



THALES IN TUNE
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WILL SUPPORT IFE
ON NEW BA TYPES
AIR TRANSPORT

JUMPING TO 2030

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COVER IMAGE

BOAC pipped Pan Am to launch the first transatlantic commercial jet services in October 1958. Our cover story sets out 60 milestones in the full 60-year history of passenger jet travel. See Cover Story **P26**

PIC OF THE WEEK
YOUR PHOTOGRAPH HERE

AirSpace user Hounddogone posted this shot of a Boeing MD-80 operated by Scandinavian Airlines on approach to Runway 27R at London Heathrow airport. The carrier is in the process of phasing-out aircraft of this type. Open a gallery in [flightglobal.com's AirSpace](http://flightglobal.com's/AirSpace) community for a chance to feature here



flightglobal.com/imageoftheweek



Fatigue monitoring technique will enable service to fly on with venerable jump jet **P18**. Aerion seeks a risk-sharing airframer to construct its supersonic business jet **P21**

US Navy/Aerion

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COVER STORY

- 26** **60 events that made the jet age** In May 1952, BOAC ushered in a new era by operating the first revenue flight of a jet aircraft, namely the de Havilland Comet, from London to Johannesburg, with a flight profile that – in terms of speed or cruising altitude – is similar to those used by Boeing 747s flying that route today. But the six decades have brought myriad technological breakthroughs, not to mention the odd false dawn, amid dramatic growth in scale. In a celebration of commercial jet travel's diamond jubilee, we pick its 60 defining moments



NEXT WEEK SPECIAL MISSIONS

We track Piaggio's serious move into the market for special-mission aircraft. Plus: the low-down on the optionally manned K-MAX and a profile of Dynamic Aviation

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BEHIND THE HEADLINES

A **team** drawn from our London and Singapore offices (*below*) kept busy in **Beijing** to produce three issues of *Airline Business Daily* – in print and **digital** editions – at **IATA's** annual general meeting, attendees of which included Air Lease chief **Steven Udvar-Hazy** (P11); visit flightglobal.com/iata12 for full coverage of the event. **St Louis** was a port of call for Washington DC-based military reporter **Dave Majumdar**, who joined a Boeing media tour (P17). And our analysis of **GKN** strategy is a product of a trip to Bristol by news editor Dominic Perry (P24).



For a full list of reader services, editorial and advertising contacts see P37

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THE WEEK ON THE WEB flightglobal.com

Our **Image of the Day** blog featured a US Air Force image of Lockheed Martin C-130s flying in formation as they returned from a training mission near Mount Fuji, Japan on 5 June. On



Hyberbola, David Todd noted the Space Shuttle atmospheric glide test prototype Enterprise had a **prang** during the last leg of its journey from the **Smithsonian's** Udvar-Hazy site near Dulles Airport in Washington DC to its

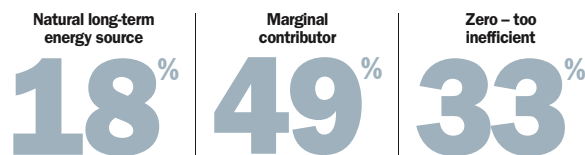
new home at the **Intrepid Air and Space Museum** in New York City (*above*). "On its barge trip, Enterprise's wingtip struck the side of a bridge as the **barge** drifted into it," writes Todd. "Thankfully, the damage is repairable." On defence blog The DEW Line, Dave Majumdar gave his verdict on the Boeing full-domed F/A-18F Block II **simulator** he got to fly while in St Louis: "In a word, awesome." And Ariel View's **Arie Egozi** analysed efforts to protect helicopters from kinetic threats.



Find all these items at flightglobal.com/wotw

QUESTION OF THE WEEK

Last week, we asked: **Solar Impulse has completed its first intercontinental flight. What is solar power's true potential in aviation?** You said:



Total votes: 785

This week, we ask for **your thoughts on A380 wing problems:**

☐ Routine maintenance fix ☐ Another headache for Airbus and operators ☐ Destroys superjumbo sales prospects

Vote at flightglobal.com/poll

HIGH FLIERS

The top five stories for the week just gone:

- 1 F-22 Raptor damaged during training flight
- 2 British Airways may take more 777-300ERs
- 3 A380 wing-cracks to require eight-week repair downtime
- 4 Delta to replace majority of its 50-seat regional jets
- 5 Boeing postpones 787 surge line activation until fourth quarter



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The Comet's legacy

Sixty years ago, the Comet ushered in the jet age. While the industry might have swapped creativity for conservatism in recent times, aviation is changing the world faster than ever

In the half-century between the 1900s and 1950s, aviation leapt from two brothers struggling to get a spluttering, home-made contraption airborne to transcontinental jet travel at speeds and altitudes much the same as today. Mass air transportation was still years away, but the Comet and Boeing's 707 shrank the world for the privileged few who could stretch to the fare.

Although the six decades since have seen many advances – supersonic travel, superjumbos, fly-by-wire cockpits and carbonfibre structures – youthful exuberance has matured to a conservative middle age.

Witness airliner architecture. Despite developments in cockpit technology, cabins and structures, today's Boeing 737-800 looks little different (number of engines aside) from the 707. A modern jet engine – although much quieter and more efficient than its 1950s predecessor – shares the same basic technology. The last attempt to fundamentally reshape the standard airliner

Mobility for the many will be the jet age's main contribution to mankind in the 21st century

design – the Airbus A380 – offered a third more capacity than the Boeing 747, but has not led to a paradigm shift in the way we travel.

The decision by Airbus and Boeing to reject clean-sheet designs in favour of adaptations of their top-selling narrowbodies – powered by tweaked versions of existing engines – will see the 737 and A320 into the 2020s and possibly beyond. That choice is understandable – why gamble the farm when you have 50% of a market that shows little sign of tiring of these work-



Comet: the dawn of the jet age

horses? But it does illustrate the industry's caution. The nostalgic may hearken back to aviation's so-called golden age. It is unlikely we will again witness a step-change in technology equivalent to jet airliners' birth in the 1950s or the jumbo's gift of long-haul travel to the middle classes two decades later.

But aviation is far from wallowing in complacency. Take safety. Technology and training have made flying many times less risky than in the first decades of the jet age. Thanks to engine advances, airliners are less polluting and quieter. Gone is the din around an airport as older-generation jets departed and landed.

Most of all, aviation has experienced a popular revolution. Due to deregulation, low-cost airlines and an industry able to mass-produce safe, reliable, affordable airliners, air travel has become attainable for ordinary Chinese, Czechs and Chileans, creating a global village where millions can trade, holiday or work across time zones. Mobility for the many will be the jet age's main contribution to mankind in the 21st century. ■

See Cover Story P26

Space is no place for political boundaries

Twenty years ago, China's space systems were essentially unflattering copies of Soviet systems, and are still derivative of others today. But Chinese engineers have made big strides in constructing space hardware and continue to gain valuable experience. The nation's ambitions in outer space seem limitless, and it shows clear signs of increasing investment. China has become, and will continue to be, a major space power.

Thus it seems futile to deliberately exclude China from cooperative space projects, but this is exactly the scenario. As space budgets in the USA and Europe fall, increasing international co-operation will be increasingly necessary. China has long professed an interest in joining the group of nations that maintain the Interna-

tional Space Station (ISS), but cannot. There are no Chinese-built instruments aboard planned co-operative missions into space. As a consequence, China has plans to assemble a much larger and more capable station – a rival to the ISS. It will soon develop its own lunar sample return and Mars programmes, and valuable scientific and diplomatic opportunities will have been missed.

A blanket denial of co-operation with the Chinese space programme benefits no one, leading to resentment and wasteful duplication of capabilities. One day soon China will accomplish a remarkable first in space that the international community cannot, or will not, duplicate – and consequently derive no benefit from. ■

See Spaceflight P23



For more on the ambitious programmes being pursued by new national players in space exploration, pay a visit to flightglobal.com/newspace



BRIEFING

GOVERNMENT OFFICIALS KILLED IN KENYA CRASH

SAFETY Kenya's internal security minister, George Saitoti, and his permanent secretary, Orwa Ojode, have been killed in a helicopter crash near Nairobi. The Eurocopter AS350B3 Squirrel (5Y-CDT), operated by the Kenya Police Air Wing, came down in woodland on 10 June in the Ngong hills just south of Nairobi, also killing both pilots and two ministerial bodyguards. The helicopter had just taken off from Nairobi's Wilson general aviation airport at about 08:30 local.

BOEING TESTS WING-KIT ADDITION FOR JDAM

WEAPONS Boeing has performed initial windtunnel tests on a wing kit-equipped version of its JDAM precision-guided weapon, which it says will have three times the range of its baseline design. The work is being performed for an undisclosed US ally, with the 226kg (500lb)-class weapon to enter production in 2014 or 2015.

O'HARE RUNWAY ISSUES PROMPT GUIDANCE CHANGE

OPERATIONS The US FAA has updated its guidance on how pilots will be advised when a runway is shortened. The Automatic Terminal Information Service will broadcast a message that includes "warning" prior to the runway number and "shortened" after the number, as well as the available length. ATC will also say "shortened" both immediately after the runway number in its line-up-and-wait, take-off and landing clearances to pilots. The update follows four incidents where aircraft landed in closed construction areas on runway 32L at Chicago O'Hare.

BALKAN CARRIERS PLAY DOWN MERGER RUMOURS

AIRLINES Neither Croatia Airlines nor Adria Airways expects a single airline to emerge for the former Yugoslavia despite exploration of a more united approach to aid the region's struggling carriers. Adria Airways, which was recapitalised last year, has been in talks with Croatia Airlines, Jat Airways and Montenegro Airlines about ways to improve the operators' prospects.

F-22 STUDENT PILOT IN TRAINING INCIDENT

MISHAP A Lockheed Martin F-22 Raptor from Tyndall AFB, Florida, suffered more than \$2 million in damage during a training incident involving a student pilot making only his second flight in the type. The US Air Force has ruled out an oxygen-related issue affecting the F-22 as having been the cause, and plans to repair the aircraft.

FLYBE INCREASES FINNISH MAINTENANCE HOLDING

MRO UK regional carrier Flybe has become the majority shareholder of Finnair's ATR turboprop support subsidiary Finnish Aircraft Maintenance. Flybe already owned 46.3%, having acquired the stake from former shareholder Finncomm in July 2011. It now holds 60% of the company, having acquired an additional 13.7% stake.

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NetJets will take delivery of its first Global 6000 later this year

PURCHASE KATE SANSFIELD LONDON

NetJets smashes own order record

Leading fractional provider seals \$9.6 billion deal for up to 425 jets as it plans complete fleet overhaul

NetJets has smashed its global business jet order record with a deal for up to 425 aircraft – 275 Bombardier Challenger series jets and 150 Cessna Citation Latitudes valued at a total of \$9.6 billion.

Last year, the world's largest business aircraft operator made the history books with the biggest private jet deal on record – ordering 120 Bombardier Global 5000, 6000, 7000 and 8000 aircraft valued at \$6.7 billion. The first jet from this order – a Global 6000 – is set for delivery in the fourth quarter of this year.

Orders and options for up to 125 Embraer Phenom 300s were also placed by NetJets five months earlier. The first of these light business jets will be added to the fleet in 2013.

This latest spending spree includes firm orders for 75 super-midsize Challenger 300s – with deliveries to start in 2014 – and 25 Challenger 605s. The first of the large-cabin business jets will enter NetJets' fleet two years later. Cessna has secured firm orders for 25 Latitudes – with deliveries to commence in 2016 – and options for 125 more of its new mid-size jet.

NetJets, a Berkshire Hathaway

subsidiary, will share the new aircraft among its US and European ventures, which operate a combined portfolio of 716 business jets for its 7,000-strong customer base.

NetJets chief executive Jordan Hansell says the company is looking at a top-to-tail overhaul of its vast fleet during the next few years. "It's time to refresh the fleet," he says. "We will need new aircraft over the horizon when the market finally recovers."

NetJets' new business jets will be configured in its bespoke design, branded the Signature Series. "These are the first aircraft that NetJets helped design from start to finish," it says.

Features include advanced in-flight entertainment and a custom cabin design, including specially selected fabrics and materials, customised seating, lighting and storage. "The Signature Series will represent an innovation in private aviation," Hansell says. "These aircraft will help to retain and stimulate interest in our product and set us apart from the competition," he adds. ■



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F-35s unavailable
for Seoul evaluation
THIS WEEK P8

REPAIRS MAX KINGSLEY-JONES BEIJING

Eight weeks downtime for A380 fix

Airbus confirms “nose to tail” service will require about 60 days but expects operators to choose a phased approach

Airbus A380 operators are working out how best to tackle repairs to the aircraft’s wing after it emerged the modification will require up to eight weeks’ downtime if implemented in one instalment.

The airframer confirms a “nose-to-tail” service will require about 60 days but says it expects most operators to choose the phased approach – spread out over three two-year heavy checks. In this case, it expects the repair to extend each heavy check, which will last two to three weeks, by “a few days”.

Emirates is the biggest A380 operator with 21 in service. Speaking at the recent IATA annual general meeting in Beijing, Emirates president Tim Clark said the work would begin in April, with the repair to each aircraft being carried

out in one instalment. He says the work will require 30,000 man-hours. Clark says the Emirates fleet will be repaired in Airbus facilities or by other organisations on Airbus’s behalf as the Dubai carrier does not have in-house capacity for the work.

Carsten Spohr, head of Lufthansa’s airline division, says his engineers are still evaluating how best to undertake the modification on its nine A380s. Qantas boss Alan Joyce says his team is doing likewise regarding its 12 aircraft.

The retrofit modification will be subject to an airworthiness directive from EASA that Airbus expects to be issued this summer. It will be available for retrofit in the first quarter of next year.

A modification for new-build aircraft will become available for



Emirates says the work requires 30,000 man-hours per aircraft

incorporation on the wing production line at the end of this year. There is a lead time of approximately 10 months on the wing, meaning that this will apply to A380s delivered from early 2014. Airbus says it expects that most operators receiving new A380s in 2013 will opt to have their wings

repaired during final assembly, resulting in a four-to-six week delay. But some airlines with a more urgent need for aircraft will decide to have the work carried out retrospectively, it adds. ■



To view all our coverage from IATA’s AGM in Beijing, visit flightglobal.com/IATA12

DISPUTE ZACH ROSENBERG WASHINGTON DC

Sierra Nevada takes LAS fight to court as it seeks halt to resurrected contest

Sierra Nevada has filed a suit against the US government, hoping to reinstate a contract to supply light air support (LAS) aircraft to the US Air Force for use by its Afghan counterpart.

The lawsuit marks the latest twist in the USAF’s attempt to purchase 20 LAS aircraft for the nascent Afghan air force. A previous contest was won by Sierra Nevada and its Brazilian partner Embraer with the EMB-314/A-29 Super Tucano, but the contract was cancelled after protests by rival bidder Hawker Beechcraft over paperwork errors.

A new competition was declared, which Sierra Nevada now wishes to halt. “Despite repeated written and verbal attempts, we have not received adequate explanation – much less justification – for the termination of our contract, the reopening of the LAS competition or the readmis-



Embraer was to supply 20 Super Tucanos under the contract

sion to the LAS competition of our competitor,” says Taco Gilbert, Sierra Nevada’s vice-president of intelligence, surveillance and reconnaissance.

The Super Tucano was selected late last year after a Hawker Beechcraft/Lockheed Martin AT-6 proposal was eliminated from the contest.

“What we seek is a fair and

open competition – one where there is a level playing field, one that provides transparency into the decision making process, and one that selects the best value as required by the request for proposal,” says Gilbert.

“Unfortunately, based on the information we have, we are concerned that this competition will not conform to these goals.” ■

FLEET

Italian carrier reaffirms order for Superjets

Italian airline Blue Panorama insists it will hold on to its order for Sukhoi Superjet 100s, having cooled on a proposed merger with Alitalia.

Blue Panorama agreed to take 12 of the Russian-built twinjet last year, with deliveries scheduled by the end of 2012.

Chairman Franco Pecci, speaking on the sidelines of the recent IATA annual general meeting in Beijing, stressed the carrier is still planning to take the aircraft, although the delivery date has slipped to around the second quarter of 2013.

The airline had been discussing integration with Alitalia, part of a three-way tie-up which also included budget operator Wind Jet. However, Pecci says Blue Panorama has been unable to reach a common position with Alitalia and prospects for a merger have receded. ■



LABOUR RELATIONS GREG WALDRON SINGAPORE

Qantas attacks union over 'unnecessary' checks

Qantas Airways has filed an action with Australia's national industrial court against its aircraft engineers' union for instructing members to perform maintenance tasks the carrier deems unnecessary. Qantas filed the motion with Fair Work Australia on 14 June against the Australian Licensed Aircraft Engineers Association, which it says "has instructed its members to take unprotected in-

dustrial action by conducting maintenance tasks that are no longer required on aircraft".

The dispute stems from Qantas's implementation on 13 June of a new "maintenance on demand" system for its Boeing 737-800s and Airbus A330s on domestic routes. It says those aircraft have better diagnostic systems, obviating the need for engineers to check the aircraft before every single flight. ■



The carrier's 737-800 fleet will have "maintenance on demand"

COMPETITION GREG WALDRON SINGAPORE

F-35s unavailable for Seoul evaluation

South Korea will now run the rule over the Lockheed Martin Joint Strike Fighter through the use of two flight simulators

South Korea's evaluation team for the F-X III competition for 60 fighters will evaluate the Lockheed Martin F-35 mainly through the use of simulators.

"At this time the F-35 fleet of 36 flying aircraft is fully occupied with test, training and delivery activities, so potential customers like [South] Korea are not able to fly the aircraft," Lockheed Martin says.

Tests of the F-35 are being con-

ducted this month. Officials from Seoul's Defense Acquisition Programme Agency will evaluate the Boeing F-15 Silent Eagle in August, and the Eurofighter Typhoon in September.

While a South Korean pilot will not have the opportunity to fly an actual F-35, Lockheed says that Seoul will receive a great deal of access to the system, mainly through the use of high-fidelity simulators including the

Joint Strike Fighter's manned tactical simulator and handling qualities simulator.

"Korea will also have the opportunity to closely observe F-35 flight operations, discuss F-35 capabilities with US Air Force and Lockheed Martin test pilots, participate in pre-flight and post-flight pilot activities and observe or participate in numerous types of maintenance activities," the company says.

Al Norman, Lockheed's chief test pilot, will also visit Seoul in late June.

"Pilots from the USAF, the US Navy, the US Marine Corps, the UK, the Netherlands, Australia, Italy, Israel and Japan have extensively flown the high-fidelity simulator and verified it is the best tool to evaluate F-35 capabilities," Lockheed says.

"All of the international nations who have selected and ordered the F-35 have evaluated its capabilities using the manned tactical simulator."

Boeing has yet to firm up its arrangements for the Silent Eagle evaluation. Although the F-15SE is not in production, Boeing says that the proposed type has substantial commonality with the F-15Ks already flown by South Korea's air force.

Key F-15SE upgrades include a reduced radar cross-section, fly-by-wire flight controls and improved sensors.

The Eurofighter consortium also has yet to provide details of its evaluation programme for South Korea, but an industry source says that in September Republic of Korea Air Force pilots will travel to Europe to fly the Typhoon. ■

ROTORCRAFT

Three-way fight for South Korean attack helicopter contest

The Bell AH-1Z Zulu, Boeing AH-64D Block III Apache and Turkish Aerospace Industries/AgustaWestland T129B are vying for South Korea's 36-aircraft AHX attack helicopter requirement, say industry sources.

Bids were submitted to Seoul's Defense Acquisition Programme Administration on 10 May, with Eurocopter deciding against pitching its Tiger attack helicopter, preferring to focus on the Surion Korea Utility Helicopter it has jointly developed with Korea Aerospace Industries.

"The next stage in the competition is the test and evaluation phase, where the [South Korean army] evaluation team travels to the various competitors' locations to do their test and flight evaluations,"



Bell has entered its AH-1Z Zulu for the AHX competition

Boeing says. It expects a selection to be made in the third or fourth quarters of this year. Offsets for the AHX programme will likely be applied to Seoul's planned Korea Attack

Helicopter. The nation is also interested in developing a light version of the proposed type to replace its Hughes MD500s which it will offer for overseas sales. ■



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JetBlue to start
analysing larger
twins for long-haul
AIR TRANSPORT P10

THIS WEEK

STRATEGY DOMINIC PERRY LONDON

Order lull is the calm before the storm

Boeing stays quietly confident of closing the gap on rival in the battle for supremacy in the re-engined narrowbody market

Airbus recently firmed two outstanding orders for A320neo family aircraft, with Norwegian Air Shuttle committing to 100 A320neos and Air Lease taking 36 of the re-engined jets, including 20 of the larger A321neos.

This takes Airbus's total firm orders for Neos to 1,425 from 26 customers. Meanwhile, Boeing has gained what it describes as more than 1,000 "commitments and orders" from 16 customers for its CFM International Leap-1B-powered 737 Max, of which 451 are firm orders.

But although existing commitments have been firmed, there have been few recent new orders. The narrowbody market is in "a state of stasis" as Teal Group vice-

president, analysis Richard Aboulafia describes it. But with the Farnborough air show looming, Aboulafia believes the next few months will be "crucial", noting that it will be "a big show for the narrowbodies".

Boeing previously dubbed 2012 "the year of the Max", and despite the lack of recent order activity it remains quietly confident that this remains the case. With competitions under way from US carriers Delta Air Lines and United Airlines and existing 737 operator Pegasus Airlines of Turkey, Boeing can almost certainly count on a number of big deals in the coming months.

Orders so far for both manufacturers' products have been partly

A320NEO ENGINE ORDERS

Engine	Aircraft
CFM International Leap-1B	578
Pratt & Whitney PW1100G	488
Undeclared	359
Total	1,425
SOURCE: Flightglobal ACAS	

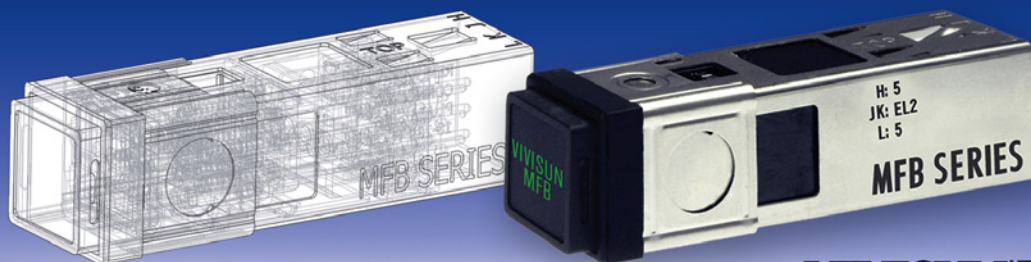
driven by the need to secure early production slots. Although both airframers are claiming their aircraft is superior, at the moment these are simply differences on paper, says Flightglobal Ascend's Chris Seymour. "I expect they'll be very close [in performance terms]," he says. "But it's very early days, there's no engine-airframe combination flying yet."

The key differentiator between

the Neo and the Max, says Aboulafia, is the engine choice available on the former, between the Pratt & Whitney PW1100G and the Leap-1A. Orders for both powerplants remain broadly neck and neck (*see table*), with CFM International slightly in front. Tellingly, perhaps, some 359 aircraft remain without a powerplant choice, reflecting operators hedging their bets on the divergent approaches taken by the engine manufacturers. As Aboulafia notes: "One of them must be wrong."

Seymour adds: "Both are claiming a good reduction in fuel burn, but until we see them flying and performing and we get the [performance] figures from them it's hard to say which is better." ■

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SAFETY

Turboprops burn in hangar blazes

Two turboprop airliners appear to have been destroyed in separate hangar fires in Europe and the Caribbean within the space of 48 hours last week.

Czech Airlines says one of its ATR 42-500s was “substantially damaged” in a Prague hangar fire on 9 June. It says the fire was “quickly extinguished” and the hangar remained “unscathed”.

While the airline declines to elaborate on whether the ATR (OK-KFM) can be repaired, it estimates the financial loss at Kc200-300 million (\$9.7-14.5 million). No-one was “seriously” injured in the fire, it says.

Antigua-based carrier LIAT suffered a similar loss the following day, when a Bombardier Dash 8-300 (V2-LGH) was wrecked in an overnight blaze. LIAT says a hangar at VC Bird airport and two office buildings were destroyed.

“The cause of the fire has not yet been ascertained,” it says. “A thorough assessment is continuing to determine the full extent of the losses.” ■

OPERATIONS MARK PILLING BEIJING

JetBlue to start analysing larger twins for long-haul

Low-cost carrier embarks on preliminary studies for widebodies on Latin American routes

US low-cost carrier JetBlue Airways is in the early stages of studying the acquisition of widebody aircraft to serve longer-haul markets.

Types such as the Airbus A350 and Boeing 787 are under consideration. The timeframe is “2015 and beyond”, said chief executive Dave Barger during IATA’s annual meeting in Beijing earlier this month.

“We are looking at larger aircraft, especially out of New York and especially Latin America. There is already plenty of service to Asia and Europe,” he says.

However, the carrier will not rush into widebody operations. “You have to earn the right to grow,” Barger says. “It would be a big change of business for a company like us.”

JetBlue’s position as the largest carrier at New York JFK means it has the position to exploit longer-



A320s and Embraers form the basis of the low-fare airline’s fleet

haul services. About 28% of its capacity will be devoted to Caribbean and Latin services by the end of the year, says Barger. “Latin America has been a terrific market for JetBlue and larger airplanes would earn their way into the network.”

JetBlue has already committed to slightly larger jets with an order for 30 Airbus A321s, which it will start to introduce next year. ■



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INVESTIGATION DAVID KAMINSKI-MORROW LONDON

Distracted crew let Q400 descend towards terrain

Pilots of a Flybe Bombardier Q400 allowed the aircraft to drift below its glidepath after becoming distracted by an electrical failure that had affected the captain’s displays.

It descended to about 700ft (210m) above terrain, while still 8nm (15km) from the runway, before the ground-proximity warning system ordered the crew to pull up.

The Q400 had been conducting an instrument landing system approach to Exeter’s Runway 26 on 11 September 2010. Its autopilot was engaged and the aircraft had been descending to a selected altitude of 2,600ft.

At about 3,300ft the engine display indicated a processor failure. While the first officer’s primary displays remained normal, the

captain’s showed absent speed bugs and minimum descent altitude setting.

The captain tried various techniques to restore the display, including switching the air-data computer source before reverting to the original when this failed to

The ground-proximity warning system issued a terrain alert, prompting the two pilots to look up

have an effect. However, the UK Air Accidents Investigation Branch says that this reversion, by design, cancelled all previously-selected flight-director

modes – including the altitude selection. This deactivation “went unnoticed” by the crew, it adds, and the effect was to allow the Q400 to descend through its cleared level.

“While attempting to resolve an unfamiliar failure which had resulted in unexpected cockpit effects, both pilots became distracted from the primary roles of flying and monitoring the aircraft,” it says.

Having failed to capture the cleared altitude the aircraft continued to descend until the ground-proximity warning system issued a terrain alert – prompting the two pilots to look up – followed a few seconds later by a “pull up” command.

There had been no action to correct the flightpath before the

warning, suggesting the pilots were “not aware of the extent of the deviation” and were not monitoring the Q400’s track or its flight-mode annunciator, says the AAIB.

It adds that the crew did not follow standard procedures after the terrain warning.

The AAIB points out it has investigated two previous incidents involving Flybe Q400s, in which the aircraft descended below their cleared level during approach owing to inappropriate mode selection and inadequate annunciator monitoring.

Flybe, which gave the pilots additional training before returning them to duty, has since introduced a new flight-operations monitoring programme involving observers in the cockpit. ■



**Tulpar Technik nets
Bombardier's
Russian MRO work**
AIR TRANSPORT P12

OPERATIONS DAVID KAMINSKI-MORROW LONDON

BA drops finance hint as it separates premium transatlantic A318 service

British Airways has established a subsidiary through which to operate its premium transatlantic services from London City Airport – a decision that appears linked to possible additional financing.

The new subsidiary, British Airways Limited, is securing its own air operator's certificate and operating licence. It will operate the two Airbus A318s in the fleet under a wet-lease arrangement with British Airways.

BA is reluctant to discuss the decision, but says: "We are in the process of exploring a variety of options related to potential new sources of finance."

The new subsidiary has emerged from a previous company established under the name Acoperco on 14 March.

In the same month, the UK Civil Aviation Authority disclosed that the company had formally applied for operating and route licences.

Acoperco then changed its name on 17 May to British Air-



Two Airbus jets fly the all-business London City-New York route

ways Limited, and appointed BA chief executive Keith Williams and chief financial officer Nick Swift as directors, according to the company's regulatory documents.

BA has informed the US Department of Transportation that it is deleting the A318s from its own air operator's certificate and transferring them to the new certificate of British Airways Limited. It had sought US clearance

for the change by 11 June. It has also sought clearance for British Airways Limited to code-share with Oneworld partners Iberia – BA's corporate sister – and American Airlines on the 32-seat A318 routes.

While the call-sign of the new operation has formally been changed to "Gherkin", in practice the flights will still use the "Speedbird" identifier when conducting the BA services. ■

LEASING

Hazy waits for fine-tuning to improve A350

US lessor Air Lease is intending to acquire the Airbus A350 at some point, but has yet to be satisfied over the specifications of the twinjet family.

Chief executive Steven Udvar-Hazy says the weight of the type has "crept up" – with the precise figure depending on buyer-furnished equipment – and adds: "We're watching that."

Performance guarantees remain an obstacle to its committing to the type. Hazy helped sway Airbus away from its original A350 concept but, while the redesigned version is likely to find its way into Air Lease's fleet, he says: "We don't want to be at the front of that programme."

He expects Airbus to introduce a weight-saving scheme for the A350. Hazy says his attention is primarily on the A350-900 and -1000, highlighting Airbus's efforts to promote the larger family members. He adds that the smaller -800 seems to be "fading into the sunset". ■

MANUFACTURING STEPHEN TRIMBLE WASHINGTON DC

Surge line for 787 remains at trickle

Everett production ramp-up facility for Boeing twinjet to retain post-assembly modification role at least until fourth quarter

Boeing has quietly postponed until at least late September its activation of an already-constructed surge line set up for building more 787s in Everett, Washington.

The surge line inside Building 40-26 has figured large in discussions about Boeing's plan to ramp up 787 production from about 3.5 per month to 10 per month by the end of next year.

Boeing says construction of the surge line is complete, but the airframer will not use the space for production of new 787s for several months.

"Our plan is to utilise the surge line space for change incorpora-

tion aircraft throughout the summer months," Boeing says.

Dozens of 787s have been produced, but cannot be delivered until they complete the change incorporation process. Boeing recently rolled out the first 787 to bypass change incorporation, for later delivery to Air India. But the first 65 787s that rolled off the line change incorporation before pre-flight operations.

Boeing will continue delivering clean 787s from two assembly lines in Everett and Charleston, South Carolina.

The surge line will focus during the third quarter on completing post-assembly modifications

to the aircraft awaiting delivery. "We will activate the [surge] line later this year to support production in the [fourth quarter]," Boeing says.

The surge line will be engaged as Boeing makes its next step-change in production output. All three assembly lines are scheduled to deliver a combined five 787s every month by the end of this year, then support a doubling of monthly output again within the next months.

The concept for the surge line was originally intended to mitigate the risk of further production delays. Boeing is simultaneously starting up a new assembly line

in Charleston, completing development of the 787-9 variant as it takes production to 10 aircraft/month over a two-year period, starting from late 2011.

It expects combined output from Charleston and the surge line to yield three 787s by the end of 2013.

Indonesia's Lion Air has become the latest operator to select the 787, having signed a commitment to take five of the type for its premium carrier, Batik Air. The latter is to launch services in 2013 with 737-900ERs on domestic and regional routes, and had been hoping to introduce long-haul types by 2015. ■



TURBOPROPS STEPHEN TRIMBLE WASHINGTON DC

Q400 approval opens Russian market

Airframer forecasts total market in the region for 460 70-seat airliners in next 18 years, or one-fifth of all European demand

Bombardier will increase its focus on selling commercial turboprops in Russia after securing aircraft type approval for the Q400. On 7 June, Russia's Interstate Aviation Committee awarded a type certificate for the Q400 in Moscow, with Bombardier ex-

ecutives joined by Canada's ambassador to Russia, John Sloan, and Ed Fast, Canadian minister of international trade.

Although Russian certification of a type that entered commercial service 12 years ago is largely a formality, the event is a key

milestone in Bombardier's marketing strategy. The airframer notes the 50-seat CRJ100/200 received type approval in Russia in 2006, and has since seen demand increase "significantly" in Russia, Belarus, Georgia, Armenia and Kazakhstan.

For the past year, Bombardier has been seeking to tap into non-traditional markets for its commercial aircraft products following a dismal sales year in 2010, when only seven Q400s were ordered globally.

Bombardier has never sold a new Dash 8-series turboprop – such as the Q200, Q300 or Q400 – to a Russian operator, although SAT Airlines has acquired used Q200s and Q300s.

SALES FORECAST

However, the airframer's long-term forecast projects that Russian and former Soviet bloc airlines will buy 460 70-seat airliners during the next 18 years, or one-fifth of all European demand. Airlines in Russia and former Soviet states already operate 800 commercial aircraft in the 20- to 149-seat category.

For these orders, Bombardier faces competition from a familiar rival – the ATR 72 – which has also entered service in the Russian market with UTair.

Bombardier can also expect competition from domestic manufacturers. Antonov continues to build An-140s and Ilyushin has introduced the Il-114 in the same market sector, although both regional turboprops have struggled to win new orders. ■



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Kazan-based airline Ak Bars Aero operates nine leased Bombardier CRJ200 regional jets

MAINTENANCE TOM ZAITSEV MOSCOW

Tulpar Technik nets Bombardier's Russian MRO work

Russian maintenance specialist Tulpar Technik has gained approval from Bombardier to provide support for its aircraft types in the country.

Michael McAdoo, Bombardier vice-president international trade, inspected Tulpar Technik's facility in Kazan earlier this month, where he met with the company's management and personnel.

McAdoo says eight Russian main-

tenance, repair and overhaul providers had sought to gain approval to maintain the growing number of Bombardier aircraft in service with local operators.

He says there are more than 100 Bombardier aircraft, including CRJ200s and business jets, in use by Russian customers.

Kazan-based Ak Bars Aero has nine leased CRJ200s, with a further

12 scheduled for delivery, while charter carrier Tulpar Air, which is affiliated with Tulpar Technik, has operated Bombardier corporate types since 2007.

Azat Khakim, Tulpar Group chairman, says its interior refurbishment division also expects to receive the manufacturer's approval to perform passenger cabin fit-outs on Bombardier types. ■

POWERPLANTS TOM ZAITSEV MOSCOW

Aviadvigatel begins tests on rival MS-21 powerplant

Russian engine designer Aviadvigatel has started testing a technology demonstrator of its PD-14 powerplant for the Irkut MS-21 twinjet.

The first series of bench tests will cover systems integration and function and reliability trials, says Aviadvigatel.

It adds that seven domestic manufacturers have supplied key

components for the test engine, with the largest input from Perm Motors, which delivered a high-pressure turbine, a compressor stator and a combustor.

The PD-14 conceptual design envisages developing three engine models with thrust of 27,600-34,400lb (123-153kN) to power the three-aircraft range.

Aviadvigatel does not rule out

the development of an enhanced model – which has been dubbed the PD-18P – to equip the Tupolev Tu-214 and Ilyushin Il-96-300 passenger aircraft as well as the Il-96-400T freighter.

Aviadvigatel director general Alexander Inozemtsev says the project participants have invested heavily to supply the programme: "In particular, Perm Motors has

invested €15 million [\$18.8 million] in building a special facility to apply ceramic coating to parts in the engine hot section."

Aviadvigatel is also seeking an international supplier of composite nacelles for the engines.

Pratt & Whitney will also supply its PW1400G engine to the programme, with nacelles produced by Bombardier Belfast. ■

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CONNECTIVITY ANDREW DOYLE LONDON

Thales backs BA with Heathrow site

French supplier opens support office to manage maintenance and repair services for the UK flag carrier's IFE equipment

Thales has opened a support office at London Heathrow airport as part of its deal to supply British Airways with TopSeries in-flight entertainment and connectivity (IFEC) systems for the airline's on-order Airbus A380 and Boeing 787 fleets.

The French supplier will use the London facility, which is leased from BA, to manage maintenance and repair services for the UK flag carrier's IFE equipment, as well as lead TopSeries sales and marketing efforts to UK and Ireland-based airlines. It currently hosts 12 Thales employees, although this could increase to 18.

"We very much have a philosophy in our IFE business that we want to invest in a significant local presence"

ALAN PELLEGRINI
Thales IFEC chief

Although deliveries of A380s and 787s to BA will not begin until next year, the carrier has already equipped about 10 777s with TopSeries IFE.

After selecting TopSeries in 2008, last year BA signed a 10-



British Airways has opted for the Thales TopSeries system on its 24 on-order Boeing 787s

year component repair agreement with Thales under which the airline will repair its own IFE equipment – as well as some systems owned by third-party customers – at its engineering facility in Llantrisant, Wales.

The deal marks the first time Thales has entered into a support arrangement which enables the customer airline to perform maintenance of IFE equipment under subcontract to the manufacturer.

The Thales Heathrow facility, which will oversee BA Engineering's IFE maintenance work, has European Aviation Safety Agency

Part 145 approval. "We very much have a philosophy in our IFE business that we want to invest in a significant local presence," says Alan Pellegrini, chief executive of Thales' IFEC business.

Andrew Musgrave, Thales regional vice-president for the UK and Ireland, says: "The key thing is obviously supporting the BA fleet, but we have other IFE customers that fly into Heathrow, so we see Heathrow as a very important hub in terms of our support and maintenance operation."

Musgrave foresees growth: "What you're seeing is the em-

bryo of an organisation that's going to grow. We are very much focused on Heathrow, and Gatwick is [nearby]."

BA director of engineering Garry Copeland says the support deal with Thales marks "a huge step forward in our partnering with key suppliers".

SUPPORT WORK

He adds: "We're doing something with Thales here that we've never done before, so Thales is embedded in our organisation. We've established a really leading-edge commercial relationship. We've also kept the work in-house and in the UK, which is hugely important for us."

Copeland says BA also aims to expand its third-party IFE support work. "Our aspiration within BA Engineering is to grow our third-party business to 20% of our workload," he says. "It's currently hovering around 14%."

BA has yet to decide whether to upgrade the IFE systems on its Boeing 747-400 and 767-300 fleets, as this will depend on the outcome of its evaluation of the Airbus A350 and future developments of the 777 as potential replacement types, says Copeland. ■

IFE DOMINIC PERRY LONDON

Flybe plans summer trial of free in-flight TV on Embraer jets

UK regional carrier Flybe intends to begin trials of a free wi-fi-based in-flight entertainment system in the "latter part of the summer" on six of its Embraer 195s.

Passengers will be able to access a server pre-loaded with programming via their personal devices such as Apple iPads or laptops.

The carrier is working with "a number of leading entertainment programming providers" to gain access to content, says Simon Lilley, Flybe director of marketing.

However, the majority of this will be geared towards business pas-

sengers, who make up about 45% of its total customers, he adds. Initially passengers will only be able to view pre-loaded content but the service may be extended to allow access to emails or texts. Scheduled to last between three and six months, the trial is designed to test customer response to the service, says Lilley. If it proves successful, it will be rolled out across its fleet of E-195 and E-175 aircraft, he adds.

At present the airline has no plans to offer the IFE on its fleet of Bombardier Q400s given the short sectors typically flown by the turbo-

props, although Lilley acknowledges this could change if there is sufficient customer demand.

Flybe is able to offer the service through its relationship with US company AirDat, which is fitting airborne weather-reporting equipment – including a satcom channel – on its fleet to provide real-time meteorological observations. Customers access programmes on a server provided by USA-based Avionica.

Flybe is equipping the first E-195 with the AirDat system, with 13 more of the type to undergo the modification this year. ■



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ROTORCRAFT

UK helicopter study confirms SAR transition

The UK government has confirmed its plans to end the military provision of search and rescue (SAR) helicopter services by April 2016, and of transferring the Royal Air Force's AgustaWestland Merlin HC3/3A transports to the Royal Navy.

Outlining the conclusions of a Defence Rotary Wing Capability Study, armed forces minister Nick Harvey on 12 June said the Ministry of Defence will focus on the future use of the AgustaWestland Lynx Wildcat and Merlin, Boeing CH-47 Chinook and Westland/Boeing Apache AH1.

Operations with the RAF's upgraded Eurocopter Puma HC2 transports will conclude in 2025. "This offers resilience to the department's lift capability as it transitions to the four core fleets," Harvey says.

The RN's current Commando Helicopter Force inventory of Westland Sea Kings will be succeeded by transferred Merlins, with the RAF to replace their capability using 14 Chinook HC6 transports. Boeing is already under contract to deliver the new-build aircraft and an initial five-year package of in-service support for approximately £1 billion (\$1.5 billion).

Harvey says the tri-service capability study "identified opportunities in training and support as the most promising areas to achieve rationalisation and efficiencies. This includes making better use of simulated training and adopting a simpler approach to procurement and alternative models for support".

Military provision of SAR cover for the UK and Falkland Islands will end with the 2016 retirement of the Sea King, with the Department for Transport to be responsible for the selection of a private contractor to perform the role. ■

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DEVELOPMENT CRAIG HOYLE LONDON

Airbus Military puts A400M fleet reliability to the test

Production-standard transport MSN6 enters 300h period of long-duration flights

Airbus Military has launched a delayed programme of function and reliability (F&R) testing of its A400M transport, with development aircraft MSN6 having begun the activity on 2 June.

Flown from Toulouse, the sortie marked the start of an intensive period of work using the European manufacturer's production-standard test asset. Nine flights had been completed by 13 June, including a 7 June sortie during which all five "Grizzly" development aircraft were briefly flown in formation for the first time.

MSN6 must accumulate 300h during long-duration flights, expected to last between 6h and 10h each, to demonstrate the reliable operation of the A400M's equipment and systems before Airbus Military can secure full civil type certification from the European Aviation Safety Agency. It hopes to complete the activity late this month, and receive certification



All five "Grizzly" development aircraft flew together on 7 June

approval during July. The company had planned to begin the F&R activity earlier this year, but this was delayed by several weeks after a vibration problem required one of MSN6's Europrop International TP400-D6 turboprop engines to be replaced.

First flown in December 2011, the aircraft had made only 19

flights totalling 77h by mid-May, the manufacturer says.

After completing its reliability test flights, MSN6 is due to appear at the Royal International Air Tattoo and Farnborough air show in the UK during July. ■



For regular updates about the A400M programme, visit flightglobal.com/dewline

ACQUISITIONS

Refurbished aircraft carrier begins sea trials as Indian navy eyes Rafale

Russia has commenced sea trials involving the Indian navy's refurbished aircraft carrier the INS *Vikramaditya*, as sources suggest the service could consider a future acquisition of the Das-

sault Rafale. Originally built for Russia as the *Admiral Gorshkov*, with a maximum displacement of 43,500t, the refitted and modernised vessel left Severodvinsk in the north of the country on 8 June

for open-sea trials. To be capable of carrying up to 34 aircraft, including RSK MiG-29K fighters, it should be delivered to the Indian navy in December.

Sources say the service is considering the carrier-capable Rafale M as a possible future acquisition, with a cost benefit to come from the Indian air force's pending deal for 126 of the type.

Already operational with the French navy, the Rafale M could potentially be operated from India's future ski-jump-equipped domestic aircraft carriers and offer a greater operational capability than the MiG-29K and the Aeronautical Development Agency's Tejas naval fighter. ■



INS *Vikramaditya* will be capable of carrying up to 34 aircraft



USMC puts faith in Harrier shelf life
DEFENCE P18

UNMANNED SYSTEMS DAVE MAJUMDAR ST LOUIS

Boeing hones design of its UCLASS candidate

Boeing is "very close" to what it considers to be a competitive design for the US Navy's unmanned carrier launched surveillance and strike (UCLASS) aircraft programme, says Chris Chadwick, president of the airframer's military aircraft division.

While the USN has yet to issue a request for proposals, Chadwick says Boeing already has a good idea of what the service's needs might be, having learned from its experience with the X-45C/Phantom Ray design and unmanned demonstration efforts involving the F/A-18.

"It's not a warmed-over X-45, but it has really learned from the X-45 and [Northrop Grumman] X-47 and other unmanned products that we have," he said at Boeing's St Louis site in Missouri, referring to the company's obser-

vation of its rival's X-47B unmanned combat aircraft system-demonstrator. "All of that is flowing into our design."

Speaking in March, USN programme manager Charlie Nava said technology from Northrop's X-47B, which includes government-owned hardware, software and aircraft-ship interfaces, will be harvested for the UCLASS effort. Nava added the service would allow all potential contractors to access that information.

Boeing expects the navy to issue a solicitation for the UCLASS requirement "later this summer". The service is seeking to have the system in limited service or at least operational assessment by 2020. ■

For more about unmanned air vehicle operations, visit flightglobal.com/uav



The RAAF will fly 10 Spartan tactical transports from 2015

PRODUCTION LUCA PERUZZI GENOA

Alenia boss looks to build on C-27J's Australian victory

Italian company already seeking further orders to continue twin-turboprop airlifter line until at least late this decade

Australia's recent order for 10 C-27J Spartan tactical transports will keep Alenia Aermacchi's production line active until the middle of this decade, but the company is actively pursuing further orders, says chief executive Giuseppe Giordo.

Alenia Aermacchi has so far received two contracts following Canberra's 12 May confirmation, with another to be signed soon to bring its overall business value to more than \$500 million.

"We have received contracts from the Australian Department of Defence to provide the capability to operate, maintain, modify and upgrade in-country the C-27J aircraft and its support systems for the long term," Giordo says.

"A third contract, covering training, maintenance and initial logistic support for the first three years, is to be signed soon between Alenia, L-3 Communications and the US government," he adds. The Italian company expects to secure additional business to support such work through-life.

L-3 is prime contractor for Australia's Air 8000 Phase 2 battlefield airlifter programme, and will install US-specific equipment with the new-build C-27Js at its Waco

facilities in Texas. The Australian government has indicated an overall A\$1.4 billion (\$1.4 billion) programme cost for its C-27J fleet. Alenia Aermacchi is now ordering long-lead production items, with deliveries expected from early 2015 to September 2016. Acquired to replace the Royal Australian Air Force's retired de Havilland Canada DHC-4 Caribous, the type should achieve initial operational capability late in 2016.

Giordo says the Australian deal will sustain Alenia's C-27J production line until 2015, but other deals under discussion could extend this until 2018 or 2019.

"With the support of the Italian government, we believe we might receive additional orders from other customers," Giordo says. Any such deals will be negotiated as direct commercial sales, rather than use the US government's Foreign Military Sales mechanism, he adds.

Alenia Aermacchi has so far delivered 49 C-27Js from confirmed orders for 89 aircraft. The remainder will be handed over to Australia, Mexico, Romania and the USA. Meanwhile, it continues to work on proposed command-and-control and armed versions of the type for special operations. ■



Experience from the Phantom Ray will support a future offering

ACCIDENT ZACH ROSENBERG WASHINGTON DC

US Navy probes demonstrator crash

The US Navy is investigating what caused one of its Northrop Grumman RQ-4 broad area maritime surveillance demonstrator (BAMS-D) aircraft to crash in an unpopulated area about 35km (19nm) away from NAS Patuxent River in Maryland during a training flight on 11 June.

"The operator lost contact, and shortly after a manned aircraft in the area confirmed that aircraft was down," the navy says.

Converted from a US Air Force Block 10 Global Hawk to demonstrate technologies for the USN, the destroyed unmanned air vehicle was one of five BAMS-D aircraft. Three remain at Patuxent River, while the other is deployed to the Middle East.

The USN has 68 production MQ-4Cs on order under its BAMS programme acquisition, with the first to be formally unveiled on 14 June. ■



SUPPORT DAVE MAJUMDAR WASHINGTON DC

USMC puts faith in Harrier shelf life

New fatigue monitoring technique and spare parts deal with the UK will enable service to fly on with venerable jump jet

A new way of tracking the fatigue life of the Boeing AV-8B Harrier II and the purchase of vitally needed spare parts from the UK will help the US Marine Corps keep its venerable jump jets in service until 2030, the US Naval Air Systems Command (NAVAIR) says. "The AV-8B is completing transition to a fatigue life expended model of structural fatigue tracking vice a total flight hour model that was used originally," NAVAIR says.

"This model more effectively tracks the structural health of the aircraft by recording actual flight loads experienced, instead of applying a worst case per flight hour service life penalty."

Once the transition is completed, the USMC expects the AV-8B to remain structurally healthy without major modification until



The Marine Corps plans to fly its AV-8Bs until beyond 2030

after 2030, covering the period while Lockheed Martin's short take-off and vertical landing F-35B enters widespread use.

While the Harrier is structurally sound, securing spare parts posed a real threat to the Marines' continued operation of the type. This was partially solved by purchasing 72 surplus BAE Systems

Harrier GR9s, plus spare parts and support equipment, all since transferred from the UK. "Many of these parts are obsolete with no source of manufacture," NAVAIR says. "As a result, the USMC has realised an immediate improvement in readiness." The USMC says it never had any intention of flying the British aircraft.

Other efforts include entering into new contracts to improve overhaul of parts and long-term agreements for the supply of consumables, NAVAIR says. The USMC is also trying to keep the Harrier's avionics relevant to 2030.

"Continuing modernisation of the AV-8B is a must to reach the out-of-service date, both from a mission systems combat relevancy perspective and a survivability perspective," says Maj William Maples, Harrier requirements officer at USMC headquarters.

Funded enhancements during the next four years include improvements to the type's operational flight programme and navigation equipment, and a digital cockpit recorder. ■



For more stories each week from the defence sector, go to flightglobal.com/defence

ORDERS

Nordic pair pick AeroVironment for UAS deals

The armies of Denmark and Sweden are to acquire Puma All Environment (AE) small unmanned air systems under separate deals with US manufacturer AeroVironment.

Worth \$9.6 million, Denmark's purchase covers an unspecified number of air vehicles and equipment, and follows a contest with Elbit Systems' Skylark.

AeroVironment says its deal with Sweden's Defence Materiel Administration comprises "12 hybrid small unmanned aircraft systems". This includes the Puma AE and Wasp micro air vehicle, plus common ground control stations, training and logistics support. Stockholm has options to later increase the procurement to a total of 30 systems, it adds. ■



For more about unmanned air vehicle operations, visit flightglobal.com/uav

MODIFICATION JIM WINCHESTER LINKÖPING

Saab revives 340 airliner in low-cost maritime surveillance aircraft guise

Saab has unveiled a new maritime surveillance aircraft (MSA) based on its 340 regional airliner, which it says could be acquired for about \$20 million.

Revealed at the company's Linköping site in Sweden on 31 May before its first flight in the new configuration, 340B+ demonstrator SE-MCG has been equipped with a Telephonics 1700B synthetic aperture radar and forward-looking infrared sensor beneath its fuselage. Japan's coastguard already operates four similarly configured aircraft, but with different internal equipment.

The 340 MSA is being aimed at coastguards, police or militaries with maritime surveillance responsibilities. Basic endurance is cited as being 6.5h, but could be increased to 8h with the addition of auxiliary fuel tanks.

Onboard systems can be monitored by a single operator, al-



Auxiliary fuel tanks could boost the 340 MSA's endurance to 8h

though Saab says more operators and functions can be added, including transport, medical evacuation and environmental sensor equipment or disposable sensors.

Saab is offering to convert airframes reaching the end of airline service and completely re-life them. Most of the 462 Saab 340s built were completed in the late 1990s, and the majority are

still in operation. The company foresees a worldwide market for between 50 and 100 of this type of aircraft in the next 15–20 years. Its MSA demonstrator – which was built in 1998 and operated by Mesaba Airlines in Northwest Airlink colours until 2011 – will make its first public appearance at the Farnborough air show in July. ■

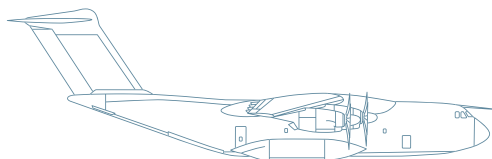
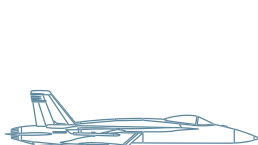


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IN BRIEF

WEST STAR TRIO

US maintenance, repair and overhaul company West Star Aviation recently accomplished the “big three” on a Dassault Falcon 2000 by installing Aviation Partners blended winglets, performing a wing tank dry bay modification and completing the large cabin aircraft’s first 3C inspection – an 18-year check which includes complete disassembly of the exterior, a full interior refurbishment and a full repaint of the aircraft.

JET EDGE G200

Jet Edge International has expanded its fleet with a wi-fi-enabled 2008-built Gulfstream 200. The super midsize business jet – registration N94FT – is the third G200 in Jet Edge’s fleet.

SIGNATURE PICKS ATP

Signature Flight Support has added ATP Jet Center at Daytona Beach International airport, Florida to its Signature Select fixed-base operations (FBO) network. Signature Select comprises independent FBOs which adhere to Signature’s systems, service and safety standards, as well as training, sales and marketing processes.

CANADIAN DEBUT

Embraer’s Legacy 650 large cabin jet made its debut at the Canadian Business Aircraft Association convention on June 13-14 in Toronto. The Brazilian airframer operates an entry-level Phenom 100 in Canada. Its Phenom 300 light cabin stablemate is earmarked for Canadian certification shortly, leading to first delivery this year.

COMPUTER UPGRADE

StandardAero has received US approval to upgrade Mark V enhanced ground proximity warning system computers for the Dassault Falcon 50, 50EX, 900 and 900EX with Honeywell’s SmartRunway and SmartLanding runway safety package, which predicts potential conflict on a flightpath.

SEAPLANES KATE SARSFIELD LONDON

Three-way scrap for Dornier Seastar assembly contract

Canada, India and China on the shortlist to construct twin-engined amphibious turboprop

Dornier Seawings plans to select the final assembly base for its Seastar CD 2 twin-engined amphibious turboprop in the third quarter of this year and will deliver the first of the 12-passenger aircraft 33 months later.

“We have got a shortlist of three candidates with whom we are in an advanced stage of discussion,” says Dornier Seawings chairman Conrado Dornier.

“The choice is between bases in Quebec, Canada – the most advanced of the three options – China and India. We are talking with three prospective partners in those countries who will also help to fund the programme.”

Dornier says it will not launch production until all the funding is in place. “We are looking at \$100 million,” he says. “The Canadian government has pledged a large part of that investment if we select Quebec, but the Indian and Chinese companies are also looking to team up with the Dornier family to jointly own the programme and bring the Seastar to market.”

The Pratt & Whitney Canada PT6A-135-powered Seastar was originally unveiled in the early 1980s, but production was halted in 1991 because of a shortage of funding. “We made a number of subsequent attempts to restart production but these failed,” says Dornier. “The Seastar already has European and US certification, so we plan to deliver the first 20 aircraft in the Seastar’s original



Production of the Seastar CD 2 was halted in 1991

round dial configuration. It will also be fitted with a collision warning system for which we will be seeking supplemental type certification.”

“We forecast a market for between 350 to 500 Seastars between 2015 and 2025”

CONRADO DORNIER
Chairman, Dornier Seawings

Subsequent aircraft will be fitted with a glass cockpit, known icing capabilities, autopilot and air-conditioning, for which Dornier will also need an STC. Dornier has received 14 firm orders and 32 letters of intent for the \$6 million Seastar to date. “We forecast a market for between 350 to 500

all composite Seastars between 2015 and 2025 and plan to build up to 50 aircraft a year,” says Dornier. Asia is expected to account for about half of the demand. “There are tremendous opportunities [in Asia] as the infrastructure lends itself to seaplanes. China is an exciting market as it has just opened up the lower airspace to general aviation traffic. There is a large amount of water here and airport infrastructure isn’t great,” says Dornier.

The Eurasburg, Germany-based company is targeting the Seastar at four sectors: commercial operators for island-hopping, governments for special missions, high-net-worth individuals, and corporations for use as shuttles. ■



For more information on the seaplane market, visit
flightglobal.com/seaplanes

CONTRACT KATE SARSFIELD LONDON

Weston steals in at Robin Hood

UK business aviation services provider Weston Aviation has been awarded a contract by Peel Airports to operate a fixed-base operation (FBO) at Robin Hood airport, Doncaster, taking its portfolio of UK FBOs to four.

Weston Aviation will also develop business aircraft charter and cargo operations at the airport when its facility opens on 9 July.

“When we opened our first location in 2002, our strategy was to establish quality FBO services at de-

veloping regional airports where there were no such services,” says company founder Nick Weston. “Now we want to take the company to the next level and bring our services to a larger, established, 24-hour operational airport.” ■



NASA nets spare
spy 'scopes but
faces funding gap
SPACEFLIGHT P23

RESEARCH KATE SARSFIELD LONDON

Aerion, NASA target more efficient supersonic flight

Nascent supersonic business jet (SSBJ) developer Aerion is collaborating with the NASA Glenn Research Center in Cleveland, Ohio, to increase the efficiency of engines during supersonic flight.

The partners are working together to mature the agency's new supersonic inlet (Supin) computer code. The software has been developed to perform aerodynamic design and analysis on engine inlets for high-speed aircraft such as Aerion's proposed 12-passenger SSBJ.

Under the arrangement, Aerion and NASA will collaborate on inlet design and advanced boundary layer control methods to achieve efficient and stable supersonic inlet operation without



Aerion seeks a risk-sharing airframer to construct its SSBJ

the need for boundary-layer bleed. A no-bleed inlet would also reduce the "cost and complexity" of engines, says Aerion.

Collaboration with NASA on its Supin code began earlier this month and is expected to last a year. It extends Aerion's existing

relationship with NASA. "Both partnerships could pay dividends for years to come in the form of faster and more efficient flight," says Aerion chief technology officer Richard Tracy.

The Reno, Nevada-based company's ongoing collaboration

with the NASA Dryden Flight Research Center in southern California will result in another round of supersonic flight tests of an Aerion test article on board a NASA-owned Boeing F-15B this quarter.

These additional flights are intended to evaluate supersonic boundary layer transition properties as they relate to manufacturing standards for surface quality and assembly tolerances.

Aerion says the two projects represent "vital elements" in its plan to design the world's first SSBJ. Aerion continues to seek a risk-sharing airframer to construct its Mach 1.6 aircraft. ■



More on supersonic business jet development programmes at flightglobal.com/ssbj

ENVIRONMENT DAVID LEARMOUNT LONDON

NBAA chief brands EU green scheme as 'discriminatory'

US Senate committee told business aviation singled out by emissions trading system

US National Business Aviation Association president Ed Bolen has claimed in front of a Senate committee that the EU's unilaterally adopted emissions trading system (ETS) particularly discriminates against the business aviation community.

Meanwhile, the European Business Aviation Association's May figures for business aviation activity in the EU show it to be 6.3% down on the same month last year. The EBAA blames part of that slump on the aggressive European attitude to aviation taxes.

Bolen told the Senate Committee on Commerce, Science, and Transportation that the ETS "singles out a great American industry for discriminatory treatment". He added: "As badly as commercial airlines are treated, non-commercial aviation is treated even worse."

EBAA president Brian Humphries points out that airlines are allocated a 10,000-tonne carbon

dioxide emission threshold before they are liable for any ETS payment, but non-commercial aviation has no threshold at all even though its aircraft are smaller and emit less.

Bolen told the committee an airline can fly from Chile to Europe twice a day using a wide-

"The ETS raises serious privacy and business confidentiality concerns"

ED BOLEN
President, NBAA

body jet without being subjected to the ETS, because commercial carriers that operate only two flights per day to or from Europe have been deemed "small emitters", and thus are exempted from the scheme.

Bolen added: "Yet a US-based farm equipment company that flies to Europe once a year on a US-built [business aircraft] will be subjected to the ETS."

Humphries points out that business aircraft are not, at present, allocated a "small emitter" exemption category like the airlines are, even though business jets are small emitters in relative terms.

Bolen told the Senate committee the ETS also creates a costly administrative burden for US-based business aviation operators "that raises serious privacy and business confidentiality concerns, because the scheme requires US companies to provide sensitive data, including bank account information, flight data, personal information and other disclosures", which would then be in the public domain. ■



More on the European Union's emissions trading scheme at flightglobal.com/eu-ets

ONLINE BOOKING

PrivateFly to spread wings in central Europe

UK online business aircraft booking service PrivateFly has expanded into France, Germany and central Europe, where it says it has begun offering dedicated local web platforms and multilingual operations.

The expansion follows a record-breaking sales month in May for the St Albans-based company, which also relaunched its UK website in April, with a dedicated Apple iPad app. "Translated and localised versions of the platforms are being supported by sales and marketing activities to develop tailored customer communications across each new market," says PrivateFly.

Chief executive Adam Twidell says the push is initially on established French and German markets. "We are also focused on central European countries which are experiencing greater growth in demand, such as Poland, which saw 13% annual growth in business aviation traffic in 2011. We will extend our reach to other countries later in the year." ■

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Mastering
complexity
BUSINESS P24

OBSERVATION ZACH ROSENBERG WASHINGTON DC

NASA nets spare telescopes but faces funding gap

Space agency unlikely to be able to use the equipment in short term as other projects eat up available budget

The US National Reconnaissance Office (NRO), which builds and operates US spy satellites, has donated two spare, unused telescopes to NASA. However the agency admits budget constraints will limit their use in the short-term.

With a 2.4m (7.9ft) aperture, they are almost identical to the celebrated Hubble Space Telescope launched in 1990, but are smaller and provide a wider field of view, earning them the nickname "stubby Hubbles".

Called simply Telescopes A and B, they are in storage in a clean room at a facility in Rochester, New York belonging to US aerospace and technology company ITT Excelis.

One of the two is officially space-qualified, meaning it has undergone rigorous tests to ensure it will be operable in space.

Although the lenses and control mechanisms are complete, the telescopes lack some major components, including cameras and control software.

Originally constructed in the late 1990s and early 2000s, the NRO will neither identify the programme for which they were intended or why the telescopes were never completed.

However, observers believe the telescopes are likely to have come from the cancelled Future Image-ry Architecture programme.

NASA has had official possession of the telescopes for 18 months, the agency says, and has been using the time to assess their viability. Agency personnel working on the project say the telescopes are well-suited for use on astronomy's top priority, the wide-field infrared survey telescope (WFIRST).

The former NRO telescopes are

significantly more capable than NASA's previously planned WFIRST, but have not been officially dedicated to the programme. "[Use of] the telescopes would eliminate about one-third of the cost of starting from scratch," NASA points out.

Despite the significantly lower cost, NASA has precious little resources with which to finish and launch the telescopes. The majority of its spending has been committed to the Space Launch System launch vehicle and the James Webb Space Telescope (JWST).

Originally constructed in the late 1990s and early 2000s, the NRO will neither identify the programme for which they were intended, or why the telescopes were never completed

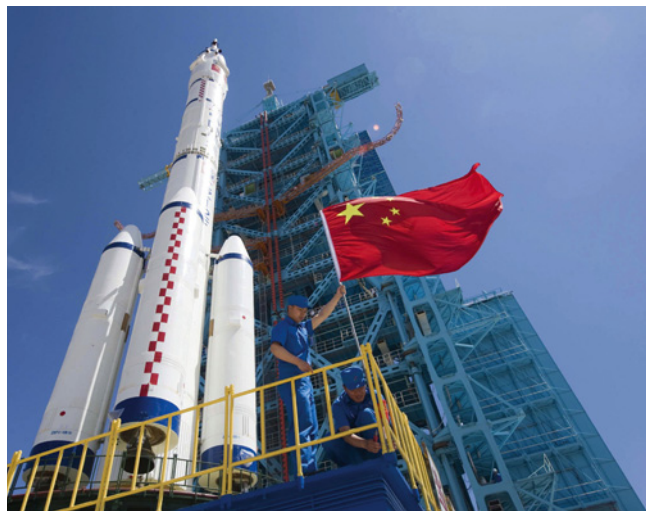
"There is no budget," says NASA. "The earliest we'd be able to work with these would be the middle of the next decade, after JWST is launched."

Although details are classified, the US military space budget, which funds the NRO, is widely acknowledged to be significantly greater than NASA's.

The NRO is in the middle of a particularly active launch schedule, with one classified satellite launched so far in 2012 and three more launches scheduled before the end of the year. ■



News from the spaceflight sector is on our reactivated blog at flightglobal.com/hyperbola



China Manned Space Engineering Office

Much larger versions of the Long March rockets are planned

MANNED SPACEFLIGHT ZACH ROSENBERG WASHINGTON DC

Ambitious plans drive China's latest launch

China is poised to launch its third manned space mission, sending a crew of three to conduct the nation's first manned docking with its Tiangong-1 space station. Reports from China indicate two of the three crew members are female, which would make them the first Chinese women in orbit.

As *Flight International* went to press, the Shenzhou-9 capsule remained on top of a Long March 2F rocket on the launch pad at Jiuquan in central China ahead of a likely 16 June launch window. As is typical of the Chinese space programme, neither an exact launch date nor detail of the crew has been officially announced.

The rocket was reportedly rolled to the pad on 10 June, after one month in a nearby preparation facility.

This launch comes on the heels

of a successful November 2011 unmanned flight, in which a Shenzhou capsule docked repeatedly with Tiangong using on-board automation.

The manned mission, however, will manually dock with the space station. The crew will reportedly spend 10 days in space before landing in the Gobi Desert.

China is executing what may be the world's most ambitious space programme, with plans to launch sample return missions to the moon and probes to Mars, while lofting a significantly larger, permanently habitable space station by 2020.

It is also constructing much larger versions of its Long March series of rockets, capable of launching significantly greater payloads into orbit. China is only the third nation to launch people into space. ■

PROGRAMMES

GEMS rocked by budget black hole

NASA has cancelled its Gravity and Extreme Magnetism Small Explorer (GEMS) programme, a relatively small satellite meant to study black holes.

Originally scheduled for launch in 2014, the mission's

budget was capped at \$119 million. Once it became clear the cost would exceed that level, the programme's fate was sealed.

Roughly \$50 million has been expended on the GEMS programme so far. ■



Good week

SPACE TOURISM The route to the stars got shorter as Xcor – the Mojave-based fuel pump specialist developing its Lynx runway take-off and landing spaceplane concept – extended its relationship with Space Expedition Corporation, which in addition to selling Lynx suborbital flights from Curacao is now booking seats from Mojave Spaceport – only an hour's drive from Los Angeles. The pair claim to have sold 175 flights, at a published price of \$95,000.



Xcor



roundtable on AirSpace

QANTAS The Australian airline is taking precautions against hostile takeovers after its share price dropped more than 30% following a dismal profit forecast on 5 June. Measures include the appointment of financial services company Macquarie Group to advise the Oneworld alliance member, says a Qantas spokesman. The carrier has also appointed Citigroup to monitor the Qantas share register for signs of a corporate raider accumulating a stake.

Bad week

MANUFACTURING DOMINIC PERRY BRISTOL

Mastering complexity

A substantial investment in composite manufacturing capability is key to GKN's strategy

Considering some see GKN Aerospace's new Western Approach factory, near Bristol, southwest England, as the future of British manufacturing, it lies in fairly inauspicious surroundings.

Rather than the trappings of a high-tech business park – landscaped grounds, sleek, low-rise buildings – Western Approach is geared to support the distribution industry and consists of a large number of identikit warehouses, blank-sided save for rows of loading docks and loitering heavy goods vehicles. In fact, GKN's plant was formerly owned by supermarket giant Walmart and was built with retail distribution in mind. However, the building was never occupied and lay empty for about 18 months before GKN moved in.

ORIGINS

The company has since invested £170 million (\$265 million) to equip the 30,000m² (323,000ft²) plant, described by GKN as “a state-of-the-art composite wing structures manufacturing and assembly facility”. It has been created to build all-composite wing spars for two in-development Airbus programmes, the A350 airliner and A400M military airlifter.

Inside the plant, which officially opened in April, all traces of its warehouse origins are gone. In the manufacturing part of the site sit the mandrels, automated carbonfibre lay-up machines, autoclaves and cutting and machining tools required to construct the wing spars. Thanks to the automated nature of the process, it is significantly quicker than laying-up the composite material by hand. GKN says the automated fibre placement (AFP) machines at the plant can lay up to 16 rows of material at 7-10kg per hour, compared with about 1kg per hour by hand. The hand lay-up process also cannot deliver the consistency and tolerances required, it says.

There are three AFP machines at Western Approach, with a fourth on the way, at a cost of



Dominic Perry

All-composite wing spars for Airbus A350s are built at the factory

about €5 million (\$6.2 million) each. At full capacity – what GKN calls “rate 13”, or producing 13 shipsets per month for the A350 – the machines will use about 20t of carbonfibre material a month.

GKN has made a number of advances in the overall process to allow it to reach rate 13 in five to six years. On the manufacturing side this includes the use of infrared lamps to provide heat during debulking of the carbonfibre components prior to curing. This softens resin in the material, allowing air bubbles to be more quickly removed from the wing spars.

In the assembly hall, the big step forward is to use a moving line. Once the assembled wing spar for the A350 is attached to its 20t jig, it is moved via robotic trolley from station to station. This increases speed and accuracy of the process, GKN argues. For the company, the investment at Western Approach is designed to cement its position as a “super tier one” supplier to the airframers.

Marcus Bryson, chief executive of GKN's £1.4 billion turnover aerospace business, says the company has been working to position itself “at the higher end of complexity where technology starts to take over”. Without that advancement, he says, “there's a huge pressure to commoditise what you do”.

He adds: “Technology is our differentiator. It is now and it will be in future. We get primes coming to GKN because of our exper-

tise. The fact that Rolls-Royce wanted to set up a joint venture with us [for composite fan blades] was because they knew we had the technology, and they didn't.”

Bryson says production of such complex structures are unlikely to become simply a commodity, whereas the components it was manufacturing 15 years ago are the parts currently seeing price pressure and intense competition. “We took that decision to get away from the simple stuff,” he adds.

MACHINING

Composites are not GKN's only area of expertise. Bryson is keen to highlight its competence in metal-lics too – for instance machining the bulkheads on the Lockheed Martin F-35 fighter. “That starts out as \$300,000-400,000 forging and they aren't going to trust a machine shop down the road with that,” he says.

That experience with metal-lics is vital to offering a more rounded approach to problems, he argues. “If you are not careful you get tunnel vision and think that composite is the solution to every problem, but there are instances where metallic can replace composite. Not all brand new aircraft are going to be 100% composite, so we need to make sure we have got the right technology in both camps.” ■



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60 events that
made the jet age
RETROSPECTIVE P26

PEOPLE MOVES

Boeing, Bond Aviation, dnata, Eirtech, Jetcraft, Jviation



Bond Aviation

Mintern: Bond boss

Former Monarch Travel chief operating officer Richard Mintern has joined helicopter operator **Bond Aviation** as chief executive. Prior to Monarch he held positions at Britannia Airways and British Aerospace. Separately, Bill Munro is to step aside as managing director of **Bond Offshore Helicopters**, to be replaced by operations director Malcolm Paine. Bond operates more than 40 helicopters from bases in the UK and Australia, employing 543 people and with a 2011 turnover of £137 million (\$212 million). FAA veteran Donna Taylor has joined aviation-focused planning, engineering

and construction management company **Jviation** as a senior consultant based in Seattle. David Dixon, a former Bombardier Business Aircraft regional VP for Asia-Pacific, has joined aircraft trader **Jetcraft** as president for Asia. At **Boeing**, 787 supplier management VP George Maffeo will succeed the retiring Mike Denton as president for Japan. Gary Morgan, formerly senior VP for UK and Ireland cargo at Menzies Aviation, has joined ground and other air services provider **dnata** as UK chief executive. **Eirtech Aviation** has appointed Andrew Rushton as VP sales.



Jviation

Taylor: Jviation consultant

QUOTE OF THE WEEK

“Africa is ripe for a democratisation of air travel”



ED WINTER, chief executive designate of Fastjet, the low-cost African carrier to be launched by EasyJet founder Stelios Haji-Ioannou, is bullish about the region. Plans moved ahead last week with the \$85.7 million acquisition of Lonrho Aviation by Stelios-affiliated British investment firm Rubicon, which now controls Nairobi-based airline Fly540.

Rubicon

BUSINESS BRIEFS

UTC SHARES ISSUE TO HELP FUND GOODRICH BUYOUT

FINANCE Pratt & Whitney, Sikorsky and Hamilton Sundstrand parent United Technologies Corporation (UTC) is to offer \$1 billion in new shares to help fund its acquisition of Goodrich, a deal expected to close next month and cost UTC \$18.4 billion, including \$16.5 billion in cash and \$1.9 billion in assumed debt. UTC also hopes to raise \$9.5 billion via a bond sale and \$3 billion from the sale of businesses including storied US rocket motors maker Pratt & Whitney Rocketdyne. Potential investors outside of aerospace have been linked to Rocketdyne, which sees its expertise as transferable to strategic industries including solar energy.

HINDUSTAN AERO ‘BUILDING RAFALE FACTORY’

FIGHTERS Hindustan Aeronautics will invest Rs6 billion (\$108 million) in two Bengaluru factories for fighter aircraft and engines. Reports have linked one of the plants to airframes for the medium multi-role combat aircraft India plans to acquire, while the other will produce powerplants. The Indian government and France's Dassault are negotiating a \$10-20 billion deal for 18 flight-ready Rafale fighters and another 108 to be produced by HAL in India.

LOCKHEED MARTIN STREAMLINES SUPPLY CHAIN

ELECTRONICS Lockheed Martin has signed up Arrow Electronics to supply more than 22,000 electronic components used in aircraft and missiles. Lockheed Martin says the deal is its largest with any single supplier for these commodities, and replaces 240 suppliers with a single, national franchised distributor.

IBERIA KEEPING THE LIGHTS ON

DIVERSIFICATION Iberia Maintenance is stepping outside of aero engine work with a licence for its Madrid workshops to inspect and repair Pratt & Whitney GG8 turbines used in power generation. GG8s are based on the Pratt & Whitney JT8D, which powers Boeing MD80-family aircraft and drives 150 electricity plants in Europe.

TURKISH AEROSPACE TO PART-PRIVATISE

INVESTMENT Turkish Aerospace Industries will initiate a part-privatisation in the first quarter of 2013, offering 20% of its shares on the Istanbul Stock Exchange as a “first step” for the \$850 million turnover company, to be followed by purchase of an Airbus or Boeing supplier in Europe or the USA. TAI's main shareholders are the Turkish Armed Forces Support Foundation and the government.

AEROSONIC REVERSES FIRST QUARTER LOSS

MANUFACTURING Florida-based aircraft components maker Aerosonic reversed a \$317,000 loss with a net profit of \$413,000 on sales up 10% to \$7.4 million in its first quarter to 27 April. The company cites the continuing impact of the “ongoing recession in the business jet and general aviation markets” and warns of volatility.

EMBRAER, ZODIAC TO MAKE CABIN PARTS IN MEXICO

REGIONAL JETS Embraer and Zodiac Aerospace will set up a joint venture in Mexico to make cabin interior parts for Embraer 170 and 190 regional jets. No timetable for the venture has been revealed.

OLYMPIC TASK FOR OLYMPIC AIR

SPONSORSHIP Olympic Air is to support the Greece team for the 2012 Olympics with air travel to and from London. Since the beginning of June, Olympic Air aircraft have sported the logo of the Hellenic Olympic Committee.

60 EVENTS THAT MADE THE JET AGE

It is 60 years since the first revenue flight of the de Havilland Comet launched the era of commercial jet travel. To celebrate its diamond jubilee, we look back at 60 of the jet age's defining moments

PHILIP JARRETT LONDON

MAY & AUGUST 1952

The world's first jet airliner revenue services, operated by BOAC Comet 1s, are inaugurated with flights from London Heathrow to Johannesburg and Colombo, followed by services to Singapore and Tokyo in October 1952 and April 1953

APRIL 1954

The Comet 1 is immediately withdrawn from service after G-ALYY breaks up and falls into

the sea south of Naples, with the loss of all on board. This is the fourth Comet accident to involve loss of life

MAY 1955

A prototype of the Sud Aviation Caravelle, France's first jet airliner, makes its maiden flight. It is the first such aircraft to have rear-mounted engines, and its nose is copied from that of the Comet. The type would enter service with Air France and SAS in April 1959

JANUARY 1952

The de Havilland Comet 1, first flown in July 1949, gains the first certificate of airworthiness to be awarded to a turbojet-powered airliner



SEPTEMBER 1956

The Soviet Union's first domestic jet service, using the Tupolev Tu-104, is opened by Aeroflot between Moscow and Irkutsk, following deliveries of production aircraft to the airline in May

OCTOBER 1958

BOAC launches the first fare-paying passenger jet services across the North Atlantic, operating Comet 4s between London and New York, and beating Pan American by some three weeks

OCTOBER 1958

Pan American starts its first Boeing 707-120 services on its New York-London route. Larger than the prototype, the -120 is the first production variant and basic domestic version

APRIL 1959

Caravelle I aircraft belonging to Scandinavian Airlines System become the first of the type to enter service, followed by those of Air France

MAY 1960

Delta Air Lines introduces the Convair 880 Model 22 into service, the prototype having first flown in January 1959. It is followed by the 880-M, designed for intercontinental routes and first delivered to Chinese airline CAT in June 1961

JULY 1960

The Boeing 720, an intermediate-range version of the 707, enters service with United



JULY 1954

The prototype Boeing 707, developed as a private venture, makes its maiden flight. Pan American Airlines places the first order, for six 707-121s, in October 1955

Steve Fiedler



flightglobal.com/airspire

Airlines, the type's major operator. The 720's fan-engined counterpart, the 720B, would enter service in 1961

JANUARY 1962

At Hatfield, UK, the first Hawker Siddeley HS121 Trident medium-range "second-generation" jet airliner makes its first flight. The aircraft is designed to meet a BEA requirement and has three tail-mounted engines

OCTOBER 1962

The Tupolev Tu-124, a scaled-down version of the Tu-104, enters service on Aeroflot's

Moscow-Tallinn route. The type had first flown in March 1960

AUGUST 1963

The prototype of the BAC One-Eleven rear-engined twinjet short/medium-haul airliner, a Series 200 model, makes its maiden flight. In October, it crashes at Cricklade, UK, after failing to recover from a phenomenon known as deep stall, costing the lives of seven crew

FEBRUARY 1964

The first commercial service by a Boeing 727 is inaugurated by Eastern Airlines, on the car-

SEPTEMBER 1959

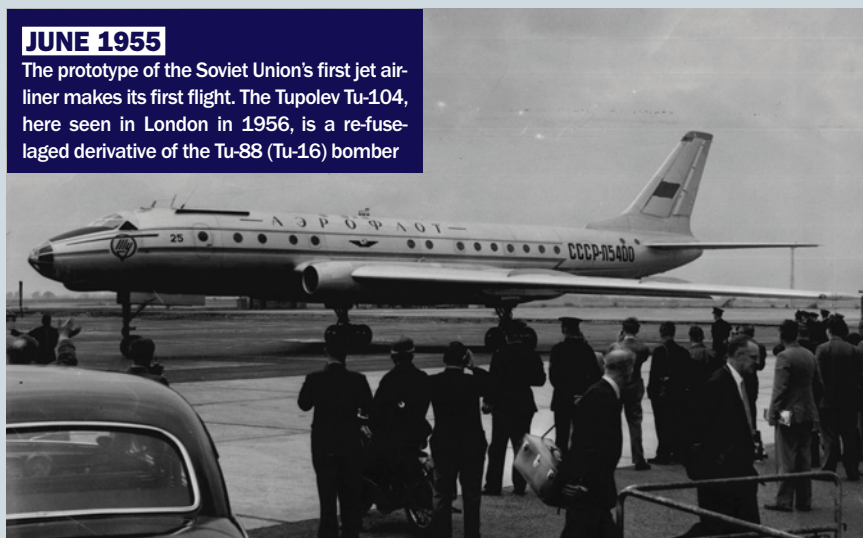
The Douglas DC-8-10 becomes the first model of this airliner to enter service, starting operations with United and Delta simultaneously. The maiden flight of the prototype had been made in May 1958



Raw Features

JUNE 1955

The prototype of the Soviet Union's first jet airliner makes its first flight. The Tupolev Tu-104, here seen in London in 1956, is a re-fused derivative of the Tu-88 (Tu-16) bomber



Raw Features

rier's Miami to Washington Dulles and Philadelphia route. The trijet medium-range airliner had first flown in February 1963

APRIL 1964

The BAC VC10, which had made its maiden flight in June 1962, begins operations on BOAC's service to Lagos, Nigeria

APRIL 1965

The BAC One-Eleven is issued with its UK certificate of airworthiness, and three days later launch customer British United Airways initiates the first commercial services with the type, from London Gatwick to Genoa, Italy

JUNE 1965

The first automatic touchdown on a commercial service is made by a BEA Trident 1C on arrival at London Heathrow from Paris. The first fully automatic landing in fog by a civil aircraft would be made at Heathrow in nil visibility in November 1966

NOVEMBER 1965

Delta Air Lines inaugurates the first McDonnell Douglas DC-9 services, following the maiden flight of the short/medium-haul twinjet's first prototype in February of the same year

JUNE 1966

Hawker Siddeley Trident G-ARPY enters an irrecoverable deep stall and crashes at

JANUARY 1970

The Boeing 747 jumbo is put into passenger service, in its initial 747-100 form, on Pan American's New York-London route, the type having first flown in February 1969



Felthorpe, Norfolk, during its maiden flight. Four crew members lose their lives

MARCH 1967

The Soviet Union's Ilyushin Il-62, a VC10

lookalike, enters national cargo service with Aeroflot – international service, on the airline's Moscow-Montreal route, then follows in September

SEPTEMBER 1967

The first passenger services are flown by the Tupolev Tu-134 T-tailed twinjet, a replacement for the Tu-124. The maiden flight of the Tu-134 had taken place in July 1963

DECEMBER 1968

The Soviet Union becomes the first nation to fly a supersonic transport aircraft when the Tupolev Tu-144 makes its first flight. In May 1970, it becomes the first SST to fly at a speed in excess of Mach 2, attaining 1,336mph (1,160kt)

MARCH 1969

The first prototype of the Aérospatiale/BAC Concorde, the West's first supersonic airliner, makes its maiden flight from Toulouse, followed by the second prototype, which takes to the air at Bristol in April

MAY 1971

The first prototype Dassault Mercure high-capacity twin-turbofan transport makes its maiden flight. Air France subsidiary Air Inter would take delivery of its first Mercure in April 1974

AUGUST 1971

American Airlines and United Airlines begin operations with the McDonnell Douglas



APRIL 1967

The Boeing 737 short-haul twinjet takes off for the first time; by mid-1974 total orders reach 415, most of them already delivered



Fox Features

DC-10 new-generation widebody airliner, first flown in August 1970

APRIL 1972

Eastern Airlines initiates passenger services using the widebody Lockheed L-1011 TriStar, which had made its maiden flight in November 1970



AirTeamImages

MAY 1974

The Airbus A300B2 enters service with Air France on the carrier's London-Paris route



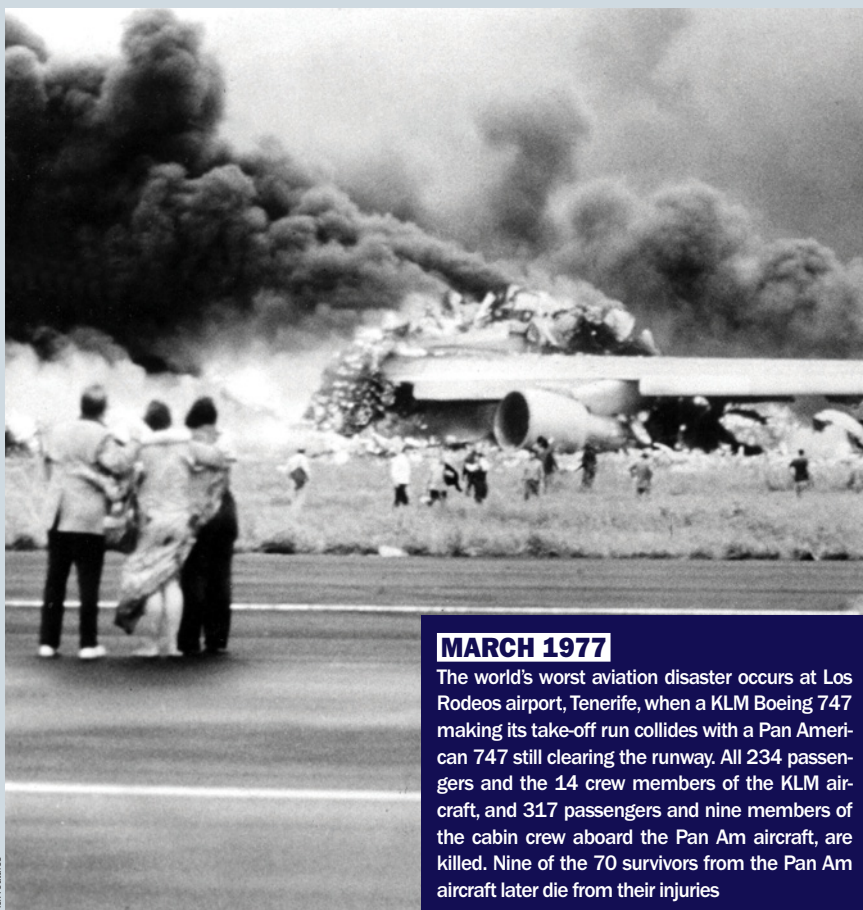
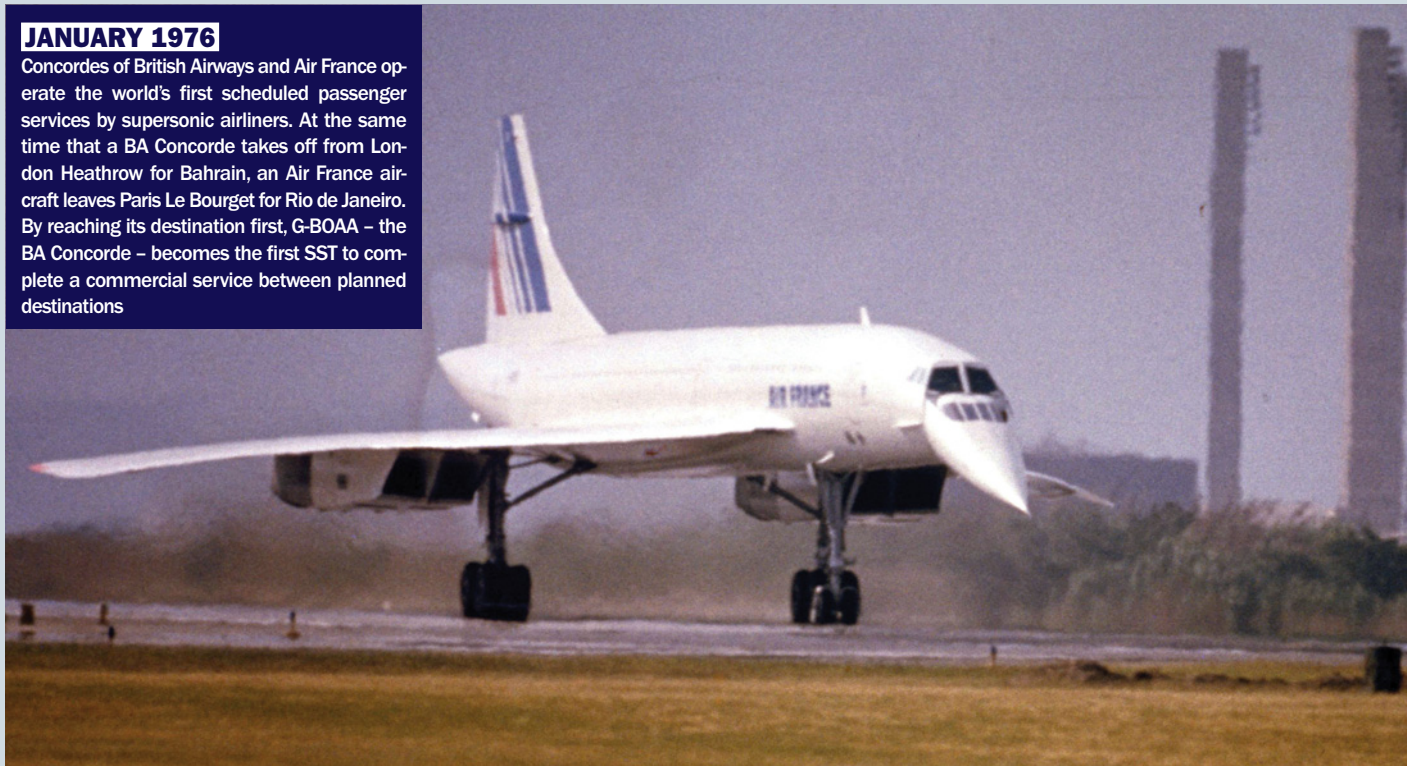
AirTeamImages

FEBRUARY 1972

Aeroflot puts the Tupolev Tu-134 into service. First flight of the trijet had occurred in October 1968. An example is here pictured in 2006

JANUARY 1976

Concordes of British Airways and Air France operate the world's first scheduled passenger services by supersonic airliners. At the same time that a BA Concorde takes off from London Heathrow for Bahrain, an Air France aircraft leaves Paris Le Bourget for Rio de Janeiro. By reaching its destination first, G-BOAA – the BA Concorde – becomes the first SST to complete a commercial service between planned destinations



MARCH 1977

The world's worst aviation disaster occurs at Los Rodeos airport, Tenerife, when a KLM Boeing 747 making its take-off run collides with a Pan American 747 still clearing the runway. All 234 passengers and the 14 crew members of the KLM aircraft, and 317 passengers and nine members of the cabin crew aboard the Pan Am aircraft, are killed. Nine of the 70 survivors from the Pan Am aircraft later die from their injuries

OCTOBER 1972

The first airliner produced by international company Airbus Industrie, the A300B1, makes its maiden flight. The prototypes are followed by the B2, representative of the initial production version

OCTOBER 1980

The McDonnell Douglas MD-80 twin-turboprop short-haul airliner is introduced to commercial service. The prototype had made its first flight in October 1979

DECEMBER 1980

Russia's first widebody, the Ilyushin Il-86 four-turboprop medium-haul airliner, enters service. The first of the type had made its maiden flight in December 1976. Production would end in 1994

JUNE 1982

All four engines of a BA Boeing 747 en route from Kuala Lumpur to Auckland, New Zealand, fail when it flies through the plume of ash and dust from Mount Galunggung, an active volcano that had erupted the previous day. After three engines are successfully restarted, the airliner is safely landed at Jakarta airport

APRIL 1982

The first Airbus A310 makes its maiden flight. Almost exactly a year later, the -200 variant would enter service with Swissair and Lufthansa



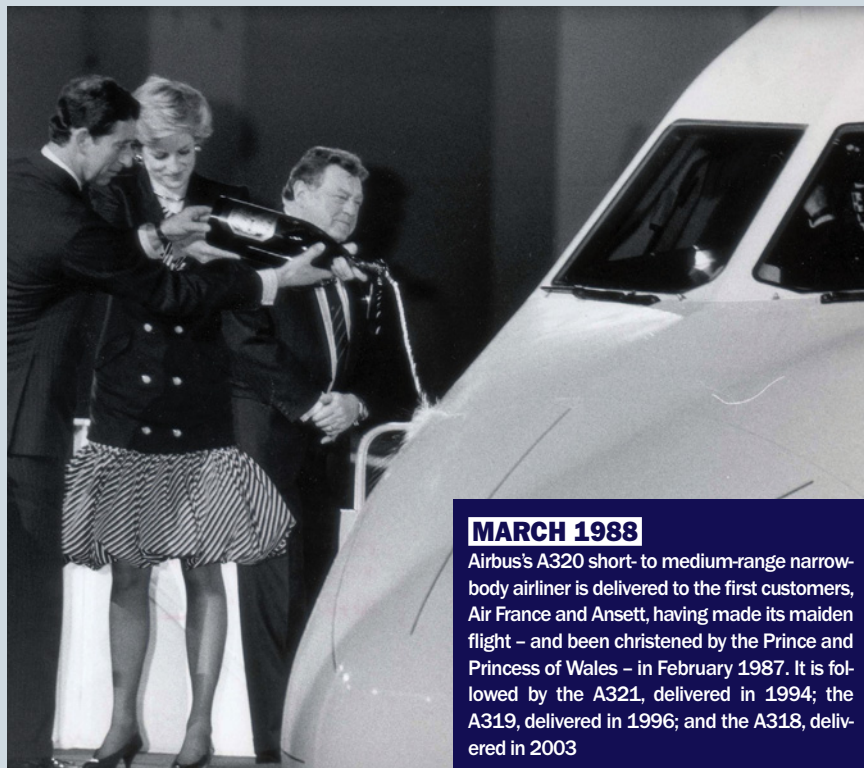
Rex Features

SEPTEMBER 1982

The Boeing 767 widebody twinjet enters service with United Airlines when a 767-200 flies on the Chicago-Denver route. The type's maiden flight had taken place in September 1981

JANUARY 1989

The Tupolev Tu-204 twin-turboprop medium-



Rex Features

MARCH 1988

Airbus's A320 short- to medium-range narrow-body airliner is delivered to the first customers, Air France and Ansett, having made its maiden flight – and been christened by the Prince and Princess of Wales – in February 1987. It is followed by the A321, delivered in 1994; the A319, delivered in 1996; and the A318, delivered in 2003

haul airliner, intended to replace the Tu-154, flies for the first time. It would enter service in 1992, followed by the Tu-214, with increased weight and range

MAY 1991

Canadair launches regional jet era with first flight of CRJ, a stretch of its Challenger execu-

tive jet. Bombardier's CRJ family becomes biggest-selling regional jet brand

MARCH 1993

Launch customers Lufthansa and Air France put the Airbus A340 long-range four-engined widebody airliner into service, following the type's first flight in October 1991

MAY 1983

The British Aerospace BAe 146-100, a four-turboprop short-haul regional airliner, enters service with Dan-Air, having made its first flight in September 1981. From the initial design evolve the -200 and -300 and the Avro RJ70, RJ85, RJ100 and RJ115



AP/Burmington



FEBRUARY 1995

Delta Air Lines takes delivery of its first McDonnell Douglas MD-90, a stretched follow-on variant of the MD-80 first flown in February 1993

AUGUST 1997

The Airbus A330-200 makes its first flight. The first customer is the International Lease Finance Corporation, which leases the aircraft to discount charter airline Canada 3000

OCTOBER 1999

The Boeing 717 enters service with AirTran Airways on the Atlanta-Washington DC route. Developed as the McDonnell Douglas MD-95, this twin-engined, single-aisle airliner became the 717 with the merger of McDonnell Douglas and Boeing in 1997, and had first flown in September 1998

JULY 2000

Air France Concorde F-BTSC suffers a tyre burst during take-off from Paris Charles de Gaulle and crashes in flames into a hotel at Gonesse, killing all 109 on board, as well as four on the ground, and injuring six other people. All Concorde in the Air France and BA fleets are subsequently grounded

SEPTEMBER 2001

Terrorists fly three Boeing airliners into New York's Twin Towers and the Pentagon – a fourth aircraft crashes in Pennsylvania – changing history and aviation security in the 21st century

MAY 1995

The first Boeing 777, the world's largest long-range widebody twinjet, is delivered to United Airlines and, later the same month, the US Federal Aviation Administration awards 180-minute ETOPS clearance, making the 777 the first airliner to carry this rating at its entry into service. The 777 had made its maiden flight in June 1994



FEBRUARY 1997

First flight of the Boeing 737 Next Generation (NG) is conducted with the 2,843rd 737 built, a -700. This model's launch customer Southwest Airlines still operates it in 2012, as evidenced here. The 737NG family now comprises the -600, -700, -800 and -900; more than 3,800 have been delivered to airlines and lessors

OCTOBER 2007

The Airbus A380 enters initial commercial service with Singapore Airlines on its service between Singapore and Sydney, Australia, passengers having bought seats in an online auction. Within four years some 16 million passengers would have been carried by A380s. Today, 72 are in service



Row Features

FEBRUARY 2002

The Embraer 170 becomes the first E-Jet to fly, signalling the Brazilian airframer's arrival in the narrowbody market

OCTOBER 2003

The final three BA Concorde landings at London Heathrow – from Edinburgh, Heathrow itself (a round-trip via the Bay of Biscay) and New York – are witnessed by big crowds on the type's last day in commercial operation



Air Burnings

APRIL 2012

Airbus begins final assembly of the first A350 XWB. The company has orders for 548 A350s, a family of long-range 250-350-passenger widebody airliners with both fuselage and wing structures made primarily from carbonfibre-reinforced polymer. The first flight is planned for mid-2013



Airbus

APRIL 2005

The Airbus A380 double-deck, widebody superjumbo flies for the first time. It is the world's largest airliner, with accommodation for 525 to passengers in a three-class configuration or up to 853 in an all-economy-class configuration, a cruising speed of Mach 0.85 and sufficient range to fly from New York to Hong Kong

MAY 2008

The Superjet 100 regional aircraft – product of a pioneering Russo-Western collaboration between Sukhoi and Alenia – makes its first flight

DECEMBER 2009

The Boeing 787 Dreamliner long-range mid-size widebody twinjet, largely constructed of carbonfibre material, makes its first flight. Almost two years later, in September 2011, first delivery of the Boeing 787, to All Nippon Airways, belatedly takes place. It is followed by the type's first commercial flight, from Narita to Hong Kong, in October and its first commercial long-haul flight, from Haneda to Frankfurt, in January 2012. ■



How did we cover these milestones at the time? Find out by searching our archive at flightglobal.com/archive

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Sopwith memories

It is 100 years since aviation pioneer Tommy Sopwith set up his aircraft factory in Kingston, London. The plant produced legendary aircraft including arguably the most successful Allied fighters in both world wars, the Sopwith Camel and Hawker Hurricane.

To celebrate the centenary, archivist Bill Downey is running an oral history project to make sure memories of those who worked on those aircraft are captured for future generations.

Says Downey: "One of the reasons for this celebration is to recognise the role of those workers, particularly women, who were conscripted to work on the factory floor. We're not looking for just light and fluffy memories – we want to capture the real perspectives of the people we know worked incredibly hard, often in difficult conditions."

Ribbon reversal

When painters put the SkyTeam livery on an Airbus A320 belonging to the alliance's latest member, Saudia, the huge ribbon logo on the rear fuselage was accidentally put on backwards.

"It's not because Arabic is written right-to-left," a little SkyTeam bird told us at IATA's annual bunfight in Beijing. "It was an honest mistake."



Models on parade



Spot the difference: it's a no-go for SkyTeam logo



When Kingston was king

She says the blunder has been corrected. "So if you have a photo, it's a collector's item." Happy to oblige (*main picture*).

Downscaling

Aviation enthusiast looking to downsize from Farnborough or RIAT? The Large Model Aircraft Rally could be for you. The event, on 28 and 29 July at the Royal Air Force Museum, Cosford, features hundreds of scale models of iconic aircraft that will take to the skies.

Plus: you can camp on site – something that might have the security operatives flapping at your tent if you tried it under the wings of a full-size F-16 at Farnborough. For more details, visit www.rafmuseum.org.

Wake-up call

Thanks to Kenneth Lim for this rather disturbing Captain Speaking on a recent United Airlines flight from San Francisco to Phoenix.

Inadvertently pressing the cabin announcement button

when he thought he was addressing the cabin crew, the commander asked: "Hey, I'm sorry, I didn't specify, can I get another teabag from you? I need a max dose of caffeine."

Notes Kenneth: "A long silence, with some muffled groans, followed."

Farewell to voice of Farnborough

Many tributes have been paid – on the PPRuNe forum and elsewhere – to John Blake, who for more than 30 years was a much-admired air display commentator at Farnborough and other shows, as well as an acclaimed aviation artist.

Test pilot John Farley writes: "In many ways his passing is yet another event that marks the end of a remarkable period in aviation history, when aeroplanes and flying were something special."

Anecdotes about Blake abound, many relating to his wartime exploits (he served in the Irish Guards and fought in Operation Market Garden).

Fellow commentator Stratton Richey says: "Stories about John – from falling down a nunnery staircase with an armed rocket propelled grenade to meeting aviation greats like Yuri Gagarin, to towing the admiral of the Royal Yacht Britannia across the forecourt at Buckingham Palace – are all true."

Delayed by diggers

At Bloemhof, South Africa Mr C Compton Paterson

100 YEARS AGO

descended, intending to remain down for only a short time.

However, so great an interest did the populace show – chiefly diggers, hundreds of whom gathered round his English-built biplane – that a long delay ensued.

Civil war protest

Protests against the ban on the export of air ambulances

75 YEARS AGO

for use in the Spanish war were made by Mr S J Noel-Brown at the

first international conference on aerial relief in Budapest. Mr Noel-Brown argued the official view the Geneva Convention of 1929 is not recognised – as the Spanish war is not international – is illogical.

Suits you, sir

At London Aeroplane Club's

50 YEARS AGO

show, before a crowd of 10,000, the proprietor of a North London

menswear shop stood on the top wing of a Tiger Moth G-ARAZ, being flown 10ft above ground by a BEA Vanguard captain, and tried to burst two balloons hanging from a line strung between two poles.

Post-crash fires

A Boeing study of more than

25 YEARS AGO

150 survivable airliner impacts finds that post-crash fires

occurred in just over 100. More than a third of the deaths in these 100 crashes resulted from fire, not from impact injuries.



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Reimagining rotorcraft

With regard to the wishes of ATR to produce a tiltrotor (*Flight International*, 15-21 May), I have the obvious low-cost – and lower noise-level – solution than the Rotodyne. Just remove the pins from the forward wing-to-fuselage attachment lugs of the ATR42/72, install a couple of hydraulic jacks and a tail rotor – and, hey presto, the rebirth of the Canadair CL-84 and Chance Vought/LTV XC-142A!

Peter Gambardella
Farnborough, UK

A timely tribute

The 50th anniversary of the first flight of the Vickers VC10 – the largest commercial aircraft put into production in the UK – falls on 29 June. I have not seen plans to have a VC10 at Farnborough. It may be the last chance to display a VC10 at the show as a tribute to the British aircraft industry.

It would be great to see two VC10s, joined by a refuelling hose, fly past on the public days.

Ian Kirby
Ashford, Middlesex

AIR TRAFFIC MANAGEMENT

Navigating China

Re: “Stuck on amber” (*Flight International*, 1-7 May), your correspondent should have asked direct questions of the CAAC or checked with operators, particularly those that operate from Hong Kong, what the actual state of play is with regards to ATM into China. I

would suggest that, due to lack of accountability and transparency, comparisons with China as a benchmark are flawed.

Yes, a lot of new runways and shiny terminals are being constructed across China, but there is no “clean sheet” with respect to development of an efficient and practical airspace system. It is still run on a legacy basis. Over 80% of the airspace is still directly controlled by the military and unusable, with the exponential growth in commercial traffic being confined to very narrow RVSM corridors. The introduction of ADS-B will not bring about any benefits unless there is complete change in the management of China’s airspace.

Delays, en-route traffic separation, allocation of cruising levels, and taxiway and runway usage are all poor, and will not change in the foreseeable future. Add bad weather anywhere within 50 miles of an airport, and the ATM is diabolical. In simple terms, the system operates on a 1960s procedural ATC basis.

A reputable study of the problems with China ATM would reveal staggering inefficiency and costs to airlines and the economy.

Capt Carl Baker
Hong Kong



Hong Kong: cautionary example?

Rex Features

Max factor

On reading about the necessity of raising the nose of the 737 Max to accommodate a larger-diameter engine, it is evident that extending the length of the main landing gear is not possible without moving the hard points on the wing.

There is a solution. By intro-

ducing a very small angle to the axis of the pivot of the gear in such a way that in retracted mode, with undercarriage leg extensions, the wheels can be one in front of the other.

The wing’s structure would not change, and in landing mode, the impact would be absorbed in the manner for which



The Vickers VC10 is about to hit a half century

Rex Features

the airframe was designed.

Rodolfo Serna
Via email

Cantonese decoded

The “surreal remark” in Straight & Level (*Flight International*, 29 May – 4 June) is actually a well-known aviation gag.

Future computerised aircraft will be crewed by a man and a dog. The man is there to feed the dog, and the dog is there to bite the man if he touches anything...

Ralph Ellis
Via email

Zeroing in on the wrong number

FedEx has “71 A330-600Fs”? (*Flight International*, 5-11 June). It does not. Nor does anybody else. A bit of proof-reading wouldn’t go amiss.

Nigel Champness
Via email

Editor’s note: Apologies. We meant A300-600Fs, of course.

In need of tips

Immodestly but not altogether inaccurately, I know more about aerodynamics than most people outside that field. I still don’t understand how winglets work. Theoretically, induced drag depends on span loading, increased but never decreased by a correction for imperfect lift distribution. Do winglets vitiate this? Is there any chance of your following up “Fuel saving tips” (*Flight International*, 1-7 May) with an idiot’s guide to them?

Noel Falconer
Via email



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EVENTS

24-26 June

Routes CIS 2012
Ekaterinburg Koltsovo, Russia
www.routesonline.com/events/149/
routes-cis-2012

7-8 July

Royal International Air Tattoo
RAF Fairford, UK
airtattoo.com

8-9 July

The Airline Strategy Awards
The Honourable Society of Lincoln's Inn,
London, UK
Tel: +44 20 8652 8036
sharon.webb@flightglobal.com
strategyawards.com

9-15 July

Farnborough International Airshow
FIVE, Farnborough, UK
Tel: +44 1252 532800
farnborough.com

23-25 July

Aviation Outlook Australia Pacific
The Hilton, Sydney, Australia
terrapiinn.com/aviationoutlook

23-26 July

Aviation Outlook Africa
Sandton Convention Centre,
Johannesburg, South Africa
Tel: +27 11 463 6001
terrapiinn.com/conference/
aviation-outlook-africa/

23-29 July

EA AirVenture Oshkosh
Wittman Regional Airport, Wisconsin
airventure.org

6-9 August

**AUVSI's Unmanned Systems North
America 2012**
Las Vegas, Nevada, USA
auvsi.com

15-17 August

LABACE 2012
São Paulo, Brazil
abag.org.br/labace2012

11-16 September

ILA Berlin Air Show
Berlin ExpoCenter Airport, Germany
ila-berlin.de

17-18 September

Flight Safety Conference
Hilton London Heathrow Airport Terminal 5
Tel: +44 20 8652 8818
hannah.bonnett@rbi.co.uk
flightglobalevents.com/flightsafety2012

26-27 September

Ascend Aviation 2020 Finance Forum
Conrad Tokyo, Japan
Lizzie Law
conferences@ascendworldwide.com

9-14 October

**Japan International Aerospace
Exhibition 2012**
Port Messe Nagoya
www.japanesaeroexpo.jp/english/

9-11 October

MRO Europe
Amsterdam RAI, the Netherlands
events.aviationweek.com

30 October - 1 November

NBAA Annual Meeting & Convention
Orlando, Florida, USA
www.routesonline.com/events/146/
routes-europe-2012

**For a full list of events see
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3	Boeing 777	Two (02)	September 2012

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The complete set of separate Bidding Documents for Boeing 737-400, 737-800 and Boeing 777 aircraft containing the detailed instructions and terms and conditions (that form an integral part hereof and are hereby incorporated by reference) can be downloaded from our website www.piac.com.pk/PIA_Business/pia-Business_Tenders.aspx or can be obtained from the office of:

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Karachi - 75200, Pakistan
Phone: +92 21 9904 3902
Fax: +92 21 3457 0147
Email: khidppk@piac.aero

Closing Date

Offers meeting the requirements as mentioned in the Bidding Documents must reach the above mentioned address latest by **July 16, 2012** at 1500 hours (Pakistan Standard Time). The bids received by the closing time shall be opened on the same day at 1530 Hrs.

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8. Knowledge of Flight Safety procedures and Crew Resource Management.

How to Apply:

Applications must be submitted on a Leicestershire Police application form which can be downloaded from the Force website at www.leics.police.uk/careers.

Further information is available by contacting either the Unit Executive Officer, Mick Dunn on 01858 881155 or the Chief Pilot David Williams on 01858 881155.

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Skills

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WORK EXPERIENCE STEVE SERFLING

Engineering a path to first flight

Executive vice-president for production development at Kestrel Aircraft, former bio-engineer Steve Serfling is leading the design update of the JP10 single-engined turboprop formerly known as the Farnborough F1

Where are you from?

I grew up in Deer River, a small town in northern Minnesota. I attended North Hennepin Community College and the University of Minnesota and received a degree in biomedical engineering technology.

When did you first realise you wanted an aviation career?

I don't have a memory of wanting a career in aviation. My move to Honeywell in 1980 started my aviation career, but it wasn't really an on-purpose decision to go into aviation. It didn't take me long to get passionate about avionics. I really got hooked on aviation as an industry when I worked for Cirrus. There are few things that compare to watching the first flight of an airplane that you had a role in designing and building. Receiving a type certificate and production certificate are a distant second and third, but also very rewarding.

What was your career path?

My first job after college was with a small biomedical firm that made muscle and nerve stimulators. From there, I went to Honeywell Commercial Aviation, where I was introduced to aviation for the first time. For most of my 16-year career at Honeywell I worked with the Ring Laser Gyro product line and GPS airborne products for the heavy business jet and air transport market. For my last five years there, I worked on the design and development of the first

certified Local Area Augmentation System (LAAS). At Honeywell, I held positions in technical publications, customer service engineering, applications engineering and programme management.

In 1995, I joined Cirrus Design as the lead avionics & electrical engineer – initially for a team of one. This was my introduction to Part 23 general aviation aircraft. The Cirrus team was small, agile and a totally new paradigm from Honeywell. We worked long hours and in less than three years certified the SR20, and less than two years later, the SR22. I also held positions as director of certification and airworthiness, vice-president for customer support and vice-president for product development. From 2006 to 2009, I had the privilege of working directly with Alan Klapmeier and Mike Van Staagen to lead the design and development, and ultimately the first flight, of “the jet” (aka Cirrus Vision, SF50). This period was the peak of my career at Cirrus. I resigned from Cirrus in May 2010.

Where did you go then?

In July 2010 I joined Alan Klapmeier at Kestrel Aircraft Company, where he was working to take the Kestrel aircraft to certification. I joined the company as executive vice-president of product development and am now also the chief operating officer. My focus is on putting together the engineering



Kestrel Aircraft Company

Serfling's career has brought him back to his native US Midwest

team and ensuring that we create a clear path to first flight of a conforming aircraft followed by certification and production of the Kestrel aircraft. We have started putting together the tooling design, flight test and aircraft build teams.

Why did Kestrel move from Maine to Superior, Wisconsin?

The engineering timeline was [dictated] by delayed funding from the New Market Tax Credit programme in Maine. This caused hiring delays and a delay in being able to procure materials for testing and initial build of the next flying test aircraft. Not knowing where our design team would be based also caused additional delays in hiring, since we couldn't advertise for a specific location.

Now that we have received funding we are aggressively hiring to complete the engineering team

and to start the tooling design and aircraft build teams. We are already hiring engineering staff to complete the design and certification over the next several years and will soon start hiring technicians and mechanics to start building the prototype. This is an exciting time and it is rewarding to be a part of growing an industry and creating jobs in Superior.

What's your favourite part of the job? Least favourite?

My favourite part of my job is working with the engineering team and watching the progress they are making. I am extremely proud of the team we have put together in both our Superior and Brunswick locations. I also enjoy working with the team to interview and hire staff. It is very rewarding to hire someone, then see them grow and contribute. We are just beginning to develop the tooling to build the composite parts for the aircraft. I look forward to this effort.

As a former engineer, my least favourite part of the job is working on budgets and tracking costs. ■



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