Security conglomerate, **Thales**, and the **Civil Aviation Authority of Singapore (CAAS)**, have signed a Memorandum of Understanding to analyse digital ATM trends, including artificial intelligence as it applies to ATM. Mixed use of airspace by manned aircraft and drones also will be explored.

"Thales no longer views the digital revolution as an emerging trend but as an immediate reality with a Euros one billion investment in digital technology already materialized by the group," **Thales executive vice president for land and air systems, Alex Cressell**, said.

"The aviation eco-system is one of the domains we feel will benefit most from digitalization." ■

Smiths Detection wins explosive screening contract in India

Aviation threat detection and screening technology company, **Smiths Detection**, has signed a US$50 million contract with **Airport Authority of India (AAI)** for the supply of high speed explosive detection systems for hold baggage screening at nine airports in India. Airports to be fitted with the units include Chennai International Airport and Kolkata Airport.

AAI manages 125 airports across India. It is responsible for creating, upgrading, maintaining and managing the country's civil aviation infrastructure on the ground and in the air. AAI also builds terminals for many airports that fall under the Modi government's small airports development initiative. The **CTX 9800** bought by AAI can screen up to 1,800 bags an hour. It is certified to operate in Europe, by North American homeland security regulators and the Civil Aviation Administration of China. ■

AAR spreads its wings to India with Indamer partnership

Global provider of aviation services to commercial airlines, **AAR**, has announced a joint venture with India's **Indamer Aviation** to establish an MRO facility in Nagpur, a relationship that has fast tracked to commencement of construction in the largest city in central India.

Initially the facility will be equipped with six narrow body bays, including one bay for painting. The complex will eventually have 16 bays and component repair workshops available for airline clients. It is scheduled to be opened in the fourth quarter of this year.

AAR president and chief operating officer, John Holmes, said last month: "We are excited to expand AAR's MRO expertise outside the Americas in partnership with Indamer, which has the local market and cultural knowledge needed for success. We are looking forward to bringing our MRO experience to central India to serve the country's fast-growing airlines."

Said **Indamer Aviation CEO, Rajeev Gupta**: "When we started planning a new MRO in India, we knew we wanted to leverage the experience of a leading independent MRO that had been successful in more mature aviation markets. AAR is the ideal partner for us and brings the knowledge and processes needed to help establish in-country capability and jobs in aircraft heavy maintenance." ■

Pratt & Whitney marks 35 years in Asia-Pacific

Pratt & Whitney kicked off its 35th year in the region with the inauguration of a GP7200 overhaul capability at its Singapore engine centre, **Pratt & Whitney Eagle Services Asia**; a joint venture with the **SIA Engineering Company**.

In addition, the facility is planned to be equipped with overhaul capabilities for the P&W Geared Turbo Fan PW1100G-JM engine by 2019.

"We are excited to inaugurate the GP7200 facility in Asia," said **senior director aftermarket operations Asia-Pacific Pratt & Whitney, Brendon McWilliam**.

"While the engine centre is a centre of

excellence for engine overhaul and repair services across multiple engine lines, our operations in this region offer a wide range of engine maintenance, repair and overhaul services for operators".

Pratt & Whitney Eagle Services Asia is the only facility in the region to service GP7200 engines. The engine was developed by **Engine Alliance**, the 50/50 joint venture between Pratt & Whitney and the General Electric Company.

In 2017, the facility was designated as an overhaul facility in Singapore for the Pratt & Whitney GTF engine at an investment cost of US$85 million. The facility will begin modifications this year. ■

Jet Airways signs lease deal with Japan's SMBC

SMBC Aviation Capital, a joint venture leasing company owned by Japan's **SMFG** and the **Sumitomo Corporation** has signed a sale and leaseback agreement with **Jet Airways** in India for 13 B737 MAX 8s with first delivery scheduled for August this year.

SMBC has been a client of the full service airline since 2004. It has previously leased three B737-800s to the Mumbai-headquartered carrier that were delivered in recent months.

"We are very pleased to conclude this transaction, our most significant MAX sale and leaseback to date," **SMBC Aviation Capital CEO, Peter Barrett**, said: "This transaction, which follows a competitive tender process, demonstrates our ability to deliver innovative financial solutions to our customers."

Jet Airways CEO, Vinay Dube, said: "This agreement will facilitate a well programmed induction of the much awaited B737MAX 8 aircraft to our fleet and help us enhance operational efficiency." ■

Bullish business for MROs in Asia-Pacific

The business of airline maintenance, repair and overhaul (MRO) could be heading for a golden era the latest market forecast from global leader in management consulting, Oliver Wyman, reveals. As with the airline market in general, growth will be driven by Asia-Pacific players, reports chief correspondent, Tom Ballantyne.

It's good news for the world's MRO providers and for original equipment manufacturers (OEMs) such as Boeing and Airbus, who continue to make significant inroads into the maintenance aftermarket space. According to consultants Oliver Wyman, in its 18th annual Fleet & MRO Forecast, annual spend is set to increase by 48% from 2018 through to 2028.

The commercial MRO industry is valued by the consultancy at $77.4 billion this year (2018) and this figure is expected to climb quickly. In just five years' time, it predicts, the MRO segment's market value will rise to $91.9 billion at a 3.5% compound annual growth rate. By 2028, this will increase to 4.5% with the industry value totalling $114.7 billion. "The likes of China, Asia and the Middle East regions will all see a marked increase in spending levels, while the established duo of North American and Europe will remain resolute," according to the forecast.

Oliver Wyman says that, as has been the case for years, Asia remains the driver of MRO growth. Regionally, as fleet growth shifts to Asia and other developing economies, the consultancy says MRO spend will also migrate to those regions. "By 2028, the combined MRO demand in the Asia-Pacific, China, and India will be more than double that in North America. India is forecast to grow 5.6% annually, but will represent less than three percent of the market. The Asia-Pacific region will grow at a healthy four percent annually, with MRO demand levels rising to equal those of Western Europe and North America. China, forecast to jump 10.6% annually, is expected to increase market size to nearly 16% of world MRO."

There is, however, a note of caution. "While China will be the key driver of MRO spend growth in Asia, rising labor costs, coupled with temporary infrastructure and capacity constraints, are likely to force Chinese operators to look to countries south and east to fulfill maintenance needs. Complicating the demand in Asia-Pacific and China, operators around the world are currently sending nearly 24% of wide-body heavy airframe maintenance needs to the region. There will be an inflection point where capacity growth within Asia cannot keep pace with the MRO demand of its own countries plus that of foreign operators, particularly those in the mature North America and Western Europe regions. Operators will have to look elsewhere for their MRO needs, presenting opportunities in North America, Western Europe, and Latin America."

Across the world this year, the majority of MRO spend will emanate from narrowbody and widebody aircraft operators, accounting for $69.2 billion and more than 90% of the projected total. The remainder of the $8.2 billion global outlay will be spent on the maintenance of regional jets and turboprops,

Unsurprisingly, the Airbus A320 family and the Boeing B737 variants will account for the most spend in 2018 and also ten years from now. Newer aircraft types such as the Boeing B787 and the Airbus A350 will be among the aircraft generating the highest spend in 2028. "These newer widebodies will depose the likes of Boeing's B747 and B757 aircraft, which are


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still generating some of the highest spend in the industry now, but will be retired from the global fleet with increasing frequency."

Some of the fastest growth is projected for MRO operations owned by aircraft manufacturers and other major original equipment manufacturers (OEMs), such as engine makers General Electric and Rolls-Royce. "Boeing, for instance, has set a $50 billion goal for its aftermarket services as part of its effort to capture more life-cycle value out of its aircraft. That represents a tripling of its current revenue from the aftermarket. Our research indicates that OEMs servicing engines handle about 53% of the market, while airlines and their affiliated MRO operations control 64% of the airframe maintenance market. OEMs handle about 58% of the component MRO aftermarket," says Oliver Wyman.

The consultancy also says that one new technology that could shake up the aftermarket later in the decade is 3-D printing. "Using models built through computer-aided design, 3-D printing can produce virtually any solid object—even those with complex architectures—in a range of materials, including plastic, ceramic, and metal. For aerospace manufacturers, this has been a boon for producing prototypes, an activity that accounts for half of additive manufacturing today."

While the forecast for aviation, fleet growth, and the MRO market is basically bullish, there are still risks on the horizon, warns Oliver Wyman. "Fast growth often leads to strained capacity and higher costs as pent-up demand allows suppliers to raise rates and workers to seek higher wages. The MRO industry is no exception, and companies are beginning to feel the pinch, particularly when it comes to finding qualified mechanics."

In its executive summary the consultancy says these are the hey days for the commercial aviation industry as well as businesses supporting it from the MRO sector. "For the first time in airline history, carriers recorded three consecutive years of record or near record profits, thanks to constrained fuel prices and operational efficiencies. Rising demand for air travel is keeping production lines at aircraft, engine, and component manufacturers busy and setting records. Lower oil prices, along with the willingness of airlines to spend on upkeep, are resulting in delayed retirements of older jets, which in turn provide more business for the MRO industry because of their additional servicing needs. And despite recent political instability and rising global tensions, aviation seems headed for more of the same—at least over the short term." ■

Benefits and threats to MRO growth

Forecasts are just that: a probable future scenario given current and expected trends. But they can, ultimately, be overtaken by events. In its latest MRO insight for the next decade Oliver Wyman also puts forward a look at what could happen in the best of worlds and the worst of worlds. It's "Cloud Nine" scenario is the most extreme and therefore the most unlikely. "For this best-case turn of events to come about, global GDP would need to dramatically increase along with traffic growth, and fuel prices and interest rates would need to stay lower than expected. In this environment, operators would be quite profitable and have a low cost for borrowing, increasing demand for additional seat miles and new aircraft deliveries. Because fuel prices would be low, older, less fuel-efficient aircraft would likely remain in the fleet to meet demand as there is no longer a high, variable cost disadvantage to operate them. In this scenario, the commercial fleet would grow to 41,695 by 2028, a nearly 4,000-aircraft increase from our base forecast. This fleet growth would fuel the MRO market to $128.5 billion in 10 years' time, nearly $14 billion more than our current base forecast."

A "Black Swan" period, the worst-case scenario, would involve a devastating event that severely impacts the world economy in general and the airline industry in particular. "The horrific terrorist attacks of 9/11 are a prime example of such an event. In this scenario, world GDP growth would be much lower than anticipated, traffic growth would be exceptionally low, fuel prices would soar because of economic uncertainty or supply problems, and interest rates would increase. In this environment, operators would likely increase aircraft retirements because of high fuel prices and low passenger traffic growth. New aircraft orders would be deferred or canceled altogether. In a Black Swan event, the fleet would grow to only 31,156 by 2028, nearly 7,000 aircraft fewer than the base forecast. The lack of new aircraft and the removal of older, more MRO-intensive aircraft would see the MRO market reach only $106.7 billion by 2028."

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