

# Flight International

28 February-6 March 2017

flightglobal.com

## Tactical error?

Airbus chief  
Enders calls for  
urgent talks to  
lift burden of  
penalties from  
tardy A400M **7**

## Swift exit

Sukhoi reshuffle  
moves Superjet  
boss after only  
five months at  
controls on civil  
programme **11**

## Road trip

M28 Skytruck  
leaves Poland  
for three-month  
Americas tour,  
with airline use  
on schedule **14**

## HELI-EXPO PREVIEW

# Coming to the rescue

How new markets like SAR are  
helping offset oil and gas slump



£3.70



9 770015 371297



ELECTRONIC WARFARE

# SEIZE THE SPECTRUM

Staying a step ahead of emerging threats. Protecting warfighters. Improving survivability. Raytheon delivers full-spectrum solutions that span a broad range of domains and capabilities. Seize the spectrum. Protect the mission.



[Raytheon.com/spectrum](https://Raytheon.com/spectrum)



@Raytheon



Raytheon





## Flight International

### Coming to the rescue

How helicopters are helping offset oil and gas declines



Bob Sharples Photography

### COVER IMAGE

Captured on a training sortie from its Newquay base, Bristow-operated Golf Yankee – a Sikorsky S-92 – is part of a fleet providing UK-wide search and rescue cover **P22**



### BEHIND THE HEADLINES

US defence and aerospace reporter Leigh Giangreco got to experience high-g performance in the rear seat of a Lockheed Martin T-50A as it showed off the aircraft it is pitching for the USAF's T-X contest (**P16**)



Commonwealth of Australia

### NEXT WEEK AVALON

All the news from Australia's biennial air show, including the first Asia-Pacific display from the F-35 Lightning II

## NEWS

### THIS WEEK

- 6** Boeing realises big dream for new site
- 7** Atlas contract 'blunder' haunts Airbus
- 8** P&W gears up to leave production problems behind.  
After 'racy' year-end, Airbus plans smoother 2017
- 9** Poland kicks off latest round of troubled helicopter saga.  
Emirates takes final A380 with EA powerplants

### AIR TRANSPORT

- 10** LHT and MTU join forces for geared turbofan overhaul.  
Thai working with officials over R-R corruption claims.  
Final CRJ900 flight for Eurowings
- 11** MH17 radar data slows Dutch inquiry.  
All change as Sukhoi Civil Aircraft drops new boss
- 12** Aerosucre 727 departed with tailwind
- 13** APU maintenance record questioned after Antonov fire

### NEWS FOCUS

- 14** PZL Mielec's Skytruck goes on the road

### DEFENCE

- 16** T-50 flight shows Lockheed's readiness
- 17** Leonardo targets strike role with M-346 FA development.  
USAF amends Huey successor plans.  
Stealth hurdles raise challenge for India's advanced medium combat aircraft
- 19** F-35 retrofit requirements rise for USAF

### BUSINESS AVIATION

- 20** Slowing Learjet 75 demand prompts new production cut.  
Gulfstream makes progress with its dynamic duo.  
Leasing expert takes top post at Embraer unit
- 21** Large jets lag but turboprops push on



Leonardo

Leonardo planning for attack version of M-346 **P17**

### COVER STORY

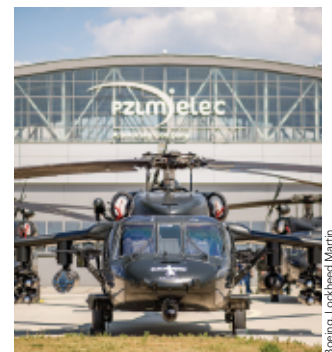
- 22 Future focused** On the eve of this year's Heli-Expo rotorcraft exhibition in Dallas, we survey some of the technologies driving a sector that may be suffering from persistent market headwinds but retains a firm belief in innovation as the key to improved safety, efficiency and performance – along with competitive advantage

### REGULARS

- 5 Comment**
- 35 Straight & Level**
- 36 Letters**
- 38 Classified**
- 40 Jobs**
- 47 Working Week**



Boeing rolls out 787-10 in ceremony at North Charleston **P6**. Poland invites military helicopter bids **P9**



Boeing, Lockheed Martin

**Download the latest Commercial Engines Report**  
now with further enhanced data and in-depth market analysis  
**flightglobal.com/commengines**





## Image of the week

During a busy week for Boeing's North Charleston plant – which included a visit from President Trump and the roll-out of the initial 787-10 – the airframer also found time to hand over the first Dreamliner to Korean Air. The Seoul-based carrier has 10 of the -9 variant on order; deliveries run to 2019

View more great aviation shots online and in our weekly tablet edition:

[flightglobal.com/](http://flightglobal.com/)  
[flight-international](http://flight-international)



Boeing

## The week in numbers

60%

Flight Dashboard

China Aircraft Leasing says expansion and gains on disposals will drive a surge in its 2016 net profit, to HK\$608m (\$78.3m)

10,000

NATS

Registrations for "Drone Assist" app within 10 days of safety initiative's launch by UK air navigation service provider NATS

14

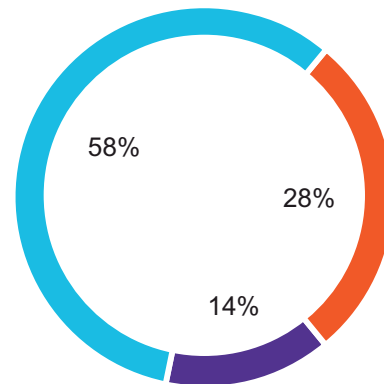
Flight Dashboard

Rossiya in 2015 looked to acquire 24 widebodies from defunct Transaero, but now says most are too worn out

## Question of the week

Last week, we asked: **Boeing 737 Max 10?** You said:

**Total votes: 3,599**



Can't match A321neo  
2,096 votes

Seattle playing safe  
1,009 votes

Take that Toulouse  
494 votes

This week, we ask: **Should A400M customers ease penalties?**

☐ **Yes: too damaging for Airbus**

☐ **Only if performance improves** ☐ **A contract is a contract**

Vote at [flightglobal.com](http://flightglobal.com)

**Flight**  
Dashboard

FlightGlobal's premium news and data service delivers breaking air transport stories with profiles, schedules, and fleet, financial and traffic information [flightglobal.com/dashboard](http://flightglobal.com/dashboard)



CAE offers training centres, training services, and simulation products for trainer and fighter aircraft.

Download the Military Simulator  
Census online now.  
[www.flightglobal.com/milisim](http://www.flightglobal.com/milisim)





# Propping up Airbus

After taking a €2.2 billion hit against the troubled A400M last year, Airbus chief Tom Enders has had enough. But should customers ease penalties when contractual terms are missed?

**E**ven for a programme with a history as chequered as the A400M, Airbus chief executive Tom Enders' latest critique of the troubled airlifter was astonishingly frank – and packed with intent.

Normally, bosses fall back on the stock statement that development programmes are complex and unpredictable. By contrast, Enders describes his company's initial development and production contract for the Atlas as its "original sin". Not only was it wrong to let customers impose the selection of an unproven engine, its further decision to accept liability for the TP400 was an "incredible blunder", he believes.

After signing a revised contract late last decade things seemed to improve, until a propeller gearbox fault hit operations and deliveries last year. According to the terms of its current deal, this left the company liable for liquidated damages, while its customers are also able to withhold programme payments as a result of the delivery delays affecting their fleets.

## Unless firm action is taken, hopes to widely export the Atlas cannot become reality

Delivering news of a total €2.2 billion (\$2.3 billion) charge taken against the A400M last year, Enders called on operator nations to re-engage with Airbus to get the programme back on course. Several issues must be resolved, he says, but removing "entirely inappropriate" financial penalties appears to be top of the list.

So far, this does not feel like a repeat of the crisis which almost led to the demise of the programme around 2009-2010, although the reaction of Airbus's customers – and their willingness to help a contractor



US Air Force

### Engine trouble still means big trouble

falling short on its promises – has yet to be felt.

Chief operating officer Fabrice Brégier bemoans the company having to use revenues from its high-flying commercial division "to invest in loss-making in defence", but critics might suggest that it cannot expect to go cap in hand to European taxpayers every time its flagship military product veers off course.

Enders' reference to red tape and bureaucracy among its customers and Europe's OCCAR defence procurement agency does, however, feel like providing valid support to his plea for mitigation. And unless firm action is taken, efforts to introduce vital tactical capabilities and get the delivery schedule back on track will be hindered, and Airbus's hopes to widely export the Atlas cannot become reality.

The A400M should be a European success story, but for now it remains a cautionary example of why multi-national procurement programmes can in reality be a nightmare for all involved. ■

**See This Week P7**

## These days, safety pays

**A**erospace, by nature, is an industry of extremes. Costs are huge, technical and financial risks severe. Timescales are long, business cycles fierce. Political winds can be fair or very foul.

Rotorcraft makers feel these forces particularly acutely. Compounding their financial pressures are relatively low volumes and a huge diversity of customer requirements, while the inherent dangers of rotary-wing flight put a premium on faith in the machines, a faith that is urgent: operators buy helicopters because no other machines can do the jobs they do.

So today, in what amounts to a long-running economic depression for the vertical-lift industry, what is the corporate priority? Perhaps counter-intuitively, it is

innovation. Facing their own economic uncertainties, customers will only buy new machines or upgrade old ones if they absolutely must, or if doing so buys them a worthwhile – that is, cost-effective – performance advantage. And there is plenty of competition, so it is a buyer's market where sellers absolutely must have something compelling to offer.

A few years ago, that might have been speed, but right now, speed looks expensive. Lower operating costs are always attractive, of course, but the breakthrough that really matters is safety. Any company whose engineers can truly improve helicopter accident figures is on to a winner. ■

**See Feature P22**



To keep up with the latest news and analysis from the defence sector, go online at [flightglobal.com/defence](http://flightglobal.com/defence)





# BRIEFING

## COLD-WEATHER TRIALS START FOR A350-1000

**DEVELOPMENT** Airbus has commenced cold-weather testing of the A350-1000 at Iqaluit in Canada. The aircraft – MSN71, the second of the three test airframes to fly – arrived at the location on 21 February. Meteorological data for Iqaluit airport shows temperatures in the region of -30°C (-22°F). Airbus says it is “on track” to achieve certification of the -1000 and deliver the first aircraft to launch customer Qatar Airways before year-end.

## INITIAL MH-90 HANDED OVER TO ITALIAN NAVY

**ROTORCRAFT** Italy has received the first of 10 NH Industries NH90 troop transport helicopters destined for its navy, which will be used to perform special forces and amphibious support missions. Designated the MH-90 in Italian service, it combines features from the standard TTH troop transport variant of the NH90 with capabilities required for ship-borne operations. The service already operates 23 examples of the naval NFH model, with a further 13 still to be delivered.

## CUTTING-EDGE WINGLETS FOR ICELANDAIR 757S

**UPGRADE** Icelandair is fitting a modified blended winglet to its Boeing 757-200 fleet, the first airline in Europe to install the Split Scimitar design on the twinjet type. Icelandair intends to have 17 aircraft with the new Aviation Partners Boeing winglets in service before the summer; four have already been retrofitted.

## INDIAN PROBE CITES FRICTION FIRE ON PW1100G

**SAFETY** Preliminary information points to a friction-related fire in the left-hand Pratt & Whitney PW1100G engine of an Airbus A320neo which carried out a return to Delhi airport after take-off on 8 February. Operated by Indian carrier GoAir, the twinjet (VT-WGB) was only delivered in June last year. French investigation authority BEA says that, according to information from the Indian authorities, there had been a “fire in the engine” traced to “rubbing and excessive friction” linked to bearings.

## ASCEND PREDICTS SLOW OFFSHORE RECOVERY

**FORECAST** The downturn in the oil and gas sector that has seen deliveries and values of large and medium helicopter types plummet over the past two years may be bottoming out – but any recovery is likely to be at least a year away, believes Flight Ascend Consultancy. The next 12 to 18 months could see “some stabilisation and signs of growth”, analyst Ben Chapman said in a webinar presentation on the market on 21 February. **See Feature P22**

## BIG TWO SET FOR 1,500 DELIVERIES IN 2017

**PRODUCTION** Combined output across Airbus and Boeing’s airliner production lines is set to reach a new record of close to 1,500 aircraft this year. Airbus Group confirmed on 22 February that it aims to deliver least 720 aircraft this year. Boeing’s 2017 production guidance in January forecast 760-765 deliveries.

## TURKISH REINSTATES 30 GROUNDED AIRCRAFT

**FLEET** Turkish Airlines will return 30 grounded aircraft to service in April, the carrier’s president Ilker Ayci has disclosed, adding that the flag carrier will operate 335 aircraft this summer. Turkish had grounded the 30 aircraft – a mixture of Airbus and Boeing jets – in November 2016, citing low demand.



Flight testing of Trent 1000-powered twinjet will begin later this year

**PROGRAMME** STEPHEN TRIMBLE WASHINGTON DC

# Boeing realises big dream for new site

Airframer lauds US domestic manufacturing credentials at North Charleston roll-out ceremony for largest 787 variant

Boeing formally introduced the first 787-10 on 17 February in North Charleston, South Carolina, in a strikingly political ceremony led by US president Donald Trump.

Huge sections of the 787, including the wings, fuselage barrels and empennage, are assembled by overseas suppliers, notably Italy and Japan, but Trump and Boeing chief executive Dennis Muilenburg made the roll-out of the 787-10 into a call to arms for restoring American manufacturing.

Boeing assembles the 787-10 exclusively in North Charleston, where it also builds the two other Dreamliner variants, along with its plant in Everett, Washington.

“As your president I’m going to do everything I can to unleash the power of the American spirit and to put our people back to work. This is our mantra: buy American and hire American. We want products made in America, made by American hands,” Trump says.

Despite the 787’s global supply chain and customer base, the 787-10 roll-out offered a testament to American manufacturing, Muilenburg says.

“This is about manufacturing in the US,” he says, adding that Boeing plans to invest another

\$6 billion into research, development and capital in the USA.

Boeing’s expansion of the North Carolina site is part of the company’s drive to expand its operations outside of the heavily unionised Puget Sound area.

The 787-10 roll-out event came only two days after a 74% majority of North Charleston workers voted to reject representation by the International Association of Machinists and Aerospace Workers.

The first completed 787-10, fitted with Rolls-Royce Trent 1000 engines, will now be prepared to enter flight testing ahead of a scheduled first delivery in the first half of next year.

The 230-passenger aircraft is Boeing’s third and largest variant in the 787 family, and there are high expectations for it. So far, the 787-9 is outselling the other variants, but Boeing executives expect the 787-10 to become a major order attraction, flying major regional trunk routes within Asia, from the Middle East and across the Atlantic Ocean.

Boeing has so far accumulated 149 orders for the -10 – against 633 commercial commitments for the -9 – with Etihad Airways and Singapore Airlines each taking 30 aircraft. ■





P&W gears up to leave production problems behind  
This Week P8

THIS WEEK

PRODUCTION CRAIG HOYLE LONDON

# Atlas contract 'blunder' haunts Airbus

Chief executive Tom Enders criticises launch deal for A400M, as group discloses €2.2 billion programme charge in 2016

Airbus has written to its customers for the A400M transport in a bid to reduce its financial exposure to programme delays, after the company's charges on the activity hit €2.2 billion (\$2.3 billion) last year.

Announcing group results for 2016 on 22 February, Airbus said it took a further €1.2 billion charge against the A400M in the second half of the year, adding to a €1 billion provision detailed last July.

Speaking at an online results briefing, Airbus chief executive Tom Enders described the project as "painful" and "frustrating", and conceded that the company made a serious mistake by agreeing to the terms of its original development and production contract.

Referring to its launch deal with the governments of Belgium, France, Germany, Luxembourg, Spain, Turkey and the UK via Europe's OCCAR defence procurement agency as an "original sin", Enders says: "It was clearly too short on budget and too short on timeline, plus we made an incredible blunder: we took responsibility, liability for the engine. A huge portion of the problems we have had with this aircraft is due to immaturity issues of the engine, and that is not entirely solved."

A propeller gearbox flaw on the Europrop International TP400-D6 last year resulted in operating re-



Despite challenges, the manufacturer says its tactical transport programme "is making good progress"

strictions and delivery delays which saw Airbus hit with penalty clauses that had been agreed with its customers during a contract revision in 2009.

## LIQUIDATED DAMAGES

"We are operating in an environment that is heavily penalising us," Enders says. "Customers keep cash back. Some put liquidated damages on top of that, because we have delays. All that adds up to a significant financial burden, on top of the additional costs we have through the industrial ramp-up."

Enders says the company wrote to its customers on 22 February. "We are asking them to re-engage with us in serious discussions to mitigate [penalties] and achieve a win-win situation, because the losses are unacceptable," he says, describing the latter as placing "a huge financial burden on Airbus".

One of the board-level signatories of the letter, chief operating officer Fabrice Brégier, used the same presentation to compare A400M penalties with the operating conditions at a "proper company": US rival Boeing. "I don't want to be part of a group which is obliged to use the revenues and earnings of commercial [aircraft] to invest in loss-making in defence," he says. "We need a level playing field."

While not attempting to hide from Airbus's shortcomings on the A400M, Enders says the multinational deal is hindered by "red tape and bureaucracy that limits our flexibility and the progress of certain military capabilities".

The requested discussions cover seven or eight items, including the "entirely inappropriate" financial penalties, he adds. Combined, these are intended to fix

"lopsided risk-sharing between governments and industry", and "give our customers more confidence in the delivery schedules and military capabilities".

## OUTSTANDING ISSUES

"Not every customer will like that, but it's absolutely necessary, to continue with this important programme," he says. "I have no reason to be pessimistic about the outcome."

Despite the A400M's significant challenges, Enders says Airbus is "making good progress with giving it the military capabilities that our customers need". It also is deploying its "best people" – including from its commercial and helicopters business areas – to address outstanding issues as a "top priority", he adds. "I'm convinced that it's worth the effort, because we are building and delivering the world's best-performing aircraft once it is mature, and once it has a mature engine."

Half of the delivered aircraft have received interim fixes to the propeller gearbox issue, but Enders says other challenges exist, including with the transport's aerial delivery capabilities and defensive aids subsystems. ■

## SALES

### Continued woes dent export potential

Tom Enders' contractual plea to customers of the A400M comes as Airbus cautions that challenges on the programme could jeopardise "securing sufficient export orders in time".

Sales targets for the tactical transport have previously been identified in the Asia-Pacific region, Latin America and the Middle East, but more than seven years after the flight debut of its first prototype, Airbus Defence &

Space has so far failed to add to its lone export deal – a four-unit contract with Malaysia.

Airbus delivered 17 A400Ms in 2016 – up from 11 the previous year – and Enders expects this number to climb above 20 aircraft in 2017, "if we are not hit by another unexpected thing".

Flight Fleets Analyzer records Airbus as having so far handed over a combined 39 A400Ms, from a total order book for 174. ■





PROPULSION STEPHEN TRIMBLE WASHINGTON DC

# P&W gears up to leave production problems behind

Engine manufacturer plans to exceed delivery target for its geared turbofans, as new blade factories come on stream

P Pratt & Whitney has an internal plan to exceed delivery targets for the geared turbofan (GTF) engine family this year after falling short of the objective in 2016, says Greg Hayes, chief executive of P&W parent company United Technologies.

The internal plan would have P&W deliver more GTF engines to the Airbus A320neo and Bombardier CSeries assembly lines than the 350-400 in the publicly released target, he told a conference on 22 February.

Hayes is "highly confident" P&W will "get behind" the parts shortages that caused it to miss delivery targets last year.

P&W built 165 of the 200 en-

gines planned in the 2016 production ramp-up, but delivered only 138 to customers; the 27 undelivered engines lacked fan blades, as P&W grappled with increasing the pace of manufacturing on the unique hybrid-metallic components.

Japanese supplier IHI opened a second factory to produce GTF fan blades in December, ramping up production in January. A third facility will open in April in Lansing, Michigan, meaning P&W should be able to meet or exceed delivery targets this year.

The production ramp-up is only one of the near-term challenges P&W is facing as it introduces its first new commercial



Modifications will be required to initial run of PW1100G powerplants

turbofan engine since the short-lived PW6000 in the late 1990s.

The GTF is one of two engines offered for the A320neo and Irkut MC-21, and the exclusive option on the CSeries, Embraer E-Jet E2 and Mitsubishi Regional Jet; P&W has collected firm orders for more than 8,000 since launching the programme in 2008.

But the engine's popularity has suffered since the A320neo entered service in January 2016 due to two technical problems: the combustor liner and a carbon air-

seal inside the GTF are proving less durable than promised.

So far airlines operating 40 GTF-powered A320neos and eight CSeries aircraft have had to ground some aircraft to install new combustor liners; P&W plans to roll out a fix for the air-seal problem later this year.

Hayes admits: "The combustor life has not been what we expected; the carbon seal is not what we expected. We've got a lot of removals. Customers are not happy. We are not happy." ■

DELIVERIES DAVID KAMINSKI-MORROW LONDON

# After 'racy' year-end, Airbus plans smoother 2017

A Airbus Group forecasts that it could deliver more than 720 commercial aircraft this year, but is trying to avoid the pressure on production experienced towards the end of 2016.

Chief financial officer Harald Wilhelm gave the revised estimate during a 22 February briefing on the company's 2016 performance, just after chief executive Tom Enders had put forward a figure of 700.

Enders had been assuring that the relatively low figure of 25 deliveries during January – including two A320neos and one A350 – was "entirely in our plan", adding the company would be "quickly" ramping up output.

He says the January total "in no way" indicates any issues in the supply chain or problems



A350 has been "plagued" with cabin quality problems, Enders says

reaching the 2017 delivery target.

But Wilhelm points out that the close of 2016 was a "really racy" period and that the company is "conscious that we need to change something" in the delivery profile, particularly as production rates rise.

Low activity in January-February is partly the result of emptying the pre-final and final assembly lines in November-December.

Wilhelm says the company is investing in an "inventory buffer" and is aiming to smooth the delivery profile this year.

However, it has warned Zodiac Aerospace – which was responsible for delivery delays on the A350 in 2016 – to maintain focus on its cabin interiors supply, following that company's disclosure of its planned acquisition by Safran. Zodiac has already been under considerable pressure from the airframer over bottlenecks in its production.

Enders says the A350 had been "plagued" by problems regarding the cabin quality, adding that this had been "one of the recurring complaints" from customers.

While Zodiac has embarked on an in-depth restructuring effort to put its production back on track, Enders says he "sincerely hopes" Zodiac's management focus "will not be distracted by the pending merger with Safran". ■



LHT and MTU join forces for geared turbofan overhaul  
**Air Transport P10**

**THIS WEEK**

**ROTORCRAFT** DOMINIC PERRY LONDON

# Poland kicks off latest round of troubled helicopter saga

Urgent requirements allow fast-track process after collapse of H225M agreement last year

Warsaw has begun negotiations with three bidders as it looks to acquire 16 helicopters – eight for special forces missions and eight for anti-submarine warfare and maritime search and rescue operations.

The defence ministry says it has “invited the bidders” – thought to be Airbus Helicopters, Leonardo Helicopters and Sikorsky – to submit offers for the requirements. Responses are due by 13 March, says defence minister Antoni Macierewicz.

“The helicopters for special forces, whose acquisition is the most urgent, will be negotiated during the first stage,” the ministry says.

The naval helicopters will not be required until 2019, it says, and it might acquire them in two batches of four aircraft, depending on delivery timelines.

Both contests are considered as urgent operational requirements, allowing Poland to bypass some of the more lengthy procedures usually associated with military procurements.

The defence ministry says off-set requirements must be an “integral part of the contract” for



Sikorsky will offer S-70i Black Hawks via local subsidiary PZL Mielec

both deals. These include the establishment of a repair and upgrade centre at Polish company WZL-1's Lodz facility.

A previous, 50-unit deal with Airbus Helicopters for H225Ms collapsed last October, following protracted negotiations over off-set conditions.

Airbus Helicopters is likely to again pitch its Caracal for both requirements; Leonardo will offer the AgustaWestland AW149 for special forces use and the AW101 for naval missions; and Sikorsky is expected to bid the S-70i Black Hawk and S-70B Seahawk for the

respective contests. However, James Katzen, director of sales for Sikorsky's PZL Mielec subsidiary, says it has not ruled out the possibility of pitching its S-92 to satisfy the naval requirement, as it continues to analyse the 21 February request.

Katzen says Warsaw is likely to issue a subsequent request for rotorcraft to meet its utility transport and multirole requirements for the armed forces, and for bodies including the Polish border guard and police. ■

**Additional reporting by Craig Hoyle in Mielec**

**FLEET**  
DAVID KAMINSKI-MORROW  
LONDON

## Emirates takes final A380 with EA powerplants

Airbus has delivered the final Engine Alliance GP7200-powered A380 to Emirates, FlightGlobal data indicates, with the aircraft (A6-EUI) flown to Dubai on 21 February.

Airbus has delivered 93 A380s to Emirates so far, including the first three powered by Rolls-Royce Trent 900 engines, Flight Fleets Analyzer shows.

Emirates is taking 50 Trent-powered A380s under an agreement with Rolls-Royce in 2015, and last year said it was picking up another two A380s which would also have Trent engines.

Emirates is pushing back six of its A380 deliveries planned for this year, but Airbus commercial aircraft chief Fabrice Brégier insists that, despite slow sales, the aircraft has a future.

He says the airframer's “first priority” is to reduce the production break-even level and improve final assembly operations to cut the cost per aircraft.

The airframer had achieved break-even, in terms of aircraft production, for the first time in 2015 but is facing a battle to maintain this situation.

Airbus will cut A380 annual output to 12 aircraft from 2018. ■

## ONTIC KEEPS YOUR AGING ROTORCRAFT FLEET FLYING

See why the civil and military helicopter industry trusts Ontic to provide OEM-pedigree parts and expert support for legacy platforms for as long as our customers need them.

**ONTIC**  
A BBA Aviation company

[ontic.com](http://ontic.com)

Visit Us At  
**Heli-Expo**  
Exhibit Booth 7608

**March 6-9**  
DALLAS TEXAS





MAINTENANCE MICHAEL GUBISCH LONDON

# LHT and MTU join forces for geared turbofan overhaul

Search under way for ideal location, as partners pledge to invest €150m and target 2020 for first operation of facility

German duo Lufthansa Technik and MTU have formalised their planned overhaul joint venture for Pratt & Whitney PW1000G-series geared turbofan (GTF) engines.

In September 2016, the pair disclosed a tentative agreement to establish a co-owned overhaul shop for the new engine family at a “globally competitive location”.

Now, LHT and MTU say they have signed the partnership deal and intend to incorporate the business during the second half of 2017, pending approval from the regulatory authorities.

However, they have yet to disclose where the facility will be situated: “The search for a globally competitive location in or

outside Europe will be completed within a few months’ time,” they say. Last year, MTU confirmed that the new site would not be in Germany.

The facility is to become operational in 2020 and have more than 500 employees. It will be designed to accommodate more than 300 shop visits a year.

LHT and MTU have pledged to jointly invest a total of €150 million (\$158 million) in establishing the facility.

Michael Schreyogg, MTU’s chief programme officer, states that the objective is to build “the most efficient MRO shop for GTF engines around”.

He adds: “Lufthansa Technik is the ideal partner for us in this



Facility will be able to accommodate up to 300 shop visits each year

endeavour. By setting up a joint facility, capital investments can be shared and opportunities for synergy and scale generated for both companies.”

MTU manufactures the low-pressure turbine and part of the high-pressure compressor for the PW1000G series and has one of the engine family’s assembly lines at its Munich headquarters.

LHT’s chief executive Johannes

Bussmann describes its new venture as “an important step in strengthening and expanding its partnerships with reputable engine manufacturers”.

The maintenance specialist has traditionally overhauled engines at its Hamburg headquarters. It services CFM International CFM56s and International Aero Engines V2500s in competition with MTU. ■



Bombardier regional type has been phased out in favour of A320s

FLEET MICHAEL GUBISCH LONDON

## Final CRJ900 flight for Eurowings

Lufthansa’s low-cost arm Eurowings has phased out its last Bombardier CRJ900 regional jet as part of short-haul fleet harmonisation around Airbus A320-family jets.

The budget carrier says it operated its last regular CRJ900 flight from Karlsruhe to Hamburg on 15 February.

Eurowings at one stage operated 23 of the 90-seat type, having previously also used its smaller

siblings, the CRJ200 as well as the CRJ700.

But as part of Eurowings’ build-up from regional operator to Lufthansa Group’s low-cost division, the CRJ900s have been replaced with A320s.

The last three CRJ900s are now being prepared for operation by another airline, Eurowings says.

Flight Fleets Analyzer indicates that these aircraft were built in 2010 and 2011. ■

INQUIRY GREG WALDRON SINGAPORE

## Thai working with officials over R-R corruption claims

Thai Airways International is working with its local anti-corruption authorities as it probes allegations regarding engine purchases that came to light during the Rolls-Royce bribery inquiry.

The carrier says it is co-operating with Thailand’s National Anti-Corruption Commission (NACC) in regard to engine acquisition practices in the period spanning 1991-2005.

It has also supplied the NACC with information about the carrier’s engine procurements during three specific periods: 1991-1992, 1994-1997 and 2004-2005.

Thai adds that it is looking at processes involved in past and present engine acquisitions.

The airline notes that its own 2012 procurement regulations established several safeguards: prohibiting purchases made through intermediaries; the use of committees and working groups to “provide a check and balance of power”; and transparency in accordance with international standards.

In the wake of the inquiry, Thai has set up two internal task forces: the first focuses on the company’s engine procurement and maintenance procedures, the other on corruption prevention.

Of the 12 counts contained in the UK Serious Fraud Office’s statement of facts against R-R, two are related to Thai. ■



Aerosucre 727 departed with tailwind  
Air Transport P12

INVESTIGATION DAVID KAMINSKI-MORROW LONDON

# MH17 radar data slows Dutch inquiry

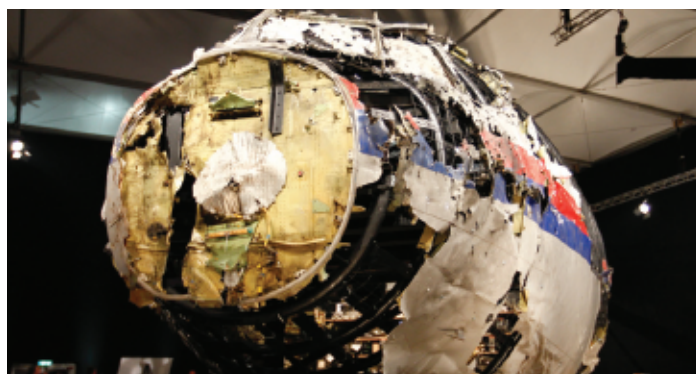
Probe into shootdown of Malaysia Airlines flight over Ukraine struggles to analyse information provided by Russian agency

Dutch investigators are still trying to unravel radar data sourced from Russia in October 2016 as part of the inquiry into the destruction of Malaysia Airlines flight MH17.

The Dutch national prosecutor's office says "many uncertainties" remain in the radar images supplied by Russian authorities to the criminal probe into the loss of the Boeing 777-200ER, shot down over Ukraine in July 2014.

It says the issues centre on differing data formats. "It cannot be determined with certainty whether the images are authentic, and what precisely they show," the office adds.

Air traffic control centres typically use the Eurocontrol-developed format known as "Asterix" to exchange radar data. But the data from Russia has not been provided in this format, says the



Previous report concluded that 777 was brought down by Buk missile

prosecutor's office. While separate software can aid the analysis, it states, this has to be translated from Russian and then tested.

Translation and familiarisation work had to be completed before the radar data analysis could begin, and further time and support is now needed to progress with this work, the office says.

Russian air transport regulator Rosaviatsia supplied the data last year, having disclosed its existence in September 2016. The agency stresses that it is willing to assist with the data decryption; it is committed to an "honest, open investigation", it says.

Rosaviatsia says the primary data is unprocessed, providing the

most detail available on the situation at the time of the 777's destruction. It also demonstrates the "authenticity" of the information, says Rosaviatsia.

It says the Dutch probe has taken three months to mention publicly the technical problems with extracting the radar data, adding it is willing "at any time" to provide developers familiar with decryption techniques.

Dutch Safety Board investigators have concluded that the 777 was brought down by a Russian-built Buk surface-to-air missile.

Last September a five-nation joint investigation team concluded the weapon was launched from rebel-held eastern Ukrainian territory. The prosecutor's office pointed out at the time that, just because the missile is not visible on radar, this does not mean it was not fired. ■

MANAGEMENT DAVID KAMINSKI-MORROW LONDON

# All change as Sukhoi Civil Aircraft drops new boss

Sukhoi Civil Aircraft's new president, Kamil Gaynutdinov, has been replaced just five months after being appointed.

The airframer, which produces the Sukhoi Superjet 100, has named Vladislav Masalov as his successor with immediate effect.

Masalov was the head of the civil aviation division for United Aircraft, a position he was assigned last year during corporate restructuring. United Aircraft has been striving to create a more unified and cost-efficient organisation, with four divisions covering specific aircraft markets.

It intends to increase the share of civil aircraft to 45% of its overall output, and is placing its main airliner programmes – the Superjet, Irkut MC-21 and Ilyushin Il-114 – under a single operation, including a single customer-support centre for civil programmes.

Gaynutdinov is being transferred to a vice-president post for after-sales service within Sukhoi Civil Aircraft.

United Aircraft's reshuffle comes less than a month after Gaynutdinov – a former Boeing executive – expressed confidence that he had board support for his strategic plans for Sukhoi Civil Aircraft. ■



United Aircraft is centralising commercial aircraft business

SHAREHOLDING

## Leonardo redraws relationship and exits SSJ100 manufacturer

Italy's Leonardo has ditched its stake in Sukhoi Civil Aircraft, the latter appears to confirm in its latest financial statement.

The airframer had originally been established with Finmeccanica – now Leonardo – as a business partner, through its Alenia Aermacchi arm.

Alenia later took a 25% stake, plus one share, in the Russian airframer, through an entity named World's Wing. The remainder was held by the main Sukhoi company. But divisions emerged in 2013, when Finmeccanica revealed it was looking to restructure the relationship.

The following year its shareholding in the airframer was reduced to less than 6%.

Sukhoi Civil Aircraft says, in its newly-issued financial statement for the fourth quarter of 2016, that World's Wing "withdrew" from the shareholding structure in December. ■





**SAFETY** DAVID KAMINSKI-MORROW LONDON

# Aerosucre 727 departed with tailwind

Investigators say freighter's crew appeared to be "unaware" of conditions before take-off from uncontrolled airport

Colombian investigators have determined that the crew of a Boeing 727-200 freighter (HK-4544) departed in a tailwind before the aircraft overran and struck a perimeter fence, briefly becoming airborne before crashing in a field.

The inquiry into the 20 December 2016 accident at Puerto Carreno states that the crew was apparently "unaware" of information regarding the direction and strength of the wind.

Colombian accident investigation authority GRIAA says preliminary information shows two aircraft – an Embraer 170 and a Cessna 208 – took off from runway 07 shortly before the 727 was due to depart.

These two aircraft had taken into account the prevailing wind at the airport, it says. Meteorological data showed the wind from 010° at 8kt (15km/h), which would have favoured a take-off from runway 07.

But GRIAA says cockpit voice recorder information shows the 727 headed instead to the threshold of the opposite-direction runway 25. It points out that Puerto Carreno was operating as an uncontrolled airport from 15:00; the 727 departed at about 17:20.



Accident inquiry was unable to locate crucial weight or loading data for fatal flight of Boeing trijet

Flight-data recorder information indicates that the trijet was configured with 30° take-off flaps. The inquiry associates this setting with a modification known as the Quiet Wing, which was developed for the 727 in order to reduce noise.

That system is designed to increase take-off performance through changes including a flap and aileron droop, to increase lift and thereby cut perceived noise on the ground.

GRIAA adds that the 727's configuration also included 6.5 units of elevator trim.

The inquiry says the evidence suggests the crew was not aware of the wind situation. Departing from runway 25 under the recorded wind conditions would have resulted in a 4kt tailwind rather than a 4kt headwind.

GRIAA says the air temperature was 31°C (88°F). The airport has an elevation of 54m and a runway length of 1,800m (5,900ft). All three engines were functioning during the take-off roll. The investigators state that the aircraft's V1 and rotation speeds were 127kt.

Evidence from video images of

the ill-fated departure show the aircraft overran and hit a perimeter fence – tearing out a 13m-wide section – before striking a small military structure and a tree, which sheared off the right main landing-gear and the starboard inboard flap.

Cockpit voice recorder information shows the crew determined that the starboard engine had lost thrust and there was a loss of hydraulic fluid following the impact.

The 727 managed to climb to 790ft but entered a slow turn to the right, with its bank angle gradually increasing to 60°. It remained airborne for about 2min but its airspeed bled away. The resulting loss of lift caused the aircraft to lose height, and it struck the ground about 4nm (7.4km) from the threshold of runway 07.

GRIAA says ground-proximity alerts and stall warnings had been sounding in the cockpit, and the crew was carrying out a fuel-jettison procedure.

The jet struck the ground at a large angle of bank, it states, with high horizontal speed but relatively shallow pitch.

One of the six occupants of the freighter survived the crash. The cockpit and empennage were among the main components to emerge from the debris field.

## RECORDS

### Probe relies on assumptions in lieu of airline's missing manifest

One area of investigation that has not been resolved by the inquiry into the crashed Aerosucre Boeing 727 is the take-off weight of the freighter.

Colombian accident investigation authority GRIAA has been unable to locate details of the manifest or the aircraft's weight and balance during examination of the wreckage.

GRIAA adds that there was no copy of this information in the company's offices.

The inquiry estimates that the aircraft, bound for Bogota, was

transporting nine pallets containing 8,990kg (19,800lb) of cargo, taking this assumption from the chartering company's documents.

As the 727 conducted its take-off roll, it overran and struck the perimeter fence, as well as other obstacles, which badly damaged the jet. It became airborne for a short time before crashing in a field and being consumed by fire.

The flightplan submitted by Aerosucre, provided to the inquiry by the air traffic service of Puerto Carreno, listed five occupants on board the jet, although

six were located at the crash site – five crew members and a cargo specialist. Two of the six survived the initial impact but one later succumbed to injuries.

The captain of the aircraft had accumulated more than 8,700h including over 6,800h on type, while the first officer had nearly 3,300h on the 727.

GRIAA says the aircraft had previously arrived at Puerto Carreno from Bogota, carrying a load of perishable and miscellaneous freight weighing 9,260kg and some 14,300kg of fuel. ■



PZL Mielec's Skytruck goes on the road  
News Focus P14

ACCIDENT DAVID KAMINSKI-MORROW LONDON

# APU maintenance record questioned after Antonov fire

Investigation casts doubt on overhaul logs for component, as Russian agency suggests 2007 entry was "fabricated"

German investigators have been unable to determine the precise cause of an uncontained auxiliary power unit (APU) fire which destroyed an Antonov An-12 freighter preparing for departure from Leipzig.

But doubts have emerged over the maintenance record of the APU at the time of the accident on 9 August 2013.

Investigation authority BFU says the crew had started the APU and both outboard engines of the Ukraine Air Alliance transport, which was parked on stand 207, when they were alerted by a "dull bang" and the APU fire-warning indicator.

The APU was mounted behind the left main landing gear. The BFU inquiry determined that the fire originated in the APU and was not contained, propagating rapidly to the cargo compartment.

It says the severity of the fire was exacerbated by fuel which had leaked from fuselage floor tanks and pooled near the left main landing gear, as well as burning light metal alloy components from the APU.

The fuselage forward of the empennage was completely consumed by the blaze.

"Due to the high degree of destruction it was not possible to determine the exact cause of the fire," says BFU.

But investigators reconstructed the APU gas turbine and its gearbox assembly and say there was evidence of a burst compressor wheel, given the nature of damage to air intakes as well as other components.

"Flying fragments of the compressor wheel could have penetrated the APU chamber and sev-

ered fuel pipes," the inquiry adds. The damage would have provided a propagation path to the cargo compartment, which was loaded with nearly 49,000 day-old chicks.

The cargo door was still open at the time, because of the live cargo, and the inquiry suggests that as a result the blaze would have been strengthened by the available oxygen.

Although the crew had activated the APU extinguisher, the extent of the damage from the initial event would explain why this was ineffective in controlling the fire.

BFU states that the area of the APU fire was "not sufficiently isolated" from the rest of the aircraft (UR-CAG).

Investigators state that the APU, built in 1975, had a total operating time of 407h and, according to the carrier, had undergone three overhauls, in 1983, 1996 and 2007.

## RESPONSE

### Delayed response to freighter incident causes alarm at Leipzig

Leipzig airport's emergency alarm system has been overhauled after delays in responding to the fire which destroyed a parked Antonov An-12 freighter.

German investigation authority BFU says more than 4min elapsed between the initial notification and arrival of the first firefighting vehicle at the accident site on 9 August 2013; ICAO standards require a maximum interval of 3min.

BFU says the airport's eastern fire station was the first to be notified, although the accident site was in the western station's sector.

The western station was alerted



Severity of An-12 blaze was exacerbated by fuel leak from floor tanks

**"Due to the high degree of destruction it was not possible to determine the exact cause of the fire"**

BFU inquiry

But Russia's Interstate Aviation Committee says that the APU manufacturer, Aviamotor, had stopped maintenance of the equipment around 2000, and there is "some doubt" that the claimed 2007 overhaul actually took place.

In formal comments to the inquiry, the committee says that it

believes the logbook entry on this overhaul was "fabricated".

It adds that the "non-fulfilment" of this overhaul could have contributed to the APU's extensive damage, although BFU says it is unable to determine whether this was a factor. The APU was fitted to the aircraft in 2012.

BFU says the flight-data recorder tape had been inserted the wrong way, although it had registered the An-12's arrival at Leipzig, while recovery of the two cockpit-voice recorders revealed one was empty and the other contained an 11min recording which was not captured at Leipzig. ■





PROGRAMME CRAIG HOYLE MIELEC

# PZL Mielec's Skytruck goes on the road

Sikorsky's Polish subsidiary has big ambitions for its twin-turboprop transport as it flies off on a sales tour of the Americas

**B**uoyed by its position within Lockheed Martin's global group of companies, Sikorsky subsidiary PZL Mielec is optimistic of driving fresh sales of its M28 Skytruck in several regions of the world.

Evidence of the company's new sales push was seen on 24 February, when a demonstrator of the twin-turboprop left its production facility in southeast Poland for a roughly three-month tour, taking in destinations in the USA, the Caribbean, Latin America and Central America.

The uniquely-configured transport departed Mielec to demonstrate its capabilities to multiple potential operators, company officials say. These activities will range from participating in an exercise for the Brazilian armed forces, delivering paratroopers and performing precision airdrop tasks. It will also showcase its short take-off and landing capabilities to commercial operators interested in acquiring the 19-seat type, and demonstrate its capacity to operate in harsh conditions.

PZL Mielec's certification for the M28 includes the ability to take-off within 548m (1,800ft) at a maximum take-off weight of 7.5t, and to land within 500m. The unpressurised type's abilities to operate from semi-prepared landing strips, and to serve high-

altitude airports will also be tested – in the latter case requiring its crew to use onboard oxygen.

During an initial two-week period in the USA, the M28 05 will be exhibited at the Heli-Expo convention in Dallas, Texas. The decision was taken to showcase it at the rotorcraft event due to the attendance of companies from the oil and gas sectors, says Ingmar Wyczalek, M28 sales manager for North and South America. It will then also visit Melbourne, Florida.

## PRODUCT SUPPORT

The Pratt & Whitney Canada PT6A-65B-powered transport will then spend seven weeks visiting Trinidad & Tobago, Brazil, Argentina, Ecuador, Colombia, Panama City and Mexico City. While in Brazil it will take part in the LAAD defence show in Rio de Janeiro. In all, the airframe is expected to amass around 200 flight hours, with "24/7" support provided via the manufacturer's existing logistics system for the type.

Wyczalek points to the importance of product support for the M28 being shown by Sikorsky and its parent Lockheed, which sees a clear niche for the rugged product beneath the larger C-130J. "Both Lockheed Martin and Sikorsky believe in the future of this product," he says.

The company is pursuing certi-



Airframer says type's versatility makes it unique in its class

fications for the type in nations including Brazil and India – which has a major regional connectivity need – and Nepal, in advance of hopefully delivering examples for passenger transport. Sales targets also include nations in Africa and the Asia-Pacific.

"We are negotiating both with the civil and the military sector, but our analysis shows that the civil market is bigger, and we want to penetrate this," Wyczalek says. The company's ambition is to secure orders to produce between 10 and 15 aircraft per year.

The aircraft also is available in a combi passenger/cargo version, or as a dedicated cargo asset capable of carrying a total of 2.3t. For this application, it can be equipped with a hoist and winch to support operations at austere locations. The airframer says the M28's rear door enables it to carry awkward loads, such as helicopter main rotor blades or mining equipment. "It is unique in its class – we are the only one with such a function," says Wyczalek, referring to rivals such as the Cessna Caravan and RUAG Dornier 228NG.

The aircraft involved in the promotional tour features an analogue cockpit, but PZL Mielec intends to transition its production standard to offer a glass cockpit configuration similar to that supplied in limited numbers to the

Polish military. Its demonstration configuration includes a mix of a passenger and cargo applications, along with stretchers to highlight its utility as a medical evacuation asset. Other roles include border surveillance, search and rescue, maritime patrol and VIP transport.

Mariusz Kubryn, head of the company's design organisation, says commercial operators will be able to pick from an avionics fit from suppliers including Garmin and Honeywell.

## MAJOR INVESTMENT

Flight Fleets Analyzer records M28s as being in operational use with the militaries of Jordan (2), Nepal (2), Poland (29), the USA (5), Venezuela (11) and Vietnam (1). Kenya is also set to introduce the type, as it is to acquire three ex US Air Force-operated examples via Washington's excess defence article programme.

In addition to its M28 promotional activities, PZL Mielec is also looking to increase its sales of the UH-60 Black Hawk-derived S-70i, including to the Polish armed forces.

Pointing to a more than \$150 million investment in the company in Mielec since its acquisition by Sikorsky, company president Janusz Zakrecki notes: "We keep growing. We are a producer of complete aviation products." ■



The Polish air force is among current military operators of the M28



# Delivering your dreams.

AMAC Aerospace is a world leader in Maintenance and Completion services for both narrow and wide-body VIP aviation. Our bespoke handling of VIP maintenance projects is world renowned and our "Return to Service" are world-class for completions.

AMAC's craftspeople and engineers are intelligent and discerning. No completion project is too small or too big. Whether your aircraft is a Global Express, narrow/wide-body – Airbus/Boeing. We are ready to cater for your every desire with every conceivable material and we welcome the opportunity to serve you.

**AMAC AEROSPACE**

[www.amacaerospace.com](http://www.amacaerospace.com)





DEMONSTRATION LEIGH GIANGRECO GREENVILLE

# T-50 flight shows Lockheed's readiness

As the US Air Force's T-X trainer contest heats up, *Flight International* takes to the skies in one of the leading contenders

There was no turning back from my maiden trainer voyage aboard a Lockheed Martin T-50A once the glass canopy closed down above my head.

As we taxied down the runway, I prepared myself to be flattened into my seat on take-off. But the GE Aviation F404's afterburner helped my pilot, Elliott Clemence, lift aircraft TX-2 off at 124kt (230km/h) within 365m (1,200ft) so smoothly that I was disappointed by the take-off of my commercial flight home later.

With TX-1 by our side, we cruised over the Smokey Mountains and shimmering lakes near Greenville, South Carolina. On my tactical display, MiG-23s and MiG-29s popped up against the mountains, and when we "dropped" a laser-guided bomb over a bridge, I half expected to see it explode on the ground.

Lockheed provided a small group of reporters the opportunity to fly the T-50, to underscore that its candidate for the US Air Force's T-X trainer contract is ready to be flown today. The company faces competition for the expected 350-aircraft deal from a clean-sheet design rolled out by a Boeing/Saab team last September and from Leonardo's DRS unit, with a T-100 development of the Aermacchi M-346.

Working with its partner Korea Aerospace Industries (KAI), Lockheed has already done much of the legwork for T-X. Pilots have completed some testing on the proven T-50 in South Korea, in-



Leigh Giangreco (left) and pilot Elliott Clemence flew aircraft TX-2 from the Greenville operations centre

cluding with an additional dorsal air refuelling tank (DART), which adds about (160kg) 350lb to the aircraft and close to no drag.

All that remains to test with the DART is a tanker clearance, says T-50 pilot Mark Ward.

## FURTHER TESTING

"We did all of the refuelling testing up to that point, even having the air force fully get their plan for how they would certify us on the tanker," he says. "As soon as we get contract award, all we have to do is pick up the phone and call the USAF tanker command and we're ready to do that testing."

TX-2 has a similar look and feel to the proposed USAF trainer, but further improvements will make the T-50A's ride more comfortable. Older-style leg restraints which buckle around the shin – a

holdover from the design's F-16 heritage – will be replaced with built-in restraints like those on the Lockheed F-35.

The proposed aircraft will also have different ejection seats with simplified straps and lap belt, says Ward. Lockheed has competed the seat selection for the T-50A, and has yet to make a selection.

The T-50 inherited its basic shape, flight controls and wing from the F-16, but Lockheed and KAI downsized the airframe to create a lighter platform. Its flight control laws are also similar, but with smoother g-onset and roll that turn the fighter into a comfortable trainer. It also needs less runway to land, and new landing gear has removed the F-16's tendency to bounce on touchdown.

"The airplane lands really smoothly and it can also handle it if a student lands really hard," Ward says. "We can go all the way up to 13 feet per second – carrier landing speed – which we would never intentionally do, but it's nice to know that the gear can handle that."

TX-2 delivered a smooth performance in the air, with a responsive stick that allowed me to bank with just a slight turn of the wrist, which made a barrel roll feel like a pleasant somersault.

The T-50A's handling and roll rate mimics the F-35, Ward notes.

After showcasing handling performance up to 4.5g, Clemence demonstrated the T-50A's high angle of attack (AOA) performance. Flying at about 100-120kt, we approached 25° AOA.

A former US Navy pilot, he says other aircraft such as the Boeing F/A-18 gently fall at maximum AOA because their thrust-to-weight ratio is not high enough, while their flight controls clamp down on the roll rate in order to control side slip.

## SERIOUS CONTENDER

"With the thrust in this airplane, you can go to maximum AOA, the slowest speed it can fly, and climb away," he says. "Not many aircraft I've flown can do that."

In January, both Northrop Grumman and Raytheon ended their pursuits of the lucrative T-X contract, with analysts attributing those decisions to it having effectively become a price "shoot-out".

If that is the case, an off-the-shelf trainer like the T-50, which requires few modifications, is a serious contender. Lockheed says that with the testing it has already completed, it could bring forward the USAF's replacement timeline for the Northrop T-38. ■



Type's robust landing gear is designed to endure tough treatment



F-35 retrofit requirements rise for USAF  
Defence P19

MODIFICATIONS LUCA PERUZZI GENOA

# Leonardo targets strike role with M-346 FA development

Company offers enhanced air-to-air and ground-attack performance from end of 2018

Leonardo used the IDEX exhibition in Abu Dhabi to unveil plans for a fighter/attack (FA) version of Aermacchi M-346, to be available from the end of 2018.

To benefit from the company's development of the M-346 into a fighter/trainer (FT) version capable of conducting training and operational missions, the FA variant will be equipped for air-to-air and air-to-surface duties.

Leonardo and the Italian air force have conducted release trials of inert 226kg (500lb) Mk 82 and Elbit Systems Lizard bombs from an FT-standard aircraft, which also carried Rafael Reccelite reconnaissance and targeting pods and a 12.7mm gun pod. This model will be further equipped with a tactical datalink, secure radios and defensive aids subsystem.



New version will build on the capabilities of fighter/trainer standard

The FA model will gain Leonardo's Grifo-346 radar – eventually with an active electronically scanned array antenna – and a more comprehensive electronic warfare/self-protection suite.

"Integration of the radar is expected to take an additional 18

months, while the mission systems configuration is being frozen," says marketing and sales representative Eduardo Munhos de Campos. The company is expected to offer an enhanced radar cross section reduction kit as part of the process. ■

PROGRAMME GREG WALDRON BENGALURU

# Stealth hurdles raise challenge for India's ADA

India is forging ahead with its most challenging fighter programme to date: the low-observable advanced medium combat aircraft (AMCA).

The director of New Delhi's Aeronautical Development Agency (ADA), CD Balaji, says the vast majority of work for the shape of the AMCA has been completed, with the biggest challenge involving the development of radar absorbent material (RAM).

Speaking at the Aero India show in Bengaluru, Balaji alluded to challenges in the area of radar cross section (RCS) reduction while talking about the collapse of a 2012 deal to buy 126 Dassault Rafales. Several issues prevented the purchase from advancing, but he points to France's unwillingness to part with a proprietary RAM coating applied to the Rafale's canopy. Had the acquisition been completed, fighters completed in India would have been sent to France to receive the coating.

Other low-observable features in the AMCA will be S-shaped engine intake ducts and canted twin tails. It will also have supercruise capability – the ability to sustain supersonic speed without using afterburner – and an active electronically scanned array radar.

For what the ADA calls "stealth mode," the indigenous fighter will carry a mix of four munitions – either bombs or missiles – in an internal weapons bay. For "non-stealth mode," it will have fuselage hardpoints and three additional hardpoints on each wing.

The AMCA's engine has not been determined, but is likely to be the Eurojet EJ200 or GE Aviation F414 – although a version of the Gas Turbine Research Establishment's indigenous Kaveri also could eventually be used.

Balaji says that once the engine choice has been made, it will take three or four more years to develop the aircraft, with a first flight planned for 2025. ■

ROTORCRAFT LEIGH GIANGRECO WASHINGTON DC

# USAF amends Huey successor plans

The US Air Force has delayed the release of a final request for proposals (RFP) to replace its fleet of Bell Helicopter UH-1N transports, after contractors told the service their off-the-shelf solutions could not meet all its proposed requirements.

A final RFP had been scheduled for release during February, but the USAF says it will now issue a second draft request in April, before advancing the process "this summer". The service still plans to award a contract during fiscal year 2018, and to

receive its first operational rotorcraft in FY2020.

In December, the USAF released a draft RFP to replace its UH-1Ns with up to 84 helicopters. Contractors responded that their commercially-available aircraft could not meet all requirements.

"The air force is shifting the acquisition approach to a pre-Milestone C entry, to allow for integration of non-developmental items [NDI]," the USAF says. "This will allow interested offerors an opportunity to integrate NDI into their off-the-shelf platform to meet all requirements."

Manufacturers have voiced concerns that requirements will favour Sikorsky's UH-60 Black Hawk. The USAF has called for its Huey replacement to carry at least nine combat troops plus equipment at over 135kt (250km/h). ■



Bidders struggled to propose off-the-shelf replacement for UH-1N



## Find your next deal with the world's most comprehensive fleets database



Where does  
our data  
come from?



30 expert  
analysts



Verified  
sources



Analyse, verify  
and validate



What makes  
Flight Fleets  
Analyzer unique?



360K+  
aircraft records



1.96 million  
aircraft events  
dating back to 1946



53,000  
people records



How does Flight  
Fleets Analyzer  
help you?



Understand  
the global fleet



Identify  
aftermarket  
opportunities



Grow  
your business



How we have  
helped people  
like you

“

We're able to move  
quickly with a clear  
understanding  
of where  
opportunities are. ”

“

The most respected, accurate fleet data. ”



“

Delivered ease and efficiency  
to my colleagues. ”

Find out more and request your demo at  
[www.flightglobal.com/fleetsanalyzer](http://www.flightglobal.com/fleetsanalyzer)



Slowing Learjet 75 demand prompts new production cut  
**Business Aviation P20**

PROCUREMENT LEIGH GIANGRECO WASHINGTON DC

# F-35 retrofit requirements rise for USAF

Planning chief reveals 108 jets now require Block 3F upgrade, as service waits on additional capabilities for Lightning II

The number of Lockheed Martin F-35As requiring hardware or software retrofits for the US Air Force has grown to more than 100, and further examples will be received without Block 3F software capabilities, a senior service official confirms.

Lt Gen Jerry Harris, deputy chief of staff for strategic plans and requirements, says the USAF is now facing a fleet of 108 F-35As that must be retrofitted from the Block 2B or 3i configurations. The service and the F-35 Joint Programme Office are working on a Block 3F upgrade plan, he adds.

## IMPROVEMENTS

When the USAF declared the F-35A ready for limited combat last August, the head of its Air Combat Command noted that the aircraft would gain greater capabilities with impending software and hardware upgrades. The type's Block 3F and 4 standards, which are expected to be available in 2018 and 2021, respectively, will increase weapons capacity and provide improved targeting.

Speaking to Congress on 16 February, Harris said 26 aircraft will require a software-only upgrade, while 19 require new signal processor cards, which will take an average of three days to install and test. Eighteen jets need updated helmet-mounted display systems, which will take 15 days to fit.

"The remaining 45 aircraft will require significant hardware modifications in the form of a Tech Refresh 2 [TR2] modification," Harris says. To take approximately 30 days to install and test per jet, "this modifica-



Significant hardware modifications will be made on 45 fighters, with work on each to take around 30 days

tion consists of 26 major components", he adds.

The USAF's operational test aircraft also require Block 3F hardware modifications, but that activity has fallen behind schedule, as availability of the full, 23-strong fleet is projected in 2018.

Late last year, the Pentagon's outgoing senior weapons tester, Michael Gilmore, warned that further F-35As may be delivered without Block 3F capabilities, including jets contained within the programme's tenth lot of low-rate initial production.

F-35 programme executive officer Lt Gen Christopher Bogdan says Gilmore's comments apply to some Block 2B-standard F-35s, which feature older hardware, and that only some of these will receive upgrades under current plans.

"The services have to decide

when and where they want to do that, if they want to do that at all," Bogdan says. "Some of those planes could remain in a 2B TR1 hardware configuration for a very long time – for example if it's a training airplane."

## OPTIMISTIC

Harris meanwhile, remains positive about the F-35A's progress.

"Concerning the completion of the system development and demonstration phase, although delivery of the final Block 3F-configured aircraft is later than expected, the air force remains optimistic that remaining fixes to known deficiencies for all systems except the [Raytheon] AIM-9X will be implemented within the Joint Programme Office estimated timeline of October 2017."

It could then be a further four

months until a fully certificated aircraft is delivered, and any delay would impact operational test and evaluation activities, he adds.

Harris also warns that accelerating procurement before the development of the Block 4 standard would increase the F-35 programme's overall cost. If the USAF chooses to increase its buy rate over the next five years, it would be forced to retrofit those additional aircraft with Block 4 hardware and software modifications, he notes, recommending that it instead looks to raise its order rate only as the new standard delivers towards the end of that period.

Bogdan says the US services are examining a long-term modification plan and trying to design some hardware changes that could be retrofitted in the field, rather than in a depot. ■

**Download the 2017  
World Air Forces Report**  
[www.flightglobal.com/waf](http://www.flightglobal.com/waf)

**FlightGlobal**  
IN ASSOCIATION WITH  
**Together  
ahead. RUAG**




**APPOINTMENT**  
**STEPHEN TRIMBLE**  
 WASHINGTON DC

## Leasing expert takes top post at Embraer unit

Embraer has hired corporate aircraft finance specialist Michael Amalfitano as the next boss of its executive jets division, replacing Marco Tulio Pellegrini.

Amalfitano joins Embraer after a 35-year career in aircraft leasing, including leadership positions at GE Capital and Stonebriar Commercial Finance.

As chief executive he inherits a division that has transitioned since last year from a decade-long pursuit of multiple development projects, to a production operation with a broad portfolio of light and midsize jets, along with VIP derivatives of Embraer's regional jets.

Pellegrini, an Embraer veteran, has led the division since January 2014 and will from 1 March assume a new, as-yet-unspecified leadership position.

In appointing Amalfitano, Embraer returns to form in bringing in an external candidate to lead the executive jets division, founded more than 15 years ago. ■

**PROGRAMME** **STEPHEN TRIMBLE** WASHINGTON DC

# Slowing Learjet 75 demand prompts new production cut

Backlog for Bombardier's superlight jet stands at 10, raising questions over Wichita plant

Bombardier plans to further reduce the production rate for the Learjet 75 this year to keep pace with market demand, the company said during a 16 February earnings call.

The superlight business jet made its debut in 2013 and reached a peak of 33 deliveries a year later. Shipments declined to 32 in 2015 and 24 in 2016.

The rate will fall again in 2017, but Bombardier has not disclosed the precise number in its financial filings.

Bombardier has orders for 10 Learjet 75s in the backlog entering 2017. After delivering only 13 examples in the first nine months of 2016, Bombardier finished strongly in the fourth quarter, with 11 more shipments.

In December 2016, Bombardier released financial guidance for 2017 which included a projected 150 overall business jet deliveries, including Learjets, Challengers and Globals.



Output of the twinjet peaked in 2014, a year after its market debut

But just two months later, the company has revised that projection down to 135 deliveries, blaming the reduction "mainly" on a production rate reset for the Learjet 75.

Bombardier chief executive Alain Bellemare says: "I feel that we have production rates of all of our product lines pretty much in line with market demand. If there's an upside potential, we

have the flexibility in our system to respond to that."

Any further reduction makes the position of the Learjet assembly operation in Wichita, Kansas, even more precarious. After cancelling the Learjet 85 programme last year and recording the last delivery of a Learjet 60XR in 2015, the Learjet 75 remains the only product still in active manufacturing in Wichita. ■

**DEVELOPMENT** **KATE SANSFIELD** LONDON

# Gulfstream makes progress with its dynamic duo

The flight-test campaigns for Gulfstream's clean-sheet G500 and G600 are progressing well, with the pair on course to meet their respective certification and entry-into-service targets.

The five aircraft in the G500 programme have flown more than 2,000h across 500 flights, Gulfstream says. Customer deliveries of the large-cabin, long-range aircraft are scheduled to begin shortly after airworthiness certification, which is slated for the fourth quarter.

The larger and longer-range G600 is pegged for service entry about 12 months later. Since making its maiden sortie in De-



G650 and its ER variant have also received certification from China

cember 2016, the first, and so far only, flight-test aircraft has accumulated more than 100h. It will be joined in the next few weeks by two additional prototypes.

Announced in 2014, the G500 and G600 are designed with Gulfstream's widest-ever cabin, Pratt & Whitney Canada PW800 engines, fly-by-wire controls and an

industry-first application of active-control sidesticks in a commercial aircraft.

Meanwhile, Gulfstream has secured certification for its flagship G650 and G650ER from the Civil Aviation Administration of China, allowing the US airframer to start delivering B-registered versions of the ultra-long-range business jets.

Gulfstream has a fleet of over 100 aircraft in China, of which more than 10 are G650/ERs, it says. The country's Gulfstream inventory consists mainly of its large-cabin and long-range G450 and G550, the company adds, with the midsize G280 accounting for only 10 units. ■



Future focused  
Heli-expo preview P22

SHIPMENTS KATE SARSFIELD LONDON

# Large jets lag but turboprops push on

GAMA figures for 2016 show falling deliveries by most manufacturers, but new models reveal some pockets of strength

There were mixed fortunes for business and general aviation manufacturers in 2016, with the turboprop sector one of the few bright spots.

In its latest annual industry review, released on 22 February, the General Aviation Manufacturers Association (GAMA) records total deliveries of 2,262 fixed-wing aircraft in 2016, compared with 2,331 pistons, turboprops and business jets the previous year. These shipments were valued at \$20.7 billion – \$3.4 billion less than in 2015.

The business jet sector was the worst performer, recording its lowest output since 2004, with shipments of only 661 aircraft, GAMA data shows, compared with 718 jets in 2015.

“This market has been rocked by a number of factors, including low oil prices and corporate profits, global economic and political instability and a large inventory of used aircraft,” says GAMA president Pete Bunce. “When you add all these together, you can see why it is tough.”

Most manufacturers saw deliveries slide. Gulfstream was the worst performer, shipping 26% fewer business jets in 2016 than in the previous 12 months. GAMA data shows the airframer delivered 120 large-cabin G450s, G550s and G650s, and 34 midsize G150s and G280s in 2015, compared with 88 large-cabin and 27 midsize jets last year.

In response to sluggish sales of its G150, the airframer stopped selling the 11-year-old model last year; the final aircraft will be delivered to its owner in mid-2017.

## Shipments 2015 vs 2016

	2015	2016
Business jets	718	661
Pistons	1,056	1,019
Turboprops	557	582
<b>Total shipments</b>	<b>2,331</b>	<b>2,262</b>
<b>Total billings</b>	<b>\$24.1bn</b>	<b>\$20.7bn</b>

Source: GAMA



Cessna's Latitude is gaining traction, with 42 handed over in 2016

The airframer hopes to bolster its large-cabin output when its clean-sheet G500 and G600 enter service in 2017 and 2018, respectively.

However, the top end of the business jet sector is going through a particularly rough patch, due largely to the waning appetite for big, long-range jets from the previously lucrative markets of China, Russia and the Middle East.

Like Gulfstream, Dassault's product line is positioned in the top-half of the sector, and deliveries of its 7X, 8X, 900LX, 2000LXS and 2000S fell from an already low base of 55 units in 2015 to 49 last year.

## TOP-END TURBULENCE

It was particularly bad for Airbus, which delivered only one VIP airliner in 2016 – an ACJ330 – compared with four units in 2015. Similarly, Boeing saw its output fall from 11 BBJ-series aircraft in 2015 – including the first BBJ 787-8 and -9 – to four last year.

A handful of OEMs bucked the downward trend. One Aviation delivered eight EA550 very light jets between January and December – one more than in the previous 12 months.

Honda Aircraft recorded its first full year of HA-420 deliveries, handing over 23 of the light

jets in 2016, against the four units shipped in the fourth quarter of 2015, when the aircraft entered service. Cirrus Aircraft's Vision SF50 personal jet made its GAMA debut, with three aircraft shipped, having entered service in December.

Textron Aviation boosted its output by more than 7% to 178 Cessna Citation-series jets, compared with 166 aircraft in 2015. The increase was largely down to the popularity of Cessna's new midsize offering, the Latitude, which entered service in July 2015. It shipped 42 examples in 2016, against 16 in the final five months of the previous year.

Aerospace analyst Rolland Vincent says new products such as the Latitude and HondaJet have given the business jet market much-needed stimulus.

“These new designs have captured the imaginations of buyers,” he says. “They offer something different – larger, quieter and more ergonomic cabins, innovative design, the latest avionics and systems integration, very competitive performance, and very good value for the dollar.”

The piston aircraft sector was another poor performer in 2016. Shipments of single- and twin-engined models slipped by 3.5%

to 1,019 units, GAMA data shows. With the exception of Cirrus, which recorded a 19-unit rise in deliveries of its SR-series, to 320 aircraft, all the airframers saw output flatten or decline.

Tecnam shipped 191 piston singles for the second year running; Diamond Aircraft recorded a 12-unit slide to 132 aircraft, although deliveries of its flagship DA62 piston-twin soared from two units in 2015 to 30 last year – reflecting the type's first whole year of production.

However, the airframer also disclosed a 45% fall in deliveries of its four-seat DA40 during the period, from 75 to 48 units. And deliveries of Cessna's piston-single family slid from 271 to 217 aircraft.

The turboprop sector was the only segment to record a year-on-year increase in shipments, according to GAMA, which says 557 single- and twin-engined designs were delivered in 2015, compared with 582 units in 2016.

Pilatus was the strongest performer, recording a 21-unit hike in PC-12NG deliveries, to 91 aircraft. Quest shipped 36 Kodiaks in 2016 – four more than the previous year; while Thrush recorded a 10-unit rise in deliveries of its S2R-family to 39 aircraft – reflecting a turnaround in the agricultural aircraft sector.

## STILL SLOWING

GAMA's 2016 shipment numbers are in line with market expectations, but Vincent believes it will take some time for the industry to return to “better health”.

He predicts a further decline in business jet deliveries in 2017 and 2018, and then a “return to higher levels of output”, strengthened by the entry into service of a wave of new models, including the superlight PC-24, super-midsize Citation Longitude, large-cabin G500/600 and ultra-long-range Bombardier Global 7000. ■



# FUTURE FOCUSED

On the eve of this year's Heli-Expo rotorcraft exhibition in Dallas, we survey some of the technologies driving a sector that may be suffering from persistent market headwinds but retains a firm belief in innovation as the key to improved safety, efficiency and performance – along with competitive advantage. Special report by Dominic Perry, Luca Peruzzi and Stephen Trimble



Airbus Helicopters is testing high-compression piston engines it reckons could slash fuel burn



## CONTENTS

- 24 **Market outlook** Sea of troubles
- 26 **Toll of history** Bell looks ahead
- 29 **Piston power** Rev it like Le Mans
- 31 **Human factors** Cockpit technology
- 33 **Avionics upgrade** Universal appeal



Bell Helicopter



MD Helicopters



C Mahoudau/ Airbus Helicopters

505 Jet Ranger X (top) has Bell feeling bright and cheerful about its return to the short-light-single market; Universal Avionics is bullish on MD902 retrofits (centre) – and other projects; At Thales, better civil rotorcraft performance is all about the human-machine interface



MARKET OUTLOOK

# Hovering at low altitude

The long-running oil price slump that has hit heavy helicopter sales may have eased off, but an orders upturn expected last year remains elusive

**DOMINIC PERRY** LONDON

Everybody in the rotorcraft industry knew that 2016 would be a difficult year, but last January you could still discern traces of optimism; the first green shoots of recovery would soon be visible, they said.

Sadly, things did not quite go to plan: 2016 saw the lowest order intake across the industry since 2008, with manufacturers receiving bookings for 541 civil and parapublic helicopters over 1.3t, a 15% fall on the previous 12 months, according to figures released by Airbus Helicopters.

As Guillaume Faury, the Marignane, France-headquartered manufacturer's chief executive, points out: "We thought that 2016 would be stable compared with 2015, but it was even lower." He describes it as "probably the most difficult year of the last decade".

It is worth remembering too that sales in 2015 had already tumbled compared with the previous year.

Faury's comments are echoed by his counterpart at Leonardo Helicopters, Daniele Romiti, who says the past 12 months were "challenging" for all the sector's participants, who were "impacted by the weakest market performance in years".

"This situation made competition among key players even tougher, both in the commercial and in the military domains," he says.

At Sikorsky, which has a smaller presence



Relentless: Bell 525 on track for 2018 despite test crash

in the civil market than its rivals, offering just two helicopters, there is a similar view.

"Overall I think the market is certainly depressed," says Dana Fiatarone, vice-president commercial systems and services, noting that the prolonged downturn in the oil and gas market, to which Sikorsky is particularly exposed, "has taken its toll on commercial helicopter sales".

"There is certainly pressure on the business, and sales and order volumes are down in the segment," he says.

Sikorsky secured orders for offshore-configured S-92s, as well as for the smaller S-76D, during 2016, Fiatarone says, but also saw success in other segments with its 12t-class heavy twin. These include emergency medical services, VIP transport, and search and rescue.

The latter has been a particular success story for Sikorsky, notably in the UK, where it has supplied the majority of rotorcraft to Bristow Helicopters for a contract with the government to provide country-wide SAR coverage.

Bristow had planned to operate just 11 S-92s, but certification and service-entry issues with the AgustaWestland AW189, also selected for the contract, has seen the Sikorsky twin used as a more-than-capable interim solution.

Fiatarone says Sikorsky is trying to get a sense from the oil and gas industry and operators of the state of the market, but acknowledges that in his 12 years with the manufacturer this is the "deepest" downturn he has seen.

"I think there was some hope early on of a quick V-shaped recovery but as time has gone on we are seeing a much shallower recovery," he says.

It is difficult to address the oil and gas market without referring to the sea of troubles washing over the Airbus Helicopters H225.

A crash in April 2016, traced to a gearbox fault, killed 13 crew and passengers aboard a



Certification issues have slowed AW189's introduction to UK search-and-rescue duty



Bell Helicopter

Norwegian-registered H225 operated by CHC Helikopter Service.

The H225 was initially grounded in most jurisdictions but flight restrictions have since eased. However Super Puma helicopters – including the AS332 L2 – are still banned from commercial operations in the crucial markets of Norway and the UK.

The manufacturer's case for a return to service comprises a number of safety measures including a tightened inspection regime and replacing one version of a critical gearbox component.

Although there is widespread geographical acceptance of these measures, the fact that Norway and the UK are still holding out means that only about 10% of the Super Pumas configured for oil and gas missions have returned to service.

It is also worth noting that even if the two nations had fallen into line, overcapacity in the North Sea is such that the AS332 L2s and H225s would not be required anyway.

However, Airbus Helicopters' Faury believes the Super Puma has a future in the North Sea. "The H225 has a clear role to play in that environment with its unique characteristics and performance," he says.

"It has started return to service and we are working to make this happen in the rest of the

world. We believe that oil and gas industry cannot rely on a single helicopter type. We need to ensure a smooth return to service and rebuild confidence in the North Sea."

No return to service will happen without first achieving a "return to trust" with the entire offshore industry, including rig workers and flightcrew, he says.

But he notes that there is "still significant overcapacity" in the offshore market. "Don't count on a significant uplift for oil and gas helicopters in the coming years."

Faury's comments on the over-reliance on one type – the S-92 – were underscored in early January when UK accident investigators discovered a potentially dangerous fault with a bearing in the Sikorsky's tail rotor assembly. It was found following an incident in which a CHC-operated aircraft was forced into an emergency landing on an oil platform after losing tail rotor authority.

There has been speculation that the travails with the Super Puma might prompt Airbus Helicopters to accelerate the development of the H225's successor, the X6, which is currently at the concept stage.

However, Faury says its timeline for service entry early next decade has not changed. "It is a long-term investment so we are not that much influenced by the short-term ups and downs," he says.

"We keep moving forward at a good pace but we do not change our perspectives for the long-term introduction of new types."

Both Airbus Helicopters and Leonardo Helicopters have seen some success in the North Sea market with their respective H175 and AgustaWestland AW189: Belgian operator Noordzee Helikopters Vlaanderen now has three of the former based in Aberdeen and Danish firm Bel Air Aviation flies a pair of the Italy-built helicopters from its base in Esbjerg.

"We believe the AW189 has the right mix of

technology, safety, cost effectiveness and productivity that the [oil and gas] market requires," Leonardo's Romiti says.

"Most long-range offshore operations require an average of no more than 16 passengers. The AW189 allows up to 30% operating cost savings compared with larger 19-seaters today."

A third competitor in the super-medium class should arrive towards the end of 2018, as Bell brings its 525 Relentless to market.

Slightly bigger than either of its rivals, its maximum take-off weight is 9.1t. Bell, like Leonardo, believes that the Relentless can take market share from the heavier H225 and S-92.

**"We believe the AW189 has the right mix of technology, safety, cost effectiveness and productivity"**

Daniele Romiti

Managing director, Leonardo Helicopters

However, first is the looming hurdle of returning its certification fleet to flight; Bell grounded its two remaining prototypes in the wake of a fatal crash involving the initial flight-test article in July 2016.

The manufacturer is confident that the two prototypes will be back in the air "in the next several months", pending the outcome of a US National Transportation Safety Board investigation.

Better news for the airframer comes from its 505 Jet Ranger X programme, which achieved certification in late 2016. First customer deliveries should begin shortly as production ramps up at its Mirabel, Canada factory.

The Mirabel plant could produce as many as 200 aircraft per year, says programme manager LaShan Bonaparte.

"We want to be at 150 by the end of next year, although by the end of 2017 I would say >>>



Agusta Helicopters

Belgian operator Noordzee Helikopters Vlaanderen has introduced H175s to North Sea



» we will probably be at around half that, or a little less,” she says.

Certification of the 505 was responsible for a “significant increase in order activity” at the tail end of last year, according to Scott Donnelly, chief executive of Bell parent Textron, as it converted letters of intent into firm commitments.

That sales uptick has given Bell confidence for the immediate future, chief executive Mitch Snyder says: “When you introduce a product into the market which has tremendous capability then the sales will come.”

In addition, he believes that the market’s recovery will roughly coincide with the arrival of the 525, which “in a couple of years” will be “done and ready to go”.

**“When you introduce a product into the market that has tremendous capability then the sales will come”**

**Mitch Snyder**

Chief executive, Bell Helicopter

Elsewhere, development activities are continuing on the skid-equipped AW109 Trekker – certification is on track for “this year”, says Romiti – as well as on the AW609 civil tilt-rotor, which has now resumed flight testing following its own crash-induced hiatus; certification is still targeted for 2018.

Airbus Helicopters continues to accumulate flight hours on the two prototypes of its medium-twin H160 as it looks to ensure validation next year. Faury says the aircraft hit their milestones “on time” in 2016, with cold-weather trials currently under way in Canada.

A third flight-test aircraft will join the fleet

later this year and manufacturing activities will begin on the type’s purpose-built assembly line. In addition, the manufacturer has begun taking tentative commitments for the type and has already signed a “significant number” of letters of intent for “all variants” of the helicopter, says Faury.

But at Sikorsky, which this November will celebrate two years under Lockheed Martin’s ownership, there is no sign of any new programme in the offing.

Although the main attractions of the company for Lockheed were clearly its military programmes and relationship with its big US domestic customer, access to the civil market was another driver for the deal.

So far, it is manifesting its civil ambition through investments in Sikorsky’s support network and progressive improvements to its existing products.

“But,” Fiatarone says, “if you are looking for the next big product announcement [from Sikorsky] then you’ll have to be a little bit patient.”

In the near term, it is working on the sort of evolution to its helicopters common to every manufacturer, but “a few years out”, it will “continue to invest in autonomy and intelligence applications”, he says.

Looking to the longer term, Sikorsky has been talking to its customer base about potential future requirements “to make sure that we have all the data to support that significant investment”, says Fiatarone. But he stresses that both the S-76D – “still a product that’s in demand” – and the S-92 – which is “really hitting its stride” – are “terrific platforms”.

“The S-92 has got some long legs left in it,” adds Fiatarone, and will continue in production, he says, “for the next several decades”. ■

## PROFILE

# New age of innovation

The pressing leadership challenge for Bell Helicopter’s chief executive is to channel the spirit of a sparkling creative legacy in a modern direction

**DOMINIC PERRY** FORT WORTH, TEXAS

As one employee at Bell Helicopter puts it: “Having the right leader at the right time is what makes a business successful. We really think with Mitch that he’s the right person for the next stage of our development.”

He is referring to Mitch Snyder, who took over from John Garrison as chief executive in October 2015. This employee echoes many at Bell in describing Garrison as “a nuts-and-bolts guy” who “preferred to be on the factory floor” exploring manufacturing processes than pushing a grand, futuristic vision. He left Bell for digger and dumper truck manufacturer Terex.

But to denigrate Garrison as simply a “process guy” is unfair, not least because Bell launched three programmes on his watch. These were the clean-sheet 525 Relentless civil helicopter and the V-280 high-speed military tiltrotor, as well a product, in the 505 Jet Ranger X, that finally seals Bell’s return to the short-light-single market it had mysteriously vacated. But for all the cutting-edge technology in the Relentless – notably its fly-by-wire (FBW) controls – there was a sense within Bell that the company had, somehow, lost its spark.

## JET PACK SPIRIT

Inside its Fort Worth, Texas headquarters there is a long glass-fronted case, almost a museum exhibit, which details the company’s achievements over the years from the model 47 to the Huey and beyond. There are notable firsts there too, such as the record-breaking X-1, early tiltrotor designs and even personal jet packs. (“We showed these off during half-time at the first Super Bowl [in 1967],” points out one employee. “Now we have Lady Gaga. Is that progress?”)

Time and again during FlightGlobal’s visit, that history is referenced – the thrust being that Bell is seeking to recapture the “spirit” that powered its early years.

It is a strategy flowing from the very top. “I have worked really hard to change the culture,” says Snyder. “Our legacy has always been innovation – look at the firsts we have pioneered. Let’s embrace that past and bring it into today and drive it in a different direction.” »



Super Puma remains grounded in Norway and UK following a fatal crash in April 2016



# INTERNATIONAL PARIS AIR SHOW

Paris • Le Bourget

**FROM 19 TO 25 JUNE, 2017**

Where aerospace leaders  
get down to business



an event from



**siae.fr**



505 Jet Ranger X was certificated in late 2016, first customer deliveries will commence shortly



Bell Helicopter

» One of his first acts as chief executive was to set up an innovations team, bringing together elements from the design and engineering departments, with a brief to come up with fresh ideas.

“When I first took over, I had this really big push on innovation – I felt that we really needed to do more there,” he says.

“I didn’t just say ‘go and innovate stuff’ – I want to solve the problems we know the industry faces.”

These range from safety and reliability at one end, to operational performance and suitability for the mission at the other.

“We are looking at different problem sets we want to have solved by different platforms or technologies, both new and existing,” he says. These could include the application of fly-by-wire controls, for example, or new forms of propulsion.

FBW controls are a particular theme of Snyder’s. “I want to get where all the mechanical linkages are gone,” he says. Although the 525 is “the first shot”, Snyder says he has greater ambitions. “I really want it in all of [our helicopters].”

### PRACTICAL APPLICATIONS

But while there is a logic to its integration in a helicopter like the Relentless, given its size and likely use, driving down the cost – and to some degree, the complexity – of a FBW system will be key to its adoption in lighter rotorcraft.

“I don’t think it’s a step too far [on a light helicopter]. It’s expensive right now, but that’s what I have asked the innovation team to look

at. It is probably going to work its way down. It will be in the heavies and super mediums first where the customer is more willing to pay for it, but it is odd to me that it is on drones and then you work your way up [to light helicopters] and it stops.”

**“I didn’t just say ‘go and innovate stuff’ – I want to solve the problems we know the industry faces”**

**Mitch Snyder**

Chief executive, Bell Helicopter

Of course, these individual innovations are important but their practical application is what counts, and for most people that means new programmes. Snyder has already launched one new self-funded development – the V-247 unmanned tiltrotor, which is pitched at a future US Marine Corps requirement “and we are working on more military products behind that as well,” he says.

With the 505 certificated only in December 2016 – deliveries began in February – and the 525 delayed until 2018, the need for another new civil programme is less pressing but that does not mean the company is idle in this sector, says Snyder.

Indeed, the 412 medium twin, which has been in service since the early 1980s, appears ripe for replacement. While Snyder admits “we do have some concepts in work” for a successor, what he is anxious to avoid is to build a

more modern version of the same aircraft. “I don’t know that I would say it is a replacement,” he says. Instead, Bell is talking to its customer base about the missions and capabilities that would be required from a future helicopter and identifying which “technology and platforms would provide that”.

Although the 505 was designed a bit more tactically to fill a space in the market Bell had vacated, the 525 had “a little bit more thought about what we are trying to do there”, he says. “We asked [operators] what was really going on in oil and gas and how far are you going [offshore]? What product do you really want?”

Another concept Snyder has previously hinted at is the development of a civil tiltrotor – and a pair of models of what are clearly commercial variants of the V-280 are on prominent display in his office. While only at



the “concept stage”, in one design Bell has modelled a 19-passenger cabin with three-abreast seating.

There is another issue: with the Valor still at the technology demonstrator stage, its future success rests on securing a large contract with the US Army under the future vertical lift initiative.

“If you replace every [Sikorsky UH-60] Black Hawk with the V-280 then you have scale. We believe in a [civil model] right now but believe it’s a derivative,” Snyder explains.

If that does not happen, however, “we would have to look at it to see if it is still viable in the quantities. Economies of scale really come when you have a military customer buying thousands of something.”

Snyder says that when he first came to the rotorcraft industry from a career in fixed-wing aviation, he was surprised at the resistance – or at least indifference – to innovation.

He points to the wildly differing levels of investment that have been poured into fighter aircraft and helicopters over recent decades. In the case of the latter, the mainstay platforms – the UH-1, Boeing CH-47 Chinook and UH-60 – all made their debuts in the 1960s and 1970s. They have, of course, been modernised in the intervening period, but the basic designs remain the same.

“In that same time we have watched the F-4 turn into the F-16 and then the F-35,” he says.

Although he points out that fixed- and rotary-wing operations have “different problems to solve”, at the end of the day “there has just been more money there”.

“Let’s borrow some of the technologies that have already been developed and push them into the rotorcraft business,” says Snyder.

Attendees at this year’s HAI Heli-Expo will be presented with a taste of Bell’s possible future, which will surprise many. “It is different, but it’s a different Bell,” he says. “It will offer a feel of what Bell Helicopter can be.”

It may be a cliché beloved of headline writers, but perhaps Snyder has truly begun to ring the changes at Bell. ■

### PROPULSION

## Reciprocal revolution

It may not have the same allure as some Airbus research projects, but an experimental scalable piston engine could deliver significant fuel savings

DOMINIC PERRY LONDON

**I**t is always the most eye-catching designs that receive the most attention. A rotorcraft featuring an entirely new architecture is sure to gain more publicity than a new helicopter that looks, well, pretty much like any other helicopter. It may have details that lift it over previous designs but if, to the casual observer, nothing radical has changed, it is likely to be overlooked. That truism applies even more strongly to engine upgrades, where there is little visual clue to the modification.

And this is the case at Airbus Helicopters. Of its current research and development programmes, the most arresting are its high-speed compound rotorcraft (the dreadfully-named LifeRCraft) and its participation in the wider City Airbus project, an electrically-powered, vertical take-off and landing aircraft designed as an urban run-around. Both are currently at the concept stage, represented solely by futuristic-looking digital renderings.

They have, as you might expect, gathered acres of publicity in both the technical and popular media. However, while such concept projects are vital to a company’s long-term future, they do nothing to address nearer-term challenges or simple issues such as operational cost.

Meanwhile, with very little fanfare, Airbus Helicopters has been working on a research programme that it believes could deliver a reduction in fuel consumption of more than 40% to operators of light single-engined helicopters.

Using an H120 light single as a flying test-bed, the manufacturer has replaced the helicopter’s stock Safran Helicopter Engines Arrius 2F turboshaft with a specially designed high-compression, kerosene-fuelled piston. Conducted under the auspices of the EU’s Clean Sky environmental research programme, flight-tests of the modified helicopter began in November 2015 and ran to July 2016. Further flight evaluations are due this year as the airframer and its partners, Austro Engine and Teos Powertrain Engineering, look to refine the design, taking it from technology readiness level (TRL) 6 all the way

to serial production.

Piston-engined helicopters are not new, of course, and date back to the earliest rotorcraft designs; Robinson and others continue to manufacture hundreds of them every year.

But, explains project head Alexandre Gierczynski, the typical piston design cannot be scaled up sufficiently to replace a turbine engine, due to power and weight constraints. The engine used on the demonstrator aircraft is a V8, featuring a machined – rather than cast – aluminium engine block to save weight, and a dry-sump system to ensure constant lubrication.

The closest comparison, he says, is to engines used by cars in the Le Mans 24-hour race – in fact, partner Teos builds V6, V8 and V12 engines for endurance racing and powered the 2009 overall Le Mans winner, a Peugeot 908 diesel. As Gierczynski points out, the design is not a great deal more complex than a standard V8 automotive engine: “The piston architecture is the same,” he says.

“The design of the engine is classical,” he says. “There are some secrets, that I will not give you, in order to get light weight but it is [mostly] a standard four-stroke engine.” It features a high-pressure, common-rail fuel injection with four valves per cylinder. “It is nothing very original,” he says.

**“Basically, we comply with all the criteria that we wanted to test, and had even better results than expected”**

Alexandre Gierczynski

Head of HCE project, Airbus Helicopters

However, used in a helicopter, it operates at lower specific power in order to “achieve the reliability you need from an aeronautical application”. “Le Mans is 24 hours, our time between overhaul is 2,000 hours,” he says.

Of course, the task was not as easy as simply transplanting an automotive engine into an aircraft. Multiple modifications were required to ensure compatibility, Gierczynski admits. Some issues, like excessive vibration, were easily cured – but others required more innovative solutions.

### EXCESS HEAT

Take the issue of cooling. As Gierczynski says, a turbine engine sheds a lot of unwanted heat via its exhaust gas, something a piston engine cannot replicate. A car partly uses the airflow from forward motion for an element of cooling, but a helicopter’s highest power demand, and therefore most heat, comes in the hover “where there is no dynamic air flow to benefit from”.

Instead, an engine-driven fan, located to ➤



525 features fly-by-wire controls

Bell Helicopter



» the rear of the powerplant, drives air through the engine to dissipate the heat. Tests were carried out last summer in temperatures of up to 31°C (88°F) with no adverse effects, says Gierczynski.

Another problem is the way a piston engine delivers power. Unlike a turbine, where combustion is continuous, a four-stroke design produces torque unevenly, and, according to Gierczynski, “the rotor is not capable of seeing these high power variations”. Uncorrected, it would “damage either the engine or the gearbox”.

To overcome the issue Teos has come up with a means of damping these torque oscillations, so the engine now has “the same characteristics as a turboshaft”.

Other developments included a specially designed dual-channel full authority digital engine control system, vital for maintaining a constant rotor speed, and changes to the avionics in order to display accurately the new engine parameters.

Although the engine itself is twice as heavy as the turboshaft it replaces, the significant reduction in fuel consumption means the helicopter needs to carry less fuel, resulting in weight neutrality, he says.

The weight factor rules out any application on twins, however: “Twice the additional mass would not be compensated for by the improved fuel consumption.”

The first phase of testing accumulated only around 10h of flying time, although three engines also amassed a combined 600h on bench tests. However, Gierczynski says the



“Very good” flight-test results point to bigger-than-expected gains in fuel economy

flights so far have “been sufficient to demonstrate the technical points we wanted to evaluate”, with “very good” results so far. “Basically we comply with all the criteria that we wanted to test, and had even better results than expected.”

For instance, the team aimed to cut fuel consumption by 30%, but achieved 42%. That figure could be reduced further, explains Gierczynski, but by no more than 2-3%. “If we can gain it then of course we will, but we

won’t spend a lot of effort to get that 2% as we have already achieved 42%.”

Power output was also “consistent and better than a turboshaft in hot and high conditions”, he says, with that power maintained at 2,500m and ISA+20°. Simpler maintenance also contributes to a reduction in direct operating costs of 30%.

### REFINEMENTS

The next phase of flight testing will help to refine the design, as Airbus Helicopters pushes towards serial applications. Gierczynski declines to give away much detail on how and when it will take it to market, but concedes that “around 2020” would be the likely timeframe.

In addition, there is no indication as to which aircraft could feature the engine. Airbus Helicopters makes three light singles – the 1,720t (3,780lb) H120, 2,250kg H125 and 2,500kg H130 – and Gierczynski says it would be applicable to all three. There is room for growth to take account of higher power requirements, too. The basic architecture of the high-compression engine is scalable – both up and down – from a V2 at one end, up to a V16 at the other. However, Gierczynski believes that a V12 is the logical limit for rotary applications.

He declines to reveal, however, if either the H125 or H130 are in its plans. “We are thinking, but there is nothing concrete today. This is an application for all light-single helicopters,” he says.

The engine may not have the sex appeal of the company’s more high-profile programmes, but light helicopters could be in for a revolution all of their own. ■



Le Mans winner 2009: project partner Teos is a master at endurance piston engines



## AVIONICS

# Interactive information

By integrating secure, flight-critical functions with “open world” data, Thales aims to bring pilots and crew into a mission-optimised future

**LUCA PERUZZI** VERGIATE, ITALY

**H**eli-Expo visitors will get a fresh look at Thales’s vision of the future of rotorcraft cockpit technology, a development project which is building enough momentum to be scheduled for possible certification in 2020.

The concept expands on the company’s Avionics 2020 hardware and software that was first shown at the 2013 Paris air show and is already flying on Airbus and other fixed-wing aircraft. A taste of things to come for rotorcraft was revealed at Heli-Expo 2014 in Los Angeles, but since then Thales has been busy with full-blown development.

For this year’s exhibition in Dallas, Thales is to show the rotary-wing technology with a customised human-machine interface (HMI). And, according to Eloi Leonhardt, business

development and sales director at Thales Helicopter Avionics, the company has signed up an as-yet-undisclosed customer and is aiming for certification of a new generation cockpit family for helicopters from 2020. Flight-testing on a customer platform will begin in 2018.

In a preview showing at Thales’s avionics facility at Vergiate, near Milan, Leonhardt explains that the 2020 concept comes from a Thales-driven network of research partnerships that aims “to refine understanding in the field of human-machine interface”.

He adds: “The result is a cockpit founded on the principles of natural and direct hands-on interaction using full touchscreen functionalities with interfaces structured to be task-oriented in order to ease flightcrew operations. It’s perfectly suited to the needs of both civil and governmental helicopter operators. It can fulfil a range of missions.”

The helicopter system is based on the Integrated Modular Avionics (IMA) architecture already supplied to Airbus and Boeing for fixed-wing programmes. The architecture makes it possible to reduce the number of separate pieces of equipment, by working through a smaller number of common processing and I/O modules (CPIOM) hosting the various software applications. According to Thales, the Avionics 2020 cockpit family is unique in allowing third-party systems or functions to be fully integrated; it also stands

**“We have been testing the new technology, especially the HMI, since 2015”**

**Eloi Leonhardt**

Business development and sales director,  
Thales Helicopter Avionics

alone in enabling “total” customisation. As demonstrated at Vergiate, the new cockpit is design-agnostic, scalable with two, three or four touchscreen multifunction displays, and based on an open, modular architecture.

## DESIGN PRINCIPLES

“Thanks to its integrated architecture, it has 30-40% of the weight and power consumption of comparable suites, with the number of LRUs [line-replaceable units] reduced by a factor of five”, says Leonhardt. “The new cockpit has been conceived around three key principles: crew-centric, mission-centric and customisable. The difference lies in the human-machine interface developments, which were inserted into the touchscreen displays at the heart of the new cockpit. They allow the systems to mirror the human brain’s decision-making process.”

The systems also merge data coming from different sources, including secure avionics and external or “open” channels, and were designed from the start for a helmet-mounted display. »



Thales’s vision of helicopter avionics is to give the crew both flight-critical and mission-centric information in one clean interface



» Moreover, he says, the 2020 system integrates an electronic flightbag showing data on the display and hence eliminating “uncomfortable” solutions such as the pilot’s knees.

“We have been testing the new technology, especially the HMI, since 2015 on a six-axis ground platform,” Leonhardt says. The test programme has involved civil and military operational and test pilots, and regulatory agencies. Thales has also been flying one new-cockpit display on an experimental helicopter platform to verify differences with the current generation. Crew familiarity with the new system, he says, has been achieved “in a few minutes”.

The next step will be to fly the full cockpit on board the first customer rotary-wing platform, in 2018, with the aim of certification by 2020.

### CONNECTIVITY

The Avionics 2020 system is also designed to integrate with operational functions beyond the helicopter itself; medical evacuation or search-and-rescue missions could benefit from, say, live transmission of patient telemetry data or live information on an accident zone. Thales is aiming to reduce pilot workload and increase crew efficiency, safety and security, but also tar-

gets reduced maintenance and operating costs, and enhanced fleet efficiency.

In October 2016, Thales acquired Belgian start-up AvioVision, a specialist in digitalisation of aircraft operation processes; its Avio-book electronic flightbag is used by 25 airlines on 900 aircraft. As Leonhardt puts it, this facility, with both secure and “open world” functions connecting a dedicated ground infrastructure with data collection, storage and sharing between operators, can be brought into the rotary wing market.

That function is imminent; Iridium’s Next satellite constellation is expected to begin initial service in 2018 – ultimately, 75 satellites in low-Earth orbit will provide constant coverage, enough bandwidth for real-time video transmission and, significantly, will support that volume of data with a small onboard equipment footprint and network security. ThalesAlenia Space is the prime contractor for the spacecraft.

Open world information to be displayed in the cockpit should be certified for flight operations, adds Leonhardt. He says: “We are currently involved in a development and evaluation programme with flight authorities to

present open-source information on one display, but in separate windows from secure flight information, on board some Airbus aircraft during 2017.”

Another key feature of Avionics 2020 is integration with a helmet-mounted display suitable for civil helicopter pilots. Drawing on Thales’s TopOwl and Scorpion military systems, the “Eyes-Out” solution is a full-colour head-up display for day and night operations, compatible with all types of helmets and head-worn equipment. Pascal Point, business development and marketing director for visors and helmets, describes the helmet-mounted display as “mainly dedicated to greatly enhancing levels of safety for helicopter crew and decreasing stress during critical flights”. That is, to achieving better mission situational awareness and “increased trajectory safety” by putting flight data directly in the pilot’s view.

The system adds just 400g (14oz) to existing headgear, Point adds.

### COMPACT AUTOPILOT

Pilots may be most thankful for a new autopilot, compact enough for light and medium helicopters. Thales is clearly eyeing the US market, where such machines are widely used by police, security, medical and rescue services – often on low-level flights in adverse weather. “Thanks to its innovative architecture which is based on the latest generation of Thales smart actuators, which eliminates the need for a flight-control computer and features software embedded in the actuators, the overall system weight is significantly reduced, allowing easy integration in both line fit or as retrofit on existing platforms,” Leonhardt says.

Thales’s compact autopilot architecture is based on two sets of three Smart+ actuators, providing a redundant dual autopilot and available in a three- or four-axis configuration, with the capability to include hover and departure modes as a software option. The four-axis configuration is available by adding a collective trim actuator.

The autopilot, adds Leonhardt, is an intuitive automatic flight control system that provides stability augmentation, attitude retention and flight director modes such as altitude or heading hold. Thales’s in-line actuators provide continuous stability augmentation without any cyclic stick displacement, both hands-on and hands-off.

And, he says, unlike many other solutions, helicopter dynamics “are seamlessly improved, from take-off to landing. Simulated flight tests have shown that pilots are immediately comfortable and make full use of it without any training.

“Pilots of light helicopters will have the same control and autopilot characteristics as in larger more complex helicopters.” ■



‘Eyes-out’ helmet-mounted display derives from military solutions and weighs just 400g





MD902s are being readied for a forward-fit and retrofit InSight cockpit system of displays, flight management and navigation

## UPGRADES

# Universal's fit-all appeal

Avionics maker's ambition to become a supplier of integrated systems to in-production aircraft is going slow, like the wider market recovery

**STEPHEN TRIMBLE** TUCSON, ARIZONA

Deep within the cavernous Dallas Convention Center during Heli-Expo, Universal Avionics will display the mock-up of its InSight integrated avionics suite in an exhibit booth adjacent to MD Helicopters (MDHI), the aircraft manufacturer that lined up four years ago to be the first customer for the avionics vendor's boldest product launch yet.

In 2013, Universal and MDHI announced that the InSight system would adorn the cockpit of the MD902 light twin as a forward-fit

and retrofit option. It was a strategic coup for the Swiss-owned, Tucson-based avionics supplier. At the time, Universal was seeking to expand from supplying major components to integrated systems on production aircraft and fulfil a long-term vision by expanding into a then-booming market for light- and medium-sized commercial helicopters.

Four years later, the InSight system is developing nicely as a retrofit option in the fixed-wing business jet market, but the MD902 forward-fit programme – much like the light and medium-twin helicopter market in general – is stalled and no recovery seems, well, in sight.

Universal has completed installation of the InSight system – including user control and input devices, primary flight and multifunction displays and flight-management system, and navigation systems – in MDHI's own test-bed. It has been integrated with several existing components, including the autopilot and radios, two subsystems that Universal adapts to the open-architecture InSight. Initial ground testing began in November but halted to let MDHI perform scheduled maintenance on the MD902, says Grady Dees, Universal's

technical sales director. "We're waiting for them to get the aircraft back in an airworthy condition," Dees says. "Meanwhile, we've been cranking away at software."

The InSight product itself is not being held back by the delay to the MD902 forward-fit programme. Cessna Citation VII business jets are now flying with a certificated InSight retrofit cockpit system. The MD902 fleet remains a candidate for a retrofit InSight package, Dees says, adding that Universal is also in talks with multiple helicopter manufacturers and operators about both forward-fit and retrofit programmes.

## UNIVERSAL APPEAL

Nor does Universal appear to be suffering. A visit to the manufacturer's 60,000ft<sup>2</sup> assembly line in Tucson in mid-December 2016 revealed a humming operation, churning out circuit boards at a rate of one every 3-4min to power Universal's diverse catalogue of about 35 avionics products, including displays, flight management systems, recorders and control units. As several US Federal Aviation Administration mandate deadlines approach by 2020, Universal is discussing »



» options for adding shifts to increase delivery volumes.

But the status of the forward-fit programme on the MD902 must feel disappointing. The selection by MDHI in 2013 sent a clear message to the helicopter industry. The small community of integrated avionics vendors on aircraft in production had a new member with Universal, the proud inventor of the navigation FMS for the business aviation industry in the early 1980s. Instead of providing only the FMS, display or other components, Universal had raised its ambitions to be an integrated flightdeck supplier for aircraft in production. The work, however, continues, according to Dees.

If not at Heli-Expo, then some time in the future, Universal expects the InSight system to be selected for more retrofit and forward-fit programmes in the helicopter market.

"We have so many irons in the fire, and I can't talk about some of them," Dees says. "For the rotary market, we have a lot of things near a commitment, but we don't have a committed customer. We definitely have a lot of opportunities."

### CHANGING FORTUNES

Meanwhile, Universal continues to develop its traditional retrofit-heavy business in the commercial helicopter market, with the help of key dealers, such as Heli-One. Universal's

**"For the rotary market, we have a lot of things near a commitment, but we don't have a committed customer"**

Grady Dees

Technical sales director, Universal Avionics

ambition to expand in the commercial helicopter market dates back several years, to a time when the segment offered a rare bright spot of growth in the larger business and general aviation markets hammered by the global financial crisis that erupted in 2008. Escalating oil prices fuelled a boom in oil and gas exploration, which depends on helicopters to gain access to remote oilfields and offshore drilling rigs. The collapse in oil prices in 2014, however, triggered an ongoing slump in helicopter sales.

The swing in fortunes in the civil helicopter market has stifled momentum on Universal's forward-fit portfolio, such as InSight. But in some ways the reluctance to buy new aircraft off assembly lines has increased demand for Universal's retrofit business.

"Our business has been heavily retrofit in the past anyway," Dees says. "So the OEMs are more affected by this downturn in new deliveries than we are in the retrofit business. Actually, in some ways it increases our business because

people decide, 'We're not going to buy new helicopters. Let's see what we can do with what we have and either repurpose them or put them in new roles or go after different contracts'."

The combination of the oil price bust and safety related operational restrictions imposed in some areas on the Airbus Helicopters H225 has opened new opportunities for Universal, including cockpit upgrades for a large worldwide fleet of Sikorsky- and Westland-built S-61 heavy lifters. Only a few years ago, that fleet was expected to be retired as swarms of H225s, Sikorsky S-92s and other new products flowed off packed assembly lines.

"There's still life left in those machines," Dees says. "It's a lot more cost-effective than purchasing a new S-92 or a new heavy-lift helicopter with all the uncertainty with the H225 these days."

Universal is perhaps uniquely suited to increasing retrofit demand. The highly automated electronics assembly line in Tucson offers a case in point. In defiance of industry trends, Universal declined to outsource the critical ingredient of any electronics vendor: the circuit board. Instead, a relatively small group of workers monitors a line of automated machines, which lay solder on the boards, install components, heat the result and then let the solder cool. Other machines perform visual inspections and functional testing.

### OTHER MARKETS

By keeping the automated assembly process in house, Universal believes it maximises options in a famously fickle retrofit market. With about 35 major products built in thousands of configurations, it is impossible to project demand for retrofit items with any certainty. Business jet and helicopter owners tend to order upgrades when an aircraft is parked for maintenance, so being able to respond quickly is critical for Universal.

Steve Pagnucco, Universal's vice-president of operations, says: "We're not going to spend any amount of our time complaining about marketing's lousy forecast. We're going to spend 100% of our time reacting quickly to the reality of the market."

Beyond civil helicopters, Universal Avionics also is gearing up to capture an anticipated wave of retrofit and forward-fit opportunities in the military helicopter and fixed-wing special missions markets. The company is already the FMS supplier for a large variety of Sikorsky helicopter and Beechcraft fixed-wing aircraft, making the transition to the military arena an attractive fit.

At the same time, Universal won't give up on the vision to become a forward-fit supplier of integrated avionics in the commercial helicopter market. The upcoming Heli-Expo may be too soon to expect to see a break-out, but the time may not be far away, either. ■



Cessna Citation VII business jets are now flying with an InSight retrofit cockpit system

From yuckspeak to tales of yore, send your offcuts to [murdo.morrison@flightglobal.com](mailto:murdo.morrison@flightglobal.com)

## From Soviet relic to superbrand

Once it was the butt of jokes about its Brezhnev-era aircraft and passenger service, like the one where a stewardess asks: "Do you want a meal?" "What are the options?" inquires the passenger. "Yes or no," says the stewardess.

Now Aeroflot has been named the world's most powerful airline brand, beating Emirates into second place.

According to the strategy consultancy Brand Finance, which compiles the annual report, Aeroflot's brand strength stems in part from dominance of its domestic market. "Its brand equity scores for metrics such as familiarity, consideration, preference and loyalty are formidable," it says.

Like Emirates and the other Gulf carriers, Aeroflot has spent big on sporting sponsorships to embed its brand in markets outside Russia – it is the official airline of Manchester United, for instance.

It's a long way from the mid-1990s, when Aeroflot's shocking safety record led the US embassy to ban its employees from travelling around Russia by air.

## Rs from elbow

Bob Dick spotted this glorious gremlin on the Sky News site in its report on actor Harrison Ford's latest flying incident – this time mercifully only a close scrape with a 737:

He passed over an American Airlines Boring 737 preparing for take off with 110 passengers on board, NBC News reported.

Ford is said to have been recorded asking air traffic controllers: "Was that airliner meant to be underneath me?"



A near-miss of the letter E

A campaign to persuade Lego to make a set based on the Red Arrows' BAE Systems Hawk is coming together, with organisers @RAFRed10 and @MarcusRamsden looking for a few more supporters to reach the 10,000 threshold for the toy company to consider the proposal. Lego offers lots of themed sets. You may be surprised that a Red Arrows one has taken so long to get to the discussion stage. You can give them your backing via Twitter.

## Trumped up

United Airlines replaced a pilot on an Austin to San Francisco flight after she boarded the aircraft late, in civilian garb, and started "ranting" at passengers over the intercom about her divorce and the state of the country. The flight was delayed for more than an hour after several passengers threatened to walk off the aircraft.

In an entirely unconnected development, President Trump has expressed his preference for the US Federal Aviation Administration to be run by a pilot, partly, it seems, because his own pilot suggested that might be a good idea (current head, Michael Huerta, an Obama appointee, does not fly).

The Donald may be scouting for suitable replacements.

## Where the heli?

Driving a truck across the snow-swept Kazakhstan steppe at night must be a lonely, soporific business, so coming across a Mil Mi-8 helicopter on the highway is always going to be a "wake up" moment.

It happened to one lorry driver who has posted on social media a video of a Kazakh pilot

running over from the aircraft to ask the way to the nearest city.

The defence ministry says the crew were taking part in a "visual orientation exercise".

## Ton van Anandel

We learn of the death of Ton van Anandel, the aviation cartoonist behind – with Martin Leeuwis – a series of 13 books of aviation humour, starting with *Say Again* in 1982. Leeuwis says his long-time collaborator will be remembered as "undoubtedly the best aviation cartoonist in the world". Check out his work on [aviation-humor.com](http://aviation-humor.com)



The funny side of flying

## French loss

Another notable Frenchman has passed away under duty for his country. Edouard Lumiere, who as a Sergeant-aviator in the French Flying Service has just been killed in an aeroplane accident, was one of the brothers who it is claimed invented the cinematograph.

## Raids on Darwin

Darwin was twice bombed by the Japanese on

**75 YEARS AGO** February 19th. The first raid, in the morning, lasted an hour, and was made by 72 twin-engined bombers escorted by fighters. In the afternoon there was a raid by 21 twin-engined bombers. Four enemy aircraft were shot down.

## Phantom flies

The first McDonnell Phantom for the RAF made its maiden flight at St Louis on February 17. The aircraft, a YF-4M, will join the two YF-4Ks and the F-4K already taking part in the flight development programme.

## Boeing job cuts

Boeing is to cut its workforce by 8,000 because of defence programme cancellations, cut-backs and lower 737 build rates. Around 6,500 jobs will go in the Seattle area, where total Boeing employment now stands at 104,000.

**100-YEAR ARCHIVE** Every issue of *Flight* from 1909 onwards can be viewed online at [flightglobal.com/archive](http://flightglobal.com/archive)



## Flight International

We welcome your letters on any aspect of the aerospace industry. Please write to:

**The Editor, Flight International, Quadrant House, The Quadrant, Sutton, Surrey, SM2 5AS, UK**

Or email:

[flight.international@flightglobal.com](mailto:flight.international@flightglobal.com)

The opinions on this page do not necessarily represent those of the editor. Letters without a full postal address supplied may not be published. Letters may also be published on [flightglobal.com](http://flightglobal.com) and must be no longer than 250 words.

## Extortors must be punished too

Regarding your article: "SFO details R-R corruption allegations" (*Flight International*, 31 January-6 February). It is sad to see reputable companies of the stature of Rolls-Royce occasionally sullied with admissions to the UK Serious Fraud Office of corruption, as it leaves the casual reader with the mistaken impression of out-right bribery.

As your detailed article indicates, these cases rarely concern bribery but mostly involve yielding to extortion by the customer's employees or related parties. Unethical and illegal behaviour by the corporation, to be sure – but it is more sinned against than sinning – and it is shameful that the corporation is publicly humiliated but the extortor is rarely even named, let alone charged.

I recall an instance when my employer was competing with another manufacturer for a "third world" airline order and an employee of that airline demanded a very substantial sum – on the grounds that the competition was close and he could

### REFORM

## Tackling mental health issues

I commend your editorial: "To err is human" (*Flight International*, 17-23

January), pointing out that more incidents linked to the mental health of pilots can be expected.

The first line of defence still remains the pilot identifying that they have a problem and seeking help of their own accord. The second remains the aviation medical examiner (AME). How can we expect a pilot to seek help, when they may have scant protection in regards to sick pay (if any) for lengthy periods? Financial ruin may not be far away. Our encounters with AMEs are far too infrequent and brief in nature for possible mental health problems to be identified.

The airline industry is an incredibly hostile environment for someone with mental health problems. Pilots are subjected to differing working hours and possible circadian dysrhythmia. They can also be removed from friends and family for days at a time and placed in among colleagues whom they may not know very well.

With the second anniversary of the tragic Germanwings accident approaching, the travelling public will be surprised at the slow pace of reform in tackling such a pressing issue.

**Chris Smith**

*Aberdeen, Scotland, UK*



Pilot suicide caused A320 crash

readily swing it one way or the other (as he undoubtedly could, given his function and position in the airline).

We assumed that a similar demand had also been made of our competitor, so we discussed the predicament and what action to take: for example, should we refer the demand to his superiors and risk acquiring additional demands? Of course, we refused to comply, not least because there was no way of hiding such a sum on the books as a "miscellaneous sales expense". We lost the contract.

Compared with industry in general, the aircraft business is peculiarly susceptible to such extortionate demands because of

the size of the contracts – whereby a trivial percentage of their value can represent a huge sum to the unscrupulous individual.

**Malcolm Bowden**

*McDonald, Tennessee, USA*

## Industry demise

Regarding your article on helicopter production at Yeovil: "Sales vital to keep Wildcat line purring" (*Flight International*, 24-30 January). As a member of the UK helicopter industry since 1947, I have witnessed its decline from success to bankruptcy.

In the 1950s, the industry produced helicopters for world-wide export: Bristol Helicopters,

under Raoul Hafner, and Saunders-Roe, with the smaller three- to five-seat aircraft.

The first step to ruin came in 1960 with the political amalgamation of the industry under Westland – who had no wish but to manufacture Sikorsky aircraft under licence – and the closure of Bristol Helicopters and Saunders-Roe.

The final straw was in 1980 when the then chief executive, against advice, put into manufacture with company funding a batch of WG-30s – a badly modified version of the Lynx – which was totally uneconomical for civilian operation.

None were sold, taking Westland into bankruptcy and foreign ownership.

**Reg Austin**

*via email*

## UAV users don't need heavy hand

Your short item in Straight & Level: "UAV the right to remain silent" (*Flight International*, 24-30 January) admirably illustrates the yawning gulf between manned aviation and unmanned.

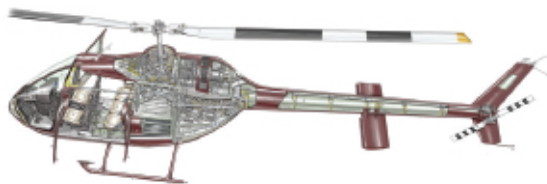
Here in New Zealand, we self-report accidents, incidents and other aviation events. The purpose, ultimately, is improved aviation safety for all.

However, the messages of "illegal place to operate your new toy!" and "@GlosPolice have it now", imply a punitive element – who's going to own up?

The unmanned sector is in its infancy, and behaviours range from simple ignorance, through to knowledgeable and compliant, to overtly anti-compliant. Using one heavy-handed approach to control all will fail.

**Allen Reynolds**

*Auckland, New Zealand*



## Check out Flight International's Image Store

Browse or customise a gift or memento from our **CUTAWAY ARCHIVE** of more than 1000 aircraft drawings

[www.flightglobalimages.com](http://www.flightglobalimages.com)

**FlightGlobal**

## EDITORIAL, ADVERTISING, PRODUCTION & READER CONTACTS

**EDITORIAL +44 20 8652 3842**  
**Quadrant House, The Quadrant,**  
**Sutton, Surrey, SM2 5AS, UK**  
[flight.international@flightglobal.com](mailto:flight.international@flightglobal.com)

**Editor** Craig Hoyle  
+44 20 8652 3834 [craig.hoyle@flightglobal.com](mailto:craig.hoyle@flightglobal.com)  
**Deputy Editor** Dominic Perry  
+44 20 8652 3206 [dominic.perry@flightglobal.com](mailto:dominic.perry@flightglobal.com)  
**Head of Strategic Content** Murdo Morrison FRAeS  
+44 20 8652 4395 [murdo.morrison@flightglobal.com](mailto:murdo.morrison@flightglobal.com)  
**Features Editor** Dan Thisdell  
+44 20 8652 4491 [dan.thisdell@flightglobal.com](mailto:dan.thisdell@flightglobal.com)  
**Business & General Aviation Editor** Kate Sarsfield  
+44 20 8652 3885 [kate.sarsfield@flightglobal.com](mailto:kate.sarsfield@flightglobal.com)  
**Consulting Editor** David Learmount  
+44 7785 901787 [david.learmount@ntlworld.com](mailto:david.learmount@ntlworld.com)  
**Magazine Enquiries**  
[flight.international@flightglobal.com](mailto:flight.international@flightglobal.com)

### AIR TRANSPORT TEAM

**Editor Flightglobal Premium News** Graham Dunn  
+44 20 8652 4995 [graham.dunn@flightglobal.com](mailto:graham.dunn@flightglobal.com)  
**Managing Editor** Niall O'Keefe  
+44 20 8652 4007 [niall.okeefe@flightglobal.com](mailto:niall.okeefe@flightglobal.com)  
**Managing Editor - Flight Airline Business**  
Lewis Harper +44 20 7911 3105  
[lewis.harper@flightglobal.com](mailto:lewis.harper@flightglobal.com)  
**Air Transport Editor** David Kaminski-Morrow  
+44 20 8652 3909  
[david.kaminski-morrow@flightglobal.com](mailto:david.kaminski-morrow@flightglobal.com)  
**Air Transport/MRO Reporter** Michael Gubisch  
+44 20 8652 8747 [michael.gubisch@flightglobal.com](mailto:michael.gubisch@flightglobal.com)  
**Senior Reporter** Oliver Clark  
+44 20 8652 8534 [oliver.clark@flightglobal.com](mailto:oliver.clark@flightglobal.com)

### AMERICAS

**Americas Managing Editor** Stephen Trimble  
+1 703 836 8052 [stephen.trimble@flightglobal.com](mailto:stephen.trimble@flightglobal.com)  
**Deputy Americas Editor - Air Transport**  
Ghim-Lay Yeo  
+1 703 836 9474 [ghimlay.yeo@flightglobal.com](mailto:ghimlay.yeo@flightglobal.com)  
**Americas Finance Editor** Edward Russell  
+1 703 836 1897 [edward.russell@flightglobal.com](mailto:edward.russell@flightglobal.com)  
**Senior Reporter** Jon Hemmerdinger  
+1 703 836 3084 [jon.hemmerdinger@flightglobal.com](mailto:jon.hemmerdinger@flightglobal.com)  
**Aviation Reporter** Leigh Giangreco  
+1 703 836 7442 [leigh.giangreco@flightglobal.com](mailto:leigh.giangreco@flightglobal.com)

### ASIA/PACIFIC

**Asia Editor** Greg Waldron  
+65 6780 4314 [greg.waldron@flightglobal.com](mailto:greg.waldron@flightglobal.com)  
**Asia Air Transport Editor** Mavis Toh  
+65 6780 4309 [mavis.toh@flightglobal.com](mailto:mavis.toh@flightglobal.com)  
**Asia Finance Editor** Ellis Taylor  
+61 498 878 583 [ellis.taylor@flightglobal.com](mailto:ellis.taylor@flightglobal.com)  
**Reporter** Aaron Chong  
+65 6780 4851 [aaron.chong@flightglobal.com](mailto:aaron.chong@flightglobal.com)  
**Reporter** Firdaus Hashim  
+65 6780 4313 [firdaus.hashim@flightglobal.com](mailto:firdaus.hashim@flightglobal.com)

### EUROPE/MIDDLE EAST

**Israel Correspondent** Arie Egozi

### FINANCE

**Global Finance Editor** Sophie Segal  
+1 212 448 2253 [sophie.segal@flightglobal.com](mailto:sophie.segal@flightglobal.com)  
**Europe Finance Editor** Jamie Bullen  
[jamie.bullen@flightglobal.com](mailto:jamie.bullen@flightglobal.com)

### FLIGHTGLOBAL.COM

**Web co-ordinator** Rebecca Springate  
+44 20 8652 4641  
[rebecca.springate@flightglobal.com](mailto:rebecca.springate@flightglobal.com)

### EDITORIAL PRODUCTION

**Global Head of Design & Production**  
Alexis Rendell  
**Chief Copy Editor, Europe** Dan Bloch  
**Layout Copy Editors** Sophia Huang, David Mawer, Tim Norman  
**Global Production Editor** Louise Murrell  
**Deputy Global Production Editor** Rachel Warner  
**Global Digital Producer** Damion Diplock  
**Web Production Editor** Andrew Costerton  
**Senior Designer** Christine Zhang  
**Designers** Scarlett Huang, Coco Li, Lin Ning, Lucy Xiao, Shirely Xiao, Sonja Ye  
**Consulting Technical Artist** Tim Hall

### DISPLAY ADVERTISEMENT SALES

**Quadrant House, The Quadrant,**  
**Sutton, Surrey, SM2 5AS, UK**

### EUROPE

**Global Sales Manager** Mark Hillier  
+44 20 8652 8022 [mark.hillier@flightglobal.com](mailto:mark.hillier@flightglobal.com)  
**Key Account Manager** Grace Hewitt  
+44 20 8652 3469 [grace.hewitt@flightglobal.com](mailto:grace.hewitt@flightglobal.com)  
**Display Sales Executive** Chris Pilkington  
+44 20 8652 8130 [chris.pilkington@flightglobal.com](mailto:chris.pilkington@flightglobal.com)  
**Sales Support** Gillian Cumming  
+44 20 8652 8837 [gillian.cumming@rbi.co.uk](mailto:gillian.cumming@rbi.co.uk)

### NORTH & SOUTH AMERICA

**Vice-President, North & South America**  
Rob Hancock +1 703 836 7444  
[robert.hancock@flightglobal.com](mailto:robert.hancock@flightglobal.com)  
**Regional Sales Director**  
Warren McEwan +1 703 836 3719  
[warren.mcewan@flightglobal.com](mailto:warren.mcewan@flightglobal.com)  
**Sales Executive** Kaye Woody  
+1 703 836 7445 [kaye.woody@flightglobal.com](mailto:kaye.woody@flightglobal.com)  
Reed Business Information, 333 N. Fairfax Street,  
Suite 301, Alexandria, VA 22314, USA

### ITALY

**Sales Manager** Riccardo Laureri  
+39 (02) 236 2500 [media@laureriassociates.it](mailto:media@laureriassociates.it)  
Laureri Associates SRL, Via Vallanze 43,  
20131 Milano, Italy

### ISRAEL

**Sales Executive** Asa Talbar +972 77 562 1900  
Fax: +972 77 562 1903 [talbar@talbar.co.il](mailto:talbar@talbar.co.il)  
Talbar Media, 41 HaGiva'a St, PO Box 3184, Givat  
Ada 37808, Israel

### ASIA/AUSTRALASIA

**Key Account Manager** Jay Ee  
+65 6780 4301 [jay.ee@flightglobal.com](mailto:jay.ee@flightglobal.com)  
Fax: +65 6789 7575  
1 Changi Business Park Crescent,  
#06-01 Plaza 8 @ CBP, Singapore 486025

### RUSSIA & CIS

**Director** Arkady Komarov  
[komarov@worldbusinessmedia.ru](mailto:komarov@worldbusinessmedia.ru)  
Tel/Fax: +7 (495) 987 3800  
World Business Media, Leningradsky Prospekt, 80,  
Korpus G, Office 807, Moscow 125190, Russia

### CLASSIFIED & RECRUITMENT

**Sales Manager** Sophie Wild  
+44 20 8652 4239 [sophie.wild@rbi.co.uk](mailto:sophie.wild@rbi.co.uk)  
**Classified Sales Executive** Chris Pilkington  
+44 20 8652 8130 [chris.pilkington@flightglobal.com](mailto:chris.pilkington@flightglobal.com)  
**Recruitment Sales Executive** Chris Harding  
+44 20 8652 4900 [recruitment.services@rbi.co.uk](mailto:recruitment.services@rbi.co.uk)

### ADVERTISEMENT PRODUCTION

**Production Manager** Sean Behan  
+44 20 8652 8232 [sean.behan@rbi.co.uk](mailto:sean.behan@rbi.co.uk)  
**Production Manager Classified** Alan Blagrove  
+44 20 8652 4406 [alan.blagrove@rbi.co.uk](mailto:alan.blagrove@rbi.co.uk)

### MARKETING

**VP Marketing** Justine Gillen  
+44 20 8652 8031 [justine.gillen@flightglobal.com](mailto:justine.gillen@flightglobal.com)

### DATA TEAM

**Director of Data** Trevor Mountford  
[trevor.mountford@flightglobal.com](mailto:trevor.mountford@flightglobal.com)  
**Fleet Research Manager** John Maloney  
+44 20 8564 6704 [john.maloney@flightglobal.com](mailto:john.maloney@flightglobal.com)

### PUBLISHING MANAGEMENT

**Chief Operating Officer**  
Philippa Edward  
[philippa.edward@flightglobal.com](mailto:philippa.edward@flightglobal.com)  
**Executive Director Content**  
Max Kingsley-Jones  
[max.kingsley.jones@flightglobal.com](mailto:max.kingsley.jones@flightglobal.com)  
**Commercial Director Publishing & Conferences**  
Stuart Burgess  
[stuart.burgess@flightglobal.com](mailto:stuart.burgess@flightglobal.com)

### READER SERVICES

#### Subscriptions

Jenny Smith  
Flight International  
Subscriptions, Reed Business Information,  
PO Box 302, Haywards Heath,  
West Sussex, RH16 3DH, UK

#### Subscription Enquiries

From UK: 0330 333 9533  
From overseas: +44 1444 475 682  
Fax +44 1444 445301  
[flightinternational.subs@quadrantsubs.com](mailto:flightinternational.subs@quadrantsubs.com)

#### Subscription Rates

1 Year: £145/\$229/€179  
2 Years: £246/\$389/€304  
3 Years: £348/\$549/€429  
Only paid subscriptions available. Cheques  
payable to Flight International

Flight International welcomes unsolicited  
contributions from readers but cannot guarantee to  
return photographs safely.

© and Database Rights 2016 Reed Business  
Information Ltd. All rights reserved. No part of this  
publication may be reproduced, stored in a retrieval  
system or transmitted in any form or by any means,  
electronic, mechanical, photocopying, recording or  
otherwise, without the prior permission in writing of the  
publishers.

#### FlightAscend Consultancy

Flight Ascend  
Consultancy is a leading  
provider of expert  
advisory and valuations  
services to the global aviation industry. Its specialist,  
independent services inform and shape the  
strategies of aviation businesses worldwide. It offers  
an unrivalled breadth and depth of aviation expertise  
and experience, backed by unique access to robust  
industry data. [flightglobal.com/consultancy](http://flightglobal.com/consultancy)  
Tel: +44 20 8564 6700  
email: [consultancy@ascendworldwide.com](mailto:consultancy@ascendworldwide.com)

#### Flight Dashboard

Flight Dashboard is a subscriber  
service which provides news and  
analysis of the aviation industry,  
from fleet information to orders,  
deliveries, airline start-ups and routes and network  
coverage. Personalise your research by airline, region  
or country to find the market intelligence you need to  
support planning, competitive strategy and find new  
opportunities. [flightglobal.com/dashboard](http://flightglobal.com/dashboard)

#### FlightFleets Analyzer

With information on more than  
360,000 aircraft, Flight Fleets  
Analyzer provides you with the  
most comprehensive current and  
historical fleet data and detailed information about  
aircraft specifications. It also enables you to access  
hours and cycles data to understand aircraft usage  
across the global fleet.  
[flightglobal.com/fleetsanalyzer](http://flightglobal.com/fleetsanalyzer)

Registered at the Post Office as a newspaper.  
Published by Reed Business Information Ltd,  
Quadrant House, The Quadrant, Sutton, Surrey SM2  
5AS, UK. Tel: +44 20 8652 3500.

Newstrade distributed by Marketforce (UK), 2nd  
Floor, 5 Churchill Place, Canary Wharf, London, E14  
5HU, UK. Tel: +44 20 3787 9001.

Classified advertising prepress by CCM. Printed in  
Great Britain by William Gibbons and Sons Ltd

Flight International published weekly 49 issues per  
year. Periodicals postage paid at Rahway, NJ.  
Postmaster send changes to Reed Business  
Information, c/o Mercury International Ltd, 365 Blair  
Road, Avenel, NJ 07001

This periodical is sold subject to the following  
conditions: namely that it is not, without the written  
consent of the publishers first given, lent, re-sold,  
hired out or in any unauthorised cover by way of  
trade, or affixed to, or as part of, any publication of  
advertising, literary or pictorial matter whatsoever.  
No part of the content may be stored electronically,  
or reproduced or transmitted in any form without the  
written permission of the Publisher.

ISSN 0015-3710 (Print) ISSN 2059-3864 (Online)

Part of **rbi** reed business  
information



## EVENTS

### 14-16 March

**IATA World Cargo Symposium**  
Abu Dhabi, UAE  
[iata.org/events](http://iata.org/events)

### 19-21 March

**Routes Asia**  
Okinawa, Japan  
[routesonline.com](http://routesonline.com)

### 21-25 March

**Langkawi International Maritime  
& Aerospace Exhibition**  
Langkawi, Malaysia  
[limaexhibition.com](http://limaexhibition.com)

### 4-6 April

**Aircraft Interiors Expo**  
Hamburg, Germany  
[aircraftinteriorsexpo.com](http://aircraftinteriorsexpo.com)

### 4-7 April

**LAAD Defence & Security**  
Rio de Janeiro, Brazil  
[laadexpo.com.br/2017/en.html](http://laadexpo.com.br/2017/en.html)

### 8-11 May

**Xponential unmanned systems  
and robotics**  
Dallas, Texas, USA  
[xponential.org](http://xponential.org)

### 22-24 May

**European Business Aviation  
Convention & Exhibition  
(EBACE)**  
Geneva, Switzerland  
[ebace.aero](http://ebace.aero)

### 4-6 June

**IATA Annual General Meeting**  
Cancun, Mexico  
[iata.org](http://iata.org)

### 19-25 June

**Paris air show**  
Le Bourget, Paris, France  
[siae.fr](http://siae.fr)

### 14-16 July

**Royal International Air Tattoo**  
RAF Fairford, Gloucestershire, UK  
[airtattoo.com](http://airtattoo.com)

### 18-23 July

**MAKS**  
Moscow, Russia  
[aviasalon.com/en](http://aviasalon.com/en)

### 24-30 July

**EAA AirVenture Oshkosh**  
Oshkosh, Wisconsin, USA  
[eaa.org/en/airventure](http://eaa.org/en/airventure)

### 12-15 September

**DSEI**  
London, UK  
[dsei.co.uk](http://dsei.co.uk)

### 23-26 September

**World Routes**  
Barcelona, Spain  
[routesonline.com/events/189/world-routes-2017/](http://routesonline.com/events/189/world-routes-2017/)

### 24-27 September

**RAA Annual Convention**  
Palm Beach, Florida, USA  
[raa.org/page/2017ACMain](http://raa.org/page/2017ACMain)

### 26-28 September

**Airline Passenger Experience  
Association**  
Long Beach, California, USA  
[apex.aero](http://apex.aero)



For a full list of events see  
[flightglobal.com/events](http://flightglobal.com/events)



## New and used aircraft



**Gulfstream®**  
Independent Authorised Sales Representative for the United Kingdom

**Tim Leacock**  
AIRCRAFT SALES LIMITED

+44 (0) 1258 818181 [tim@timleacockaircraft.com](mailto:tim@timleacockaircraft.com) [jonathan@timleacockaircraft.com](mailto:jonathan@timleacockaircraft.com) [timleacockaircraft.com](http://timleacockaircraft.com)

## Courses and tuition



### Essential Courses for CRM Trainers

**CRMT Core Course**  
The CRM Trainers core course is ideal for delegates who will deliver training for pilots and cabin crew of airlines and other aviation operations. It meets the requirements of EASA, FAA and all major regulatory bodies. 5-day courses begin 6 Mar, 3 Apr, 8 May, 5 Jun 17 at Global Air Training.

**CRMT Refresher Course**  
The CRMT refresher course complies with the requirements of EASA for all CRMT to attend a refresher course every 3 years. The refresher syllabus includes new EASA CRM modules. 1-day courses 10 Apr, 2 Jun 17.

**CRM HPL Course**  
EASA regulations require that a CRM trainer should have followed a human performance and limitations (HPL) course. This course delivers the HPL elements of EASA requirements for CRM trainers. 2-day courses begin 30 Mar, 01 June 17.

More info & book online:  
[www.globalairtraining.com](http://www.globalairtraining.com)  
t: +44 (0)1829 771334  
e: [ops@globalairtraining.com](mailto:ops@globalairtraining.com)

**GLOBAL AIR TRAINING**



**EASA**  
Virtual Academy  
APPROVED COURSE

**CAAi**  
Above and beyond

### Flight Operations Inspector Theory Course by the UK CAA Experts

London Gatwick | 13-24 Mar 2017

Developed by Senior UK CAA Flight Operations Inspectors, this course is designed to provide Inspectors with the core knowledge and competencies required to understand the process of compliance with European Community rules in respect of Commercial Air Transport (CAT) Operations.

This course is suitable for Inspecting staff within Flight and Ground Operations, both in regulatory and industry positions.

To book now or for more information, please visit  
[www.caainternational.com/training](http://www.caainternational.com/training)  
or contact us  
T +44 (0) 1293 768700 or  
E [training@caainternational.com](mailto:training@caainternational.com)  
Part of the UK CAA International Directorate



## Equipment, maintenance and service

mt-propeller



Airport Straubing-Wallmühle, EDMS  
94348 Atting / Germany  
Phone: +49(0)9429-9409-0, Fax: +49(0)9429-8432  
sales@mt-propeller.com  
**www.mt-propeller.com**

**Development & Production**  
of high performance  
composite constant  
speed propellers.  
More than 18,000  
propeller systems flying.

**Sales & Service** for  
products made by  
McCaughey,  
Hartzell,  
Sensenich,  
Woodward,  
Goodrich.



## Business services

**AOG**  
**URGENT**  
Dauphin parts in stock  
**alpine**.aero  
air support

Let your recruitment  
drive soar...



post your vacancies now  
+44 (0)20 8652 4900

FlightJobs

## Aircraft leasing

## Tenders



Ref: DACPM/169/2017/46

Date: 29 January 2017

### Request for Proposal (RFP)

1. Biman Bangladesh Airlines Ltd. Invites Proposal/Offer for taking ACMI lease of One (01) Wide-Bodied Aircraft with capacity minimum 300 seats for a period of three months for Hajj Operation in 2017. 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:

a.	Number and Type of Aircraft	One (01) Wide-Bodied Aircraft.
b.	Age of the Aircraft	Aircraft must not be more than 20 years in age as on 08th October 2017.
c.	Seat Capacity	Minimum 300 Passenger Seats.
d.	Air Operators Certificate	The operator must have valid Air Operator Certificate (AOC) for ACMI Operation.
e.	Guaranteed Hours	Minimum 700 Block Hours.
f.	Nature of Lease	Aircraft, Crew, Maintenance & Insurance (ACMI) Lease.

2. Detailed information is available in the RFP Schedule. RFP Notice and Schedule may be viewed at official web-site of Biman: [www.biman-airlines.com](http://www.biman-airlines.com)
3. Proposals/Offer are to be submitted to General Manager (Corporate Planning), Biman Bangladesh Airlines Limited, Head Office, Balaka, Kurmitola, Dhaka-1229, Bangladesh latest by 1000 hours BST (0400 hours UTC) on 22 February 2017 through Courier Service or dedicated e-mail to [dacpm169@bdbiman.com](mailto:dacpm169@bdbiman.com). The Proposal(s)/Offer(s) will be opened on the same day immediately after the closing time and date in presence of the Bidder(s), if any. No Proposal/ Offer will be accepted after the closing time.
4. Bidders are requested to comply with the stipulated terms and conditions of the RFP Schedule, failing which the Proposals/Offer may be rejected at the option of Biman. Interested Bidders/Lessors may contact General Manager (Corporate Planning) at Telephone: +880-2-8901600/Ext. 2413, +8802-8901588 (Direct), e-mail: [gmp@bdbiman.com](mailto:gmp@bdbiman.com) during the Office Hour for any clarification regarding the RFP Schedule, if required.
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.

Mohd. Abdur Rahman Faruky  
General Manager Corporate Planning

**SkyWorld**  
Aviation

The Regional Aircraft Marketing Specialist

Tel. + 44 1753 832088 [juliet@skyworld.co.uk](mailto:juliet@skyworld.co.uk)

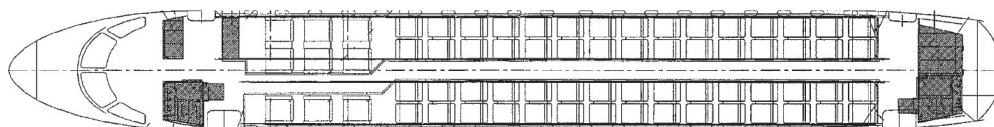
## ERJ 170-100 SU for sale or lease



Library picture

- FAA Certified
- Long range
- Manufactured 2004
- One owner since new

- Excellent landing gear status
- 69 leather seats (60Y, 9F)



[www.skyworld.co.uk](http://www.skyworld.co.uk)

CLASSIFIED

TEL +44 (0) 20 8652 8130 EMAIL [chris.pilkington@flightglobal.com](mailto:chris.pilkington@flightglobal.com)



## Join us as we grow our business

**Stobart Air** is growing its fleet and we have E-JET PILOT opportunities for Direct Entry Captains (Type Rated and Non Type Rated) and Direct Entry First Officers (Type Rated only) at London, Southend Airport and Dublin.

Permanent employment contracts on offer. Fixed rosters, competitive salaries and benefits.

Be part of a dynamic operation renowned for quality, safety and integrity as we expand our network of operation and service delivery to our partners and customers.

Find out more at: [www.stobartgroup.co.uk/stobart-aviation](http://www.stobartgroup.co.uk/stobart-aviation)

Apply to: [pilotrecruitment@stobartair.com](mailto:pilotrecruitment@stobartair.com)

**Stobart**  
Air 



TIME FOR  
YOUR CAREER  
TO TAKE FLIGHT

Start your job search today  
[flightglobal.com/jobs](http://flightglobal.com/jobs)

AVIATION | AIRLINES | AEROSPACE

**FlightJobs**



# TAKE COMMAND OF YOUR CAREER TODAY!

Advance your career with Scoot-Tigerair  
growing fleet of Airbus 320s and Boeing 787 Dreamliners now!



Interested in flying with our growing fleet of 32 Airbus 320s and 20 Boeing 787 Dreamliners by year 2020? Join us now!

- Competitive salary package and benefits
- Fast-track career progression and training with Scoot & Tigerair
- Living and working in a multicultural city like Singapore
- Our friendly and unique company culture that embraces different nationalities

Apply now at [BeDifferent.flyscoot.com](http://BeDifferent.flyscoot.com)

Apply now at [Tigerair.com/sg/en/careers.php](http://Tigerair.com/sg/en/careers.php)



# RECRUITMENT ADVERTISEMENT FOR NON-CIVIL SERVICE VACANCY CIVIL AVIATION DEPARTMENT, GOVERNMENT OF HONG KONG SPECIAL ADMINISTRATIVE REGION

## Contract Senior Air Traffic Control Training Accreditation Manager

**Salary:** HK\$105,880 - \$113,600 (approximately US\$13,574\* - US\$14,564\*) per month depending on relevant experience of the candidate.

(\*Based on exchange rate of HK\$7.8 = US\$1) (subject to fluctuation)

### Entry Requirements:

Candidates should –

- (a) have 10 years of cadet and Air Traffic Control (ATC) experience in which at least 5 years as a practicing air traffic controller;
- (b) in addition to (a), have 10 years working experience in an ATC training institute in which at least 5 years in a senior managerial or higher position;
- (c) have good knowledge in International Civil Aviation Organization (ICAO) standards and ATC training needs;
- (d) be qualified to instruct in at least one of the following subjects: On-the-job Training Instructor, Human Factors in ATC, Fundamental ATC, Language Proficiency Testing; and
- (e) previous experience in the accreditation of the aviation training institute delivering ATC training will be an advantage.

### Duties:

Senior ATC Training Accreditation Manager is mainly deployed to study, develop and implement an accreditation programme compliant with the application requirements and International Civil Aviation Organization (ICAO) TRAINAIR PLUS Assessment criteria that will enable the Air Traffic Management Division (ATMD) of Civil Aviation Department (CAD) to ultimately gain full membership of TRAINAIR PLUS Programme. The post holder is also responsible to develop, administer and manage an Aviation Language Proficiency Testing Process and Training Programme and discharge other Air Traffic Control training related duties.

(Note: Post holder may be required to work irregular hours.)

**Terms of Appointment:** Successful candidate will be appointed on two years non-civil service contract terms. Renewal of contract will be subject to operational needs.

**Fringe Benefits:** An end-of-contract gratuity may be granted if the contract is completed with satisfactory performance and conduct. Such gratuity, if granted, will be the sum which, when added to the Government's contribution to the Mandatory Provident Fund (MPF) Scheme in respect of the appointee as required by the MPF Schemes Ordinance, equals to 15% of the total basic salary drawn during the contract period. 14 days' annual leave and full pay sickness allowance, whereas rest days, statutory holidays, maternity/paternity leave, where appropriate, will be granted in accordance with the provisions in the Employment Ordinance.

**Enquiry Address and Tel. No.:** Assistant Departmental Secretary (Personnel) 2, Level 5, Civil Aviation Department Headquarters, 1 Tung Fai Road, Hong Kong International Airport, Lantau, Hong Kong S.A.R., People's Republic of China. (Fax.: (852) 2910 6399 or e-mail to <recruitment@cad.gov.hk>, or Telephone: (852) 2910 6334 quoting reference CAD ADMD PR/5-25/87).

**Closing Date for Application:** 6 March 2017

### General Notes:

- (a) Persons who are not permanent residents of Hong Kong Special Administrative Region (HKSAR) may also apply for this vacancy but will be appointed only when no suitable and qualified candidates who are permanent residents of the HKSAR are available.
- (b) As an Equal Opportunities Employer, the Government is committed to eliminating discrimination in employment. The vacancy advertised is open to all applicants meeting the basic entry requirement irrespective of their disability, sex, marital status, pregnancy, age, family status, sexual orientation and race.
- (c) Non-civil service vacancies are not posts on the civil service establishment. Candidates appointed are not on civil service terms of appointment and conditions of service. Candidates appointed are not civil servants and will not be eligible for posting, promotion or transfer to any posts in the civil service.
- (d) The entry pay, terms of appointment and conditions of service to be offered are subject to the provisions prevailing at the time the offer of appointment is made.
- (e) Where a large number of candidates meet the specified entry requirements, the recruiting department may devise shortlisting criteria to select the better qualified candidates for further processing. In these circumstances, only shortlisted candidates will be invited to attend recruitment examination and/or interview.
- (f) It is Government policy to place people with a disability in appropriate jobs wherever possible. If a disabled candidate meets the entry requirements, he/she will be invited to attend the selection interview/written examination without being subject to any further shortlisting criteria.
- (g) Holders of academic qualifications other than those obtained from Hong Kong institutions/Hong Kong Examinations and Assessment Authority may also apply but their qualifications will be subject to assessments on equivalence with the required entry qualifications. They should submit copies of their official transcripts and certificates by mail to the above enquiry address.
- (h) Non-civil service vacancies information contained in this column is also available on the GovHK website on the Internet at <http://www.gov.hk>
- (i) Towards the application deadline, our on-line system would likely be overloaded due to large volume of applications. To ensure timely completion of your on-line application, it is advisable to submit the application as early as possible.

**How to apply:** Application Forms [G.F. 340 (Rev. 3/2013)] can be downloaded from the Civil Service Bureau's web site (<http://www.csb.gov.hk>). Completed forms, together with copies of official transcripts and certificates (for holders of non-local academic qualifications), should reach the above enquiry address of the recruiting department on or before the closing date for application. Please specify the title of the post being applied for on the envelope. On-line application can also be made through the Civil Service Bureau's website (<http://www.csb.gov.hk>). Candidates with non-local academic qualifications who apply online should submit their copies of official transcripts and certificates **within one week after the close of application period** to the above enquiry address, and the online application number should be quoted on the envelope and the copies of supporting documents. For effective and timely delivery of mails, all senders are required to ensure that their posted mail items are affixed with sufficient postage. Mail items bearing insufficient postage will not reach us and will be handled by the Hongkong Post in accordance with the Post Office Ordinance. Applicants are encouraged to provide their email addresses on the application forms. Candidates who are selected for the interview will normally receive an invitation (by email or by post) in about one to two weeks from the closing date for application. Those who are not invited for interview may assume that their applications are unsuccessful. For enquiries, please call the telephone number indicated.



# We are searching for Captains and First Officers

Qatar Airways will be conducting a recruitment event at London Heathrow in March 2017 in search of talented individuals to join our award-winning team.

Given our current growth, we are looking for Captains and First Officers across our young Boeing and Airbus fleet.

If you are an experienced pilot, and interested in hearing more about joining our five-star team at Qatar Airways, visit our information session and meet with our pilot recruitment team.

Flight Deck Presentation

Date: 22 and 23 March 2017

Timing: Two sessions per day 10:00 and/or 13:00

Venue: Sheraton Skyline Hotel – London Heathrow

Bath Road (A4), Hayes, London Heathrow, UB3 5BP, United Kingdom



GOING PLACES TOGETHER





## Department for Transport

# Inspector of Air Accidents (Operations)

**Starting Salary £72,944**

The Air Accidents Investigation Branch (AAIB) requires Inspectors to join its internationally renowned team of accident investigators. Using your experience as a pilot, your brief will be to investigate the operational aspects of civil aircraft accidents both in the UK and abroad. A proven team player, you will be responsible for establishing the facts relating to an accident or serious incident by interviewing crew members and witnesses, reviewing flight operations, weather and ATC procedures, and investigating relevant human factors. The ability to write first-class, accurate, detailed and timely technical reports is an essential requirement. The role may involve work in physically demanding environmental conditions for which you will be required to undertake a fitness assessment. Additionally, you will be required to have the necessary interpersonal skills to deal with traumatic events and communicate appropriately, including giving evidence in court. You will require a broad-based knowledge of aviation and hold a current ATPL together with command experience on a fixed or rotary wing air transport aircraft type operating in the civil environment.

This is a role where your determination, drive and sound judgement will be challenged and stretched.

This is quite often a pressurised post requiring considerable dedication and self-motivation. You will be provided with an opportunity to remain current and to maintain your ATPL so that your aviation knowledge is kept up-to-date.

A valid UK driving licence is required. This position is open to UK citizens only.

To apply online, please visit [www.civilservice.gov.uk/jobs](http://www.civilservice.gov.uk/jobs) and find this vacancy under 'Department for Transport'.

Please ensure you refer to supporting guidance before completing your application.

Please note we do not accept CVs in lieu of a fully completed application form.

Closing date: 6th March 2017.

The Department for Transport is an equal opportunities employer. We value diversity and want our workforce to reflect the communities that we serve.



## Head of Training - Flight Crew

Permanent, full-time London Stansted Airport-based position within an award winning charter airline.

Reporting directly to the Flight Operations Director for all matters related to Flight Operations Training and Standards, with additional reporting to the Accountable Manager for Compliance with Crew Training legislation.

Responsible for the supervision of all training and testing requirements of flight crew to ensure a safe and efficient standard exceeding the regulatory minimum.

The role is primarily office based with approximately 25% line/check flying as required.

### Required skills and qualifications

The successful candidate will have:-

- Held a similar post within an AOC in an aircraft operations environment for a minimum of 2 years, with a minimum of 5 years TRE experience.
- Excellent management skills and experience.
- They must have the right to live and work in the UK.
- They must be an EASA ATPL(A) holder with ideally a Boeing or Airbus type rating and a valid Class One Medical.

Salary commensurate with the role and experience with a performance-based bonus payable.

Closing date for applications 6th March 2017, with interviews week commencing 20th March.

Further details and applications direct to the Careers link on <http://jobs.titan-airways.co.uk>



TIME FOR  
YOUR CAREER  
TO TAKE FLIGHT

Start your job search today  
[flightglobal.com/jobs](http://flightglobal.com/jobs)

AVIATION | AIRLINES | AEROSPACE

**FlightJobs**



Australian Government

Civil Aviation Safety Authority

# Now recruiting for the **Chief Executive Officer and Director of Aviation Safety**

The Chief Executive Officer and Director of Aviation Safety (CEO/DAS) provides strategic leadership and management to advance the program of work relating to the regulation of civil aviation safety in Australia and maintaining CASA's standing as a world leading aviation safety regulator.

We are seeking an individual with experience in leading large complex organisations, superior influencing and engagement skills and resilience to lead CASA in providing support and oversight of aviation safety.

The successful candidate will engage in a collaborative and productive way with other Australian and state government agencies and build the connections between government and the aviation community. This role requires the ability to establish and maintain good working relationships with our Minister (Infrastructure and Transport), CASA's Board, Australian government aviation safety partners, aviation institutions and associations, and the Australian public.

As CEO/DAS, you will be required to represent and advocate Australia's civil aviation safety program in a complex and dynamic environment. You will provide clear policy direction and strategies, manage risks and strengthen relationships with the aviation community, government and Australian public.

For initial discussions or if you would like to know more about this position, please contact CASA Board Chair, **Jeff Boyd** on **+61 2 6217 1318**.

To obtain an information pack please email Cate Saunders, People & Culture Manager, at **Cate.Saunders@casa.gov.au**. The pack contains further details on CASA and the context for this role, along with information on the selection process and employment with CASA. The position is based in **Canberra, Australia**.

*safe skies for all*

Applications will close on  
Monday, **13 March 2017**

[casa.gov.au/ceo](http://casa.gov.au/ceo)



## Flight crew

### Technical Recruitment Solutions



- Product & System Design
- Project Management
- Manufacturing & Supply Chain
- Engineering & Engineering Management

trs@resourcegroup.co.uk  
+44 (0) 1905 368 576  
[www.resourcegroup.co.uk/trs](http://www.resourcegroup.co.uk/trs)

## Flight crew

### AeroProfessional Aviation People Experts

- ▶ Recruitment ◀ Skills Insights
- ◀ Compliance ▶ Flight Ops Support

[www.aeroprofessional.com](http://www.aeroprofessional.com)

## Maintenance

### Aviation Resourcing Services



- Maintenance Personnel
- Production Personnel
- Temporary & Permanent
- Global Reach

flight@resourcegroup.co.uk  
+44 (0) 1638 672 880  
[www.resourcegroup.co.uk/ars](http://www.resourcegroup.co.uk/ars)

## Engineering



The preferred company for Stress (Fatigue & DT), GFEM, Composites, Aeronautical Research. Business units: Contract staff, Workpackages, Innovation and New Concepts, Aeronautical Research. [www.bishop-gmbh.com](http://www.bishop-gmbh.com)  
Contact [bishop.peter@bishop-gmbh.com](mailto:bishop.peter@bishop-gmbh.com)  
Tel 0049-(0)40-866-258-10 Fax 0049-(0)40-866-258-20

Let your recruitment  
drive soar...

post your vacancies now  
+44 (0)20 8652 4900

FlightJobs

### Flight Crew Services



- Commercial & VIP Recruitment
- Management Recruitment
- Temporary & Permanent
- Payroll

flight@resourcegroup.co.uk  
+44 (0) 1256 368 500  
[www.resourcegroup.co.uk/fcs](http://www.resourcegroup.co.uk/fcs)



### Safe Hands Aviation Recruitment

Call: +44 (0)1524 381 544  
Email: [info@safehands.aero](mailto:info@safehands.aero)  
[www.safehands.aero](http://www.safehands.aero)

you're in safe hands with us

Aviation Strongfield

**Strongfield Specialist Aerospace Personnel**

+44 (0)20 8799 8924 [amedhurst@strongfieldtech.com](mailto:amedhurst@strongfieldtech.com)  
[www.strongfield.com](http://www.strongfield.com)

### RECRUITMENT FOR THE AVIATION INDUSTRY

**Sigma**

AVIATION SERVICES

Tel: +353 1 669 8224

Fax: +353 1 669 8201

Email: [recruitment@sigmaaviationservices.com](mailto:recruitment@sigmaaviationservices.com)  
[www.sigmaaviationservices.com](http://www.sigmaaviationservices.com)

### PROCTOR Aviation

Talk to us for the most exciting  
Expat Pilot Jobs in INDIA

[jobs@proctoraviation.com](mailto:jobs@proctoraviation.com)  
[www.proctoraviation.com](http://www.proctoraviation.com)  
+91 22 6120 4400

**GDC**

ENGINEERING

Worldwide specialist for  
Aerospace Engineering, Certification &  
Management Services

E: [yourcv@gdcengineering.com](mailto:yourcv@gdcengineering.com)

T: +49 (0) 8153 93130

W: [www.gdcengineering.com](http://www.gdcengineering.com)

Let your recruitment  
drive soar...

post your vacancies now  
+44 (0)20 8652 4900

FlightJobs

Let your recruitment  
drive soar...

post your vacancies now  
+44 (0)20 8652 4900

FlightJobs

## WORK EXPERIENCE DENIS GUINDON

# Building an aerospace powerhouse

Denis Guindon has worked for Transport Canada since 1992, and in various roles has witnessed huge growth in the country's aerospace industry. In 2015, he was appointed director-general, civil aviation

## How did you get started?

My passion for aviation started at a very young age. When I was 12 years old, I watched a McDonnell Douglas DC-9 fly by my house and was mesmerised by it. I remember thinking that the pilot had the greatest job in the world. At 16 I obtained a private pilot licence, and was teased by my friends and family as I didn't even have a driver's licence to get myself to the flying club. I enrolled in the Airline Flying programme at the Cégep de Chicoutimi, a community college. Fifteen years after reading *Around the World in 80 Days* by Jules Verne, I flew a VIP military aircraft and circled the world westbound in eight days. During this time, I realised I had truly accomplished my dream. I still reflect on that as one of my proudest moments.

## Where have you worked?

I first served in the Canadian armed forces as a pilot-in-command of the Lockheed Martin CC-130 Hercules. I was very lucky to be able to fly on both the tactical and strategic levels at such a young age, seeing the fjords of Norway, the Andes and the Himalayas. One of the most rewarding assignments during this period was flying relief missions in Africa to support the Ethiopian people during the great famine of the mid-1980s. I also piloted a Bombardier Challenger 600-series business jet, which afforded me the honour of flying prime ministers, heads of states and dignitaries.



Transport Canada

Flying around the world in eight days was a high point for Guindon

My experience with the Challenger, both flying and training new pilots, paved the way for my arrival at Transport Canada in 1992 as an air carrier inspector overseeing the operations of regional jets. I rapidly moved into performing inspections on larger aircraft such as Airbus and Boeing airliners, and became a manager fairly early on in my career with Transport Canada. I occupied various positions related to the oversight of national and international air carriers which, once again, brought me around the world. At the last count, I had touched down in more than 50 countries and protectorates. From 2008 to 2012, I worked on a number of Transport Canada's organisational development

projects in areas such as rail safety, aircraft services, marine safety and civil aviation. In 2012, I was promoted to director of national operations, where I was responsible for the regulatory oversight of Canada's major airlines and the country's air navigation service providers.

## What do you do now?

In April 2015, I was appointed as one of two directors-general of civil aviation at Transport Canada. My mandate is aviation safety oversight and transformation, which includes the delivery of national surveillance activities and safety services, such as aircraft certification. My responsibility is to develop a clear change management plan to ensure that strengthened and

consistent direction is provided, nationally and within the regions. Canada is the third-largest aeronautical manufacturer in the world and it's amazing that our employees are so successful in sustaining and supporting the development of this thriving industry.

## Certification of the CSeries was a pretty big deal?

This project was a significant undertaking. The certification of Bombardier's CSeries was a historic moment for Canadian aerospace, and Transport Canada is very proud to have been a part of this process.

## Any advice for people considering a career as a pilot?

Today we can take passengers from North America to Paris within minutes of their scheduled arrival time, all while they're sitting comfortably, sipping a drink and watching a movie. We do this consistently, day in and day out. I really feel that learning to fly gives you the tenacity to do great things with your career and in your life. I would encourage any new pilot to pursue your dreams and excel in this thriving and diverse field. Nothing can be better. ■



Looking for a job in aerospace? Check out our listings online at [flightglobal.com/jobs](http://flightglobal.com/jobs)

If you would like to feature in Working Week, or you know someone who does, email your pitch to [kate.sarsfield@flightglobal.com](mailto:kate.sarsfield@flightglobal.com)



## Check out Flight International's Image Store

Browse or customise a gift or memento from our **CUTAWAY ARCHIVE** of more than 1000 aircraft drawings

[www.flightglobalimages.com](http://www.flightglobalimages.com)

**FlightGlobal**





## COCKPIT B50

THE ULTIMATE **PILOT'S** INSTRUMENT

Aviation enters a new era with a multifunction chronograph delivering unprecedented performance. At the heart of this high-tech feat beats a (COSC) chronometer-certified SuperQuartz™ movement specially developed by Breitling for aviation. Equipped with a sturdy and light titanium case, the Cockpit B50 innovates with its huge range of functions, extreme user friendliness, rechargeable battery and an ultra-legible high-intensity display mode. Reliable, accurate, efficient: the ultimate pilot's instrument.

[BREITLING.COM](http://BREITLING.COM)



INSTRUMENTS FOR PROFESSIONALS™