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FLIGHT INTERNATIONAL

VOLUME 185 NUMBER 5434 **8-14 APRIL 2014**

Diamond

COVER IMAGE

Austrian airframer Diamond supplied this image of its single-engine DA40 TDI, a model popular with flying schools and assembled in China by its Chinese partner P28

PIC OF THE WEEK
YOUR PHOTOGRAPH HERE

All Nippon Airways posted this shot of its final Boeing 747-400 – registration JA8961 – about to embark on its retirement flight on the Tokyo Haneda-Okinawa route on 31 March. This marked the end of passenger service for the 747 in Japan, where it was once widely-used by ANA and Japan Airlines

All Nippon Airways

flightglobal.com/imageoftheday

European air traffic controllers in trial programme to ease Heathrow stacking P14. Lockheed Martin delivers its first pair of C-130J tactical transports to South Korea P10

Rex Features, Lockheed Martin

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NEXT WEEK BUSINESS AVIATION
Ahead of ABACE we look at China's business aviation market and fly the Dassault Falcon 7X into a challenging Alpine airport. Plus: Interiors show report

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BEHIND THE HEADLINES

Airline Business editor **Max Kingsley-Jones** took the controls of a Boeing **727** at the Future of Flight Aviation Center in **Everett, Washington**, after flying to Seattle on board **Delta Air Lines**' inaugural service from London. He spoke to Boeing about the progress of **787-9** flight-testing (P9). Meanwhile, **Dan Thisdell** (not pictured for security reasons) visited **Raytheon** UK's factory at **Glenrothes**, Scotland for a briefing on Paveway guided bomb (P18) development and exotic technologies including the world's largest **silicon carbide** wafers, which can support electronics operating at 400°C-plus.

For a full list of reader services, editorial and advertising contacts see P38

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THE WEEK ON THE WEB
flightglobal.com

In his **Ariel View blog**, our man in Tel Aviv, Arie Egozi, says the ease with which anyone can order a **micro unmanned air system** is causing a different type of problem for the Israeli air force and Israeli manufacturers of such systems. While the air force has to find ways to **prevent** these UAS from being used by **terrorist** organisations, Israeli manufacturers of such systems are seeing a large part of their **market disappear**. Consequently, suppliers of these micro and mini UAS are calling on the nation's defence ministry to **ease export restrictions** on these aircraft. In another blog, Egozi reveals that the Israeli air force has asked for a **formal proposal** for two Lockheed Martin **C-130J**s – on top of an existing order for four of the type. "Sources here say the **contract** is in the final stages of processing," says Egozi.

Find all these items at **flightglobal.com/wotw**

QUESTION OF THE WEEK

Last week, we asked: **After criticising the F-35, what should the US military do?** You said:

Put up with more delays	Reduce its orders commitment	Look for alternatives
30%	22%	48%

Total votes: 1,631

This week, we ask: **Aviation safety in Africa?**
❑ **Improving rapidly** ❑ **Patchy progress**
❑ **Still dangerous place to fly**

Vote at flightglobal.com/poll

HIGH FLIERS

The top five stories for the week just gone:

1. **PICTURES**: Asiana A380 emerges from Hamburg paint shop
2. **PICTURES**: 747 retired from passenger service in Japan
3. **ANALYSIS**: What does Boeing's 777X mean for airlines and Airbus?
4. Asiana cites crew failures and autothrottle design in flight 214 crash
5. ANA to order 70 777s, 787s and A320neos

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E-JETS E2 THE SECOND GENERATION

LOVE WHAT YOU FLY | EMBRAER Commercial Aviation

Learning to teach

Implementing a completely new way of delivering airline pilot ab initio training was never going to be easy or free of controversy, but it is here – and the industry must make sure it works well

The multicrew pilot licence (MPL) is here to stay, but it remains a work-in-progress. That was the verdict at the International Civil Aviation Organisation's MPL symposium at the end of last year.

All the states represented at the symposium – based on their experience – confirmed that the MPL concept is proving to be a sound one, and that graduates' performance after a year or more on the line has been rated good or very good. ICAO, however, reasserted that the validation process must continue, with feedback still required from airlines as the MPL graduates mature and their exposure to a greater range of experiences further tests the product. The International Federation of Airline Pilots' Associations wants to see validation continuing until the first MPLs have been selected for command and served as line captain for several years.

This validation process is utterly pointless unless lessons are learned from it, and remedial action taken where indicated. ICAO says although the feedback sample was sufficient to allow valid conclusions to be drawn, it was disappointed that it was not better. But ICAO has, in the light of feedback from approved training organisations (ATO), as well as the airlines, made a long list of recommendations for improvement – mostly in the way MPL courses are structured and focused.

MPL graduates do not get a licence by getting lucky with the multiple-choice questions

It says that although early graduates are performing well so far, this might be despite the manner in which the instruction is delivered, rather than because of it.

Rex Features

We'll be watching you, chum

The components that make the MPL a robust concept are that applicants undergo compulsory selection before starting – and the graduates do not get a licence by being airborne for a minimum time and getting lucky with the multiple-choice questions. They have to survive continuous assessment and be judged competent in all the prescribed skills, with the required evidence of competency in each skill defined in detail.

The MPL's challenge is that because assessment and reporting has to be so extensive and precise – as well as being unfamiliar to the early deliverers – it is far more demanding for the ATOs and their instructors than the traditional commercial pilot licence. The ATOs themselves are, mostly, being suitably self-critical. Their verdict is that training MPL pilots has turned out to be a steep learning curve, and they admit the students on their later MPL courses are benefitting from the experience gained on the early ones. ICAO wants this learning and the resulting evidence-based improvement to be a continuous process – and so it must be. ■

See Feature P32

What's a reputation worth?

It's an oft-repeated truth that a good reputation can be destroyed in an instant. It is also true that a good reputation counts for much in business. For Finmeccanica, both of these truths loom very large right now.

The Italian industrial champion is under judicial fire from Rome and New Delhi, as investigators tear into allegations that its AgustaWestland division bribed its way to a lucrative contract to supply VVIP helicopters to India. Meanwhile, the company faces restrictions in bidding for other contracts in India.

However, after that particular legal trouble is resolved, it will take a long and determined effort by every employee to restore Finmeccanica's reputation. There is nothing inherent to Finmeccanica or particularly Italian about this scandal. Doing business in one's home market is difficult enough, but when big deals are more and more forged in countries where corruption is a way of life, the bribery trap has a very wide mouth.

So, Finmeccanica's peers would do well to mumble "there-but-for-the-grace…" and examine closely their own standards of oversight – and the actual behaviour of their people, especially those connected to sales or purchasing. In the long run, in an industry increasingly reliant on a fluid matrix of partnerships and joint ventures in many countries and cultures, a reputation for honesty and reliability is invaluable. ■

See News Focus P23

Read our archive of *Flight International* comments on editor Murdo Morrison's blog: **flightglobal.com/comment**

Follow more stories from the military aviation sector at flightglobal.com/defence

BRIEFING

DELTA FIRES STARTING GUN ON 50-AIRCRAFT ORDER

WIDEBODIES Delta Air Lines is lining up a second-half 2014 order for up to 50 widebodies to replace some or all of its ageing Boeing 747-400s and 767-300ERs. The Atlanta-based carrier has issued a request for proposals to evaluate the Airbus A330-200 and -300, A350-900 and -1000, and Boeing 777-300ER and 787-8, -9 and -10. Delta is also understood to be considering a potential re-engined A330-300 if Airbus decides to go forward with the programme.

ISRAEL MAY RELAX UAS EXPORT CONTROLS

UNMANNED SYSTEMS The Israeli defence ministry has agreed to review export restrictions following complaints by the country's numerous makers of micro and mini unmanned air systems, which say controls designed to keep large-payload UAS out of the hands of hostile forces are "not logical" when applied to small systems. Terrorist organisations in Lebanon have made a number of attempts to use UAS – mostly of Iranian origin – to penetrate Israeli airspace.

BABCOCK TO BUY BOND AVIATION

OPERATIONS Engineering services provider Babcock is to acquire helicopter operator Avincis – the Bond Aviation and Inaer parent – for £1.6 billion ($2.6 billion) from private equity owners Investindustrial and Kohlberg Kravis Roberts. Avincis operates 343 rotary- and fixed-wing aircraft. Separately, Avincis is to pay SKr707 million ($108 million) for 84.6% of Scandinavian Air Ambulance, which operates 22 aircraft transporting patients across Sweden, Denmark and Finland.

DAMBUSTERS UNIT GOES OUT WITH A BANG

RETIREMENTS The UK Royal Air Force disbanded two of its Panavia Tornado GR4 units on 28 March, when 12 and 617 squadrons ceased operations at RAF Lossiemouth in Scotland. Known as "The Dambusters", the latter will be reformed in 2018, as the UK's first frontline squadron to operate Lockheed Martin's F-35B Lightning II.

BELL 412 DEAL WITH PHILIPPINE MILITARY

ROTORCRAFT Eight Bell 412EP helicopters have been ordered by the Philippines, including five configured for combat utility and three for VIP transportation. The first three will be delivered in time for the Philippines to host the Asia Pacific Economic Cooperation Summit in 2015. The deal falls under a 2012 military materials and services memorandum of understanding between the Canadian Commercial Corporation and the Philippine Department of National Defense. The Philippine military has operated Bell helicopters since the 1960s.

BERLIN TO FINALISE ROTARY REDUCTIONS

CUTS Germany is close to finalising the terms of a memorandum of understanding to reduce its orders for Airbus Helicopters Tiger attack helicopters from 80 aircraft to 57, and 122 NH Industries NH90 tactical transports to 82. Berlin plans to use the near €1.15 billion ($1.5 billion) in savings to fund the development and acquisition of 18 examples of a new maritime NH90 dubbed the "Sea Lion".

DASSAULT COMPLETES LCY APPROVAL FOR FALCONS

BUSINESS AVIATION Dassault has won approval to operate its Falcon 2000S and 2000LXS twinjets at London City. The French company says it is the only business jet manufacturer to have its entire current production fleet certified for the airport in the UK capital's Docklands financial district. Dassault's flagship 7X received London City approval in 2009.

Rex Features

The tactical transport was one of six introduced since 2010

INCIDENT **ATUL CHANDRA** BENGALURU

India awaits clues to crash of C-130J

Air force asks Lockheed Martin to assist with investigation after new-generation type lost during routine training flight

The Indian air force has yet to come out with a preliminary report on the fatal crash of one of its Lockheed Martin C-130J tactical transports, which resulted in the deaths of five experienced aircrew.

"Investigations as part of the Court of Inquiry are currently underway, and we have nothing further to add at the moment," the air force says.

The aircraft's flight data recorder, which sustained damage in the crash on 28 March, has been recovered from the accident, 72 miles west of the Indian city of Gwailor.

"To avoid any loss of data while trying to decode the equipment, we have decided to send the black box to the US," the Press Trust of India quoted the air force source as saying.

"At the request of the Indian air force, Lockheed Martin is assisting with its investigation into the crash," the airframer says.

Bearing the tail number KC-3803, the destroyed aircraft was the third of six C-130Js that were delivered to the Indian air force between 2010 and 2011. It was the second Hercules in a two-aircraft training sortie, and had taken off from Agra before coming down. The accident happened at just after 10am local time, says a report from Flightglobal's Ascend Online database. The lead aircraft later landed safely.

New Delhi obtained six C-130Js under a 2008 deal conducted via the US Foreign Military Sales mechanism. In late 2013, it finalised a follow-on order for six additional examples. There is no indication as yet whether a further example of the tactical transport could be added to the latter purchase as a result of the crash.

India's remaining J-model Hercules are assigned to the air force's 77 Sqn at Hindan air base near New Delhi. These were delivered in a configuration optimised for special mission roles and for performing precision low-level flying.

The service is also in the process of fielding 10 Boeing C-17s, with the US-built types intended to boost the capability – and safety – of its airlift fleet.

The Indian crash represents the third in-flight hull loss involving a C-130J, following an Italian air force example which crashed in November 2009 and a Norwegian transport which struck a mountain in Sweden in March 2012. ■

Aditional reporting by Greg Waldron in Singapore

Africa halves its accidents but progress is still 'fragile'
THIS WEEK P10

PROGRAMME **MAX KINGSLEY-JONES** SEATTLE

787-9 on track for mid-2014 delivery

Test campaign for stretched Dreamliner closing in on FAA certification, with 1,000h flown using development aircraft

The Boeing 787-9 flight-test programme has progressed smoothly over its first six months and the manufacturer is on course to deliver the Rolls-Royce Trent 1000-powered version this summer as scheduled.

Flight-testing of the stretched Dreamliner derivative began on 17 September last year, when the first of three 787-9 development aircraft (line number 126) took to the air. Delivery of the first Trent-powered 787-9 to launch operator Air New Zealand is scheduled for mid-2014.

The test campaign, which is being based at Boeing Field in Seattle, is expected to comprise around 1,500 flight hours, a portion of which will cover function and reliability (F&R) and ETOPS testing.

"That [1,500h] is a number that you go in with, and there's a certain level of growth that you typically expect to see throughout the programme, but we've had less than the typical amount of growth in hours," says Mark Jenks, Boeing's vice-president of 787 derivatives development.

Max Kingsley-Jones/Flightglobal

ANA's first Trent-powered 787-9 is being prepared for its debut

Two Trent 1000-powered 787-9s have flown, along with the first General Electric GEnx-powered version. Boeing says that the three aircraft have flown in excess of 1,000h in more than 440 flights to date. These three development aircraft will be reworked for customers once testing is completed.

"The -9 flight-test programme has gone really smoothly," says Jenks. "We've now flown just about everything we're going to fly, and we're now into the final flights for the score with the FAA. We're well into that process at this point."

Meanwhile, the first and second Trent-powered 787-9 customer aircraft equipped with furnished cabins have rolled out of the assembly building – destined for All Nippon Airways and ANZ. ANA's first 787-9 is currently at Boeing's Everett plant being prepared for its first flight, while ANZ's -9 was due to be rolled out of the paint shop on 6 April.

"We're going to fly the [Trent 787-9] F&R ETOPS programme on the first production airplane," says Ed Petkus, Boeing's deputy chief project engineer on 787 derivatives development. "There'll be another F&R programme on the GE version, and that will be on the first GEnx-powered production aircraft."

The first GEnx-powered 787-9 customer aircraft, which is for United Airlines, is structurally complete and progressing down the Everett assembly line.

United expects to receive its first 787-9 in July and will initially operate the twinjet on US domestic routes before using it to launch non-stop services between Los Angeles and Melbourne on 26 October. ■

EMISSIONS **OLIVER CLARK** LONDON

ETS coverage to be limited to intra-European flights

The European Parliament has voted by a large majority to remove international flights from the Emissions Trading System (ETS) and limit it to intra-European flights only until at least 2017.

The parliament voted by 458 with 120 against and 24 abstentions in its plenary session on 3 April to limit ETS to flights within the European Economic Area. International flights to and from Europe and those overflying European airspace will not be included under the amended ETS.

This will be reviewed in 2017 following the ICAO 2016 General Assembly, which is expected to adopt a global framework for a market-based measure to calculate and tax airline emissions.

Rex Features

Low-cost carriers will be required to comply until at least 2017

Under the amended scheme, airlines which do not operate any intra-European flights will not be expected to surrender carbon emission readings to the European Commission.

Those which are still included in the ETS had faced an April deadline to surrender their 2013 emissions readings, but this has been put back to 2015, when the carriers will need to hand over carbon readings for both 2013 and 2014.

While the amendments to the scheme are now all but agreed, the final wording of the new ETS coverage will have to be debated by the various European bodies before becoming law.

The vote follows months of debate between the parliament, various commission committees and member states, several of which were bitterly opposed to reimposing ETS after it was frozen in 2012.

The Association of European Airlines welcomes the result, saying it brings "stability" for the continent's airlines. However, chief executive Athar Husain Khan notes: "We would have preferred legal certainty and planning stability until 2020 when the global market-based mechanism is due to come into force."

By contrast, the European Low Fares Airline Association condemned the vote and threatened to take the case to the European Court of Justice. ■

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PROSECUTION
DAVID LEARMOUNT LONDON

DIY pilot lands in deep water after UAV flight

The UK Civil Aviation Authority has brought its first successful prosecution for the "dangerous and illegal flying" of an unmanned air vehicle.

Robert Knowles, from Barrow-in-Furness, Cumbria, was found to have flown the device closer than the minimum 50m (164ft) separation from the Jubilee Bridge across Walney Channel, and also through restricted airspace around BAE Systems' submarine testing facility at Barrow-in-Furness. Both offences breached the UK's Air Navigation Order.

The court heard that on 25 August 2013 a UAV was recovered from water near the nuclear submarine facility. Knowles, who admitted to building the fixed-wing device himself and flying it that day, was fined £800 ($1,330) by the magistrate's court, and also faces costs of £3,500.

The CAA says the conviction "will send a message to recreational users of UAVs that the devices are subject to aviation safety rules". Anyone using unmanned aircraft for "aerial work", or for commercial gain, requires a permission to do so from the CAA to ensure safety standards and that the operator is fully covered by indemnity insurance. ■

Read more news and analysis from the unmanned sector: flightglobal.com/uav

REPORT DAVID LEARMOUNT LONDON

Africa halves its accidents but progress is still 'fragile'

IATA calls for renewed determination to catch up with rest of the world on aviation safety

Aviation safety in sub-Saharan Africa improved markedly in 2013, according to the International Air Transport Association, with the accident rate in the region having halved compared to the previous year.

In its latest global airline safety report, published on 3 April, IATA shows Africa reduced its all-aircraft rate to 7.45 accidents per 1 million flights in 2013, compared with 14.8 in 2012.

The crash of a LAM-operated Embraer 190 on 29 November was the only Western-built hull loss on the continent last year: six crew and 27 passengers were killed.

Global airline safety trends also show a continual improvement in the five-year moving average, says IATA, although performance in 2013 could not equal the exceptional figures for the previous year – the all-time safest by a large margin.

Measured as a global Western-built hull-loss rate per 1 million flights, 2013 saw a rate of 0.41, compared with 2012's exceptional 0.21. Taking into account all aircraft types covered by the assessment, there were 16 fatal accidents globally in 2013, compared with 15 in 2012 and a five-year average of 13. Last year showed exceptionally low fatality figures, however, at 210 globally, compared with 414 deaths in fewer accidents in 2012.

Rex Features

An E190 was the only Western hull loss on the continent last year

However, IATA director general Tony Tyler warns that Africa's safety progress remains fragile. "Africa's overall rate is still many times worse than global levels, so there is plenty of work to do," he says. "We cannot take the recent improvement trend for granted.

"To make these gains a foundation on which to achieve world-class safety levels is going to require the determination and commitment of all stakeholders, including governments."

The association says that by the end of 2013, only 11 African states had achieved 60% implementation of ICAO standards and recommended practices – which define the minimum standards that all signatory states are obliged to meet. IATA says meeting the Abuja Declaration's commitment to achieve equivalent safety rates to the global average by 2015 will require acceleration in the pace of implementation.

Airlines that submit to the IATA operational safety audit (IOSA) – a requirement for all IATA member carriers and voluntarily accepted by 150 others – showed a total accident rate that was less than half that of non-IOSA airlines, according to the report. An enhanced IOSA scheme has also been introduced, which uses a continuous assessment process working on a two-year cycle, rather than the original concept of a biennial audit providing a "snapshot" of operational safety every two years. ■

See Air Transport P14

TACTICAL TRANSPORTS

Seoul duo: C-130Js delivered

Lockheed Martin has delivered its first pair of C-130Js to South Korea's air force, with the tactical transports having left its Marietta, Georgia site on 1 April. Drawn from a four-aircraft order signed in December 2010, the stretched-fuselage -30s will augment Seoul's in-service fleet of 12 H-model Hercules, which Flightglobal's Ascend Online database records as having been built between 1984 and 1989. Lockheed says the milestone sees South Korea become the 14th nation to field the C-130J.

Lockheed Martin

IATA upbeat on air freight market growth
AIR TRANSPORT P12

DEVELOPMENT **JON HEMMERDINGER** WASHINGTON DC

Boeing lands first order for BBJ Max

Leap-1B-powered VIP type to feature longer cabin, increased cargo capacity and extended range over previous models

Boeing has launched a business jet variant of its 737 Max, following an order from an undisclosed, existing BBJ customer.

The BBJ Max 8 will be delivered without a finished interior in 2018, to a completion centre chosen by the customer, says Boeing. The CFM International Leap-1B-powered version of the 737 Max 8 becomes the latest model from the Seattle manufacturer to join the Boeing Business Jet range.

The BBJ1, BBJ2 and BBJ3 are variants of the 737-700, -800 and -900, respectively. Boeing has also delivered 29 business jet versions of its widebodies, as well as a handful of VIP-configured standard 737s. The new BBJ Max 8 will have a range of 6,300nm (11,700km) – more than 800nm further than the BBJ2.

The new model will feature a cabin that is 5.8m (19ft) longer than the BBJ2, and also offer three times more cargo space, Boeing says.

Boeing is also marketing a BBJ Max 9, based on the 737 Max 9, which is expected to have a range up to 6,255nm, and studying plans to develop a BBJ Max 7, based on the 737 Max 7.

First flight of the 737 Max is scheduled for 2016, and deliveries to commercial customers are expected to begin in 2017, the company says. ■

BOEING BUSINESS JETS ORDERS AND DELIVERIES

Type	737	BBJ	757	767	777	787	747-400	747-8	Total
Orders	9	159	5	8	6	12	3	9	211
Deliveries	9	148	5	8	5	0	3	8	186
In service	9	134	5	7	5	0	3	0	163

SOURCE: Boeing

The jet will be delivered without a finished interior in 2018

Boeing

ACQUISITIONS **EDWARD RUSSELL** WASHINGTON DC

Air Canada finalises fleet renewal order

Air Canada and Boeing have finalised the carrier's order for up to 109 737 Max aircraft.

The agreement includes 33 737 Max 8s and 28 Max 9s, as well as 18 options and 30 purchase rights for further Max aircraft. The proposed deal was announced in December 2013. "Our narrowbody fleet renewal programme with the 737 Max is expected to yield significant cost savings, and is a key element of our ongoing cost transformation programme," says Calin Rovinescu, president and chief executive of Air Canada. "Projected fuel and maintenance cost improvements of more than 20% per seat will generate an estimated [costs per available seat mile] reduction of approximately 10%, compared to our existing narrowbody fleet."

The deal is valued at $6.5 billion at list prices. ■

INVESTIGATION **DAVID KAMINSKI-MORROW** LONDON

MH370 air-ground communications appear routine

Investigators probing the disappearance of Malaysia Airlines flight MH370 have reiterated that there was no evidence of unusual air traffic control communications before the aircraft vanished.

"There is no indication of anything abnormal in the transcript," said the nation's ministry of transport, as it released details of air-ground communications.

It remains convinced that the Boeing 777's movements after it lost contact are "consistent with deliberate action".

The transcript shows that after taking off from Kuala Lumpur for the 8 March service to Beijing, the aircraft's crew were cleared by departure control to climb to 18,000ft, turn right immediately and fly directly to the IGARI waypoint over the Gulf of Thailand. Flight MH370 was then handed off to the en route centre and cleared to climb to 25,000ft, and later cleared to its requested cruise altitude of 35,000ft.

Rex Features

Chinese Il-76 transports recently joined the search effort

Eleven minutes after acknowledging this clearance, at just after 01:01, the flight informed the en route centre that it was maintaining 35,000ft. It transmitted a near-identical message shortly before 01:08. Both were acknowledged by air traffic control.

There was no further communication until 01:19, when air traffic control instructed MH370 to contact Vietnam's Ho Chi Minh centre and gave the radio frequency as 120.9MHz.

The response from the aircraft did not read back the frequency, but simply stated: "Good night Malaysian three seven zero."

Investigators have yet to determine the source of the sign-off. Malaysia Airlines had previously indicated that it believed the first officer transmitted the message.

About 2min after this last voice message, all normal contact with the 777 was lost in the vicinity of the IGARI waypoint, and no further voice, transponder or ACARS transmissions were received. Military radar indicates that the aircraft deviated from its course, turning west and heading out over the Indian Ocean.

Analysis of rudimentary satellite communication signals suggests it then turned south and eventually crashed into the sea west of Australia. ■

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OPERATIONS **GREG WALDRON** KUALA LUMPUR

Data sharing key to improving industry safety – FAA

Better data sharing by the industry and more relevant pilot training are the keys to unlocking further improvements in air safety, according to the US Federal Aviation Administration.

"I can't over-emphasise enough the importance of what data sharing does," says John Hickey, deputy associate administrator for aviation safety at the FAA. "When an airline, aircraft manufacturer, and a government regulator come together and look at the data together, they cannot but make the right decision."

Hickey, speaking at the IATA Ops conference in Kuala Lumpur, said data sharing by carriers helped reduce the USA's fatal accident rate by 70% from the 1990s to the 2000s.

But, he adds, airlines were initially wary of sharing safety related data with government regulators, fearing punitive action.

Without naming countries or regions, Hickey indicates that data sharing internationally still has some way to go: "Data sharing is the number-one way to reduce fatal accidents around the world."

Hickey also expresses concern that pilot training is divorced from the reality of operating modern aircraft: "An evolution has occurred in that pilots, with their training, have become somewhat incompatible with the way airplanes are built and designed today. When we look at accidents over the last 10 years, there is a fundamental misunderstanding going on between man and machine. We have to fix that."

Hickey notes that the USA has mandated that pilot training should focus on areas such as stall recognition, avoidance and recovery and aircraft upset modes. But now, he says, deteriorating hand flying skills are of concern: "There is too much reliance on automation, there needs to be a balance."

Another problem is the US requirement that pilots need 1,500 flight hours to become a first officer, up from 250h previously, which Hickey says creates a "potential challenge to airlines". ■

See News Focus P21

David Learmount offers his views on aviation safety issues: flightglobal.com/learmount

OUTLOOK **GRAHAM DUNN** LONDON

IATA upbeat on freight market growth

Association heralds strengthening cargo business after positive traffic figures for early 2014 indicate improvement

The International Air Transport Association is heralding a strengthening of the air freight market, as traffic figures for February reveal a 3% year-on-year growth – indicating continued momentum from January's improvement of 3.6%.

Coming after a strong second half in 2013, IATA says it sees signs of improvement in what has been a stagnant market.

"Cargo has had a positive start to the year," says IATA director general Tony Tyler. "There is good cause for measured optimism for the cargo industry's prospects in 2014. The 3.6% growth in demand recorded over the first two months of this year is a significant step up from the 1.4% growth in demand over the whole of 2013."

Rex Features

Middle Eastern carriers posted an 11.9% recovery in February

However, Tyler reiterates IATA's concerns that "on-shoring" manufacturing supply chains and increased protectionist measures are dampening trade growth. "These factors are a major part of the reason why we are not seeing trade growth of 5-6%, which we would expect to see at the current level of domestic production," he says. IATA says the vast majority of the growth in cargo was realised by airlines in the Middle East and Europe, which recorded 11.9% and 5.5% growth, respectively, compared with February 2012. Air cargo growth was virtually minimal among Asia-Pacific carriers – which represent the largest share of the air freight market – although this in part may be distorted by weaker demand this year from the Chinese New Year falling later.

"Regional trade growth in recent months has been improving, so stronger air freight growth should be posted in the months ahead," IATA says.

But, it adds: "Chinese economic performance, however, may be on the verge of a slowdown, which would restrict trade and freight demand." ■

MODIFICATIONS **MICHAEL GUBISCH** LONDON

AEI unveils freighter and combi conversion for 737-800

Miami-based passenger-to-freighter conversion specialist Aeronautical Engineers (AEI) has formally launched its freighter conversion programme for the Boeing 737-800.

After studying the programme for a year, AEI says it is developing a modification programme to turn 737-800s into both cargo and combi aircraft.

While the full-freighter should be able to carry 12 pallets with up to 23,600kg (52,000lb) of freight on its main deck, the combi model is to accommodate six pallets with up to 13,600kg in the forward section of the cabin – up to the over-wing emergency exits – and 90 passengers in economy class in the aft section.

The passenger and freight sections will be separated by a rigid cargo barrier with a sliding door.

AEI says the self-funded engineering work will take between two-and-a-half and three years. A supplemental type certificate will initially be gained from the US Federal Aviation Administration, but approvals from European, Chinese, Brazilian and Russian regulators are set to follow.

The first aircraft will be converted at AEI's conversion partner Commercial Jet in Miami. However, the modification programme will also be conducted by AEI's other partners, comprising Flightstar Aircraft Services in Jacksonville, Florida, Malaysian MRO provider Airod Aerospace, and Boeing Shanghai Aviation Services. ■

"We cannot let another aircraft simply vanish."
AIR TRANSPORT P14

INVESTIGATION **JON HEMMERDINGER** WASHINGTON DC

Asiana pinpoints crew failure in crash

777 autothrottle design and warning systems also cited as contributors to fatal accident, but Boeing denies blame

Asiana Airlines has concluded that a failure by its pilots to monitor and maintain airspeed led to the fatal crash of one of its Boeing 777-200ERs at San Francisco in July 2013.

But the Asiana report, released on 31 March by the US National Transportation Safety Board (NTSB) – which is still investigating the accident – also points to poor design of the 777's autothrottle and airspeed warning systems and other factors as contributing to the accident.

A separate report from Boeing places blame on the pilots.

"The crew, composed of three highly-trained and experienced pilots, did not ensure a minimum safe airspeed during the final approach," says the Asiana report, dated 17 March. "The record shows that there were complex and interrelated causes of this accident."

The accident occurred on 6 July, when Asiana flight 214 from Seoul slammed into a seawall at the end of San Francisco's runway 28 left, leading to the deaths of three passengers. Because an instrument landing system was inoperative that day, the pilots conducted a visual approach.

The NTSB has said it found no mechanical problems with the aircraft.

However, in the days following the accident, the NTSB revealed that the trainee pilot who was flying the approach, Lee Kang Kuk, told them he was unaware that the aircraft's autothrottle had not been maintaining speed. The autothrottle stopped maintaining speed when one of the pilots retarded the throttles while the aircraft's autopilot was in flight-level change (FLCH) mode, the NTSB says.

Boeing

The FAA has recommended changes to the type's autopilot

Asiana's report describes the autothrottle as having a "FLCH trap" that can lead crews to wrongly believe the aircraft is maintaining airspeed.

"There were inconsistencies in the aircraft's automation logic that led to the unexpected disabling of airspeed protection without adequate warning," the airline says.

The report notes that in 2010, a test pilot flying a Boeing 787, which has a similar autothrottle, was caught "by surprise" when the autothrottle did not engage during descent in FLCH mode.

In response, the US Federal Aviation Administration recommended that Boeing change the software so that the autothrottle will "wake up during large excursions from target speed," the report says.

Asiana adds that the 777's low airspeed alert, which activated less than 11s prior to impact, did not provide enough warning to prevent the accident.

The pilots could have avoided the crash had the warning activated 12s before impact, Asiana says.

The airline also responds to statements made by pilot Lee to the NTSB that suggested he was concerned about his ability to fly the visual approach. Investigators said Lee told them: "It was very stressful, very difficult to perform a visual approach with a heavy airplane, always."

However, Asiana says that Lee had misused the word "stressful", believing it meant being "alert and attentive", not "anxious or worried".

"Elsewhere in the interview, [Lee] reported that he felt well-prepared to perform the SFO approach, and that it was 'nothing special'," says Asiana.

The NTSB also released documents on 31 March from Boeing in which the company notes the aircraft did not meet industry standards for a stable approach when it passed 500ft.

Below 500ft, there were "numerous cues – both visual and tactile – provided to the flightcrew that showed the aircraft's speed was decaying, the aircraft's thrust setting was incorrect and the aircraft was increasingly below the glide path," Boeing says.

Boeing adds that engaging FLCH mode had been contrary to its guidance, and concludes that the accident was caused by the flightcrew's failure to monitor and control airspeed, thrust and the glide path. ■

EXCLUSIVE

Qatar raises the bar in A380 stakes

Ahead of Qatar Airways' first three Airbus A380 deliveries, scheduled for June, Flightglobal has obtained an exclusive sneak-peek at the lounge area on the upper deck of the superjumbo. Situated near the rear of the business-class cabin, the lounge features a pair of large sofas, striking ceiling lights and a specially designed bar area. Fellow Gulf carrier Emirates is famed for the Aim Aviation-designed horseshoe-shaped bar on its A380s, but Qatar believes its offering can match that of its rival. Qatar's double-deckers will be configured in a three-class layout, with eight first-class, 48 business-class and a total of 461 economy-class seats. Of the latter, 56 are located on the upper deck and will be offered to the airline's frequent fliers first.

Qatar Airways

Keep up with the latest news and analysis with our coverage of flight MH370: flightglobal.com/MH370

SAFETY **DAVID LEARMOUNT** LONDON **GREG WALDRON** SINGAPORE

'We cannot let aircraft simply vanish'

IATA chief calls for viable process to track airlines in airspace beyond radar coverage in wake of MH370 and AF447

Following the loss of Air France flight 447 and now Malaysia Airlines flight MH370, another airliner cannot be allowed to "simply vanish".

That is the view of International Air Transport Association director general and chief executive officer Tony Tyler, speaking in Kuala Lumpur at IATA's annual operations conference.

He says a viable process for tracking aircraft in airspace beyond radar coverage must be agreed by December this year.

The IATA chief cautions against undue haste, however. "In our eagerness to move this along, we must also ensure that prudent decisions are made in line with global standards," he says. "This is not the time for hastily prepared sales pitches or regional solutions."

"The ICAO [International Civil Aviation Organization] process is the way to move this forward. I have no doubt that governments are eager to come to a conclusion and take action as soon as possible," he adds.

BillyPix

"MH370 highlighted the need to improve our tracking of aircraft in flight"

TONY TYLER
Director general and CEO, IATA

Tyler warns that speculating as to the cause of MH370's loss is pointless, but adds: "There are, however, at least two areas of process – aircraft tracking and passenger data – where there are clearly challenges that need to be overcome."

He continues: "MH370 has highlighted the need to improve our tracking of aircraft in flight. Air France 447 brought similar issues to light a few years ago and some progress was made, but that must be accelerated.

"We cannot let another aircraft simply vanish."

Tyler says IATA will convene an expert task force, that will include ICAO. "This group will examine all of the options available for tracking commercial aircraft against the parameters of implementation, investment, time and complexity to achieve the desired coverage.

"This group will report its conclusions by December 2014, reflecting the need for urgent action and careful analysis," he says. On passenger data – in a clear reference to the fact that two passengers on MH370 were found to have been carrying stolen passports – Tyler adds: "It is important to remember that airlines are not border guards or policemen. The checking of passports is the well-established responsibility of governments. The industry goes to great effort and expense to ensure that governments have reliable information about passengers before an aircraft takes off. Governments need to review their processes for vetting and using this data, such as Interpol's stolen and lost passport database."

AF447, an Airbus A330, went missing over the South Atlantic ocean in 2009, while MH370, a Boeing 777, was lost over the southern Indian Ocean on 8 March. A search continues to locate and identify the wreckage. ■

David Learmount offers his views on aviation safety issues: flightglobal.com/learmount

CONGESTION **DAVID KAMINSKI-MORROW** LONDON

European ATCs in trial to ease Heathrow stacking

Continental European air traffic control services are participating in a trial programme aimed at reducing the time aircraft spend in London Heathrow's holding patterns by 25%.

The programme involves air traffic control services in France and the Netherlands, as well as Scotland and Ireland, instructing UK-bound aircraft to reduce speed if congestion increases in the holding stacks.

UK air navigation service NATS is limited to controlling flights only within its own airspace, which leaves relatively little time to prevent a build-up of holding traffic.

Heathrow has four holding patterns, two each to the north and south of London, in which aircraft typically spend 8min before being cleared for approach.

Rex Features

Currently aircraft spend 8min in holding patterns above the airport

The new programme, designated XMAN, will allow NATS to fine-tune the rate of inbound flights by extending its reach.

XMAN has resulted in the creation of a speed-reduction horizon at a 350nm (650km) radius from Heathrow, meaning that flights in continental airspace – as far into France as the Swiss border – can be slowed, absorbing 3min of delay.

This will be achieved through a co-operative pact with French air navigation service DSNA and the Maastricht upper area centre – which handles traffic over the Benelux countries – as well as Scotland's Prestwick centre. NATS managing director of operations Martin Rolfe claims XMAN represents the world's first cross-border arrivals management trial, and that it aims to trim the average holding time by at least a quarter.

"We expect the trial to be a significant benefit to our airline customers in terms of fuel savings," he adds. The test programme will run until the end of this year.

Pre-trial testing involved British Airways flight BA74 – a Boeing 747-400 arriving from Lagos on 21 March – which exchanged live XMAN data with controllers at France's Reims centre. The centre's project leader, Gerald Regniaud, says a dedicated human-machine interface provides Heathrow arrivals management data to the French side. ■

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PROGRAMMES **MURDO MORRISON** LONDON

Bombardier dismisses 90-seat Q400

Canadian airframer rules out turboprop stretch to focus on high-density configuration and possible "combi" variant

Bombardier is firmly ruling out developing a 90-seat stretch of its Dash 8 Q400 turboprop, and will instead focus on promoting an 86-seat, high-density configuration of its existing aircraft.

The Canadian airframer also believes a "combi" version of the turboprop – with a moveable bulkhead and expanded cargo area – could be a route to developing new markets, especially in Asia. Such a move could help in extending the life of the programme, said Mike Arcamone, president of Bombardier Commercial Aircraft, speaking after an Aviation Club luncheon in London on 27 March.

Bombardier will "not build" a longer-fuselage version of the Pratt & Whitney Canada PW150A-powered Q400, he says. "It's not in our plans", he adds.

With five aircraft types in development, another certification effort would compound Bombardier Aerospace's financial headaches, even if the airframer saw market potential for a stretched Q400.

The company already faces mounting costs from its delayed CSeries and Learjet 85 business jet programmes, and has two further Global executive jets under development.

Instead, Bombardier is focusing on exploiting "flexible" applications for the Q400 in emerging markets, says Arcamone. There is a "lot of interest" in a combi variant as well as the 86-seater, for which Thai low-cost carrier Nok Air is launch customer, he adds.

Although Bombardier has no firm customers yet, the combi conversion would come under a supplemental type certificate, allowing customers to move the bulkhead in a maintenance facility. Indonesia, where there is a need to transport small consignments of cargo as well as passengers between remote airports, would be a "major market" for the variant, he says. ■

Bombardier

Indonesia is a key target market for the "flexible" type

POWERPLANTS **STEPHEN TRIMBLE** WEST LAFAYETTE

GE chief throttles back on CMCs for 777X engine

General Electric is adopting a cautious line on the prospects for incorporating fuel-saving ceramic matrix composites in a critical component for the GE9X engine selected to power the Boeing 777X.

GE Aviation president and chief executive David Joyce appeared to backtrack on earlier commitments to greatly expand the use of CMC materials on the GE9X, including replacing nickel alloy for the stage 1 blades of the high pressure turbine.

The CFM International Leap engine – in which GE is a 50% stakeholder – features the lighter, stronger alternative to exotic metal alloys in the stage 1 turbine shrouds. GE has also said the Passport 20 engine for the Bombardier Global 7000 and 8000 ultra-long-range business jets will be partly made using a new form of CMC.

Last June, Joyce personally showed off a CMC-derived stage 1 turbine blade for the GE9X, explaining how it could account for as much as 15% of the promised fuel savings for the GE9X.

However, speaking at a factory announcement in West Lafayette, Indiana on 26 March, Joyce adopted a more cautious tone, noting that the technology must also pass a high bar for manufacturing readiness.

"If we don't [adopt CMC turbine blades] it can always become an upgrade on the engine at some time in the future," Joyce says. ■

PRODUCTION

CFM partner breaks ground on Indiana Leap assembly plant

General Electric will assemble half of its share of the CFM International Leap-series engine orderbook at a new 21,000m² (225,000ft²) facility in West Lafayette, Indiana.

The manufacturer, which is partnered with Snecma in the CFM joint-venture, formally unveiled the concept for the $100 million West Lafayette facility – the company's seventh new factory-opening in the USA since 2007 – in a ceremony attended by GE Aviation president and chief executive David Joyce.

"GE Aviation is on a strong growth trajectory," Joyce said in a speech at the ground breaking event on 26 March. GE has booked orders for 6,000 Leap powerplants across three aircraft types – the Airbus A320neo, Boeing 737 Max and Comac C919.

Hiring at the West Lafayette facility will begin in 2015, and could create more than 200 jobs within five years. GE plans to split the assembly of Leap engines and the high-pressure sections between West Lafayette and an existing factory in Durham, North Carolina.

"Because of the huge Leap backlog, we have to move fast," Joyce says. ■

Paveway IV gets agile for Typhoon
DEFENCE P18

REQUIREMENT

Saab, Pilatus to pitch PC-21 for Sweden

Pilatus and Saab are to offer the former's PC-21 turboprop trainer to the Swedish air force, for a potentially 20-aircraft requirement to replace its Saab 105s.

Signed in Bern on 28 March, the memorandum of understanding is the result of "long dialogue that began with the selection of the Gripen E in Switzerland," says Saab chief executive Håkan Buskhe. Describing a potential deal as "a win-win situation for both countries", the Swiss airframer says: "The PC-21 has been the subject of sales negotiations between Pilatus and Sweden for some time." Pilatus has to date sold a combined 131 PC-21s to the air forces of Qatar, Saudi Arabia, Singapore, Switzerland and the United Arab Emirates. ■

CONTRACT **GREG WALDRON** SINGAPORE

Manila seals order for FA-50 fighters

The Philippines has signed a $420 million contract for 12 Korea Aerospace Industries FA-50 fighters, with the aircraft to be delivered within 38 months of the deal coming into effect, the company says.

Signed between the governments of the Philippines and South Korea, the long-awaited acquisition marks an important step for Manila, which has had no operational fighters since the retirement of its fleet of Northrop F-5s in 2004.

Derived from KAI's T-50 advanced jet trainer, its FA-50s will be suitable both for pilot instruction and light combat duties.

Entering service with South Korea's air force with an Elta Systems EL/M-2032 fire-control radar and Link 16 tactical data link, the General Electric F404-powered FA-50 can carry air-to-air and air-to surface weapons up to a maximum combat load of 4,500kg (9,920lb).

Korea Aerospace Industries

The type can carry a maximum combat payload of 4,500kg

KAI, which has previously also sold 16 T-50is to Indonesia and 24 FA-50 derivatives to Iraq, is eyeing potential export opportunities in Peru, Thailand and the United Arab Emirates, and will offer the trainer with development partner Lockheed Martin for the US Air Force's T-X requirement. ■

FLEETS **DOMINIC PERRY** LONDON **STEPHEN TRIMBLE** WASHINGTON DC

Qatar flexes its procurement muscle

Doha to advance multi-billion-dollar plans to acquire attack helicopters, aerial refuelling tankers and AEW&C aircraft

Qatar used its biennial Doha International Maritime Defence Exhibition and Conference to advance potential deals for new attack and transport helicopters, airborne early warning and control (AEW&C) system aircraft and in-flight refuelling tankers.

The Gulf state looks set to acquire 24 Boeing AH-64E Apaches as part of a new spending spree, with Flightglobal's Ascend Online advisory service recording these as due for delivery between 2015 and 2017.

The US manufacturer is also reported to be in line to supply the Qatar Emiri Air Force with three 737-based AEW&C aircraft. Neither Boeing nor the US Defense Security Cooperation Agency, which would broker any sales made using the Foreign Military Sales framework, have commented on the selections.

European sources confirm, however, that Doha has signed a letter of intent covering the possible acquisition of 22 NH Industries (NHI) NH90 helicopters, in a deal worth around €2 billion ($2.8 billion). The tentative agreement includes the expected purchase of 12 tactical transports and 10 examples in the navalised NFH configuration.

Anthony Pecchi/Airbus Helicopters

An order for 22 NH90s is among the deals under discussion

Airbus Helicopters revealed in January that it was in talks with Doha over a possible NH90 order, but no timeline has been revealed for the expected conclusion of negotiations, and NHI declines to comment. Oman is currently the consortium's only Middle Eastern operator of the type.

Meanwhile, Airbus Defence & Space announced on 27 March that it has been selected to supply two A330 multi-role tanker transports to Qatar, which currently lacks an in-flight refuelling capability. This would be required to support a future fleet of fighters to be acquired from a candidate list including the Boeing F-15E and F/A-18E/F Super Hornet, Dassault Rafale, Eurofighter Typhoon and Lockheed Martin F-16.

If advanced, the new purchases will continue a substantial investment made by Doha over the recent years. This has seen it introduce Boeing C-17 and Lockheed C-130J transports and order 24 Pilatus PC-21 trainers.

Also at the show, Thales signed a memorandum of understanding with Qatar's armed forces to develop an optionally-piloted aircraft to be used during intelligence, surveillance, target acquisition and reconnaissance missions. Doha's military will be responsible for selecting the aircraft type, while the company will integrate its remotely-piloted capability and mission system equipment. ■

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INTEGRATION **DAN THISDELL** GLENROTHES

Paveway IV gets agile for Typhoon

Requalification of precision-guided bomb shows it to be suitable for the Eurofighter's full range of manoeuvres

The UK Royal Air Force could be as little as four to five months away from having its Paveway IV precision-guided bomb fully qualified through the Eurofighter Typhoon's entire flight envelope, for carriage using all six under-wing carriage points.

New work by Raytheon UK has lifted the remaining Typhoon and Panavia Tornado GR4 flight envelope restrictions for the weapon, originally developed for the BAE Systems Harrier GR7/9.

Raytheon UK chief weapons engineer T J Marsden says necessary aircraft-level qualification work by BAE Systems and the Ministry of Defence could be completed within months.

The MoD says: "Raytheon UK has successfully completed a requalification programme for Paveway IV, and the results are now being assessed by the MoD and partners."

The RAF's Tornado GR4s also now have no restrictions on the carriage of up to five of the weapons, used by the type during the Libya campaign in 2011 with "a couple of restrictions" on carriage configuration, says Marsden.

Saudi Arabia also is "interested" in adopting Paveway IV for its Typhoon and Tornado fleets.

Marsden says that while the Typhoon and Tornado put far more stress on carried Paveways than the 226kg (500lb) weapon was designed to withstand, its requalification work showed the bomb to be suitable without modification for even the most extreme manoeuvres by the former. The work also shows the Paveway IV can be carried without restriction by the type throughout the weapon's 20-year storage life.

Royal Air Force operations could be launched with up to six of the strike weapons

Raytheon UK

The Typhoon requalification is an important step in the RAF's ongoing push to have the aircraft ready to take on the complete range of Tornado air-to-ground mission capabilities, by the time that the GR4 is retired in 2019.

Speaking at Raytheon UK's Glenrothes, Scotland facility, which is at the end of a 12-month transition period during which it has taken on manufacturing work previously done at Harlow, Essex, Marsden added that the MoD has also "expressed a lot of interest" in Paveway IV for its General Atomics Aeronautical Systems Reaper fleet. ■

DEVELOPMENT

Spiral development gathers pace with new warhead trial

Raytheon UK's spiral development of the Paveway IV precision-guided bomb has passed a fresh milestone, with a full "arena trial" detonation of its Spear Cap 1 low collateral damage warhead.

Chief weapons engineer T J Marsden says the early-March 2014 detonation – in a containment arena built to capture all the fragments – was a prelude to six weeks of work to categorise every fragment impact.

The results will be used to validate the company's new hydrocode modelling software, which allows it to rapidly design iterations of a warhead.

A digital seeker-equipped version of the Spear Cap 1 is also now in flight testing, with improved guidance software to track targets such as land vehicles travelling in excess of 70mph (115km/h). "Little or no" aircraft integration will be required, says Marsden.

An integrated antenna to defeat GPS jammers will begin trials in the next two to three months and be offered to the UK Ministry of Defence "quickly", while a Raytheon-QinetiQ concept for an enhanced hard target penetrator is also ready for development.

The partners have validated an expendable shroud for a hardened steel spear that fits inside the standard Paveway IV external form. ■

REQUIREMENT **ATUL CHANDRA** BENGALURU

India starts scan for new AWACS host platform

New Delhi has launched a global tender for the supply of six aircraft to serve as platforms for its ambitious Airborne Warning and Control System India (AWACS India) programme.

The tender invites bids from airframers by 15 July for the "supply of suitable aircraft with necessary structural modifications, power and endurance adaptations", together with "equipment installation/installation provisions for the AWACS India role".

A smaller system using the EMB-145 is already in development

Embraer

The project will also include design and certification tasks, including the manufacture and fitting of a 10m (33ft)-diameter antenna rotodome via a supporting pylon.

The Bengaluru-based Centre for Airborne Systems (CABS) is leading the AWACS India programme, which received approval from the nation's Cabinet Committee on Security in February 2013. The effort is scheduled to be complete by 2020-2021.

CABS is also involved in the design and development of an indigenous airborne early warning and control system, being integrated with three Embraer EMB-145 regional jets. This is currently three years behind schedule.

The Indian air force at present has three A-50EI Phalcon platforms developed from the Ilyushin Il-76, but earlier plans to acquire an additional two have so far failed to progress. ■

Pilots must go back to basics
NEWS FOCUS P21

CERTIFICATION CRAIG HOYLE LONDON

MAA assessing UK Rivet Joint safety

Authority expected to issue its decision on the airworthiness of modified RC-135W surveillance aircraft within weeks

The UK Military Aviation Authority (MAA) expects to within weeks reach a decision on the airworthiness of the Royal Air Force's RC-135W Rivet Joint surveillance aircraft, which should be introduced operationally from later this year.

US company L-3 Communications is modifying three 1964-vintage KC-135R tankers to the Rivet Joint signals intelligence-gathering configuration for the RAF, with the first having been delivered to its Waddington air base in Lincolnshire last November. The aircraft has not been flown again since its arrival, as certification activities continue.

"We've been given some big boxes of paperwork, and our team will take 20 working days to assess Airseeker and the release to service recommendation," says Air Marshal Dick Garwood, director general of the MAA.

Over two years ago, the RAF's chief of materiel (air), Air Marshal Simon Bollom, warned that the age of the airframes being adapted via the UK's Airseeker programme would require additional methods to be adopted to complete certification via the MAA, as the required evidence "may be limited, or not exist at all".

This could include drawing on the US Air Force's decades-long experience of the RC-135, and culminate with the MAA and service "duty holders" accepting increased operating risk due to the importance of the platform's role.

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The signals intelligence platform has not flown since arriving at RAF Waddington last November

RISK AND ACCOUNTABILITY

Speaking at an Air Power Association meeting in London on 25 March, Garwood said the MAA has had a major cultural impact on the UK armed forces since it began operations in April 2010.

Airworthiness oversight for the services is now held by five operating duty holders – each with a personal and legal responsibility – and then up through the air force, army and navy chiefs and to defence secretary Philip Hammond.

"The risk and accountability is now in the right place. The frontline like it," Garwood says.

"I think the rules are appropriate, and are better than they were. The difference now is we do enforce the rules. I think the culture is changing, and improving."

The MAA, which has 260 staff, receives around 12,000 reports per year from the duty holder area, and shares its relevant findings via an online air safety "dashboard".

Categorically rejecting criticism from some that the organisation has imposed an "insidious safety culture", Garwood says: "We have people out there now who understand risk, and how to manage it. It's a focus on risk to life – I'm not interested in risk to reputation, money or anything else."

Meanwhile, the MAA is working with comparable airworthiness authorities in France and the USA to recognise each others' practices. This will save time and money while collaborating on projects like the Airbus A400M and Lockheed Martin F-35B, and assist with any future British Army move to acquire Boeing's AH-64E Apache, Garwood says.

Under current plans, the MAA will be expanded into a tri-service Defence Safety Authority organisation, expected to be fully operational in April 2016. This body will be responsible for the safety of air, land, maritime and nuclear systems, plus ordnance. ■

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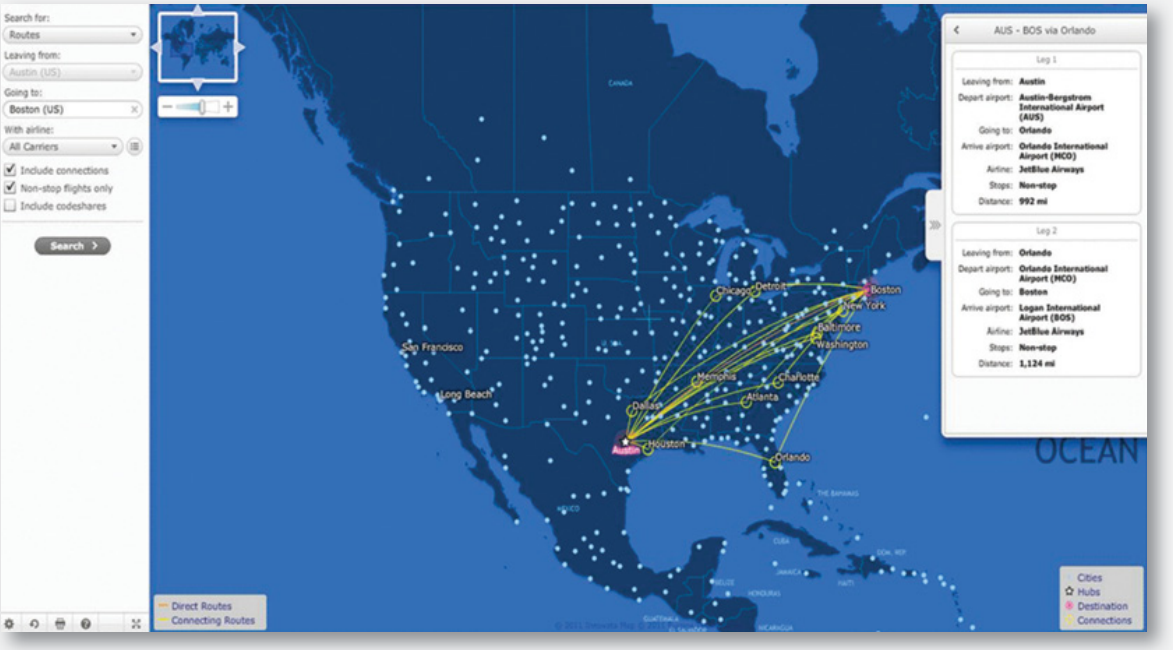

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Flightglobal

AVIATION CONNECTED

Start-up seeks backing for Triton triple-cabin concept
BUSINESS AVIATION P22

TRAINING **DAVID LEARMOUNT** LONDON

Pilots must go back to basics

Flightdeck automation is rampant, and industry commentators believe it is time flightcrews relearned how to actually fly

There are signs that influential decision-makers in the airline industry have decided pilot training needs to revisit the basics.

However, it remains to be seen whether the advice and guidance that emerged at the Royal Aeronautical Society's "Aircraft commander in the 21st century" conference – the third in a series that started in 2012 – will translate into action.

The events addressed growing industry concern over a degradation in airline pilot performance. This was heightened by a series of loss-of-control events like Air France 447 over the south Atlantic in 2009, and reinforced by the Asiana Boeing 777 crash on landing at San Francisco last year.

It seems some pilots no longer routinely watch basic aircraft performance indicators like airspeed, attitude and power. The automatic systems are so good that pilots are beginning to trust them implicitly, leaving them free to monitor different things. But exactly what is attracting the attention of today's airline pilot?

CHANGING ROLES

The RAeS conferences concluded that the airline pilot's job has changed from aviating to systems management, but without any adjustment in the way they are prepared for the job. This is despite the fact a pilot who retired in 1979 would hardly recognise anything on the flightdeck of a Boeing 787.

Aircraft systems have become far more complex, and the automatic tools that pilots use to control and navigate them are now so accurate that flightcrew have no cause to handle the aircraft.

Speaking during an open forum session at the end of the 25-26 March event in London, Capt Mike Varney of Airbus and Capt Steve Hawkins of British Airways separately came to the same conclusion: pilots have to be reintroduced to their aircraft as flying machines, because both they and their employers have become obsessed with systems management, to the exclusion of flying. The operations and training leadership at both organisations have taken up the idea of tripping out the flight director and turning off the automatics at the beginning of type or recurrent simulator training sessions.

PA

The Asiana 777 crash at San Francisco highlighted growing concerns

Hawkins says BA is now giving pilots time to "fly" visual patterns with no flight director and no autopilot, while Airbus is introducing new A350 pilots to the aircraft by allowing them to discover it as a flying machine first, before exploring the systems. Both report an improvement in pilot performance for the rest of the training sessions.

Dr Kathy Abbott, senior human factors scientist at the US Federal Aviation Administration and NASA, remains an advocate of the pilot as an overall risk mitigator, despite the fact that some occasionally make fatal mistakes.

The industry needs to study how pilots get things right even when under stress, and consolidate on that, she says, rather than agonising about how they get things wrong. According to a mass of operational data studied by the FAA, only one out of 10 flights go according to the flightplan filed and programmed into the flight management system, meaning that the pilots are there to cope with all the variables. Abbott cites the Hudson River ditching and the Qantas A380 catastrophic engine failure as situations in which crews managed beautifully, where automation would not have been able to do so. The skills, knowledge and character that enable crews to cope in high stress situations like these need to be understood and reinforced, she says.

> **Both pilots and their employers have become obsessed with systems management, to the exclusion of flying**

In a November 2013 report entitled "The operational use of flightpath management systems", the FAA says industry has not got the balance right in the way it prepares pilots to use automation. As raised in the conference forum, the need to keep pilots competent in "core skills" is often cited, but industry needs to review what "core piloting skills" actually consist of today.

MENTORING PROGRAMME

Deke Abbott, aviation safety inspector, air carrier operations at the FAA, does not see airlines providing any more time for training, but thinks mentoring could make a difference.

Envisaging a classroom or one-on-one ground-based scenario, he wants to reintroduce the idea of pilot role models, with the more senior and experienced flightcrew giving time in the air and on the ground to encourage the less experienced. This was backed up from the conference floor with a suggestion that all pilots – particularly the new ones on the line – should be given motivation for self-improvement as knowledgeable, expert aviators.

Former BA pilot Capt Hugh Dibley believes co-pilots should be treated by their commanders as captains-in-waiting, and regularly entrusted with tasks normally assumed by the captain during line operations. This kind of mentoring makes them better co-pilots and eventually good captains, he says.

Another point is that airline operations people are not successful at "selling" operational imperatives, like the need for revised or extra training, to the airline board. If these aims are ever to be achieved, they must find the language and the figures to convince top strategists to "buy into" the operational aspects of safety. Unless they do, the resources to improve will not be made available. ■

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IN BRIEF

GRAND OPENING

Embraer has opened its new business aircraft service centre at Bertram Luiz Leupolz airport in Sorocaba, Brazil – 80km (49 miles) west of São Paolo. The 20,000m² (215,300ft²) facility has two hangars – one dedicated to maintenance, repair and overhaul of Embraer jets, and the other for transient business aircraft. Embraer has selected Universal Aviation to run a fixed-base operation at the site.

MERIDIAN MILESTONE

Piper has delivered the 550th M-Class Meridian single-engined turboprop to a Swedish customer. The Pratt & Whitney PT6A-42A-powered type – Piper's top-of-the-range product – will be used for personal and corporate transportation. Annual deliveries of the $2.2 million Meridian fluctuated from a peak of 98 in 2001 – one year after it entered service – to just 23 in 2003, according to Flightglobal's Ascend Online database.

MEXICAN GLOBAL

Bombardier has delivered the first Mexican-owned Global 6000 to operator Aero Angeles. The Canadian airframer says it has delivered 30 Global-series business jets to customers in Latin America, where its installed base totals around 470 business jets to date. Bombardier expects to account for more than 2,300 new business jet deliveries over the next 20 years.

TOP PROP

Hartzell has received European supplemental type certification for its swept airfoil composite five-blade propeller for the Daher-Socata TBM 700/850. The prop boosts the single-engined type's take-off acceleration, climb rate and cruise speed, and is also "significantly quieter in the cabin" than the existing propeller, says Hartzell.

NEW DESIGN **KATE SARSFIELD** LONDON

Start-up seeks backing for Triton triple-cabin concept

Micronautix courts aerospace manufacturers to help bring single-engine aircraft to market

The designers of an unorthodox aircraft with twin passenger pods sitting either side of the central fuselage are seeking the backing of an established aerospace name to bring their single-engine pusher-prop to market.

Charlee Smith, founder of Templeton, California-based Micronautix says he has already approached a number of original equipment manufacturers, including General Atomics, Extra Aircraft and Aurora Flight Sciences, about the Triton concept but nothing has materialised. "They are happy to assist with the programme as long as I come up with $60-plus million to help finance it," he says.

However, Smith is undeterred. "I would be willing to hand over the design rights to the most suitable company, just to see the Triton become a reality," he says.

Smith, who is also the vice-president of adhesive manufacturer BSI, admits developing a new aircraft poses significant challenges – not least the huge sums involved in bringing the design to market. "Aviation history is filled with failed concepts that designers have attempted to bring to market by themselves," says Smith. "I feel the positive impact the Triton can have on aviation is more important than my own personal gain."

Micronautix

The type is aimed at owner-flyers, air taxi and air tour operators

The Triton's design features a centre pod which houses the pilot and a single passenger. This is flanked by two "cabins", each holding two passengers.

"The Triton will provide panoramic views and luxury car-like accommodation in a fighter jet-like environment that sitting in the back seat of today's average GA aircraft just can't provide," says Smith.

The type will be powered by a 450hp (330kW) Rolls-Royce M250-B17F/2 turboprop, providing a cruise speed of around 165kt (310km/h), stall speed with flaps of 60kt and a range of 820nm (1,500km). Gross weight will be around 1,900kg (4,200lb), with an empty weight of 1,200kg. The Triton will have a wingspan of 13m (42ft) and a wing area of 19m² (205ft²).

The aircraft will also be equipped with a ballistic recovery system.

Micronautix plans to offer a number of versions of the type, including an amphibian and an electric hybrid "which will provide up to 20min of near silent flight over noise-sensitive areas", such an national parks, says Smith.

The Triton is being targeted at owner-flyers, air taxi and air tour operators. Micronautix plans to unveil a one-sixth and one-tenth scale model of the Triton later this year. ■

LIGHT JETS

Embraer delivers 300th Phenom 100

Embraer has delivered the 300th Phenom 100 to Brazilian agricultural company Laticínios Bela Vista – already an owner of the entry-level type.

The twinjet was purchased with the intent of being used by the Bela Vista de Goiás-based enterprise for executive transportation. The Phenom 100 was launched in 2005 and entered service three years later. The latest version – launched late last year and renamed the 100E – features multifunction spoilers and a number of enhancements to the type's interior.

According to Flightglobal's Ascend Online database, Embraer has 123 orders for the six-seat aircraft, and options for a further 49. ■

PHENOM 100 DISTRIBUTION

Region	Fleet
North America	154
Latin America/Caribbean	103
Europe	26
Asia-Pacific	14
Africa	3
TOTAL	300

SOURCE: Flightglobal Ascend Online

Electric dreams
FEATURE P24

MANAGEMENT DAN THISDELL LONDON

New fight for Finmeccanica

A review of a corporate governance culture that failed to avert an existential bribery crisis is the first step to redemption

As Winston Churchill might have put it, this is not the end. And, since the road ahead is long, it is not obviously the beginning of the end. But this corporate governance committee report is at least the end of a traumatic beginning for Finmeccanica.

That report was commissioned in February 2013, days after Alessandro Pansa was elevated to chief executive after predecessor Giuseppe Orsi's arrest in connection with the still-ongoing investigation into bribes allegedly paid to win a deal to supply helicopters to India.

The independent Flick Committee concludes that Finmeccanica "has launched a thorough and positive reform of the governance system" and laid down recommendations geared to ensuring transparency, compliance and "correct behaviour".

But the committee – named after chairperson Giovanni Maria Flick, a former president of Italy's constitutional court and justice ministry – is withholding judgement until the new rules "penetrate the culture underlying the rules themselves."

NOTES ON A SCANDAL

Finmeccanica's woes are plain for all to see. A disastrous 2011 saw heavy losses at its power and road and rail transport divisions and a €750 million ($1.02 billion) write-down against defects in fuselage sections and horizontal stabilisers it supplies to the Boeing 787 programme contribute to a net loss of €2.3 billion.

Finmeccanica

Key programmes are increasingly difficult to 'leverage'

The India scandal has cost the company both Orsi, who was head of AgustaWestland when the deal to supply 12 AW101 helicopters was sealed, and his successor Bruno Spagnolini.

Flick's summary of the roots of the corruption crisis is illuminating. In the 2002-2011 period – which saw the acquisition of GKN's share in AgustaWestland and the $5.2 billion acquisition of US defence electronics firm DRS Technologies – sales tripled to more than €18 billion and headcount nearly doubled to 75,000. During that time, management culture evolved around loose control of operating units.

Throughout, little was done to establish robust reporting and governance standards that might have averted the trouble in India. The 2008 financial crisis and decline in US and European defence spending only amplified pressure to win sales.

For sure, the determination of Finmeccanica's top brass to both overhaul operational performance and root out corruption is impressive. Orsi, who stepped up to head Finmeccanica at the tail end of 2011, set in motion the restructuring around aerospace that Pansa is now driving.

For a company in financial distress, Pansa – a former banker – now seems like the right chief executive. Likewise the chairman: Giovanni de Gennaro, appointed in June 2013, is a police professional with a distinguished career as an anti-Mafia crusader.

The 2013 results (*see table*) show some pressure coming off the financial side, especially given progress toward divesting the road and rail units. But while the numbers are encouraging, recovery might best be described as delicate.

FIGHT ON TWO FRONTS

As Pansa told investors in a briefing on the 2013 results, key programmes like Eurofighter, Tornado and Meteor (missile, with MBDA) are increasingly difficult to "leverage", and Finmeccanica faces a real challenge to invest enough to "remain on the technological frontier".

There is more transition to come. This year, Finmeccanica has put in place a "new organisational model" which follows Flick's emphasis on greater centralised control. The group is demolishing barriers between operating companies by introducing formal, group-wide skills networks and "verticalizing" support functions. As Pansa put it: "No-one can feel safe in this new model, but everyone can fill himself with a lot of opportunity."

Joseph Lampel, professor of strategy at City University London's Cass Business School, says the Flick committee is right to distinguish between the opportunity for reform and actual change. To change attitudes in such a large company will take years of constant effort at all levels.

Meanwhile, he notes, a European company like Finmeccanica relies increasingly on exports to countries where corruption is endemic. And, where incentives are linked to sales, it is too easy for corruption to persist unless all vestiges of a "don't ask, don't tell" attitude are purged. Management, he stresses, "must ask!".

Moreover, the fight against corruption is a battle that pits large, short-term incentives to bribe and win a deal against far greater long-term costs – financial and reputational – which typically are born by later generations of management. Finmeccanica's India troubles will prove unusual, says Lampel, if individuals directly linked to wrongdoing end up paying for it.

Ultimately, Finmeccanica is fighting for its life on two fronts: against a changed geopolitical and economic environment, and against a self-destructive internal culture. As the Flick report puts it: "This double transition requires a significant organisational effort and the results will be more fully evaluated in a mature phase of the process." ■

FINMECCANICA 2013 RESULTS BY DIVISION € MILLION

	Orders	v 2012	Revenue	v 2012	EBITA	v 2012
Helicopters*	4,384	+9.2%	4,076	-3.9%	562	+18.8%
Aeronautics	3,980	+25.6%	3,343	+12.4%	182	+75%
EU defence electronics**	3,457	+7.8%	3,214	-10.5%	71	-54.5%
US defence electronics***	2,018	-18.5%	2,240	-19.1%	198	-32.4%
Space	1,002	+15.7%	1,051	-0.2%	94	+11.9%

*AgustaWestland **Selex ES ***DRS. SOURCE: Finmeccanica

ELECTRIC DREAMS

The technology to empower battery-powered aircraft is improving, but regulatory hurdles continue to hold back the burgeoning industry

KEN WALKER LONDON

Electric aircraft are coming. But not as quickly as their backers predicted just a few years ago.

As this year's Aero Friedrichshafen show rolls round, the pace of introduction has slowed as a combination of technical and regulatory factors have conspired to delay what its enthusiasts tout as near-silent, inexpensive flight.

Electric aircraft are undoubtedly "growing in popularity, just in the amount of technology we're seeing coming forward", says Experimental Aircraft Association (EAA) spokesman Dick Knapinski. A significant problem is persuading regulators to keep pace with that technology.

A particular difficulty is US Federal Aviation Administration regulations that insist on the use of reciprocating engines in certain classes of aircraft. These were formulated to prevent turbines from being fitted to light aircraft but have had the unintended consequence of severely limiting the use of electric motors.

"One of the big things right now is working with the regulators in the USA, making [electric propulsion] possible, allowing electric propulsion to be part of the ultralight and light sport aircraft categories," says Knapinski. "We would like to open that up into other aircraft categories so that as the technology emerges, the regulatory environment here in the USA would be able to accept these products. That's probably the most important hurdle."

Knapinski believes that the FAA has taken on board the need for change. "They just have to work through all the legalities in changing the language."

Brien Seeley, co-founder of the Comparative Aircraft Flight Efficiency (CAFE) Foundation, believes that the electric aircraft market needs some sort of stimulus to propel it from the fringes into mainstream use.

Chinese company Yuneec International has probably done most in this regard, he says.

Overall, the general aviation market has seen little innovation or investment in recent years, he says. Indeed, it has tended to be military-biased companies such as General Atomics or Northrop Grumman that have been looking most closely at electric power – for unmanned aerial systems, not light aircraft.

The problem of energy density – extracting enough power for sufficiently long periods – can be solved by using replaceable battery packs; like Knapinski at the EAA, Seeley believes the more intractable problem comes in the form of the regulatory regime.

NO RULES

"Research has shown that [a suitable power source] is already do-able, but as soon as you make the vehicle, you run into the question: 'How will the FAA certificate the aircraft when currently there is no set of rules for doing so?'

"I think people see [electric aircraft] as the future, but it has not yet reached critical mass." If electric aircraft are really to make an impact, he believes, there is no point in them simply replacing Cessnas and Pipers in what he describes as a saturated market; a revolutionary jump in capability is required.

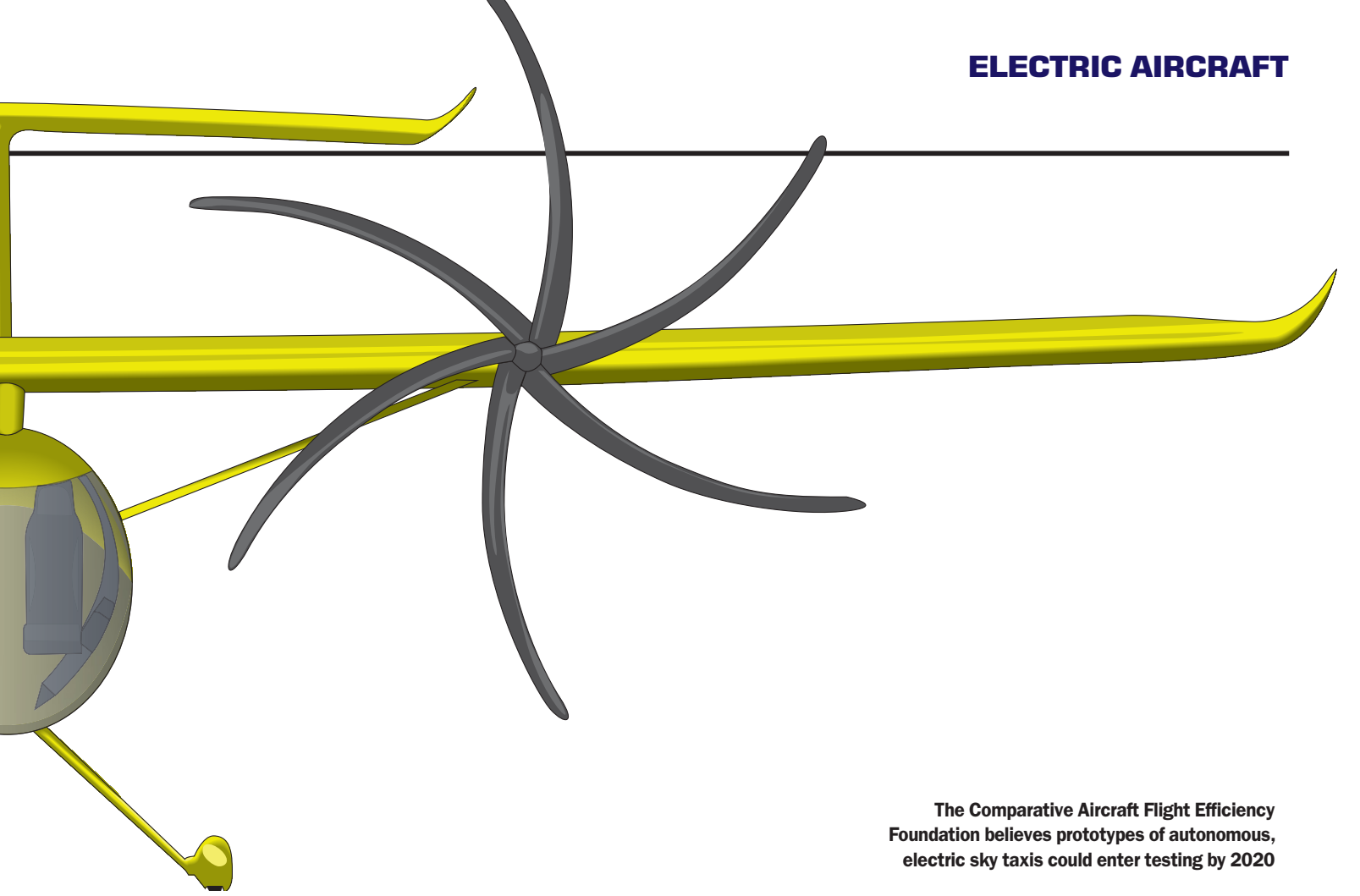
That capability could come in the form of short take-off, ultra-quiet, autonomous "sky taxis", he believes, although a halfway house would be a remote pilot overseeing the flight.

He sees these electrically-powered aircraft largely replacing the traditional owner-pilot model. A queue of waiting two-passenger sky taxis at small, secure airfields around towns and cities could deliver the swift transport that a time-pressed world demands. He believes that prototypes could exist by the end of the decade.

Seeley also cites the expense of bringing a new aircraft to market and jumping through the certification hoops, which can cost anywhere from $50 million to $100 million. This could be overcome, but it would require an act of will by governments to ease the regulatory burden.

In *Flight International* four years ago, Seeley said he was "extremely confident, 99% or more, that in 10 years, electric general aviation aircraft will be flying". Lack of funding, he admits, has probably pushed that date four years downstream.

Although energy density issues are being solved for fixed-wing electric aircraft, they remain problematic for rotary-wing models. Sikorsky's Firefly project involved taking a Schweizer S-300C light helicopter and replacing its Textron Lycoming HIO-360 D1A with an electric motor powered by lithium-ion



The Comparative Aircraft Flight Efficiency Foundation believes prototypes of autonomous, electric sky taxis could enter testing by 2020

battery cells. When *Flight International* reported on the project in July 2011, the helicopter was said to be just months away from its first flight. Almost three years later, that milestone has yet to arrive.

Firefly programme manager Jonathan Hartman says "the technology is sound and the vehicle is ready". The problem: getting enough power from an electric power unit to cope with the particular stresses required by vertical take-off and landings.

"Sikorsky Innovations looks forward to incorporating and flying a future energy storage system that provides a meaningful amount of endurance," says Hartman. "The most significant challenge for further development at present is finding an energy storage system (batteries, fuel cells, super capacitors as examples) with a sufficient balance of energy density, power density, safety and reliability to provide a compelling flight endurance for a VTOL application." There is currently no indication when Firefly will take to the air.

> **"I think people see [electric aircraft] as the future, but it has not reached critical mass"**
>
> **BRIEN SEELEY**
> Co-founder, CAFE

A similar problem struck Colorado-based Bye Energy, which built an electrically-powered Cessna 172. "We went through the rigour of ground taxi and flight tests," says founder George Bye. "It was very valuable research, but the energy density of the batteries wasn't sufficient to make it a practical solution."

Battery technology is advancing steadily and energy density has doubled in the past few years, which brings the prospect of commercially viable electrically-powered flight closer. For the moment, however, Bye's company is focusing on unmanned designs aimed at the governmental or military markets, notably making use of solar energy cells embedded in the airframe.

GERMAN EFFICIENCY

Germany is in the vanguard of electrically-powered flight, with Lange Aviation having successfully obtained EASA certification for its Antares 20E motorglider (a larger version, the Antares 23E, is currently flying on a national permit, pending completion of the certification process). The fleet has so far flown around 80,000h without problems, says chief executive Axel Lange.

They derive their power from lithium-ion batteries from French company Saft. Positioned in the leading edges of both inner wings are two battery packs with a total of 72 cells. "I'm not allowed by Saft to say what the output is, but it's a lot," comments Lange. The batteries have a life of around 20 years and could give power for up to 4,500 cycles.

Lange Aviation has also developed, together with the German Aerospace Centre, or DLR, the Antares DLR-H2 testbed, which the company says is the world's first piloted aircraft capable of performing a complete flight powered only by fuel cells.

This has performed flights of up to 500km (310 miles), from Zweibrücken to Berlin, with »

Yuneec International has already achieved German certification for its electrically-powered ESpyder ultralight

Yuneec International

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» a maximum time aloft of around 3.75h. This is a pure research machine, says Lange. "You need a pilot who is also an engineer and another engineer to start the fuel cells. So, it's not ready for the market. But it works."

The H2 was designed to test fuel-cell systems that may one day fly in airliners, possibly replacing the auxiliary power unit and other subsystems. In the process, it also tests systems that will be incorporated into the company's Antares H3, which is about 18 months from first flight, and for which a new type of fuel cell is currently being bench-tested.

EXTREME DURATION

This fuel cell is known as a "high-temperature PEM", or proton exchange membrane, that is used in its design. The fuel cell can use either hydrogen as a fuel – giving up to 15h of endurance – or methanol. The latter is more difficult to work with, but could give a flying time of up to 50h and a range of up to 3,200nm (6,000km). Fuel and the fuel cells would be carried in four pods under the 23m (75ft) span wings, driving a pusher propeller mounted at the top of a T-tail.

The H3 will initially be a manned aircraft, but once these extreme flight durations are proven, unmanned operation then becomes the only real option, says Lange. The H3 could be used for tasks such as earth observation or surveying. Further German involvement in the sector comes from PC-Aero, which anticipates having its Elektra One certificated by the DULV by the end of summer.

The 11m span battery-powered aircraft has around 12kWh of power, giving endurance of around 3h. Economical cruising speed will be 70-80kt (130-150km/h), with a maximum speed of around 90kt and range of more than 400km, according to chief executive Calin Gologan.

China's Yuneec International uses lithium-ion batteries to power its e430 two-seat type

PC-Aero designs and certificates the single-seat Elektra One, but will sell licences for others to build it, rather than constructing it itself.

It is also due to start work on a prototype two-seater Elektra Two in April or May, with the proof-of-concept aircraft due to take around a year to build. "I don't want to go into too many details," says Gologan. "We will be at Aero Friedrichshafen and there may be announcements there." The Elektra Two would have a new, as yet unspecified, power unit.

Fellow German company Flight Design has gone down a different route, creating a hybrid powerplant that incorporates a lithium-iron-phosphate battery to power an electric engine that acts as a starter, generator and also provides additional power during take-off and the initial 5min of climb. It supplements a Rotax 914.

"The manufacturers see the advantage," says chief executive Matthias Betsch, "but at the moment they have enough conventional projects and not enough capacity to take this additional project on board. But I think it will happen."

The company that has come closest to making electrically-powered aircraft a regular feature on airfield aprons is China's Yuneec International, manufacturer of what it describes as the world's first commercially-produced electric aircraft, the two-seat e430.

This is currently undergoing certification with Germany's DULV. Yuneec has already achieved DULV certification with its ESpyder electric ultralight. The e430 is an all-composite, V-tailed two-seat light sport aircraft, powered by lithium-ion batteries that allow 2h of flight with a maximum speed of 80kt and a stalling speed of 35kt.

MAINSTREAM AIRCRAFT

In the USA, Yuneec uses its customer service and marketing division, California-based GreenWing International (GWI) as the conduit for its products. "The e430 is designed as a mainstream aircraft that can be flown cross-country or used for primary training," said GWI's US marketing and customer service manager Tony Settember.

He sees the e430 as appealing to two classes of customers: "People who want to own something that is cutting-edge, new and eco-friendly. It will be a niche market to begin with." However, "In the USA, it won't survive on the 'wonder of flight' factor. It will be the economics."

Sharply-reduced operating costs compared with conventional aircraft will make it popular with training schools, believes Settember. "A Cessna 172 burns 8 gallons an hour, that's $48 an hour in fuel. The e430 will burn $1-3 an hour in equivalent fuel costs," he says. The electric motor is also designed to be virtually maintenance-free, he adds, whereas 2,000-3,000h on a Lycoming will require thousands of dollars worth of maintenance.

An e430 takes around 5h to fully recharge its battery, but that problem can be solved by the use of swappable battery packs. Flying schools will quickly realise, he believes, that even if they cannot do a full 40-50h training curriculum on the e430, undertaking the first 20h on it will still cut their costs significantly.

So, electric power remains on the horizon. But that horizon, in most cases, remains frustratingly distant. ■

The next electrically-powered project for Germany's Lange Aviation will be the Antares H3

CHINA TAKES OFF

With no heritage in making or operating light aircraft, the country is moving to create a GA sector by easing flying restrictions, and buying or teaming with Western airframers

KATE SARSFIELD LONDON

General aviation in China has existed on a minimal scale for decades. Little interest has been shown in this niche sector by the ruling party and the aerospace sector, resulting in a limited indigenous aircraft manufacturing base, a small installed base of light aircraft – mainly serving the agricultural and pilot training markets – and around 200 airports, which are dominated by the country's airlines and military.

Over the last five years, however, China's attitude towards GA has undergone a transformation. This vast country is now seeking to become not only a major user of light aircraft but a key player in the manufacturing of GA types. So what has triggered this change in attitude?

WATERSHED MOMENT

According to Ed Smith, senior vice-president of international and environmental affairs for the General Aviation Manufacturers Association (GAMA), the devastating earthquake in Sichuan province in 2008 marked the turning point for GA in China.

"It was one of the deadliest earthquakes in its history [claiming around 70,000 lives] and yet the government was helpless," he says. "Unable to access the devastated towns and villages due to the poor roads and a shortage of suitable aircraft, China was forced, for the first time in recent memory, to ask for international assistance to help with the recovery effort," Smith adds.

His view is supported by Roger Whyte, aviation expert and former senior executive with Cessna. "China did not have enough resources of its own to cope with this situation. Once the rescue and relief effort was in full swing, however, China soon realised how versatile and indispensable GA aircraft could be. They then set about building their search and rescue [and medical evacuation] capability," he says.

In an effort to boost the fleet even further, the government began to offer financial incentives to encourage owners and operators to buy GA aircraft that could be used in a crisis, Whyte adds. This practice continues today.

The impact of the legislation is reflected in the growth of light aircraft fleet numbers for the country. According to GAMA, China's fleet of piston singles and piston twins climbed from 807 in 2012 – the first year it lists the country's fleet data – to 890 last year, and this inventory is expected to continue on an upward trajectory.

China's ambition to mobilise and beef up its mediocre GA industry and infrastructure was laid bare in its 12 five-year plan – published in 2012 – which builds on this momentum.

FIVE-YEAR PLAN

"When the Chinese government puts it in writing, they mean business," says Smith.

The report outlines China's strategy to build a "popular and diversified" civil aviation industry, which will grow rapidly "and feature new historical development opportunities".

These expectations are set against a backdrop of economic prosperity and regeneration across China's provinces for the period of the plan ending in 2017. "Civil aviation market demands will grow more vigorously. The independent innovation capabilities of China will be improved. There will be more high-tech products and products with high added value 'made by China'," says the report.

"The five-year plan is a signal that the government will support anyone who gets into general aviation," Smith says.

"As such there has been fierce competition within the provinces to set up manufacturing centres of excellence – a Wichita of China, if you will," he continues.

US and European manufacturers have been the target of Chinese buyers – consisting of established aviation companies such as AVIC, wealthy investors seeking a fresh venture and provincial governments looking for new opportunities: "Over the years we have received a number of cold calls from Chinese provincial governments asking if we know of any GA companies that are up for sale," says Smith.

There have been many. The financial crisis of 2008 hit the global general aviation industry hard. Many companies, notably in the traditional markets of the USA and Europe, saw their sales plummet, leaving them vulnerable to a buy-out. US companies Cirrus, Glasair, Liberty Aerospace, Mooney, Teledyne Continental and Enstrom were all snapped-up by Chinese companies. So too were German companies, Thielert and Xtreme.

Other manufacturers have joined forces with Chinese companies in the hope of boosting sales of their aircraft within the country.

Cessna established a joint venture with CAIGA in 2012 to build its ubiquitous 208 Caravan in Shijiazhuang, in northern China's Hebei province, for the Chinese market.

Deliveries of the single-engined turboprop began in 2013.

Diamond

Diamond has built 130 DA40 TDIs to date at its joint venture in Shandong province

TRAINING DEMAND

Austrian airframer Diamond made its foray into the Chinese market in 2005 through a $42 million joint venture with Shandong Bin Ao Aircraft Industries, based in Shandong province. The partnership is building DA40 TDI piston singles under licence for the Chinese market and other "selected Asian countries" from its 30,000m² (320,000ft²) facility. Diamond says it has built 130 aircraft to date and has orders for another 40 DA40s. Much of the demand for its diesel-fuelled aircraft is coming from the country's pilot training schools, which are feeding the hungry Chinese airlines. "The flight schools are driving a lot of demand for light aircraft in China," says Peter Merker, founder and chief executive of MBL China Consulting. To illustrate his observation, he points out that China's eight schools have a combined fleet of only 328 aircraft and training capacity for over 2,100 pilots.

"Flight training is a steady but growing market in China," he says.

Beijing-based MBL brokers deals between Chinese, European and US companies. MBL is currently assisting in the sale of Germany's Extra Aircraft to an undisclosed Chinese buyer and helping to transfer production of the EA500 single-engined turboprop to China. MBL says it has also assisted in the sale of a "complete business jet programme" to a Chinese buyer, although it is unable to disclose the identity of either party due to the signing of non-disclosure agreements.

Merker says MBL attempted to broker acquisitions between Europe and China around a decade ago. "For the first eight years we failed completely," he admits. "The market simply hadn't opened up."

Within the last three years, however, the environment has shifted greatly, thanks to the government's directive to open up the general aviation market. "There are a lot of aviation companies and entrepreneurs who see this industry as exciting, worthwhile and a potentially lucrative business," he continues.

Mooney

Mooney – builder of the Acclaim piston single – was snapped up by Zhengzhou-based Meijing group last year

"There was and continues to be a desire to buy established companies with proven designs and technologies. These tend to be located in the traditional markets of the US and Europe."

RICH PICKINGS

Aviation analyst Brian Foley says the swoop on established brands such as Cirrus, Continental and Enstrom happened when the general aviation industry was at its most vulnerable.

"Issuing a national directive to grow GA in 2009 and 2010 was a shrewd move by the Chinese," he says. "Their economy was doing well – in contrast to the USA and Europe – so rather than start their aircraft manufacturing companies from nil, buyers were able to leap into the GA field by snapping up established brands and technologies with the help of generous government subsidies," Foley continues.

He argues that some bids made by Chinese buyers were designed to fend off rival suitors. "[CAIGA] paid a premium for Cirrus, for example. Many Western businesses were unable to make a counter offer. They were simply priced out of the market," he says.

Foley believes the rush to snap up struggling GA companies led to a "disjointed foray" into the market for China.

"There has been a lack of coordination between the buyers, some of whom have purchased competing companies, Cirrus and Mooney for example," he says.

For these struggling airframers, however, the Chinese buyers provided a much-needed lifeline and their subsequent investment in the companies helped to secure their long-term future.

Kerrville, Texas-based Mooney – builder of the Acclaim and Ovation family of high performance piston singles – was snapped up by Zhengzhou-based real estate development company Meijing group last year, after the financial crisis forced it to close its doors in 2008. With a new management structure in place, the airframer is poised to restart »

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» manufacturing, although the product offering is likely to be reduced.

CAIGA has invested heavily in the Cirrus product line since acquiring the Duluth, Minnesota-based builder of the SR20/22 piston singles and the Vision SF50 personal jet in 2011.

"CAIGA has committed $100 million to bring the SF50 personal jet to market," says Cirrus senior vice-president Todd Simmons. Before the CAIGA acquisition, Cirrus was working on the aircraft at a low level, due to a lack of funding. "CAIGA has really stepped up," says Simmons.

The first conforming prototype made its first flight on 24 March "and we expect to deliver the first Vision in the second half of 2015," he adds.

While manufacturing will remain in the USA, CAIGA has not ruled out setting up a second manufacturing base in China to service its home-grown customers. "It is prohibitively expensive to build an aircraft in the USA and ship it to China," Simmons says. "So it would be a reasonable to say that aircraft sold to China will be built in China."

CHINESE ACQUISITIONS

Chinese purchaser	Target company	Headquarters	Date	Price	Outcome
CAIGA*	Cirrus	US	2011	Undisclosed	Successful
Guizhou Aviation Industry Corporation	Grob Aerospace	Germany	2008	Undisclosed	Unsuccessful
AVIC	Piper	US	2011		Unsuccessful
CAIGA	Emivest	US	2011	$3.5 million	Unsuccessful
Zhuhai Hanxing General Aviation	Glasair Aviation	US	2012		Successful
Helipark/Shanxi Qingyun Group	Xtreme	Germany	2013		Successful
Chongqing Helicopter Investment	Enstrom Helicopter	US	2013		Successful
CAIGA	Epic Aircraft**	US	2010		Successful
Undisclosed	Walter Extra***	Germany	2013		Successful
Superior Aviation Beijing	Hawker Beechcraft	US	2012	$1.8 billion	Unsuccessful
Meijing Group	Mooney	US	2013	$100 million	Successful
Tecnify	Teledyne Continental Motors	US	2010		Successful
Superior Aviation	Superior Airparts	US	2010		Successful
AVIC	Thielert Aircraft Engines	Germany	2013		Successful

NOTES: **Subsequently sold to Russia Engineeering ***EA500 turboprop single only. SOURCE: MBL China Consulting. *China Aviation Industry General Aircraft (owned by AVIC)

Cirrus Aircraft

China's CAIGA has committed $100 million to bring the Cirrus Vision SF50 to market

CHINESE POTENTIAL

Some observers are confident that China will eventually become one of the leading markets for GA aircraft.

"The government is targeting economic growth of 7.5% over 2014 and this will lead to increased domestic spending and capital investment in new companies. This bodes well for GA," says Whyte. He compares the growth of China's GA market with the rise of its automobile industry. "It's now the largest in the world, producing 20 million units a year. If you would have told me that it would grow to be that size a few years ago, I would have laughed," Whyte adds.

As the demand for GA aircraft rises, the government has now turned its attention to the country's inadequate aviation infrastructure. "There is no point having a large GA fleet if you can't support it and give people the freedom to fly without onerous restrictions," says Foley. There are around 150 civil-use airports across China, compared with over 5,000 in the USA. The airspace is also heavily controlled by the military.

"It's going to take time to change," says Merker. "The investment and the will is there to develop the infrastructure to support the growing industry. For example, another 500 GA airfields are planned," he adds.

Merker cites a document issued in November last year by the Chinese army and the CAAC which sets out their plans to open up low-altitude airspace in China.

The new rules lift the requirement to obtain advance flight mission clearance for many GA flights, although approval is still required for flights in certain places, such as border areas and prohibited zones.

"This is one of the most important policy measures for some time," says Merker. "It will make great contribution to the liberalisation of low air spaces and to the development of general aviation in China."

Restrictions have been lifted initially for flights below 1,000m (3,280ft). Operations above this level remain limited to certain routes that are largely dictated by the Chinese military, although the plan is to eventually loosen the restrictions on operations up to 3,000m.

GAMA's Smith says that while the government should be applauded for their willingness to ease the restrictions, the current reforms – covering flights of 1,000m and below – are still fairly restrictive and benefit only a few operations, such as those involving helicopters, emergency flights and flight training.

Foley agrees: "This is a cute offer, but it's practically unusable," he says. "Within China airspace, the military is number one, followed by the airlines and then lowly GA."

"The situation is improving in dribs and drabs as the government has begun to appreciate the important role GA plays in a developing economy," adds Foley. ■

Cessna established a joint venture in Hebei province to build its 208 Caravan

Cessna

European Flight Training

Feedback from airlines on initial MPL graduates' progress was part of the methodology when the scheme was introduced

BACK ON COURSE

After a rocky start, the multicrew pilot licence is slowly becoming accepted in the business – but its detractors argue that greater international commonality is needed

DAVID LEARMOUNT LONDON

Despite the initial reluctance by much of the aviation world to welcome a new training and licensing system for today's airline pilots, the multicrew pilot licence (MPL) looks as if it will survive its teething troubles and thrive.

Although early assessments of MPL graduates' performance as airline first officers is generally good, according to feedback received by ICAO, experience at flight training organisations (FTO) suggests that modifications to the new courses will produce better results. One of the most obvious facts about the early formulation of MPL courses by FTOs in different countries is that there is a considerable variation in the structure of the courses approved by the different national aviation authorities (NAA). But because MPL students are judged according to closely defined performance in every skill they are required to demonstrate, theoretically this does not matter. Nevertheless, the training world would like to identify best practice and work toward greater international commonality.

TRADITIONAL TESTS

Simulation and training giant CAE says the main problem leading to differences between the structure of MPL courses in different states is the seemingly irresistible temptation to include existing components from traditional courses.

Examples include inserting a requirement to gain a private pilot licence under the old criteria en route to the MPL, and adopting traditional theoretical tests "in lieu of mastery tests", says CAE. The difference between the two is that theory tests are multiple choice tests of right/wrong propositions, while mastery tests require a demonstration of understanding. CAE also adds that the end-of-course requirement for base training in the actual type the graduates will fly on the line, including 12 take-offs and landings, is costly and puts many airlines off. As an example of the potential for perfectly valid differences in the structure of MPL training courses, the UK Civil Aviation Authority points out that, even within its own jurisdiction, "each MPL course that we approve [at an approved training organisation [ATO] has a different course footprint". It adds, however, that "as a rough guide" there is a total of about 13h solo training on each of the courses, none of them involve less than 240h of flying and/or time in a flight simulation training device (FSTD), and although there is no specific command time, each student will experience a split of about 50% as pilot flying (PF) and 50% pilot not flying (PNF).

CAE has distilled it down to a single sentence to show the two different objectives of the traditional commercial pilot licence (CPL) course compared with that of the MPL course. The traditional CPL course, says CAE, sets out "to meet the prescribed minimum skill, knowledge and prerequisite exposure times (not experience) needs of… the licence". On

the other hand, the MPL objective, according to CAE, is "to meet the identified skill, knowledge, and attitudinal requirements to effectively perform… the job". If the pilot demonstrates he/she can perform all aspects of the job, he/she is awarded a licence.

Back in 2005 when the standards and methodology for the new MPL were defined at ICAO, it was agreed that there would be a validation process involving all the stakeholders that would start once MPL graduates had been working on the line for a year or more after completing their line acceptance checks. Airlines employing the new MPL graduates as working first officers would be required to provide feedback on the fledgling pilots' progress. This would be backed up with input from individual NAAs that had the task of formulating the parameters for the approved MPL courses in each state, as well as feedback from the FTOs entrusted with training pilots according to this completely new philosophy.

The first milestone in the MPL validation process was ICAO's MPL Symposium at its Montreal headquarters in December 2013. Presenters from NAAs, airlines, IATA, the International Federation of Air Line Pilots' Associations (IFALPA), FTOs, flight simulator and aircraft manufacturers – and from ICAO itself – met to throw their experiences into the ring for the first time.

Operations chief at ICAO Mitch Fox reported from the symposium that ICAO received 15 data sets from MPL programmes in different countries. Without exception, these states imposed a requirement for pre-selection procedures that were coordinated with the sponsoring airlines. Performance evaluators at the approved training organisations had to meet performance requirements themselves, and for the theoretical knowledge test, nine of the states required it to be conducted by the NAA, while the remainder allowed the ATO to conduct it.

MPL VIEWS

AREAS OF CONCERN

ORGANISATIONS SUCH as the International Federation of Airline Pilots' Associations and the European Cockpit Association do not oppose the MPL, but they express concerns about possible shortcomings of the training courses as presently formulated – and about potential abuse in the hands of approved training organisations, that would put price ahead of quality.

At present the organisations are concerned the MPL is widespread in airline service without the level of validation they would have liked to see – all the way up to captaincy for the first MPLs – which has not yet come to pass.

At the ICAO MPL Symposium, IFALPA listed these areas of concern:

- Basic manual flying skills: how can an MPL gain adequate manual flying skills when they fly fewer hours in real aircraft, and when it is accepted that FSTDs are not designed to teach handling, and have no record of success in teaching it?
- Instrument flying skills: weather change and turbulence representation is not good enough in most FSTDs to gain instrument meteorological conditions flying skills.

MPL students cannot learn about ATC and how it works – because the ATC environment is not faithfully represented even in top-end full flight simulators, let alone simpler FSTDs. The MPL task analysis, says IFALPA, does not include captaincy. IFALPA alleges that the MPL under-values time spent in light aircraft as a part of training for the airline multicrew environment.

How can an MPL gain manual flying skills when they fly fewer hours in real aircraft?

Less exposure to real flying, less solo time, and more time in FSTDs means pilots do not face the "fear factor" that comes from making a mistake in the airborne environment – and having to deal with the effects of it. IFALPA believes that MPL courses are ATO-driven, not airline-driven as they should be. If the MPL student's sponsor airline suffers from a market downturn during the training course and can no longer employ the student, the trainee is left with experience on a course that only relates to the sponsor airline. It is useless for general aviation employment, and there is no agreed system of training credits. Among airline feedback at the ICAO Symposium, one IFALPA fear that is definitely borne out is that MPL pilots struggle, at first, with managing ATC and communications tasks.

Also, "father of the MPL" Dieter Harms and others acknowledge the need for an approved system of credits for MPL training when market changes result in a student completing a large part of the course and then having the job offer withdrawn by the sponsor airline. Harms argues also for a manufacturer-linked MPL as well as airline-linked MPLs. ■

CAE

CAE argues that end-of-course MPL requirements put many airlines off

SOUND CONCEPT

The feedback provided complete but de-identified data on 586 students who completed their course successfully. The success rate at most ATOs was 100%, with the lowest rate at 98%. All the states believe the MPL concept is a sound one, Fox told the symposium, and from the data it has reviewed, ICAO believes the concept has shown to be sound. He also remarked that the large variations between MPL training programmes was "to be expected" for competency-based training courses.

The general verdict of the symposium was that many lessons have been learned in the process of turning the written objectives into a viable training syllabus and the system to deliver it. The symposium agreed that, at present, »

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» the execution of the new MPL is far from perfect, but apart from the pilots' associations who still have some definite reservations about the way the MPL is currently delivered (see boxout), no-one suggested that it could not be made to work as intended. And, says ICAO, those lessons must be shared internationally, and changes made where necessary.

SLOW IMPROVEMENT

ICAO air navigation commissioner Jim Dow told the symposium that – gradually – best practices will be identified and incorporated into guidance documents like ICAO's PANS Training. That way, training to prepare aspiring pilots for today's very different kind of airline piloting tasks will slowly improve and, at the same time, the process will be standardised globally, putting to an end to the pointless differences inherent in the present nationally-based pilot licensing system, whether for the traditional CPL/airline transport pilot licence (ATPL) or the MPL/ATPL.

The delegates to the ICAO symposium learned that the early MPL courses had their weaknesses because of the steep learning curve that FTOs and NAAs had to undergo in applying the new concepts, both in the delivery of instruction and the assessment of student competency levels. Several ATOs in different countries had the same story to tell. CAE reported: "Total training time is continuously moving to an optimised total." In other words, experience with teaching for MPL is demonstrating how much time most students need to gain the required competencies and to have them measured, rather than how long it takes – in theory – to expose the students to all the syllabus boxes they have to tick before being presented with a CPL handling test.

Transport Canada said: "It has to be recognised that course length and number of training hours are not meaningful criteria to measure the quality or the success of a competency-based training scheme." Fair enough, but FTOs are finding out that, on average, it takes a certain amount of instructional and practice time for students to be able to acquire and demonstrate the skills they need.

Feedback from all parties indicates that the delivery of MPL training is a more exacting task than delivery of CPL training, because of the higher quality-control outcome standards that are built into the MPL. Originally ICAO did not require special training for MPL instructors, but now it has been persuaded by IATA and IFALPA to specify it. Instructor training for MPL delivery is competency-based, not qualification-based, but EASA has chosen to require it to be qualification-based.

MPL is under the microscope in a way that CPL is not. But all the pilot errors or misjudgements that have led to disaster in the past 20 years have been made by pilots who did their basic training under the old system, not the MPL. Many in the industry blame basic – or ab-initio – pilot training for an alleged degradation in skills, but actually FTO-provided ab initio training for CPL/ATPL is much the same as it has always been, so there is a strong argument that the skills degradation issue is all about automation-related loss of skills.

IMPROVING OUTPUT

One of the potentially desirable results of the introduction of performance-based training via MPL will be that the same degree of scrutiny, plus competency-based measurement of performance, will be applied also to the CPL, which has the potential to improve the output quality. This will probably result in training programmes for the two licences converging. If the CPL student wants a job on a multicrew flightdeck he/she has to take an additional course in crew co-operation skills.

The outcome of the symposium, as summarised by ICAO's Dow, is that the MPL is a living programme, and that the validation process should continue to enable it to improve. IATA stated that it formally backs MPL implementation. The ICAO secretariat provided a list of areas where improvement is required and greater harmonisation between nations in the implementation of the course is desirable. Basic areas that should be kept under review as judged by the student performance outcomes are the ideal ratio of actual flying to FSTD-based instruction, and the need for raw data instrument flying practice.

The message is that MPL is here to stay, but its delivery system needs improvement and so does the traditional CPL. The industry and regulators – but particularly the airlines – have to decide what skills they want future pilots to have, and how these are best delivered and sustained. ■

FICTION AND FACT

Myth

1. MPL was designed as a cheaper way of training pilots for the airlines.
2. MPL students self-select.
3. MPL students can spend as much time as it takes to achieve competency.
4. MPL students are not required to fly any solo or command time.
5. MPL does not consider captaincy and only trains copilots.

Reality

1. MPL has not saved any airline one penny. The licence cannot be issued until the trainee has reached defined levels of competency.
2. MPL students cannot begin training without selection by an airline and an approved training organisation (ATO).
3. MPL students can be trained only on a consolidated course at an ATO.
4. All the MPL courses that have been approved have specified solo and P1/command time.
5. MPL selection takes into account leadership potential, and solo/command time sows the seeds for captaincy.

PROGRESS REPORT

WHAT THE INDUSTRY THINKS

FEEDBACK ON MPL from airlines and ATOs:

■ **"Father of the MPL" Dieter Harms:** "MPL is impossible without selection. A way must be found to eliminate confusion over what competency means."

■ **Civil Aviation Authority of China:** "MPL can only be trained through an integrated course. MPLs on the line now have about 1,500h. They are good to very good without exception."

■ **Dirk Kröger vice-president pilot schools division, Lufthansa Flight Training:** "Yes, it is working. However, MPL should now be further developed in the areas of theoretical training, instructor qualification and employment flexibility for MPL holders to cope with the volatility of the airline industry." The latter sentiment is backed up by CAE Oxford Aviation Academy (OAA) after Flybe cuts meant MPL students were left with no job.

■ **Comment from several states and ATOs:** "MPLs are less confident with ATC communications because the FSTD environment does not replicate real ATC."

■ **Ethiopian Airlines:** "[MPLs] act like an experienced FO from day one."

■ **CAE Oxford Aviation Academy MPL for Flybe and MPL for Dragonair:** The first courses were a steep learning curve, and the results from the second courses were much improved.

■ **Dragonair at OAA:** Allowed a second student to be on board as an observer increased training time by one-third "with good results". No difference in handling skills between CPL and MPL graduates.

■ **Swiss Aviation Training:** "No significant differences exist regarding quality and performance between ATPL and MPL students. Saving money with the MPL programme was never an intention." ■

From yuckspeak to tales of yore, send your offcuts to murdo.morrison@flightglobal.com

Navigators found safe and well

Good news about the lost navigators of GAPAN.

Last week we reported on the distinguished organisation's name change to the Honourable Company of Air Pilots, following its royal charter, that led it to drop the "...and Navigators" bit of its monicker.

David Curgenven writes to say that the map-readers are still acknowledged in the company's full title: The Honourable Company of Air Pilots Incorporating Air Navigators. "All is not lost," he says.

Nanny state

This unusual inscription (*right*) was a common sight among the overhead stowage bays onboard Royal Air Force TriStar ZD950, as it made its recent operational farewell from service. Sabotage, anyone?

Our roving reporter was slightly disappointed to be handed the traditional "butty box" for lunch, rather than something of the slightly fresher and four-legged variety, maybe with some rice & peas. Mmm.

Near miss

Chris Barnes recounts a tale told by a colleague aboard a flight from San Francisco to Seattle. The first officer announced that on the right side a full view of Crater Lake (*below*) in Oregon could be observed.

"It is spectacular to see from the air and is the deepest lake in the USA. History says that it was formed 7,700 years ago by a volcanic explosion similar to Krakatoa. Today it is a popular National Park, with tarmac thoroughfares that hug the rim in many areas," says Chris.

However, he recounts, the idyll was ruined somewhat when one of the 'baseball caps on backwards' passengers sitting behind remarked: "Look man, it just missed the road."

Rex Features

Phew. Close call.

TV presenter Denise van Outen dons a Hardy Amies-designed 1974 air hostess uniform (original left) to mark the 40th anniversary of British Airways. Van Outen is also 40 this year.

British Airways

Who are they kidding?

Islander's return

Bob Wealthy of the Britten-Norman Aircraft Preservation Society writes to say that BNAPS is restoring a B-N Islander flown by Guernsey's Aurigny Air Services on its inaugural service 46 years ago.

The project – which includes painting G-AVCN in its original Aurigny colours – is due to be finished by June 2015, but to complete final assembly, BNAPS needs a suitable building on the Isle of Wight – birthplace, of course, of the no-nonsense prop, one of the UK aerospace industry's bestselling types.

June 2015 marks the 50th anniversary of the first flight of BN-2 prototype G-ATCT – later named the Islander – from Bembridge airport on 13 June 1965, by which time Bob says BNAPS expects to have a "completed, instrumented and furnished fuselage" on display.

Aurigny is retiring its fleet of six Trislanders (the Islander's three-engined sister) this year after 43 years operating the type.

Yuckspeak

From an Airbus Defence & Space and European Space Agency release:

High-precision Earth observation instrument = spy satellite

All under control

100 YEARS AGO

Every type of aeroplane has its peculiarities, and it is quite conceivable a pilot may get confused. On the other hand, in my opinion, if a universal standard control were adopted, it would tend to reduce this trouble. One can imagine the confusion there would be, supposing a certain make of motor car were steered by the feet.

Just plane odd

75 YEARS AGO

The news that Australia will immediately enlarge her military aircraft production to cope with a maximum of 800 machines a year is good news, but it must puzzle not a few that a country which does not manufacture cars should suddenly spring into the air with its own aeroplanes.

Wooing the Scots

50 YEARS AGO

BOAC has neglected Scotland but is now going to "woo the Scots", said Sir Giles Guthrie, the corporation's chairman. BOAC intended, he announced, to operate a daily service between Prestwick and New York, winter and summer.

Dog's dinner

25 YEARS AGO

Cleaners on a British Airways Boeing 747 found a stick of gelignite hidden in a seatback. There was no detonator with the small amount of explosive – one of several sticks placed there by Surrey Police. The intention was to train police dogs to sniff out explosives.

100-YEAR ARCHIVE
Every issue of *Flight* from 1909 onwards can be viewed online at flightglobal.com/archive

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ROTORCRAFT

Helicopters are safer than ever

I take issue with the ill-informed and incorrect comments attributed to David Learmount in the *Daily Telegraph* on 15 March.

To say helicopters are inherently unstable and the most dangerous form of transport is not only false, but damaging to our industry and insulting to its practitioners.

It may be true that the previous generation of helicopters were somewhat unstable, but they were flown very successfully by thousands of well-trained pilots, both military and civil, across a range of operations made possible only by helicopters.

Today's rotorcraft have sophisticated autopilots and stabilisation systems that are on a par with those found in commercial airliners.

Moreover, they now benefit from modern avionics, including precise navigation aids that permit simultaneous operations alongside other airspace users in all weathers and at night.

Helicopters are certainly not the most dangerous form of transport. Statistically you are more at risk on a bicycle.

The industry has worked ceaselessly to bring safety levels to those enjoyed by twin-turboprop airliners, and the list of unrelated accidents featured in the article presents a grossly distorted picture of contemporary operations, including aeromedical and police, as well as the more traditional role of air transport to locations unable to support fixed wing operations.

Indeed, the whole North Sea hydrocarbon enterprise would have been impossible without helicopters.

I would add that among the accidents listed, the majority were caused by human factors – including undue pressure on pilots – and not mechanical failure.

Sir Christopher Coville
Chairman, British Helicopter Association, Chobham, UK

Helideck weight of no concern

In your article "A new era for safety" (*Flight International*, 25-31 March) you say "The CAA will review whether operations should continue to helidecks where the overall dimensions and loading values as notified for the helidecks are insufficient to accommodate the types in use".

These "undersize or overweight" operations are those of the Sikorsky S-92 on S-61N helidecks, the EC225 on S-61N and AS332L helidecks, and of the AW139 on S-76 and Bell 212 helidecks. In all these situations, safety cases have been presented to the UK Civil Aviation Authority and Health and Safety Executive showing that for these types the size and strength of the helidecks are sufficient.

A conservative estimate in June 2013 showed that there had been over 1 million such helideck landings, all without incident. Also, the CAA safety data unit was asked to list all mandatory occurrence reports (MORs) arising from UK offshore helideck operations in the past 10 years where any difficulty was encountered. 21 MORs were detailed – none were dramatic, and none related to size or strength. The CAA will rightly want to evaluate all offshore risks, but their own (lack of) evidence in this area should tell them to look elsewhere.

For example, the "flotation bags that prevent the helicopter inverting" are something the CAA has been studying (with oil industry support) for some time and with some success, although helicopter manufacturers have not yet provided hardware. Ditching evidence proves that this is a real and deadly risk area.

"Undersize or overweight" helideck operations are also long since under way in Norway, as well as Holland, Qatar, Malaysia and Australia.

Mike Ginn FRAeS
Forest Row, UK

Confused pilots

Referencing the article "Investigators query logic and response of flight directors" (*Flight International*, 4-10 March), where the pilots were confused by and misinterpreted the presentations produced by the computers.

Another sad case of the systems flying the aircraft and not the pilots. As well as in-depth training of the management of the computer systems, there should be a policy of simulator training when such situations are presented. Modern simulators provide hundreds of scenarios.

Maybe civil aviation authorities should get more involved, being proactive instead of reactive – or not even active.

Peter Gray MRAeS
Redhill, Surrey

Floating beacon

The difficulties following the AF447 and MH370 episodes would suggest an emergency beacon designed to float off a ditched airliner would be desirable. The delays and difficulties finding the submerged recorders seem unacceptable.

Steve Gilchrist
East Lothian

Losing aircraft

If scientists can put a GPS transmitter on a Manx Shearwater and follow it from the UK to South America, the Caribbean and back to the UK, how is it that the airline industry manages to lose aircraft?

J McDermott
Hereford, UK

Important story

I do agree with John P Murphy. In his letter (11-17 March) he questions why there was no report on the Ethiopian 767 that was flown to Geneva.

In your reply you say it was "politically driven". That's not the point. For me the story is more around that one pilot takes control of an airliner while the other has left the flightdeck, and doesn't allow the other one to return. In the LAM Embraer accident, it didn't end so peacefully.

Erik Coremans
By email

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15-17 April
Asian Business Aviation Conference and Exhibition (ABACE)
Shanghai, China
abace.aero

11-13 May
Airport Show
Dubai, UAE
theairportshow.com

12-15 May
AUVSI's Unmanned Systems
Orlando, USA
auvsishow.org

13-15 May
Regional Airline Association
St Louis, USA
raa.org

20-22 May
European Business Aviation Convention and Exhibition
Geneva, Switzerland
ebace.aero

20-25 May
ILA, the Berlin air show
Berlin, Germany
ila-berlin.com

3-4 June
Heli UK Expo
Northampton, UK
heliukexpo.com

1-2 July
Ascend Finance Forum
London, UK
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11-13 July
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airtattoo.com

14-20 July
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8-9 September
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Ref: DACPM/150/2014/1207 — Date: 31 March 2014

RFP (Request for Proposal) for Aircraft Procurement Agency

1. Biman Bangladesh Airlines Limited is looking for a reputed international agency for assisting Biman in sourcing a variety of jet and turboprop aircraft for its ambitious expansion plans over the coming years. Biman will exercise purchase, dry lease or wet lease options to induct aircraft in its fleet.
2. The successful RFP applicant will need to fulfill the mandatory conditions below, and also be prepared to visit Dhaka at their own cost, to present their company and products & services. The successful RFP applicant should also negotiate recompense from the aircraft owners/lessors/agents etc without affecting the final price paid by Biman. The selected aircraft procurement agency would not be paid any commission or service charge and/or any form of payment from Biman for providing the services.
3. The mandatory conditions for the RFP applicant are as follows:
   (a) Must be a fully incorporated company, not an individual, that has been in existence for more than 5 years. Documentary proof should be sent at time of application, and full details of company ownership are to be provided;
   (b) Must not be owned or partly owned by any one aircraft leasing/ownership source, to ensure full impartiality of aircraft selection;
   (c) Must have proven track record of placing aircraft from multiple sources, to at least 5 airlines. Details are to be provided at time of application;
   (d) Must have proven track record of placing a variety of different aircraft types;
   (e) Must be prepared, after successful selection, to provide full written mandate both from aircraft owners/leasing companies, and airlines/aircraft operators;
   (f) Must be prepared to produce a professional portfolio for Biman at their own cost, and to produce evidence of similar work done on behalf of other airlines or aircraft operators;
4. Detailed information on Biman and RFP notice may be viewed at the official website of Biman **www.biman-airlines.com**
5. The proposals/offers are to be submitted latest **by 1000 hours LT** (0400 hours UTC) **on 24th April 2014** addressed to General Manger (Corporate Planning), Biman Bangladesh Airlines Ltd., Head office, Balaka, Kurmitola, Dhaka-1229, Bangladesh, through courier service or email to **dacpm150@bdbiman.com** The proposal/offer will be opened immediately after the closing time in presence of the applicant(s), if any. No proposal/offer will be accepted after the closing time. Biman Bangladesh Airlines Ltd. will not be held responsible for the late receipt of any proposal/offer due to any reason, whatsoever.
6. Biman Bangladesh Airlines Ltd. reserves the right to accept or reject any or all the proposals/offers at any time and/or stage without assigning any reason, whatsoever, and no claim will be entertained in this regard.

(Md. Belayet Hossain)
General Manager (Corporate Planning)

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Ref: DACPM/149/2014/1203 — Date: 27 March 2014

Request for Proposal (RFP)

1. Biman Bangladesh Airlines Ltd. invites Proposal/Offer for taking ACMI lease of One (01) Wide-Bodied Aircraft with capacity 450 seats or above for Hajj Operation in 2014. Airlines, Operators, Owners of Aircraft and/or Leasing Companies may submit their proposals as per terms and conditions given in the RFP Schedule. Basic information are mentioned below:

Number and Type of Aircraft	**One (01) Wide-Bodied Aircraft**
Seat Capacity	**450 passenger seats or above**
Nature of Lease	**ACMI (Aircraft, Crew, Maintenance and Insurance)**
Date of 1st flight in Pre-hajj Phase	27 August 2014 (tentative)
Date of last flight in Pre-hajj Phase	28 September 2014 (tentative)
Date of 1st flight in Post-hajj Phase	08 October 2014 (tentative)
Date of last flight in Post-hajj Phase	08 November 2014 (tentative)
Number of Flights to be operated during Pre and Post Hajj Phase	Around 30 to 35 flights in each Phase
Number of passengers to be carried during Pre and Post Hajj Phase	Around 13,500-15,750 in each Phase
Date of Manufacturing of Aircraft	**Must not be more than 20 years old as on 27th August 2014 (Commencement date of Hajj Operation 2014)**
Heavy Maintenance Check	**Major checks/maintenance of the offered aircraft must not fall due during the lease period**
Owner's Authorization	**In case the Bidder is not the owner of the offered aircraft, then the bidder must submit a Letter from the owner to the effect that the owner has authorized the bidder to lease the aircraft**
Last Date of Submission	**Latest by 1000 hours (0400 hours UTC) on 20 April 2014**
Opening Date and Venue	Immediately after the closing time and date, in the Mini Conference Room of Biman Head Office, Balaka, Kurmitola, Dhaka

2. Detail information are available in the RFP Schedule. RFP Notice and Schedule may be viewed at Biman's website: **www.biman-airlines.com**
3. Proposals/Offers are to be submitted to General Manager (Corporate Planning), Biman Bangladesh Airlines Limited, Head Office, Balaka, Kurmitola, Dhaka-1229, Bangladesh **through Courier Service or e-mail to dacpm149@bdbiman.com**. The Proposals/Offers may also be dropped in the Tender Box within the stipulated time and date, to be placed in Planning Division. No Proposal/Offer will be accepted after the closing time.
4. No unsolicited paper/document/information/approach will be entertained at any level. Bidders are requested to comply with the stipulated terms and conditions of the RFP Schedule, failing which the Proposals/Offers may be rejected at the option of Biman.
5. Biman Bangladesh Airlines Ltd. reserves the right to accept or reject any or all Proposal(s)/Offer(s) partly or wholly at any time and/or stage without assigning any reason, whatsoever, and no claim will be entertained in this regard.

Md. Belayet Hossain
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Serco UK and Europe, Front Line Command Division have vacancies for a Hawk Pilots within the Fleet Requirements Air Direction Unit working for the Multi Organisational Contract based at RNAS Culdrose.

736 Squadron provides threat simulations and training to all elements of the RN, RM and NATO warships and operates under the MAA RAs and RN regulations.

The successful applicant will have specific responsibilities, which will include the following:

- Will be an ex military (RN/RAF) pilot, with a minimum of at least one recent fast jet tour.
- Completed minimum 1800 hours
- Able to pass the Institute of Naval Medicine/OASC Initial Aircrew Medical Standard
- Carry out secondary duties within the Squadron as agreed with the customer.
- Maintain Instructional standards as laid down by the Customer and the Company.

The ideal candidate will have the following experience/qualifications:

- Current Hawk T Mk1
- Single Seat Fast Jet Background
- QWI
- Must be an EU citizen capable of passing rigorous security checks.
- The successful candidate will be expected to work on his or her own initiative and have a completely flexible approach to the Company's and Customer's tasking.

The post is vacant with immediate effect.

Salary is circa £55,000 - £60,000

Applications to charlotte.harrison@serco.com

CATHAY PACIFIC

Manager Inflight Services Standards and Safety

Department: Inflight Services

Reports to: General Manager Inflight Services

We are seeking an experienced and high-calibre individual to join our Inflight Services Department as Manager Inflight Services Standards and Safety.

Reporting to the General Manager Inflight Services, the incumbent plays a key role in leading the research, design, development, effective implementation, maintenance, assessment, tracking and measurement of standards, procedures and delivery related to cabin services and safety.

The primary focus is to ensure Cathay Pacific achieves industry best practices standards and to make sure the delivery of service and safety is in line with the corporate service philosophy while complying with the aviation safety and security requirements including the Occupational Health and Safety of our cabin crew.

Interested applicants can apply online at:
http://careers.cathaypacific.com

Cathay Pacific is an Equal Opportunities Employer. Personal data provided by job applicants will be used strictly in accordance with our personal data policy and for recruitment purposes only. Candidates not notified within eight weeks may consider their application unsuccessful. All related information will be kept in our file for up to 24 months. A copy of our Personal Information Collection Statement will be provided upon request by contacting our Data Protection Officer.

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- EASA CPL (H) or ATPL (H)
- IR (H) preferred
- AS365 type rating preferred
- Minimum of 2000 hours PIC
- 500 hours twin helicopter PIC
- HEMS experience preferred
- Candidates must have the ability to work as a member of a small team and must be willing to relocate to the North of England
- Please note that the EASA 60-year age limit for single pilot public transport applies to this role

Please send your CVs to:
Mark Griffiths (Chief Helicopter Pilot):
mark.griffiths@multiflight.com

Multiflight Limited, South Side Aviation Centre, Leeds Bradford International Airport, Leeds, West Yorkshire, LS19 7UG, U.K.

All information received will be kept in strictest confidence and used only for recruitment purposes

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Singapore, may apply via our website: **http://www.flyscoot.com/index.php/en/career**
A new LCC based in Bangkok, may write in to **joinus_nscoot@flyscoot.com**

Shortlisted candidates will have to go through online assessment tests and an assessment centre.

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Scoot™ operates medium and long haul no-frills flights between Singapore and Sydney, Gold Coast, Bangkok, Taipei, Tokyo, Tianjin, Shenyang, Nanjing, Qingdao, Seoul, Hong Kong and Perth. Operating a fleet of Boeing 777-200 aircraft, Scoot provides – in addition to fantastic value airfares – a safe, reliable and contemporary travel experience with a unique attitude – Scootitude™. Scoot is passionate about changing the way people travel long distance. Book your tickets at Flyscoot.com or contact our call centre. Find out more on *Flyscoot.com, Facebook.com/FlyScoot* or *e.Weibo.com/Flyscoot!*

Channel Islands

Director of Civil Aviation

Salary: circa £100,000 pa Five year contract

We have an exciting opportunity for someone with experience at a senior level in aviation matters to undertake this statutory licensing and regulation role based in Guernsey.

We are looking for a candidate who is self driven with the personal qualities and experience to provide strategic advice on developments in international air transport matters and effectively regulate a vital part of the Channel Islands infrastructure and to represent their interests at inter-government level.

For further information on this post and to apply please visit **www.gov.gg/directorofcivilaviation**

Closing Date: 27 April 2014

HNA

The **HNA AVIATION Group,** is announcing on ALL their fleets and **especially on their B737-NG fleet,** being the largest in the Asia-Pacific Region, vacancies for Captains and experienced First Officers.

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ONLY type-rated pilots with an age limit of 55 years (45 in case of F/Os) and with actual flight time on the type of an aircraft type applied through the website are eligible and kindly note, that there are no CCQ nor fleet transfer programs available and more details can be found on:

www.HNA-OVERSEAS.com

Hiring Airbus First Officers to join our growing fleet

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Information Sessions

City	Date	Time	Venue
Amsterdam	2nd and 3rd May	12:00 noon	Sheraton Amsterdam Airport Hotel & Conference Center, Schiphol Boulevard 101, 1118BG Schiphol, Amsterdam, Netherlands.

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Engineering

WORK EXPERIENCE KRISTIN INCROCCI

No such thing as a 'typical' day

Kristin Incrocci is owner and chief pilot of Florida-based training school LIFT Aviation. She is on the brink of launching a Cirrus SR20/22-based air taxi operation, flying from the company's Sarasota base

Why made you pursue a career in aviation?
I grew up in the right seat of my dad's airplane and from that moment on I knew that was where I wanted to be. It's a freeing feeling being in the skies and I couldn't dream of a better industry to be in. Getting to go flying on a daily basis was a dream of mine from a very young age and I'm glad I stuck with it.

What are your qualifications?
Bachelors of science in aerospace science and technology from Embry Riddle Aeronautical University. CFI, CFII, MEI, Commercial, Gold Seal instructor, Cirrus standardised instructor pilot.

Tell us about your typical day.
To be honest there really isn't a "typical" day. The weather is ever changing here in Florida's gulf coast so that can quickly change your plans. One day I could be teaching a student to fly instrument, the next day flying the King Air 350 or Phenom 100, the day after that I could be doing touch and gos with a helicopter pilot who is learning to fly a Cirrus. It's a challenge, but that's why I love it.

What do you like most about your job?
The moment after a student comes back from their first solo or one of your students passes their check ride to become a private pilot, that's the best feeling in the world. To know that you took them from no flight experience to a private pilot is thrilling. You feel like a parent again, so proud of what they have accomplished.

SRQ Aviation

Incrocci: Getting to go flying on a daily basis is a dream

What are the most challenging aspects?
It's very hard to make people understand that yes, the Federal Aviation Administration minimum requirement is only 40h of flight time to go for the private pilot check ride, but there are very few students who do it in that timeframe. Everybody is money conscious now and it is a very big price difference in terms of 40h flight time versus 60h flight time. The Cirrus aircraft can be very difficult to learn how to land, I would say that is what takes students the longest to master. Much of the time the students get frustrated with themselves that they haven't mastered the landings, so it can be a challenge to keep them motivated.

How is the US flight training market faring?
In the coming years I think we will probably see a shortage of commercial pilots just due to the cost of learning to fly. Most of our clients are private pilots who either want to own or rent a Cirrus and take Cirrus transition training. Occasionally we get students who start and learn to fly in the Cirrus.

> "I grew up in the right seat of my dad's airplane, and from that moment I knew that was where I wanted to be"

What are your plans for SRQ Aviation?
We plan to rebrand the company as LIFT Aviation and start up a FAA Part 135 charter operation out of Sarasota Bradenton International airport. We have hopes to expand the certificate to fly to other states in southeastern USA and the Bahamas. We do plan on continuing to give flight instruction and provide Cirrus rentals to our clients. In addition we plan on doing private pilot ground schools, as well as instrument and CFI academies. ■

For more employee work experiences, pay a visit to **flightglobal.com/workingweek**

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