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## Airbus pumps up Singapore partnership on MRTT tanker

Airbus Defence & Space and Singapore will collaborate on the development, certification and implementation of an automatic aerial refueling capability for the A330 Multi-Role Tanker Transport (MRTT).

A flight-test campaign for the system is under way, with certification expected in 2021, says Airbus. The agreement will see a Republic of Singapore Air Force (RSAF) A330 MRTT take part in the work.

Objectives of the activity include improving the aircraft's availability and mission success rate.

Airbus head of military aircraft Alberto Gutierrez says: "With this agreement, the RSAF leads the evolution of the A330 MRTT, helping us to bring new hands-off capabilities to the benchmark of next-gen tanker operations."

The system, designated A3R, will reduce the air refueling operator's (ARO) workload, boost safety, and optimize the rate of fuel transfer. When A3R is activated, the flight control of the aircraft's boom is fully automated and transfers fuel on contact with the receiver, with the ARO in a monitoring role.

"The A3R development paves the way towards a fully autonomous aerial refueling operation," says Airbus.

Cirium fleets data indicates that Singapore has four in-service A330 MRTTs with two additional examples to be delivered. The type replaced the RSAF's Boeing KC-135Rs in 2019.



## F-15EX TO INDIA?



### US defence chief confirms Boeing bid for export licence

By GREG WALDRON

**B**oeing is contemplating pitching the F-15EX to New Delhi for one of the country's long-running fighter procurements – a contest in which its F/A-18E/F is already competing. The airframer confirmed that it has requested US government clearance to offer the twin-engined type for an Indian air force requirement for 110 fighters.

"While awaiting further definition on the Indian air force's requirements, we have requested a licence for the F-15 so that we're

ready to share the full spectrum of potential solutions across our fighter portfolio when appropriate," says the company.

Boeing was responding to a query from *Flight Daily News* after a recent meeting with Kelli Seybolt, US deputy under secretary of the Air Force for international affairs, who disclosed that the manufacturer had sought an export licence for India in relation to the F-15EX. The approval will allow Boeing to discuss the F-15EX with Indian officials in compliance with the US's International Traffic in Arms Regulations.

Boeing's move would see it offer the latest

EX variant of the long-running F-15 to New Delhi. Enhancements over previous iterations include an active electronically scanned array radar and improved payload.

Likely contenders for the requirement represent a virtual who's who of combat aircraft, including the single-engined Lockheed Martin F-16V – dubbed the F-21 for the Indian contest – and the Saab Gripen E/F, alongside the twin-engined Dassault Rafale, Eurofighter Typhoon, and Super Hornet. Russia is also likely to offer the RAC MiG-35 and Sukhoi Su-35.

Pictured is a Singaporean F-15 on the static.

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# Boeing sets high bar for BGS

In announcing the creation of Boeing Global Services (BGS) in 2016, former Boeing chief Dennis Muilenburg set the airframer's support and services unit a goal to earn \$50 billion in revenue within a decade – tripling its revenue at the time. Analysts have described BGS as a lynchpin to Boeing's wider strategy – a business that would generate cash to fund Boeing's next commercial aircraft development.

BGS chief executive Ted Colbert does not understate BGS's role. "We are absolutely key to the stability and growth of the company," he says.

Acquisitions were part of BGS's growth plan, with the business buying parts provider KLX and flight software company ForeFlight, for instance. Colbert says integration of those companies continues.

By 2019, BGS services revenue had hit \$18.5 billion, some way off the \$50 billion goal. Then came the Max grounding, which analysts said will freeze support income Boeing hoped to reap from the Max.

Colbert says the Max grounding has "absolutely impacted" BGS, although he expects demand for the unit's services will catch up. With the financial effect of the Max hammering Boeing's bottom line – the company closed a \$13 billion loan last month – BGS's acquisitions have stalled.



Colbert: We are key to stability and growth of the company

## T-7A PITCHED TO ASIA

Boeing is pitching its T-7A Red Hawk to Asian militaries for the first time at the Singapore air show as it seeks a first export deal for the advanced jet trainer.

The airframer is under contract to build as many as 351 examples for the US Air Force (USAF), with the first aircraft scheduled for delivery in 2023.

Boeing plans to produce as many as 48 aircraft per year for the service, but says it has the capacity to expand its annual production to support export sales.

In September 2018, the USAF selected Boeing for its \$9 billion T-X contract to replace its 59-year-old Northrop T-38C Talons. Boeing believes there is a global market for 2,600 T-7As, both as trainers and light-attack or aggressor aircraft.

"Some statistics say one in four and advanced fighters in the world's air forces today are being used for training missions," says Thomas Breckenridge, vice-president of international sales in Boeing's strike, surveillance and mobility business unit. "Having the fighter-like performance of the T-7A enables pilots to not only train



more effectively, but enables air forces to use a more affordable option rather than the advanced fighters that were intended for operational use."

Boeing says it is ready to offer offsets to win contracts with foreign nations, but declines to specify parts of the T-7A that could be readily outsourced.

## SAY HELO TO CMC

Canadian avionics specialist CMC Electronics has a helo demonstrator at the Singapore show to showcase its advanced cockpit display systems. The demonstrator – a generic helicopter flight simulator at CMC's booth – has been equipped with CMC's smart displays and its



It's all about configurability, says Huynh-Belanger

CMC-9000 flight-management system.

Montreal-based CMC's displays can be configured to work with various aircraft systems and can display a range of information in several settings. They can be primary flight displays or navigation displays and can host flight management system software, says CMC product manager for civil flight management systems Alex Huynh-Belanger.

The key word is "configurability", he says. "We are moving more and more to integrated solutions where one hardware platform can handle multiple software inputs," says Huynh-Belanger. "We are now merging into a single unit."

CMC, which has been in business for more than 100 years, also makes satellite-communications antennas, vision-system sensors, head-up displays, electronic flight bags, aircraft servers, GPS receivers and various microelectronics.

## Subaru shows off 412EPX as it aims for civil service

Bell may have pulled out of the Singapore air show, but regional partner Subaru is present, alongside their newest product, the 412EPX.

Tokyo in 2015 selected a joint Bell-Subaru bid of an upgraded model 412EPI to replace the UH-1Js operated by the Japan Air Self-Defence Force, which will be built by Subaru in Utsunomiya.

A first prototype of the New Utility Helicopter was handed over to the Japanese ministry of defence in February 2019.

Meanwhile, the partners continue to promote the 412EPX to the civil market, following its certification in July 2018.

Subaru is already assembling the first customer aircraft, which is destined for Japan's national police service.

Bell will also build 412EPX

helicopters at its facility in Mirabel near Montreal; the aircraft on the Singapore static display – the first of three production-standard examples – was assembled at the Canadian facility.

Production of the 412EPI will cease before mid-year as output switches to the newer model. Upgrades over the EPI are mainly focused on the transmission and rotor mast, to which Subaru has made extensive contribution, allowing it to withstand higher torque loads.

The changes enable an increase in maximum take-off weight to 5,530kg (12,200lb) internally – almost 5,900kg with an external load – from 5,400kg previously. Powered by twin 1,120shp (837kW) Pratt & Whitney Canada PT6-9 engines, the EPX also features the latest iteration of Bell's BasiX Pro avionics.



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# AIRBUS RAMPING UP SERVICES

**A**irbus is targeting revenue of \$10 billion from the aviation services market within a decade, as it looks to make up for its late entry into the sector.

Speaking at the Singapore air show, Remi Maillard, senior vice-president for Airbus services, said the manufacturer is forecasting that the commercial services business will be worth \$4.9 trillion over the next 20 years, of which a third – \$1.8 trillion – will come from the Asia-Pacific region.

He says Airbus is aiming for significant growth in the sector and concedes that it had historically not been prioritising its services business. “In Airbus we started late in the services market. We started a few years ago and we’ve grown with 15-18% for the last years,” he says.

“In 2018, [our services business] was \$3.5 billion, out of a global market of \$150 billion,” Maillard says. “Our mission is to deliver \$10 billion services revenue in the next decade. And we are well on track to reach this.”

He adds that the expansion will be achieved through organic growth “but we might also be looking at some partnerships or M&A [mergers and acquisitions] on the way”.

Maillard says that Airbus’s ambitions in the

By MAX KINGSLEY-JONES

sector will see it extending in to non-Airbus types and customers.

“We are already providing services on non-Airbus platforms,” he says. “A large share of our parts-distribution subsidiary Satair is going to non-Airbus platforms. The Navblue flight-operations software subsidiary is working with a lot of non-Airbus customers, and we want to do that more in the future.”

Meanwhile, Airbus will use its new digital alliance with Delta Air Lines to drive its business beyond its own platforms, says Maillard. “We will share the data and our connective capabilities and this will apply to both the Airbus and non-Airbus fleet.”

He adds that the strategy could definitely extend to other services markets, such as training.

Airbus is working to address the high cost of re-configuring A380 cabins, which it recognises can be a significant detractor to remarketing the aircraft on the second-hand market. It is looking to its new Singapore MRO business for the answer.

“The cost of re-configuration is definitely a major challenge for the A380 or any big aircraft,” says Maillard.

Remi Maillard is aiming for growth in Asia-Pacific region



## ST ENGINEERING EXPANDS ACCESS TO CONVENIENCE

ST Engineering is showcasing the world’s first expandable aircraft lavatory, designed to give persons with restricted mobility better onboard accessibility.

The concept, known as Access, features a moveable wall that will provide up to 40% more space when expanded, without impinging on seat count. The lavatory is functional in both expanded and unexpanded states, ST Engineering says.

Access is capable of being retrofitted or line-fitted on narrowbody aircraft, the manufacturer says, adding that it is in talks with interested carriers.

ST Engineering also debuted at the show a second lavatory concept, known as Arc, which allows for cabin and ground crew to replenish supplies from the aircraft aisle, instead of entering the unit.

Arc, which is targeted at widebodies, will “reduce the turnaround time” for replenishment, says ST Engineering.

Meanwhile, the company’s aerospace unit is looking to up its sustainability efforts in its operations.

The head of ST Engineering’s aerospace unit, Lim Serh Ghee, acknowledges that the company “has a part to play” in sustainability, along with the larger aviation community.

“We are looking into that area from the back-end [side of things]. How can we – when the aircraft is in maintenance – cut down on the carbon emissions?” Lim says.

On sustainability, Lim says the ST Engineering is also looking to leverage technology – another area of focus in its long-term strategy – to “build a portfolio for a sustainable future”.

One example Lim cites is additive printing of cabin interior parts. “We are trying to build a portfolio of commonly-damaged cabin interior parts. [We have] a digital file of the designs, but we don’t print it until it is needed – it is a virtual inventory,” he says.

That way, when platforms are retired, “[we] won’t have a large inventory of parts that we throw away”, Lim adds.

Kalai Vanen from the Singapore Disability Sport Council tries the lav for size



## Singapore co-operates to explore urban air mobility

Airbus and the Civil Aviation Authority of Singapore (CAAS) have signed a memorandum of understanding to explore urban air mobility solutions in Singapore.

As part of the agreement, Airbus and CAAS will work together on developing urban air mobility services using unmanned aircraft systems. “The parties will specifically work together to realise the unmanned traffic management system and services to support the initial use-case,” says Airbus.

Both parties will also study the feasibility and requirements for further urban air mobility services, including cargo and passenger transportation solutions.

“The collaboration aims to bring UAM services and platforms to reality in Singapore’s urban environment, with the target to enhance industry productivity and improve the country’s regional connectivity,” the airframer states.



Jeff Chatfield of Avation (left) signs with ATR chief Stefano Bortoli

## AVATION CONVERTS ATR RIGHTS FOR US-BANGLA

Avation has converted purchase rights on two ATR 72-600s into firm orders and will place the turboprops with US-Bangla Airlines on lease later this year, reports Cirium.

As part of the deal, the Singapore-based lessor has taken two more purchase rights to replace those exercised for the Bangladeshi carrier. Avation executive chairman Jeff Chatfield says this will maintain the lessor’s ATR 72-600 purchase rights at 25.

ATR chief executive Stefano Bortoli says the two aircraft to be operated by US-Bangla will be delivered from June.

Cirium fleets data shows that US-Bangla currently operates six ATR 72-600s, four Boeing 737-800s and three Bombardier CRJ-900s.

The airline flies to eight international destinations and seven domestic points in Bangladesh.





## SEEING STARS AND STRIPES IN THE SUN

Despite the pull-out from the show of a number of prime US companies, the country still has the largest number of overseas exhibitors and plenty of metal to see on the static.

And, as the sun finally breaks through on Changi, what better way to view it all than through some

stars and stripes-branded sunglasses?

The US embassy in Singapore is giving away a free pair to anyone who takes a photo of any US aircraft at the show and posts it on Instagram with the hashtag #watchUSsoar and tag @usembassysingapore.

To claim their glasses, attendees just have to show their post at the embassy's table, next to the sure-win lucky dip, between 10am and 2pm to pick up their shades, which are pictured being modelled by members of the *Flight Daily News* distribution team.

## Collins gets innovative in Singapore

Collins Aerospace has launched an innovation hub in Singapore to standardise advanced digital technology solutions across its MRO network.

The company says the hub will focus on automation, sensing and machine-learning technology – as it seeks to address issues regarding inventory management and parts availability – as well as building up additive manufacturing capabilities and techniques.

Collins has also committed to developing more than 40 proofs-of-concept over the next five years and expects these to evolve into new products and enhanced service offerings for its MRO customers.

General manager and vice-president for global repair services Bob Butz says: “The innovation hub will play a critical role in helping Collins Aerospace evolve our MRO shops by combining data science with state-of-the-art robotic and automation technology to enhance customer connectivity.”

# AIRBUS IS LIFTED BY THAI BUY

By DOMINIC PERRY

**A**irbus Helicopters has secured a six-unit order for H135 trainers from the Royal Thai Air Force (RTAF) while it eyes further co-operation with the Malaysian military, including a possible follow-on sale of the H225M.

Deliveries of the H135s will begin in 2021, with the RTAF to use them for a full range of instruction, including ab initio training. They are the first military training helicopters to be acquired by the service.

“We are extremely honoured by RTAF’s decision to expand its training fleet with the H135,” says Fabrice Rochereau, vice-president, head of sales Asia-Pacific.

Bangkok has proved a strong customer in the region for Airbus Helicopters: the air force operates 12 H225Ms heavy-twins, and its army and navy are customers for the UH-72 Lakota and H145M, respectively.

Thailand joins other operators of H135 trainers including Australia, Germany and the UK.

Meanwhile, Airbus Helicopters is working to offer to the Royal Malaysian Air Force both short- and long-term solutions to replace its grounded fleet of 12 Sikorsky S-61A Nuri rotorcraft.

Malaysia already flies 12 H225Ms and Rochereau says it would be a “waste of taxpayers’ money to go for anything else”.

Vincent Dubrule, head of the Asia-Pacific region for Airbus Helicopters, says the acquisition of the H225M would be a “logical continuation” but acknowledges that Kuala Lumpur has a budget gap in the short term.

As a temporary solution, the airframer is likely to propose the lease of repurposed oil and gas helicopters, says Dubrule. These could be deployed relatively rapidly while Malaysia finalises a longer-term acquisition.

Oil and gas operators such as Bristow Group are seeking buyers for their fleets of idle H225s, which are out of favour in many offshore markets.

Airbus Helicopters is forecasting sales of 5,500 military helicopters across the Asia-Pacific over the next 20 years.



Shuler says SureFly acquisition will pay dividends

## MOOG POWERS AHEAD WITH ELECTRIC AIRCRAFT AMBITION

Flight controls specialist Moog is at Singapore fresh from the December acquisition of eVTOL aircraft developer SureFly.

Previously owned by US electric ground vehicle specialist Workhorse, Moog bought the SureFly operation for \$5 million, which, says Roger Shuler, director of marketing and strategy development, included “some pretty interesting intellectual property and engineers”.

Although Moog had some interest in electric aircraft “now we are really taking a big step forward in that technology”, says Shuler.

SureFly had been developing its own battery-powered urban air mobility vehicle, but Shuler says the acquisition is driven more by an interest in electric power systems rather than a complete aircraft.

However, Moog this year will use a demonstrator vehicle to highlight the potential of an autonomous electric-powered aircraft for US military customers capable of performing resupply or casualty evacuation missions.

Moog is continuing to work with Workhorse on the latter’s HorseFly small cargo drone, which is designed for autonomous last-mile package delivery.



# NARROWBODY AND 787 FAIL TO MEET BOEING'S NMA NEED

By JON HEMMERDINGER

**B**oeing executives have provided clarification on their view of the mid-market opportunity, suggesting neither a narrowbody nor new 787 variant can adequately address the segment.

Speaking at the Singapore air show, Boeing vice-president of commercial sales and marketing Ihssane Mounir insisted narrowbodies lack sufficient comfort for operating medium-haul mid-market flights.

The industry generally defines that market as including 4,000-5,000nm (7,400-9,260km) routes.

"I'm not sure about the concept," Mounir says, adding that airlines would need to remove seats to make a narrowbody sufficiently comfortable for such flights.

His comments took square aim at Airbus, which last year targeted the mid-market by launching the 4,700nm-range A321XLR. Airbus hopes to begin delivering that aircraft in 2023.

Those comments oppose a view held by Teal Group analyst Richard Aboulafia, who suggests Boeing might scrap the proposed New Mid-market Airplane (NMA) and instead develop a new line of single-aisle aircraft, including a stretched variant to address the mid-market.

Another analyst, Addison Schonland of AirInsight Group, suggests Boeing might take a different tack altogether by developing a smaller 787 variant dubbed the 787-3. Boeing scrapped development of that variant last decade.



Single-aisles like A321XLR lack comfort for long-haul, says Mounir

But at the show yesterday, Boeing vice-president of commercial aircraft marketing Randy Tinseth downplayed the mid-market suitability of a modified 787.

Recalling Boeing's experience with the 787-3, he says: "It was really, really, really, really hard to de-rate... a widebody like that – with that kind of cross section, with that kind of capability... to the point where you could make it much more efficient than

today's single-aisle airplanes.

"That's a tough thing to do, and that's why, at the end of the day, our customers put the -3 on hold, and they went to the [787-8]," Tinseth adds.

However, he stresses all options remain on the table for Boeing. "We are committed to investing," Tinseth says.

Boeing had for years planned to tackle the mid-market space with a 270-seat widebody dubbed the New Mid-market Airplane (NMA). But the certainty of that plan eroded several weeks ago when chief executive David Calhoun said he had ordered a complete NMA rethink.

Calhoun said Boeing was reevaluating market requirements and would start with a clean sheet of paper, again.

Meanwhile, Tinseth predicts the coronavirus outbreak will hammer every notable airline industry economic indicator in 2020, though the extent of that effect remains unknown.

Before the virus outbreak, Boeing had anticipated 2020 global airline traffic would increase 4-5% year-on-year and that the cargo industry would rise 1-2% – a slight recovery for that struggling sector.

Boeing also anticipates the airline industry would hit \$30 billion profits and that jet fuel would cost \$1.85-2.05/gal.

"All of these factors are under pressure," Tinseth says. "The virus... will and has had an effect on traffic and we are going to see... our customers' profits impacted."

## Ex-Nok boss tells his tale

Former Nok Air chief executive Patee Sarasin has launched a tell-all book about his career and the ups and downs of Thailand's notoriously competitive airline market, and is at the show to promote it.

Sarasin co-founded Nok Air and was its chief executive until 2017. This period saw the rise of low-cost carriers such as Thai AirAsia and Thai Lion Air, and a fundamental rebalancing of air travel in Southeast Asia.

In addition to brutal competition, Sarasin guided his airline through the 2004 Indian Ocean Tsunami, the financial crisis of 2008-2009, political protests in 2006 that shut down Bangkok's two airports, and 2011 floods that forced the airline to relocate its main base of operations.

"It is ironic that we are launching the book now, when the aviation industry is experiencing a major global crisis caused by the coronavirus, because my book *Smiling Through Turbulence* is all about crises that airlines go through," says Sarasin.

One revelation in the book is that Nok nearly tied up with Indonesian low-cost carrier Lion Air.

"Rather than partner with Nok Air, Lion established Thai Lion Air which came into the Thai domestic market and sparked a price war," says Sarasin.

"Lion entered the Thai market not to take on Nok Air, but to compete against AirAsia. [Lion chief executive Rusdi Kirana] and AirAsia's Tony Fernandes are rivals and sadly for Nok Air, we became collateral damage in a battle between AirAsia Group and Lion Air Group for market dominance in Southeast Asia."







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## IMPROVED HERON MAKES ITS MARK AT THE AIR SHOW

Israel Aerospace Industries (IAI) has launched its Heron MkII unmanned air vehicle with a full-scale mock-up at the Singapore air show static park.

Moshe Levy, IAI executive vice-president, stresses that Singapore and the wider region are key markets for the company, not least for sales of the medium-altitude, long-endurance UAV.

Levy says that although the Heron MkII is highly configurable to meet customer requirements, it is optimised for the maritime surveillance role, potentially including the deployment of miniature sonobuoys.

With line-of-sight control, the aircraft has a mission radius of 199nm (350km), which rises to 540nm when used on beyond-line-of-site operations. Endurance is up to 45h, with a service ceiling of 35,000ft.

Singapore operates the original Heron, which achieved full operational capability clearance in 2017.

Narrowbody will be 'most scrutinised aircraft in history', says Dickson



## FAA OUTLINES STEPS FOR 737 MAX RETURN

By NIAL O'KEEFE, CIRIUM

US Federal Aviation Administration chief Steve Dickson has set out the milestones that must be passed before the Boeing 737 Max can be returned to service.

"The certification flight test, and then the evaluation of the certification flight, is the next major milestone," said Dickson during a briefing at the show. "That's FAA pilots evaluating the compliance of the final software to FAA Transport Category aircraft regulations."

However, the flight test has not yet been scheduled. "We still have a few issues to resolve, but we are continuing to narrow the issues," he says. "We are waiting for proposals from Boeing on a few items to be able to clear the way to that flight."

Elaborating on matters to be resolved, Dickson mentions an issue with the "stab out of trim" light, noting: "It's not a problem with the software per se, but this light that's been on the airplane forever tends to flicker when the trim is running very quickly... it's

coming on at inappropriate times – it's essentially getting overloaded with data. They'll have to buffer that a little bit."

He adds: "We'll be addressing that, evaluating that. That's a matter of a few days."

In reference to a separate issue with wire bundles on the Max, Dickson says: "Boeing has not yet given us a proposal on that. We'll see to what extent those issues are common with the 737NG."

Once the certification flight has been completed and the data analysed within a few days, operational validation will proceed. Boeing has made a pilot-training proposal, which the FAA will evaluate, says Dickson – himself a pilot. "From beginning to end, the JOEB [Joint Operations Evaluation Board] and FSB [Flight Safety Board] report process is roughly probably 30 days, and that can't happen until the certification flight."

Subsequent processes include the final design documentation and the technical advisory board report. The FAA must also consider public responses to the master minimum equipment list that has been out for comment since 5 December before it gets to the stage of issuing a continued airworthiness notification to the international community – providing notice of pending significant safety actions – and an airworthiness directive advising operators of the required corrective action.

"We'll rescind the grounding order within a day or two after that," says Dickson.

After the issuance of certificates of airworthiness, US airlines will need to get their training programmes approved by the FAA.

He vows that the Max will, upon its return to service, be "the most scrutinised aircraft in history". The FAA will also impose a requirement that every Max operator around the world conduct a validation flight without passengers.

Dickson also sketches how the whole process might affect future regulation: "The lessons learned will ideally lead to a more holistic rather than transactional item-by-item approach to aircraft certification – not only in the US, but worldwide, where we will more effectively integrate human factors considerations throughout the design process as aircraft become more automated and systems more complex."



## Zipair has big plans for Japan

Executives from Boeing, Japan Airlines and long-haul, low-cost offshoot Zipair are talking up the new carrier's pending launch of passenger flights.

Speaking at the Singapore air show, officials outlined Zipair's plans, which will be launched in May with a fleet of two Boeing 787-8s. The carrier will initially deploy the Dreamliners from Tokyo-Narita to Bangkok and Seoul. But the carrier is now working to achieve the extended twin-engine operations approval required to launch transpacific flights, says Zipair president Shingo Nishida.

Zipair's 787-8s – sourced from the parent carrier – can accommodate 290 passengers in a two-class layout, with 18 lie-flat business-class seats and 272 in the economy cabin, he says.

The company will not offer seat-back in-flight entertainment, but will instead provide services via passengers' personal devices, Nishida says.

Nishida says low-cost, long-haul carrier will launch services in May





A woman and a man in pilot uniforms are standing in front of an airport terminal. The woman is in the foreground, wearing a white short-sleeved shirt, a dark tie, and dark trousers. The man is standing behind her, wearing a dark suit, a white shirt, a dark tie, and a pilot's cap. They are both looking towards the camera. The background shows the modern architecture of an airport terminal with large windows and structural columns.

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# F-16 IS HOT COMMODITY

**T**he US Air Force is looking to develop a commoditised version of the Lockheed Martin F-16 to make it easier for its allies and foreign partners to buy the combat aircraft.

The service is eyeing a fighter as its next project after creating a commoditised MQ-9 Reaper unmanned air vehicle (UAV) in co-ordination with manufacturer General Atomics Aeronautical Systems, says Kelli Seybolt, deputy under secretary of the US Air Force for international affairs, speaking at the air show yesterday.

The USAF believes the amount of customisation that goes into aircraft bought through Foreign Military Sales complicates the process and increases cost. By creating a standard, or "commoditised" version, the service believes it can make it easier to buy American.

The concept is being refined first with the MQ-9, says Seybolt.

"It would create a situation where we would have a standard MQ-9 platform that the

By GARRETT REIM

countries could come in and buy. It's kind of like buying a car," she says. "Commoditisation is going to allow [potential customers] to have less risk as they look at procuring the platform, because they'll know the price and know what they're getting."

A commoditised aircraft would have a standard price, standard operating cost, and would avoid costly customisation.

"One of the challenges with programmes across the board is when countries start looking at really tailoring what they want, creating developmental aspects," says Seybolt. "That's where you add cost and risk."

Lockheed Martin said in a financial earnings call in October 2019 that it believed it could increase its backlog of F-16 orders in the near term from 30 units to 90 units based on demand from Asia and the Middle East.

In Asia, prospective customers include India, Indonesia, the Philippines and Taiwan.



USAF wants to offer standardised fighter to export customers



## Waldron wins journalism award

FlightGlobal Asia managing editor Greg Waldron has won an Outstanding Achievement Award at the inaugural Aerospace Media Awards Asia.

The judging panel of communications experts cited Waldron's diverse range of stories and consistent output in recent years on a broad range of aerospace topics in the region.

Waldron thanked his colleagues at FlightGlobal as well as the broader community of aerospace reporters and communicators, noting that he learns something new in every conversation with industry colleagues.

"The aviation industry has an endless amount of detail and nuance," he says. "It is a great privilege to work with such a passionate group of professionals."

Waldron writes broadly on a number of subjects including defence, airline strategy, rotorcraft, and the broader aerospace sector. He has worked with FlightGlobal since 2010.

In addition to Waldron's award, FlightGlobal stories were shortlisted in five categories: Best UAV Submission, Best Propulsion Submission, Best Commercial Submission, Best Rotorcraft Submission, and Best MRO Submission.

## AIRBUS SAYS A321XLR SALES WILL TOP 1,000

Buoyed by the early success of the A321XLR, Airbus is confident that sales of the extended-range single-aisle will easily exceed 1,000 aircraft within the next decade.

The A321XLR was launched at the Paris air show in June last year and firm orders now stand at over 450 aircraft.

"Having delivered the technical solution that delivered the performance, it works, and the customers immediately placed orders," says Francois Caudron, Airbus senior vice-president for marketing.

Speaking at the Singapore air show, Caudron said that the A321XLR's 450-plus orders are "only the start".

"I wouldn't be surprised to see more than 1,000 XLRs being sold because this is changing the way airlines are going to operate," Caudron says.

He adds that his sales forecast could be achieved "safely within the next 10 years", but acknowledges some could be result from customers converting existing A321neo orders to the new variant.

"It will be probably a mix – some of them could be conversions."

Caudron says that the XLR is already proving popular in the Asia-Pacific region, with five customers having placed orders in the wake of the launch: AirAsia, Cebu Pacific, Qantas Group and VietJet Air.

"The world and the airlines are just waking up to the capability of the aircraft," he adds.



Firm orders for extended range variant are now at more than 450 units

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China's August 1st display team made its debut at the show



## CHINA'S FLYING COLOURS

The Chengdu J-10A is making its debut appearance in the skies over Singapore at this year's show as part of the People's Liberation Army Air Force's (PLAAF's) August 1st display team.

The fighter's appearance is especially notable given Singapore's ban on travellers who have been to China within the past 14 days. The appearance is timed to celebrate 30 years of diplomatic relations between Singapore and Beijing.

While the August 1st flies A-model standard aircraft, Beijing has gone on to develop more advanced B- and C-model variants.

The J-10B variant features an infrared search and track system mounted in front of the cockpit, modified control surfaces, an upgraded engine, and a lower radar cross section. The J-10C gains an active electronically scanned array radar.

Though the appearance of the J-10A is a sign of Beijing's impressive

airpower development, it also highlights a significant weakness: engines. The jet is equipped with a Russian-built Saturn AL-31FN.

Subsequent versions of the J-10, however, have the WS-10 Taihang powerplant. At Zhuhai in 2019, a J-10B testbed surprised observers by performing a flying display powered by a WS-10 with thrust vectoring control. This marked a significant leap forward in Chinese engine technology.

## FLIGHT DATA RECORDS ARE SAFE IN FORTRESS

By JON HEMMERDINGER

**C**urtiss-Wright is using the Singapore show to showcase a new-generation flight recorder that can store 25h of cockpit audio recordings, meeting a mandate for commercial aircraft set to take effect in 2021.

The company's Fortress recorders are designed to be integrated into a range of commercial and military aircraft, including helicopters.

Units destined for commercial aircraft can be equipped with a wireless data transmission function that becomes active when the system senses unusual flight conditions, says Curtiss-Wright vice-president of sales and marketing Christopher Thomson.

The recorders are available for new aircraft and as a retrofit for existing commercial aircraft, without the need for wiring changes or other modifications.

Military versions of Fortress can also be fitted with data encryption, aircraft health monitoring technology and cockpit video capability, he adds.

Although Curtiss-Wright produces the recorders, its partner Honeywell sells them into the business aviation and commercial air transport markets, including a supply agreement with Boeing, Thomson says.

Those for the civil sector will be compliant with EASA regulations taking effect in 2021, which require large new-build commercial aircraft to have recorders that retain 25h



Christopher Thomson with new Curtiss-Wright recorder

of cockpit audio – up from 2h – and a means to determine the location of an incident.

The rules follow the 2009 crash of Air France flight 447, wreckage from which remained lost almost two years, and the disappearance of Malaysia Airlines flight 370 in 2014.

## Cirium adds Allen as finance editor

Michael Allen has joined Cirium as its Hong Kong-based Asia finance editor.

Before his move to the data and analytics company – with which FlightGlobal operates a content-sharing partnership – Allen served as *Business Traveller's* Asia-Pacific editor.

He has been based in Hong Kong since 2016, having relocated to the city from London during his time with *Airfinance Journal*, where he likewise was Asia finance editor.

In his new position with Cirium, he reports to Simin Ngai, Dashboard editor Asia.

## ST AERO SHOWS T'WAY FOR MRO

South Korean low-cost carrier T'way Air has extended its component and engine MRO contracts with ST Engineering's aerospace unit.

ST Engineering will provide component maintenance-by-the-hour services to T'way's fleet of 28 Boeing 737-800s.

The contract also covers the 25 737 Max aircraft T'way intends to add.

Under the engine MRO contract, ST Engineering will continue to support T'way's fleet of CFM International CFM56-7Bs.

Both contracts take effect from March.

## FLIGHT DAILYNEWS

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## IAI's Family of Battle Proven Loitering Weapons goes Naval

*Providing an excellent solution for the congested naval arena warfare*

**L**oitering Munitions (LM) evolved in Israel since the mid-1970s, based on operational lessons during the Yom Kippur War, where Israel failed to achieve sufficient air superiority over enemy air defences. In the years that followed the 1973 war, the Israeli defence establishment encouraged industry research and development in unmanned and autonomous capabilities for the Suppression and Destruction of Enemy Air Defences (SEAD/DEAD), measures that paved the way for manned aircraft to strike those Surface-to-Air Missile (SAM) sites.

The HARPY 'suicide drone' conceived in the mid-1980s was one of these solutions developed by Israel Aerospace Industries (IAI) Missile Division. HARPY comprised of swarms of autonomous aerial platforms equipped with a radar-seeker and warhead. HARPYs could loiter for hours at high altitude inside a SAM-Defended Area and, once threat radar became active, HARPY rapidly engaged that radar, steeply diving to hit the radar with devastating effect.

Evolving through decades of operational service, the HARPY was recently modernized in two aspects: A new Anti-Radiation (AR) seekers offering improved target location, identification and classification and extended frequency coverage, particularly in the lower frequency bands. Utilizing a modern and versatile platform, the system now offers longer loitering, of up to 9 hours. Its unique autonomous capabilities and ground based operability turn HARPY into a disruptive capability against land-based adversary Anti-Access/Access Denial assets.

To excel as multi-mission combat system, IAI evolved its autonomous LM to be remotely operated, conducting reconnaissance and surveillance missions with the ability to attack targets immediately as they are detected. For such missions, 'Man in The Loop' control was first introduced with the HAROP – a loitering platform with maritime capabilities powerful enough to carry a sophisticated multi-sensor EO payload, large warhead, datalink and enough fuel for a 9-hour mission. Sharing a common platform with HARPY



*IAI's Harop loitering weapon system Launched*

NG, HAROP delivers imagery intelligence in real-time over a two-way datalink. Once a target is detected by the operator, from distances hundreds of kilometres away, HAROP is commanded to attack, dives in on the designated target and activates its large warhead. The approach azimuth, as well as the dive angle is selectable by the operator, to suit various operational scenarios.

At the Singapore Air show, IAI is displaying its LM family with its newest member - Mini Harpy, a newly-developed loitering munition, based on unique IAI development and technology, the Mini Harpy combines the capabilities of the Company's two flagship loitering missiles, the Harop and the Harpy, offering detection of broadcast radiation with electro optical capabilities. The Mini Harpy is a tactical system designed for field or marine units. It can be launched from land, marine and helicopter borne platforms, providing complete independence in intelligence collection for an updated situational picture and closing the attack circle at low cost.

The system was designed to provide operators with control up to the last moment, including cessation of attack at any stage. Electrically powered, it is extremely quiet, carries shaped charge of approx. 8 kg, and operates in mission range of 100 km for duration of two hours and 45 kg in weight.

A smaller LM from IAI is the ROTEM, designed specifically for warfare in complex terrain and urban areas. It employs a folding multi-rotor as a platform, multiple imaging and IR cameras for sensors, and multiple acoustic transducers to detect and avoid obstacle, and safely manoeuvre narrow urban streets or dense vegetation. Its payload bay holds enough space to carry warhead of one kilogram or extra batteries, extending the mission endurance from 30 to 45 minutes. It is operated by a single soldier using simple point and click commands on a tablet controller, similar to the one operating the Green Dragon.

Boaz Levi, IAI Corporate Vice President and General Manager of the Systems, Missiles & Space Group said: "IAI's advanced loitering munitions offer an operational solution to the complex arena experienced by armies, with a special emphasis to the congested naval arena warfare. The new naval adjustments made to the loitering munitions provide an excellent solution for coastal protection, Combat Ships, Offshore Patrol Vessels and Patrol Boats. The unique organic independent capabilities provide an operational flexibility to the naval commanding level, both at the intelligence level and at the operational level".



*IAI's Mini Harpy loitering weapon system*



*IAI's Rotem loitering weapon system*



# AIRLINES COUNT THE COST OF CORONAVIRUS



Cathay Pacific has suffered a 30% decline in activity and is encouraging employees to take unpaid leave

Outbreak of disease is severely affecting carriers based in and flying into the region. Our content partner Cirium has been assessing the damage

**T**he coronavirus outbreak may be costing the aviation sector more than the Severe Acute Respiratory Syndrome (SARS) did in 2003, even as the world is just coming to terms with the new virus strain.

"China is a larger part of the global economy and global airline traffic than it was in 2003," notes Joanna Lu, Ascend by Cirium's head of consultancy for Asia.

With China's airlines carrying up to 10 times more passengers than they were 17 years ago, the impact on air travel will be far greater and on a global scale.

"In 2003, the worst impact was 80% reduction in Chinese airlines and a 45% reduction in [Asia-Pacific] traffic. If this happens today, that implies a fall in global traffic of around 10-15%," says Lu.

Contagion fears have put global travel on hold, while discussions around quarantines and border control run counter to the tourist experience, the main driver of air travel.

The sense of uncertainty has only been heightened by images of Macau shutting its casinos, and curtailed activities at events of large economic value – a prominent example being the Singapore air show. Some have expressed concerns about this summer's Olympics in Tokyo.

SARS affected the travel industry for up to half a year, and that appears to be a reference point for airlines and the broader aviation industry.

Cebu Pacific recently put a figure on the coronavirus outbreak's impact. It expects to take a P\$3-4 billion (\$59-79 million) hit to full-year profit if the situation persists for six months, an estimate given in the context of a P\$8.9 billion operating profit in the first half of 2019.

"We can't forecast because the situation is escalating so fast," Cebu Pacific's chief executive Lance Gokongwei told *The Philippine Star*.

By **SIMIN NGAI**, CIRIUM

"We just had an update regarding [the eruption of] Taal volcano three weeks ago and now there's a change in forecast. People don't want to travel."

The fact that Wuhan is a central transport hub has accelerated the spread of the coronavirus, and the number of cases outside of mainland China has been rising fast.

Japan, Singapore and Thailand now have the highest numbers of coronavirus patients outside mainland China, and locally-transmitted cases have emerged. This supports the thinking that the virus is highly contagious and that human-to-human transmission can occur.

Most Asian countries have responded with increased border controls and travel restrictions. This includes major travel hubs and popular tourist destinations such as Australia, Indonesia, Japan, Malaysia, New Zealand, the Philippines, Singapore, South Korea, Thailand and Vietnam.

Key measures include turning away visitors of any nationality who have been in mainland China within the past 14 days – a duration believed to be the coronavirus's incubation period.

Some have implemented more targeted measures aimed at citizens from Wuhan, Hubei or China. In the case of Mongolia and the Philippines, for example, this extends to the Chinese territories of Hong Kong and Macau.

"Governmental actions clearly have sent a signal that there is a high risk travelling to China to their citizens," says Lu.

With memories of SARS still vivid for many people, some have responded irrationally, even to the extent of xenophobia. In the Philippines, Malaysia and South Korea, for example, there have been online petitions calling for a ban on entry of travellers from China.

China has been critical of travel restrictions imposed on country of origin. Responding to the USA's warnings that its citizens should avoid China, the foreign affairs ministry stated: "Just as the WHO recommended against travel restrictions, the US rushed to go in the opposite way. Certainly not a gesture of goodwill."

China is no doubt a big market for tourism and has been actively targeted by the wider aviation industry for at least the past decade.

Indonesia estimates it will lose \$4 billion in earnings from tourism if travel from China is disrupted for one year. Last month, Finnair attributed its decision to suspend select routes to China's suspension of all group tours.

## TRAVEL SUSPENSION

The carrier's chief operations officer, Jaako Schildt, said: "These cancellations are needed to manage the impact of the recent suspension of group travel by Chinese authorities, which have a pronounced impact on the load factors of our Beijing Daxing and Nanjing flights."

A point to consider is China's track record for influencing the consumption patterns of its tourists. South Korea offers a prime example.

Despite its popularity with Chinese visitors, the country's tourism sector suffered greatly when China banned tour groups from August 2016 over the deployment of a US anti-missile defence system to South Korea. Such restrictions were gradually lifted from the end of 2017 through to April 2019, and figures for Chinese visitors to South Korea indicate that the segment continued on the road to recovery, at least until the coronavirus outbreak.

The tables have turned, as various Asian countries turn away Chinese-origin tourists to curb the spread of the coronavirus. Border control

may be essential at this juncture – but if mishandled, the economic superpower's displeasure may have lasting effects on how each country is perceived or encouraged as a tourist destination for Chinese citizens.

Cirium schedules data shows that about 100 new connections to Chinese cities outside of Beijing and Shanghai were due to begin in the first quarter of 2020 and, as it stands, just under 20 in the second quarter. Most of these are operated by Chinese carriers.

"SARS saw a reduction in year-on-year traffic for four months (February-May 2003). We don't know how long this one will last," says Lu.

"Currently, we see a roughly 25% reduction in flights from and within mainland China," she adds. "At a global level, this is just 3-4% at present. Planned Q1 schedule growth was around 2-3%, so it is likely we will see a global reduction in capacity in February."

Hong Kong Airlines is making job cuts, while compatriot Cathay Pacific, which suffered a 30% decline in overall capacity as a direct result of the outbreak, is encouraging employees to take three weeks of unpaid leave to conserve money.

"Preserving cash is the key to protecting our business. We have already been taking multiple measures to achieve this," says Cathay Pacific.

To protect their crew, global carriers are shortening layovers on China flights, while Singapore Airlines and Korean Air are sending additional crew to avoid overnight stays. American Airlines put an immediate halt to China services, after its pilots filed a lawsuit.

There is no certainty how long the coronavirus outbreak will last, but Lu says airlines have become more responsive, proactively cancelling services and halting bookings almost immediately rather than waiting to see empty flights.



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In Southeast Asia, Singapore is the superpower of the skies. Its air force heritage goes back half a century and its military aviation history is on display to the general public in an extensive permanent exhibition next to the Paya Lebar air base. *Flight Daily News* went along to join the tourists

# LIVING HERITAGE



One of the original A-4S fighter-bombers, operated from 1973 to 1992

in the air force for 37 years until his retirement as a senior warrant officer two years ago. He worked as a helicopter crew chief in types such as the Airbus Helicopters H215M Super Puma, Bell 212 and UH-1H. In 1983, at the age of 20, he was involved in one of the air force's most challenging missions: rescuing civilians from stranded cable cars 1,000ft above the waterway between Singapore's mainland and the resort island of Sentosa. The cable cars were stuck after the superstructure of a ship struck the cableway. The mission involved the Bell 212, which was then primarily tasked with search and rescue.

## LIVES SAVED

"My role then was winch man, so I would actually go down to the cable car and get people out. In total 13 people were in danger on that night and we succeeded in saving them. Two aircraft were used: the first one rescued six. I was in the second aircraft and we saved seven lives."

The museum includes a large number of aircraft exhibits, some of which are unique to Singapore. At the museum's entrance is a Northrop Grumman E-2C airborne early warning and control (AEW&C) aircraft, which was retired in favour of the nation's current Gulfstream G550-based AEW&C platform. Visitors are not allowed inside the aircraft, however.

"We took everything out," says Selvarajoo. "It's basically the outer part of the aircraft that is being displayed. The doors [of our aircraft] are all sealed. We get many visitors asking if they can go into the cabin of the helicopter or into the cockpit, but the answer is normally no. We have to seal it to make sure we have longevity."

Another notable type on display is the Hawker Hunter, the first fighter operated by the RSAF. The aircraft on display is equipped with four Raytheon AIM-9 Sidewinder missiles and a pair

By GREG WALDRON

The Republic of Singapore Air Force (RSAF) is a very real and present entity in the city state. Given the nation's small size, it is difficult to go an entire day without seeing or hearing a military aircraft of some type flying above. Singapore has the most powerful air force in Southeast Asia, with Boeing F-15SGs, Lockheed Martin F-16s (which are being upgraded), Boeing AH-64D attack helicopters and a range of support assets, including brand-new Airbus Defence & Space A330 multirole tanker transports.

The force places a strong premium on training and developing personnel. This range of advanced capability did not come into being overnight, but rather as part of a gradual evolution from the air force's founding in 1967, two years after Singapore's independence. Its history is celebrated in the

country's surprisingly large air force museum. Located adjacent to the high-security Paya Lebar air base, it is the one place in the area where visitors can wander about, snapping photos at will.

Selvanathan Selvarajoo is one of the museum's two civilian curators. He works with a small team that includes another civilian curator and four national servicemen to provide tours. Selvarajoo is busy: the museum is a popular destination for schools, military personnel, retirees and families.

"With a military organisation, sometimes the public perceives the museum to be in a security zone and thinks it won't be easy to come in," he says. "Our museum is open to the public, but when they walk in they feel like they are walking into an airbase environment. They get to go back to the beginnings of the RSAF in the 1970s and 1980s."

Selvarajoo knows a thing or two about military aviation, having served



Douglas A4-SU Super Skyhawk, re-engined and upgraded in the 1980s. Type remained in service with RSAF until 2006



of bombs along the centreline, though the ports for its four Aden 30mm cannons are sealed. Singapore operated three variants of the iconic British jet: the FGA.74 single-seat fighter, the FR.74A reconnaissance variant and the T.75 two-seat trainer. All were upgraded in the 1970s with improved avionics and additional weapons stations. The Hunters were a feature of Singapore's skies until 1992, when they were phased out and replaced by the F-16A.

One essential part of Singapore's aviation history on display is the Douglas A4-SU Super Skyhawk. In the mid-1980s Singapore undertook an ambitious re-engining programme for the type, which saw the Wright J65-W-20 powerplant replaced with a non-afterburning version of the GE Aviation F404, the same powerplant found in the Boeing F/A-18 Hornet.

It pushed static thrust from 8,400lb (37.4kN) to 10,800lb. In addition to a new engine, the jet received an upgraded weapons delivery and navigation system. The A4-SU served until 2006, when it was replaced by the F-15SG.

Visitors can also peer into the tandem cockpit of the two-seat TA-4SU Skyhawk. This trainer was created by sawing the nose off a single-seat A-4B and grafting it with the cockpit section of another A-4, thus making a two-seat trainer that increased fuselage length by 71cm. Lockheed Aircraft Service conducted this work in the mid-1970s, converting three in the USA and four in Singapore.

In a nod to Singapore's past as an Imperial outpost, a Bloodhound Mk II surface-to-air missile towers over the aircraft display area. When the British left Singapore in 1970 they handed



over Bloodhound missile batteries. They stayed in service for 20 years.

Outside, at the front of the museum, near the E-2C, are examples of the Hunter, Skyhawk and a UH-1H mounted on large pylons, easily visible from the road. During his air force career, Selvarajoo flew on the very UH-1H on display. He says it takes considerable effort to get the aircraft ready for display. "When an aircraft or system is identified to be displayed for heritage, obviously it has to be prepared," he says. "This includes body work and making sure it's well painted to a pristine condition. It's important

to seal a lot of holes to make sure vermin do not trouble us. We also need to make sure there are no sharp points and that it's safe for the public to visit... We make it so you can get up close and personal with the aircraft."

Singapore's tropical environment means it is essential to conduct regular maintenance checks. The next aircraft likely to go on display is the Northrop F-5E, which the RSAF retired a few years ago. The F-5E was Singapore's first supersonic jet. Officials have yet to confirm, however, when (or if) the type will eventually go on display.

Apart from the aircraft exhibits, the

museum has an indoor gallery that focuses on the air force's history, missions, personnel, and aircraft types. Visitors can use touchscreens to find details about different types of aircraft, attempt to hold formation with Singapore's Black Knights display team, and fly an intercept mission against an interloping aircraft.

One section focuses on the RSAF's international missions. Over the years, the force has participated in humanitarian relief missions in Indonesia, Malaysia, the Philippines, the USA and other countries. Selvarajoo himself has played a part in this work,

having been deployed to Timor Leste, as well as the Gulf of Aden, where Super Pumas were deployed from a Singapore warship in support of anti-piracy operations.

Though his current role may be less adrenalin-inducing than being helicopter crew chief, Selvarajoo brings tremendous energy to his work, helping the general public learn more about an important part of Singapore's history as an independent nation. ■ The Singapore Air Force Museum is located at 400 Airport Road, Singapore 534234. Open: Tuesday to Sunday 08:30-17:00

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Convair XC-99 was designed to carry 204 passengers with baggage and cargo more than 4,000 miles

# GIANT FAILURES

The Boeing 747, which went into service 50 years ago, was, of course, the original jumbo jet. But in the decades leading up to its introduction, manufacturers worked on a number of super-sized transport projects, with little success. We look at the faltering evolution of the large airliner

By MAX KINGSLEY-JONES

**D**riven by the demand for ever-larger aircraft to carry troops during the Second World War, as the conflict drew to a close several very large transports were in development that – when adapted for civil use – promised a step change in airline capacity. But despite their potential to drive air travel growth, circumstances conspired to make these designs a false dawn, with the pace of technology rather than customer demand hampering their development.

The US aerospace industry emerged from the war with an impressive line-up of large, long-range piston-engined transports that included the graceful Lockheed Constellation and Douglas's workmanlike DC series of airliners. And work was well under way on giant land-planes that were almost double the size of these machines – although nothing in planning came close in size to outclassing the giant H-4 Hercules flying boat created during the war by the eccentric aviation entrepreneur Howard Hughes.

As peacetime began, Douglas and Lockheed were developing large piston-powered military transports, the Globemaster and Constitution, while Convair had set the bar even higher with its XC-99, derived from the B-36 bomber. In an article published in December 1947, *Flight* described these three transports as “some of the largest and most ambi-

tious aircraft in the world”. Powered by four Pratt & Whitney Wasp pistons, the Constitution, which had two passenger decks, made its first flight in November 1946 and could seat about 160 passengers in airline configuration. The XC-99, which was also a double-decker and powered by Wasps (but six rather than four), flew 12 months later.

## MODEL WINGSPAN

With a wingspan of more than 70m (230ft), Convair's planned civil variant, the Model 37, could seat more than 200 airline passengers. Reporting on the first flight of the XC-99, which weighed 120t (265,000lb) and was the world's largest land-plane, *Flight* wrote: “It is estimated that 90,000 spectators turned up at Lindbergh Field, San Diego, to watch the event.”

Not to be outdone by its transatlantic ally, the UK government had fired up its own transport aircraft ambitions

with a multi-pronged strategy that included a large propeller-driven long-range airliner, the Bristol Brabazon. However, unlike the US projects, this was intended ultimately to be powered by the emerging turboprop technology, rather than pistons.

In a 1947 analysis of the coming airliner designs, *Flight* reported that Convair's proposed Model 37 would be able to carry “204 passengers, with over 15,000lb of baggage, mail and freight, over 4,000 miles. It has been reported that Pan American Airways estimated that with a fleet of 15 such aircraft they could transport 750,000 passengers yearly across the Atlantic.”

Despite all the promise, neither of these giant US transports found any takers, either in civil or military applications, as the piston era bowed out and engine designs reached the end of their growth potential. Commenting at the time, *Flight* said: “The design of large civil aircraft is temporarily

stalled, marking time on the threshold of a new engineering epoch which awaits the post-gestation period of the gas turbine.”

The giant Convair and Lockheed designs were too ahead of their time, and aircraft manufacturers found themselves in a holding pattern, awaiting the embryonic turbine-engine era to become established – which would take at least a decade.

*Flight* succinctly summed up the predicament of these two giant transports in May 1948: “Quite obviously, then, this [lack of available piston-engine power] adds up to a vote of ‘no confidence’ in the two remaining big fellows in their present stage of development, since both the Lockheed Constitution and the Convair XC-99 are distinctly underpowered, at any rate as civil transports. Both were conceived during the war as military transports, which is hardly the ideal incubation for civil life.

“The Constitution, however, does manage to retain most of the familiar Lockheed characteristics of good breeding and may possibly reach the more powerful turboprop stage when such engines become available in the USA.

“But one incredulous blink at the boxcar aerodynamics of the XC-99 shows that it can have no possible future as a commercial passenger transport, and we fancy that its makers have no intention of offering to airline operators, except perhaps as a cargo tramp.”

## BRABAZON NOSEDIVE

Although the UK avoided the “piston trap” with the giant Bristol-designed Brabazon, its design would require no less than eight Bristol Proteus turboprops to achieve its transatlantic mission carrying 100 passengers in sublime luxury.

Hindered by engine development problems, however, the huge airliner failed to secure any airline customers and was cancelled three years after the prototype flew in 1949.

Large-airliner development underwent a bit of a hiatus in the 1950s as propeller- and jet-turbine technology rapidly evolved. But the arrival of the turbofan at the turn of the 1960s saw the ensuing decade spawn ever-larger transport aircraft, starting with stretched Boeing 707 and Douglas DC-8 derivatives and culminating in the arrival of the original jumbo jet, the 747, in 1969. ■



Bristol Brabazon (left) could find no customers and piston technology left Lockheed Constitution (right) underpowered





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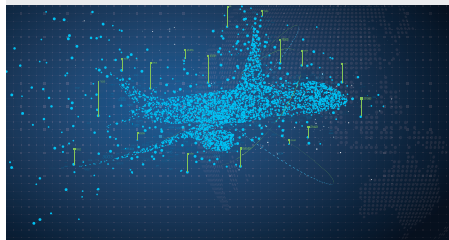
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12-13 May 2020, Bangkok



### The Airline Strategy Awards

[strategyawards.com](https://strategyawards.com)

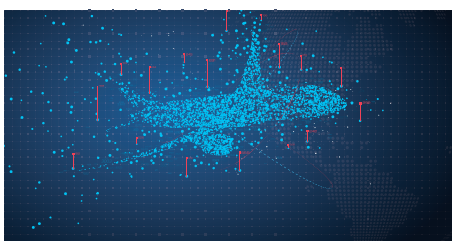
19 July 2020, London



### Aerospace Big Data Americas

[flightglobal.com/bigdata](https://flightglobal.com/bigdata)

29-30 September 2020, Seattle



### Airlines 2050

[flightglobal.com/airlines2050](https://flightglobal.com/airlines2050)

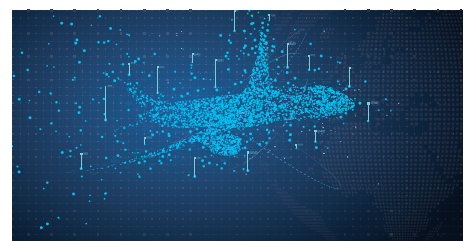
19 October 2020, London



### Aerospace Big Data EMEA

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December 2020







# 110 years of nons



The world's first aviation weekly marked its 12th decade in 2019 with a front cover from every year







# top *Flight*



By MAX KINGSLEY-JONES

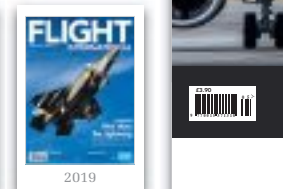
**F**light International magazine is celebrating 12 decades of aviation insight, having marked its 110th anniversary last year. *Flight* published its first issue on 2 January 1909, and rightly declared itself as the “first aero weekly in the world”. This spread illustrates our 11 decades in print, with a cover from every year.

Our objective when *Flight* was created in 1909 was to report on the nascent industry now called “aerospace”.

The weekly *Flight* was spun out of *The Automotor Journal*, which had been tracking the slowly evolving aviation sector. *Flight* became a stand-alone weekly not long after UK aviation pioneer Alliott Verdon (AV) Roe had taken his first hops and the American Samuel F Cody became the first person in the UK to fly, in October 1908.

*Flight*’s mission statement back in our first decade was to be “devoted to the interests, practice and progress of aerial locomotion and transport”. As *Flight* begins its 12 decade, it continues on that original 1909 mission, having followed the industry through its incredible journey for well over a century. ■

Read more about *Flight*’s 110 years in print at:  
[flightglobal.com/Flight110](http://flightglobal.com/Flight110)





If you have enjoyed reading *Flight Daily News* at Singapore, you are one of thousands who turn to our show newspapers for their fix of stories, analysis and interviews at major industry events around the world. FlightGlobal has been publishing its family of dailies at air shows, conventions and exhibitions since the 1980s. As well as Singapore, our distribution team – clad in their distinctive red flight suits – can be found handing out copies each morning at the Farnborough air show, and, in odd years, Paris and Dubai.

In addition, the two main annual business aviation gatherings – NBAA BACE in the USA and EBACE in Geneva – play host to the industry's only same-day dailies, *Flight Evening News*, where they have been appearing since 2004. At the Aircraft Interiors Expo in Hamburg each year, we publish a unique double-fronted daily, featuring exclusive content from the adjoining World Travel & Catering Exhibition. Additionally, our sister title, *Airline Business Daily* provides all the coverage from the ALTA Latin American airline leaders' event and the IATA convention.

The dailies have survived the advent of digital publishing. While our web site, flightglobal.com, provides the best breaking coverage of industry events, as well as a searchable depository of content, picking up our print publications remain one of the best ways to keep abreast of what has been and what will be happening at the event.

"We see the two media as complementary," says *Flight Daily News* editor Murdo Morrison. "The web site is often the easiest way of keeping in touch with a show if you are not there, but there is nothing to beat turning the pages of a hot-off-the-press newspaper to get the real feel for an event. We have expert reporters all over the show, but we also put a huge emphasis on design, with dozens of large, live photographs and headlines that catch the eye."

On conventional dailies, such as Singapore, the working day for the team starts early, with a news meeting around 07:45 to go through the diary, scroll through the overnight emails, and discuss the agenda for the day. Reporters, who already have their beats, are assigned specific stories or press conferences, and often deadlines. With up to 20 live pages a day on a Paris or Farnborough daily, a page has



Flightglobal journalists and photographers plan the daily news

# READ ALL OVER

From our eye-catching photography to our unmistakable flight-suited distribution team, *Flight Daily News* is an air show institution around the world. Here is a glimpse into how we put this unique publication together

to be processed and passed for press every 30 to 45min. The pace is slightly less frenetic at Singapore, but, with around eight news pages to be created every day, as well as a web site to keep updated, there is little time to relax.

An important part of the planning process each morning and throughout the day, is commissioning photographs. "Don't tell the writers, but the old cliché that a good picture is worth a thousand words really does often apply," says Morrison. "Our photographers, who work for the UK-based

agency BillyPix, have often been with us for 10 or 20 years, and know exactly what is needed to create the sort of image – whether a representative of a company on his or her stand, or an aircraft on the static – that really lifts a page."

Speed is of the essence too, for writers



and snappers. "Often our journalists and the photographer will have under 1h to walk to the chalet, booth or area of the static, do an interview and set up and take a picture, hasten back to the newsroom and write the story, backing it up with additional research if necessary, and upload the photos," says Morrison. "Although their words will go through a copy editor, it is down to the original writer to ensure the facts and quotes are right, and that it's written in a compelling enough way that people will want to read it."

The best-laid plans can run awry, of

course. No matter how organised the schedule is, it only takes a major announcement – a significant aircraft order, for instance – late in the day to cause everything to be ripped apart to accommodate the breaking news. "Believe it or not, it's not that unusual to have one of the team burst into the newsroom just as we're preparing to get the last pages over to the printer just ahead of deadline, and announce: 'Hold the front page!'," says Morrison.

One of the most important parts of the daily operation is the distribution. Events and operations manager Laura Gardner runs the operation, often turning up at the show with colleagues long before dawn to collect the shipment of newspapers from the printers. Following that, she briefs and co-ordinates the distributors, whose flight suits are based on the uniform of the Royal Air Force's aerobatic team, the Red Arrows, and are also on site before any visitors.

"We pride ourselves on the quality of our distribution team," says Gardner. "We ask them to be friendly and remember that they – not the journalists – are the face of *Flight Daily News* and the interaction with the reader. There is no point in producing the best quality daily if the people handing it out do not do their best to communicate our brand values, which are all about the authority of our coverage, but also that we are part of the community at the show."

Another essential element of the process is the production team. At Singapore, it consists of a copy editor, whose job it is to check for typos and other clear factual errors, as well as writing headlines and captions; a designer, who lays out the pages, and, with the photo editor, chooses the images; and a head of production, who liaises with the editor and printer to ensure that deadlines are met or managed. At the biggest shows, Farnborough and Paris,

this engine room is slightly bigger.

Teamwork is, of course, key. The dailies – and FlightGlobal's online coverage – only happen as a result of anything up to 30 members of staff working like a machine, everyone with a role in making sure that show visitors and those following events from afar know exactly what is going on in the press conferences, on the static, in the halls, and behind the scenes every day. ■

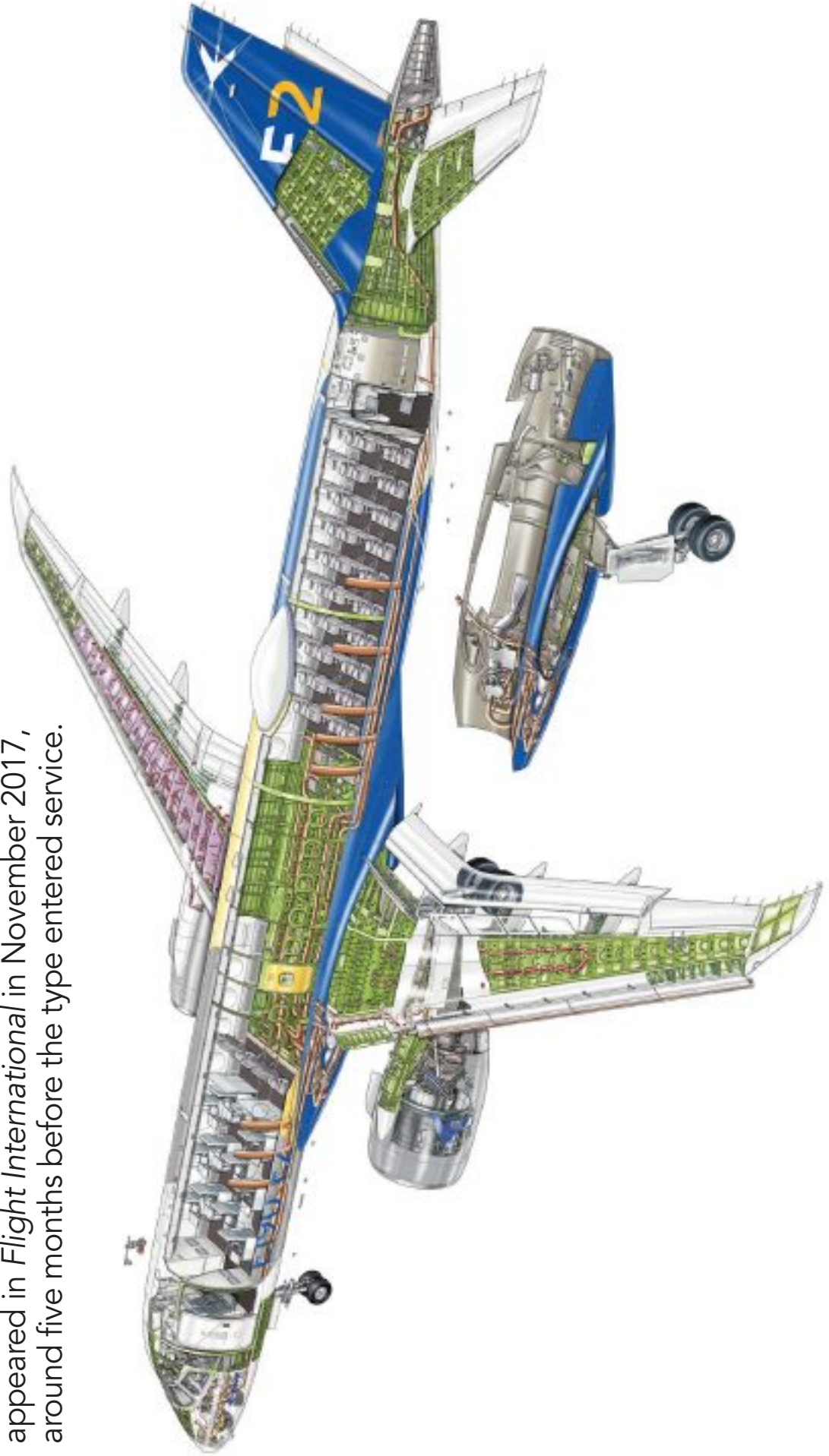


Distribution team ensures attendees receive the latest news



# EMBRAER 190-E2

The E190-E2 was the first to be certificated of three variants of a re-engined family of regional jets, launched by Embraer at the 2013 Paris air show. Our cutaway, drawn by veteran technical artist Tim Hall, first appeared in *Flight International* in November 2017, around five months before the type entered service.





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