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The top international marketplace for aircraft, equipment, tuition and jobs.

NEXT WEEK



As the US Helicopter Association International show approaches, Flight International looks at developments in military-helicopter technology and features the latest Boeing AH-64 Apache (above).

The first conference to address the business issues raised by airline crew management

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Airline financial planners are already looking hard at flight crews in their quest to reduce costs. Almost weekly, carriers are signing new employment contracts, studying new outsourcing options (for crews as well as training) and looking at how to set up new "low-cost" operations.

Changes to rostering and scheduling practices are clearly part of the mix, but how far can they go? What are the legal and political ramifications of making major changes? Has the industry outgrown the tradition of seniority? Will selection practices have to adapt?

Is cross-crew qualification actually providing the hard savings promised by the manufacturers when they sold the benefits of aircraft commonality? Are crew licensing authorities keeping pace with the accelerating rate of change?

Then again there are new possibilities being opened up by the new global alliances. As yet their impact on crew operations has been relatively slight, but what of the future? At least one major carrier has already sought to supplement a temporary shortfall in crews by bringing in personnel from a partner. Is this likely to develop beyond a stop-gap measure into a standard practice?

Clearly, these are just some of many questions facing a changing industry. Crew Management '98 aims to bring together airline executives, management, pilots and service providers to help develop some of the answers.

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COMMENT

DO NOT PASS 'GO'

SO BRITISH AIRWAYS' NO-FRILLS start-up is "Go"; but will it—and what sort of response will it attract from powerful European competitors like Lufthansa? Even more important, from where will the passengers come to make these no-frills airlines work?

The justification for an existing airline to launch a low-fares operation is that it will attract people who would not otherwise fly, and thus grow the market at the margin, or that it will stop other low-fares carriers from stealing its existing traffic. It is questionable, however, whether either is justified.

In a mature market (such as those of Europe or the USA) it is extremely difficult to grow business at the margin—and even more difficult to do it profitably. That has been proved yet again

in Europe through the experience of cross-Channel rail operator Eurostar. It has attracted around half of the combined air/sea/rail UK-Europe passenger traffic, but has done so largely through taking business away from sea and air, rather than through growing the market—and it is unprofitable, even with that traffic share.

That is not to say it is impossible: there are routes, even in the UK, where the introduction of competition has increased the traffic so much that even the incumbent airline has experienced growth—but at what price?

Going into a market with a cut-price operation in an effort to stop other cut-price operators from stealing your existing business has an air of self-defeat about it. It is most unlikely that such an operation will generate better yields than the existing business does: even with cheaper crews, no frills, lower distribution costs, etc, the cut-price airline still has to pay the real cost of acquiring and operating an airliner. If the passengers on your existing airline were going to be attracted by a low-cost alternative, then they will also be attracted by your own low-cost offering, so keeping them in the family will not mean the same as keeping them in the original high-price seats. An in-house low-cost operation will inevitably steal passengers from its parent, and thus harm its chances of making money.

Some airlines and manufacturers are already successfully marshalling this sort of argument as justification for not investing in a next-generation supersonic airliner. Such an aircraft would have to be bigger and longer-reaching than the

Concorde to deliver reduced seat-kilometre costs. To fill it, an operator would have to raid more of the high-yield business- and first-class passengers from its existing subsonic operations, thus damaging or destroying their profitability.

BA, of course, is not new to the no-frills game. In 1975, it brought to Europe the revolutionary idea of replacing traditional scheduled services with a new type of no-frills operation. Cheap, written-down, airliners would be used to provide a high-frequency service with no seat reservations or fancy

meals; customers could just turn up to fly, and even pay for their tickets on board. If there were too many passengers for a particular flight, a back-up aircraft would be put quickly into service.

This Shuttle service transformed traffic on the company's internal UK routes, as similar services had done in the USA, but competitors soon put paid to the idea by bringing back to those routes all the frills that BA had dropped, and BA had to follow suit. Competition became features-oriented rather than price-dominated—in turn leading to the more recent arrival of low-price start-ups like Ryanair, easyJet and Debonair.

That history in itself should give cause for concern in those launching these new services: what works for one price-cutter in an overpriced market doesn't necessarily work for two price-cutters offering similar services. Give customers a choice between being uncomfortably cramped in and having a few creature comforts, and they will go for comfort—especially if the price penalty is low. For all their price attractiveness, low-cost start-ups in general have a poor survival record around the world. In going down this route, Europe's majors stand more chance of hurting themselves than their competitors. As the first to try in this latest round, BA must be careful that it doesn't earn the classic epitaph: "As start-ups go, it went."



"Give customers a choice between being cramped in and having a few creature comforts, and they will go for comfort."

Bosses mull Airbus merger ideas

DOUGLAS BARRIE/LONDON

AIRBUS INDUSTRIE presidents were due to meet on 2 February to hear new proposals from a high-level working party tasked with finding an acceptable solution for a merger of Aerospatiale, British Aerospace, and Daimler-Benz Aerospace into a single European aerospace giant.

It is hoped that the new proposal, known as Option E, will break the logjam of European civil and defence aerospace consolidation. If the proposal is accepted, it is likely to form the basis of the response to an earlier demand from the French, German, and UK Governments that a restructuring plan be submitted by 31 March.

Industry sources say that Option

E recommends bringing together the civil and military aerospace interests of the three companies. This would include combat-aircraft, space, helicopter and missile businesses of some of the partners.

While there is a consensus about the need to create a European aerospace company on the scale of US giants Boeing and Lockheed Martin, the method of achieving this has proved elusive so far.

Sir Richard Evans, BAe chief executive, has voiced the general concern, saying: "There's a view among industrialists that they should have a single European aerospace company, but there is little clarity about what form such a company should take." Option E is the latest attempt to provide a template for this.

The proposal is the latest effort to clear the way quickly for establishing Airbus Industrie as a single corporate entity rather than as a GIE (*Groupement d'intérêt économique*). Under Option E, Airbus would form the civil-aircraft arm of the merged companies, and its restructuring would be implemented first.

The proposal is designed to counter Aerospatiale concerns which have previously stymied consolidation efforts.

The crux of the French company's concern was that it was being asked to relinquish its crown jewel, the stake in Airbus, without ensuring the future security of its remaining business. Recent concessions by Aerospatiale have seen it agree to separate its design and Airbus man-

ufacturing activities into a separate subsidiary in preparation for the switch to a single corporate entity.

One of the critical areas for negotiation, say sources, is Aerospatiale's status as a state-owned company. They suggest that Aerospatiale president Yves Michor is trying to persuade Evans and Dasa president Manfred Bischoff that the French Government will treat Aerospatiale effectively as if it were a privately held company.

The initial proposal does not include Dassault, say industry sources, because of the uncertainty over its merger with Aerospatiale. The aim would, however, be to include Dassault and other European companies such as Saab, Alenia and the Airbus minority partner, CASA.

Wexford agrees to acquire US regional

US AIRWAYS Express carrier Chautauqua Airlines is to be acquired by US investment firm Wexford Aviation, which plans to place some of its recently ordered Embraer RJ-135 and RJ-145 regional jets with the Indianapolis-based airline.

Greenwich, Connecticut-based Wexford has agreed to acquire 100% of privately held Chautauqua, which had 1997 sales of \$72 million, says Wexford executive vice-president Ed Wegel. The airline operates 29 turboprops, 17 19-seat British Aerospace Jetstream 31s and 12 30-seat Saab 340As.

Subject to US Airways' approval, Wegel says that Wexford plans to introduce regional jets at Chautauqua. The company has 20 50-seat ERJ-145s on firm order, plus 20 options, and has signed a letter of intent for 20 37-seat ERJ-135s, with 20 options.

Swedish leasing company Solitair Kapital, in which Wexford acquired a controlling interest in 1997, will offer the ERJ-135s and ERJ-145s on operating leases worldwide, says Wegel. Wexford is to take equity stakes in airlines to which it leases aircraft, he says.

See *Air Transport*, P10.

American/BA may give up Gatwick slots

ALAN GEORGE/LONDON

THE PROPOSED British Airways/American Airlines alliance may be allowed to include London Gatwick Airport slots among the concessions it needs to make to gain approval from the European Commission for the tie-up. Previously, it was thought that all of the slots to be sacrificed would be at London Heathrow.

A well-placed official in Brussels also says that European competi-

tion chief Karel van Miert and the UK Department of Industry have agreed to compromise on the actual number of slots which the alliance will have to give up.

Van Miert had originally suggested that the alliance should surrender 350 slots, while the UK Government had put forward a figure of 168.

The alliance has been stalled since its inception in 1996, primarily because of the hard line the European Commission has taken

on competition issues. Both sides have taken a more conciliatory position recently and a new formula is aimed at making it possible for "...competitors to enter any route between the two destinations".

The frequency of American/BA flights across the North Atlantic is of concern. Brussels considers that flights on some routes are so frequent that new competitor are deterred. "We will ask for a reduction or a freezing of frequencies on some routes," it says.

British Airways is ready to Go with no-frills contender

BRITISH AIRWAYS is to launch its London Stansted based "no-frills" division under the name Go. The launch is set for early in the second quarter of 1998.

Go's chief executive Barbara Cassani denies that the new airline's remit is to eliminate new low-cost entrants such as easyJet, but warns that it "...won't go on to a route on which we can't be competitive on pricing—we're going to knock the socks off customers [with pricing]—they'll be surprised."

The airline has declined to release any further details for the moment, although Go is known to be aiming for an April launch with



BA's new low-fare airline is set to get going at Stansted with 737-300s soon

ex-Philippine Airlines Boeing 737-300s leased from General Electric Capital Aviation Services.

Cassani says that the recruitment programme is going well and that operations will be launched "in

the spring" with 150 staff, increasing to 300 at the end of the first year. She adds that all the pilots are being recruited from outside BA, but some retired ex-BA pilots are expected to be taken on.

Northwest and Continental tie-up raises Alitalia/KLM hopes

KEVIN O'TOOLE/LONDON
JULIAN MOXON/PARIS

THE TIE-UP between Northwest and Continental Airlines has been welcomed by European partners Alitalia and KLM, offering the prospect of a global alliance within five years.

"The deal opens the door to a much wider co-operation," says Fausto Cereti, chairman of Alitalia, which already has a successful link with Continental on the Rome-New York route and which chose KLM as its European partner at the end of 1997.

Cereti suggests that the deal could form a platform to create a rival to the Lufthansa/United-led Star Alliance. "We expect to have concluded a four-way alliance by 2002," he says. KLM also welcomes the news from its long-standing US partner Northwest, claiming that the grouping now forms "one of the world's strongest aviation alliances".

The deal is likely to come under scrutiny, however, by the European Commission's competition directorate, which is studying KLM/

Northwest, and has suggested that it will now take the Continental link into consideration.

Under the new US deal, Northwest will link its route network with that of Continental and seek broad codesharing, although this is subject to approval by Northwest's pilots' union. The pilots have linked their consent to success in their long-running contract negotiations, but say that they are willing to work "expeditiously" to bring the talks to a conclusion.

Northwest will also acquire the 14% stake in Continental owned by David Bonderman's Air Partners investment house, for a mix of \$311 million in cash and new shares, but will not seek management control.

Northwest, which itself had an acrimonious boardroom clash with KLM over issues of ownership and control, has agreed that its Continental stock will be placed in a voting trust for at least six years "to guarantee the independence" of its new partner. It must vote as directed by Continental's management, except on matters involving future merger proposals.

Northwest chief executive Das-

burg apparently did not seek a merger, saying that the smaller stock purchase did not require "...the human and capital costs which other transactions would have incurred".

Delta Air Lines, which has previously held talks with Continental, offered a rival deal based on a full merger, but this was rejected by Continental, and could have met labour problems because of fears of lay-offs. Continental chief executive Gordon Bethune calls the Northwest offer "a gold mine" and "vastly superior" to the Delta bid.

Continental estimates that the alliance will generate an extra \$500 million in annual profits for the two airlines after the first three years, and expects to receive around 45% of the benefits.

Bethune says that the deal will cause no cutbacks, as networks are largely complementary. Continental is American Airlines' main rival in Texas and offers access to South American markets, while Northwest's stronghold is in the US Midwest. It also has a mature trans-Pacific network and access to Japan and beyond.



New crew launched to Mir on Soyuz

ASOYUZ U BOOSTER was launched from Baikonur Cosmodrome in Kazakhstan on 29 January carrying the three-man Soyuz TM27 to dock at the Russian Mir space station. The TM27 crew, Talgat Musabayev and Nikolai Budarin will inhabit the Mir until August. French mission specialist Leopold Eyharts, who was also on the flight, will return to Earth with the TM26 crew.

Latin carriers link for A320 deal

THREE MAJOR Latin American carriers, TAM of Brazil, TACA Group of El Salvador and LanChile, are in final negotiations with Airbus Industrie to place a joint order for up to 130 A320-family aircraft. The deal should be concluded by March.

LanChile confirms that it has already signed a letter of intent with Airbus and that it "...is in the final stages of negotiation for what will be the largest-ever single order in the history of the airline". LanChile adds that it decided to join TAM and TACA as the size of the combined order puts it in a stronger negotiating position on pricing and conditions from Airbus. The manufacturer declines to comment on the negotiations.

LanChile says that it hopes to

finalise and sign a deal for 20 A320-family aircraft by March, with the types being acquired directly from Airbus rather than from one of the operating-lease companies. An engine selection has yet to be made.

LanChile, which also controls domestic airline Ladeco, expects deliveries to begin in the fourth quarter of 2000 and to be completed in 2005. The new aircraft will replace ageing Boeing 737-200s.

The division between the remainder of the order has not been revealed, although the TACA Group, which controls Aviateca, Lacs, Nica and Sahsa, is understood to be planning an order for at least 30 A319s. The airline and its Lacs subsidiary already operate A320s. TAM is believed to be about to order some 50 A319s.

Insurers threaten to withdraw cover unless airlines tackle computer bug

AVIATION INSURERS have challenged airlines to prove that their fleet avionics are free of the "millennium bug" which threatens to disrupt computer software, or lose their cover for any incidents which result from it.

The issue, says a major Lloyds insurance-market underwriter, is what may happen to embedded computer microprocessors at midnight on 31 December, 1999. Some, programmed with dates which recognise years only as two digits, will see the "00" as a reversion to the year 1900, which could affect the system software.

British Aviation Insurance Group chief underwriter Tony Medniuk says that airlines have

been sent a checklist of actions, and any carriers which cannot demonstrate compliance will lose cover.

Some airlines have provisionally decided to ground their fleets for a short time on 1 January, 2000, to carry out final checks. Medniuk says that he is surprised by "...how little this issue seems to have been discussed in the industry."

The International Federation of Airline Pilots Associations is about to dispatch a letter to all aircraft and avionics manufacturers expressing the Association's "increasing concern" at the lack of information on what steps are being taken to address the issues, which it describes as ranging potentially "from catastrophic to nil".

Engine change delays Stationair deliveries

Cessna has announced nearly a year-long delay in initial customer deliveries of its 206 Stationair and Turbo Stationair six-seat utility aircraft, following its decision to replace the Textron Lycoming IO- and TIO-580 engines with IO- and TIO-540 variants because of reliability and service life issues.

The setback came to light during the aircraft's airframe and engine-certification programme, when, according to the Wichita, Kansas-based aircraft manufacturer, the turbocharged, higher-compression, TIO-580 was unable to pass Lycoming's 500h endurance test, "...raising doubt that the engine would perform to standards without a lengthened development programme", says Cessna.

The 540 variants will not alter performance and specifications – the Stationair and Turbo Stationair will cruise at 145kt (270km/h) at 6,500ft (2,000m) and 165kt at 20,000ft, respectively. Deliveries of the 206 and T206, originally planned for December 1997, will not start until "late 1998". □

US Air Force places Capricorn in orbit

THE US AIR FORCE has launched a prototype of a new-generation National Reconnaissance Office satellite data-system (SDS) spacecraft, called the *Capricorn*, on 29 January, aboard an ILS International Launch Services Atlas 2A booster from Cape Canaveral, Florida.

SDS spacecraft, which are operated in highly elliptical, 38,400 x 320km, orbits, are used to relay high-resolution digital and radar images to worldwide mobile and fixed receivers from areas not covered by geostationary-orbit military-communications satellites, such as in polar regions.

Images are transmitted via the SDS from Lacrosse and Advanced KH-11 reconnaissance satellites. The SDS craft also carry infra-red sensors to monitor missile launches and nuclear tests, complementing Defence Support Programme 647 third-generation spacecraft. □

Airbus urges AE31X speed-up to compete with Boeing 717

PAUL LEWIS/SINGAPORE

AIRBUS INDUSTRIE and its Chinese and Singapore partners are discussing speeding up development of the proposed smaller AE316 member of the planned AE31X family of regional aircraft, in response to Boeing's relaunch of the former MD-95 twinjet as the 717-200.

It is understood that Airbus Industrie Asia (AIA) is proposing that pre-development work on the new aircraft begin in March, even if a final overall agreement has still not been reached with Aviation Industries of China (AVIC) and Singapore Technologies (STPL). "We would negotiate as we work," suggests one official.

The proposal to commit larger amounts of money to the nine-month pre-development phase ahead of an agreement has not met with universal applause from Airbus' Asian partners. It is believed that Singapore in particular is reluctant to spend much before a business case has been established.

There are also concerns from other quarters about beginning more detailed design work before the final specifications – such as



Airbus is seeking to move forward with the AE316 and the larger AE317

weight and cost – are defined. "We're trying to move faster, but certain things must be decided first," argues a Chinese source.

Efforts to speed up the work come in the wake of the decision by Boeing to deliver the first 717 in 1999. On the current timescale, the AE31X family is not due to enter service until at least mid-2002.

AIA, AVIC and STPL had been struggling with a range of issues in an effort to reach a final joint-venture accord before the end of 1997, but failed to do so. Under the latest revised schedule, the pre-development phase is to lead to the launch of full-scale development in 1999, a first flight in mid-2001 and entry into service 12 months later.

Boeing, in the meantime, has decided to commit to completing

development of the 717 and delivering the first 100-seat jet airliner to AirTran in 1999. This is leading to calls within Airbus to get moving with the 95- to 105-seat AE316, or risk forfeiting the projected 3,000-aircraft market to Boeing.

Klaus Nittinger, managing director of BMW Rolls-Royce, which provides its BR715 to power the 717 and is a contender for the AE31X, has hinted at the problems for the partners. "The Chinese do not have a clear idea whether they are going to be able to make money with such a programme. If they find the programme is not going to break even, but they still want to do it, then who is going to pay for it? The Singaporeans are sceptical, because they do not see a business case for the aircraft," he says. □

FAA starts search for systems to back up GPS

POTENTIAL BACK-UPS to the global-positioning system (GPS) are being considered by the US Federal Aviation Administration, which is backing away from sole-means use of GPS for navigation because of concerns over signal interference.

Although the FAA says that "...no decision has been made", it is now likely to approve the GPS-based wide-area augmentation system (WAAS) for primary-means use only, which will require a back-up system.

A request for information on potential back-up systems was issued in January and the FAA's Joint Resources Council will be briefed in March on the alterna-

tives. The FAA is examining Loran-C, inertial-navigation systems, "skeleton" VHF omnirange/distance-measuring equipment (VOR/DME) systems and an anti-jam GPS antenna developed by the military.

Use of the existing Loran-C radio-navigation system is being championed by the US general-aviation (GA) community, but opposed by the airlines, which would prefer VOR/DME as the back-up system. Loran is widely installed in GA aircraft, but not used in airliners.

US Loran ground stations are scheduled to be switched off at the end of 2000, shortly after the WAAS is planned to become oper-

ational, while VOR/DME stations are due to be phased out between 2006 and 2010.

The GA and airline communities want to continue using the systems with which their aircraft are already equipped, and the FAA says that, if a GPS back-up is required, "...it might be a combination" of the available systems.

One problem with using Loran is that there has been no significant investment in the system since it was flagged for termination in 1994. As part of its evaluation, the FAA plans to transmit WAAS correction signals over an experimental Loran transmitter, which could result in Loran stations becoming, in effect, ground-based satellites. □

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Emirates nears A340 decision

IAN SHEPPARD/LONDON

EMIRATES AIRLINES is preparing to make a decision on its long-awaited requirement for ultra-long-range aircraft. The airline signed a letter of intent (LoI) with Airbus for up to A340-500s in November 1997, but has kept the manufacturer waiting because of Boeing's last-minute attempt to meet performance demands for its yet-to-be-launched 777-200X.

Maurice Flanagan, managing director of the Middle East carrier,

says that it is "...awaiting [777-200X] final payload/range performance figures" from the US manufacturer, after a team from Boeing visited Emirates' base in Dubai, United Arab Emirates, in January.

Flanagan confirms that an LoI was signed with Airbus in late 1997 for six A340-500s, plus six options, and that Airbus is anxious to see the order firmed up (*Flight International*, 26 November-2 December, 1997). Boeing, meanwhile, has been endeavouring to line up enough customers to launch the

-200X/300X, so far unsuccessfully.

Speaking at the Royal Aeronautical Society in London on 28 January, Flanagan said: "We realise we have to move quickly [to remain an A340 launch customer]... We will sign for a long-range aircraft soon. Which aircraft we will select is not absolutely clear."

He adds that Emirates' ambition is to have the capability to fly direct to New York, Sydney and, ultimately, Los Angeles from Dubai. Emirates is an established operator of the 777-200, but it has always

been a major Airbus customer.

Flanagan also indicates his concern over the effect of Boeing's recent production delays on any commitment to develop the 777-200X, particularly in the light of Boeing's decision earlier this month to push the proposed in-service date of the -200X/300X back from September 2000 to early 2001. "Boeing has a number of us puzzled," says Flanagan, referring to its flirtation with various derivative and new large-aircraft options during 1997. □

Argentina picks new operator for airports

ARGENTINA HAS awarded a 30-year concession to operate 33 airports to the Aeropuertos Argentina 2000 consortium, which includes Milan Airport operator SEA and US-based ground-handling agent Ogden Aviation Services. The consortium will pay \$171 million a year to operate the airports, which the Government will hand over on 13 February.

Ogden, SEA and Argentina's Corporacion America each hold a one-third stake in the winning consortium, which is required to invest \$2.04 billion in improving airport services and capacity. The bulk of this is expected to be spent on Buenos Aires' Ezeiza International and Aeroparque airports.

In December, the International Air Transport Association criticised the airport-privatisation plans, arguing that they would convert "a public monopoly into a private one", and lead to higher fees. □

GE prepares for GE90 growth possibility

GUY NORRIS/LOS ANGELES

GENERAL ELECTRIC is to upgrade its GE90 compressor design to reduce fuel consumption by 1.5-2%. Although the move is aimed at the Boeing 777-200IGW (increased gross-weight), the company is preparing for the possibility that a substantial market will develop for future growth versions.

The US engine manufacturer is focusing its improvement drive on advanced three-dimensional aerodynamic design of the ten-stage high-pressure compressor, already based on a scaled version of the GE/NASA energy-efficient-engine compressor design. Software has "...evolved to new levels" since the GE90 was designed, when more

ambitious codes were not used because of GE's "risk-abatement" policy, says Dick Ostroff, manager of GE90 integration. The results of the application of the software to the CFM International CFM56-5BP compressor have been encouraging, however, says Ostroff.

Other improvements will include "optimised" blade clearances in the low-pressure compressor (LPC), which were increased after a fourth-stage LPC blade failure in flight tests in 1994. The failure was traced to a "dynamic response problem", which resulted in rubbing. Clearances will also be slightly altered in the fan and the low- and high-pressure turbines.

The first improved core will begin test runs at GE's Evendale,

Ohio, test site in April, while the first complete-engine test is scheduled for mid-year. Tests on the company's 747 testbed will begin in Mojave, California, "towards the end of the third quarter", says Chuck Chadwell, GE commercial engines operation vice-president.

A higher exhaust-gas temperature margin will enable GE to offer the engine with either a life improvement of 7,000-10,000h on wing, a higher flat-rating or a thrust "bump" up to 418kN (94,000lb) thrust, says GE. Chadwell says that GE has held off on growth and waited for the market to "sort itself out", but "...if a market for a bigger engine develops, I don't want to do incremental developments - I'd rather have something ready". □

KLM starts on rebranding of regional partners

KLM HAS CONFIRMED the first phase of the rebranding of its regional partners, involving its wholly owned subsidiaries Air UK and CityHopper, and Air Excel Commuter, which is the Dutch airline's regional feeder.

As expected, the airlines' names will be prefixed by "KLM", while their own names will be written in lower case, eg, "KLM uk". The three fleets, which total some 72 aircraft, are to be repainted into a new KLM-style blue, silver and white livery by the end of 1999.

KLM has not detailed its plans for the incorporation of its other



More details of KLM uk's new role should emerge in the coming months

European partners - Braathens SAFE (in which it holds a 30% stake) and Eurowings (KLM's German regional feeder) - which may be set to move closer to KLM's identity in the longer term.

KLM uk says: "There is more of

the plot to unfold in the coming months." It is looking at opportunities to grow at Amsterdam Schiphol Airport, and is evaluating 150-seat aircraft. The airline is believed to be close to adding two Boeing 737-400s to its fleet. □

NEWS IN BRIEF

■ MYANMAR F27 CRASH

A 20-year-old Myanmar Airways Fokker F27 600 suffered a fatal accident during take-off from Thandwe, Myanmar, on 28 January, killing 14 of the 45 people on board. An engine problem appears to have caused the aircraft to veer off the runway.

Safety-authority plans detailed

JULIAN MOXON AND
ALAN GEORGE/BRUSSELS

NEW DETAILS of the planned European Air Safety Authority (EASA) have been revealed by European transport Commissioner Neil Kinnock. In spite of the progress, he admits that there remain "several very difficult political issues" to be resolved.

The European Commission (EC) has called a meeting on 11 February at which industry organisations have been invited to comment on ESAS issues outlined in a document circulated in early January. These include:

- what role, if any, should be played in EASA by national aviation authorities;
- which decisions should be taken by EASA's political-level management and which by its executive management;
- whether EASA's rule-making powers should include safety regulation of air-traffic management and airports;

■ the geographical extent of EASA membership.

Organisations being consulted include the European Association of Aerospace Industries, the Association of European Airlines and the International Federation of Airline Pilots' Associations.

The creation of the Authority has already been given a high priority by the UK during its six-month presidency of the European Union (EU), which started on 1 January.

Kinnock revealed something of the Commission's view during a 27 January speech at the Forum Europe seminar in Brussels on "The outlook for civil aviation in the EU". The Transport Commissioner said that the initial proposal centres on an Authority with a "global remit", covering not only aircraft safety, but also that of the airports, air-traffic management and other bodies. It should be given "...delegated powers when joint certification is more efficient and less costly, and when it is not, the Authority should be able to oversee

the action of national bodies in order to ensure that rules are effectively and uniformly applied".

Claude Probst, head of the EC's air-safety unit at the transport directorate, adds that the EC's role should be to "...organise a level playing field" in the jurisdiction of the Authority. "Everyone agrees that the organisation of aviation safety in Europe is unsatisfactory. There is a need for change, but there are differences of opinion about how to achieve it - whether to go for the decentralised version, essentially giving the Joint Aviation Authorities legal status and introducing majority voting, or to decide on a totally new European organisation," he says.

Probst insists that EASA should be a "...strong agency at the executive level, able to adopt safety rules and to check the conformity of products, organisation and personnel within its rules". It should not be "...just a body of safety regulators, but an organisation at a political level". □

South African long-haul airline prepares to launch

A NEW SOUTH African airline, Air South Africa, plans to launch services between Johannesburg and London with a Boeing 747 during the third quarter of this year. Although Air SA's licence was approved by Pretoria's Air Services Licensing Council in 1997, the launch has been postponed twice after delays in finding investors.

The airline's chief executive is Laurie Hopkins, formerly an executive director of now-defunct international South African carrier Avia Air. Hopkins and local aviation entrepreneur Rod Meyer have sizeable stakes in the company, which plans three flights weekly between Johannesburg and London Gatwick Airport, via Malta.

Hopkins says that negotiations are under way for a 747. He is confident that the airline will be able to acquire another 747 and increase its frequencies to seven a week within six months of launch.

According to its licence application, the carrier has a board of eight directors, including three UK

nationals. New talks on financing are under way following the breakdown of negotiations with a black-empowerment group which had originally been expected to invest.

Hopkins dismisses scepticism about the viability of yet another airline plying the London-Johannesburg route, already served by British Airways, South African Airways, Virgin Atlantic and charter carriers Britannia Airways and Caledonian Airways.

Unprecedented conditions have been imposed on the newcomers

by the country's civil-aviation authority following the collapse in recent years of three South African carriers, including Avia, Flitestar, and Phoenix Airways. An amendment to aviation legislation enables the CAA to monitor Air SA's operations for its first 18 months, including scrutinising its management accounts, agreements on loan capital and the state of its insurance policies. The airline will also have to establish a multi-million-rand passenger-protection scheme to safeguard prepaid tickets. □



The financial crash of Avia has led to tight surveillance of Air South Africa

MARKETPLACE

++ **Egyptair** has signed a firm contract with Airbus Industrie for four A340-600s, including two orders and two options. It will introduce the 400-seat, Rolls-Royce Trent 500-powered A340 in 2003. ++

Southern Air Transport has taken delivery of a Boeing 747-200F, acquired from Northwest Airlines, which is being operated for South African Airways. SAT plans to add further 747 freighters by year-end. ++ Egyptian charter carrier **Lotus Air**, has selected International Aero Engines' V2500 to power its two Airbus A320s on order (one firm and one option). Deliveries will begin in January 1999. ++ **International Lease Finance** has sold five aircraft to a special-purpose company set up by Metlife Capital, with First Security Bank operating as a trustee. They include a Boeing 737-300 leased to Varig, a 737-400 leased to Alaska Airlines, a Boeing 757-200 leased to Mexicana, a Boeing 767-300ER leased to Asiana and an Airbus A319 leased to Swissair. ILFC continues to manage the leases. ++ **Med Airlines**, the new Italian regional based in Sicily, has taken the first of two Saab 2000s which will be introduced on scheduled services between Trapani and Rome from March. ++ **Shaheen**

Air International has taken an Airbus A320 on six-month wet-lease from Belgium's Constellation International. ++ **British Airways** is gradually to replace with Boeing 737-200s its ten remaining British Aerospace ATP turboprops on its services between England and Scotland. The ATPs, the last true regional aircraft operated by BA, will be phased out by 1999. ++

Interlease Aviation Investors has bought Gulf Air's last five Lockheed L-1011 TriStar 200s which will be flown by existing TriStar operator TradeWinds International Airlines. ++ **Taesa** has leased an ex-Pan Am Airbus A300B4 from ING Leset International Equipment Management for six months. ++

SA Airlink has ordered a new British Aerospace Jetstream 41 from Aero International (Regional), to be delivered in March 1998.

Wexford adds to Embraer orderbook with letter for 40 ERJ-135s

WEXFORD AVIATION has signed a letter of intent for 40 Embraer RJ-135 37-seat regional jets, worth \$500 million. The agreement is similar to an earlier deal for 20 firm orders, with 20 options, for Embraer RJ-145 50-seat regional jets, worth \$700 million. Greenwich, Connecticut-

based investment firm Wexford plans to place some of the ERJ-135s and ERJ-145s in service with an unidentified US regional airline which it is acquiring, and the rest will be offered worldwide on operating lease, says executive vice-president Ed Wegel.

Wexford's first ERJ-145 is to

be delivered in November and its first ERJ-135 is scheduled for delivery in November 1999, Wegel says. The ERJ-135 prototype, basically an ERJ-145 with a section of fuselage removed, is expected to be flown in the second half of 1998, Embraer says.

Wegel, as part of the investor

group which privatised BWIA International Airlines, placed an order for ten ERJ-145s which the Caribbean carrier subsequently cancelled. "They could not work out what to do with them," he says. "If they had just held on to the delivery positions, they could have sold them now for a lot of money." □

WORKSHOP

++ Pemco Aeroplex has been awarded a maintenance contract by **Mesa Airlines** to carry out line maintenance, technical support and transit checks in support of Mesa's Bombardier Canadair Regional Jets in operation through Birmingham International Airport, Alabama. **++ AeroCorp** has signed a contract with **Continental Airlines** to undertake heavy scheduled maintenance of the airline's Boeing 727 and 737 fleets at its Lake City, Florida, site. **++ FLS Aerospace** has signed an £8 million (\$13 million) contract with Copenhagen-based **Sterling European Airlines** to provide component-support services for its Boeing 727s, newly acquired Boeing 737-300s and, eventually, four 737-800s on order. **++ Air 2000** will open five UK line-maintenance stations on 1 May to complement its new maintenance base at Bristol Airport. It has also signed a letter of intent to extend **FLS Aerospace's** contract for heavy maintenance of its fleet. **++ Flightspares** of Southend, UK, has opened a regional office in Strasbourg, France, which it will share with sister EIS Group company **AEM**. **++ Hunting's Aircraft Engineering Centre** at East Midlands Airport in the UK has been awarded a contract by **British Aerospace Asset Management Turboprops** to carry out a return-to-work package on an ex-demonstrator BAe Jetstream 41. **++ Avtar Alliance** has signed a spares-support contract with **Air Transat** covering the airline's Boeing 737-400s leased from Virgin Express.

Boeing weighs up crisis in Asia

GRAHAM WARWICK/WASHINGTON DC

BOEING EXPECTS to deliver 60 fewer aircraft, mainly 747s and 777s, to Asian airlines over the next three years, because of the region's economic downturn.

The revised forecast implies the near-term cancellation or deferral of orders in hand from Asian airlines, but the company has yet to see any "outright cancellations", says Boeing Commercial Airplane Group president Ron Woodard.

Boeing has not revised its overall delivery forecast downward, stresses president Harry Stonecipher. The company expects that aircraft no longer required by Asian airlines will find homes in other regions. "Demand in other parts of the world is still robust, and we are confident we can retain high production rates," he says.

Stonecipher says that Boeing has more than 300 aircraft on order which are scheduled for delivery to Asian airlines between 1998 and 2000 - "one-fifth of our total production", he says. Most narrow-body-aircraft deliveries will be to China, so far unaffected by the region's economic crisis. Wide-



Woodard: looking on the bright side

body deliveries are most at risk and, while Boeing expects Asian airlines to take scheduled 1998 deliveries, Stonecipher acknowledges that the 747 and 777 are "most vulnerable" in 1999 and 2000.

Boeing sees a bright side to the Asian downturn, in that aircraft could become available for early delivery to other customers. The company has no 747 delivery slots available before mid-2000. "There is US and European demand for the 747 we cannot meet," says Woodard. Stonecipher, meanwhile, sees an opportunity in the downturn to ease Boeing's production problems.

Woodard says that the company is ahead of schedule on its production-recovery plan. Total parts shortages are down to 1,555, 375 below plan; while total jobs behind schedule are down to 18,100, some 6,900 below plan. Boeing chairman Phil Condit says that the combined 737, 747, 757, 767 and 777 production rate will reach 43 a month in the second quarter and stay there, although the ability to go to higher rates will be "protected".

Boeing tendered 336 Seattle-built 7-series aircraft for delivery in 1997, and plans to deliver a total of 550 in 1998, including Douglas Products division aircraft assembled at Long Beach, California. Condit expects deliveries in 1999 "...to be relatively stable, in the 550-plus range".

The Asian crisis could affect plans for growth versions of the 747 and 777, Woodard says. Asian airlines form a large part of the potential demand for 747 and 777 derivatives. "We continue to discuss possible configurations with customers," he says, but the Asian downturn "...could influence" decisions. "We will not launch until we have customers," he stresses. □

Crashed SilkAir 737 hinge bolt 'was installed'

BOEING SAYS THAT an elevator hinge bolt, previously believed to be missing from the SilkAir Boeing 737-300 which crashed on 19 December, 1997, was installed at the time. In a letter sent on 27 January to all 737 operators, the manufacturer says: "An examination of the wreckage gives clear evidence that the missing elevator

hinge bolt had been installed." The letter adds that fasteners found to be missing from the 737's horizontal stabiliser had been documented as being in place when the aircraft received a quarter-"C" check nine days before the accident, near Palembang, Indonesia.

"At this time there are no indications that missing fasteners or bolts

caused, or contributed to, the tragic crash," the letter says. Boeing says that checks on 192 737s worldwide found loose or missing leading-edge fasteners and/or elevator hinge bolts on eight aircraft, "...none of which was a safety-of-flight issue". Checks on factory 737s found no missing or loose fasteners or bolts, Boeing says. □

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CFMI takes lion's share of 1997 orders

GUY NORRIS/LOS ANGELES

THE GENERAL Electric/Snecma alliance CFM International (CFMI) won orders for 1,314 CFM56 engines in 1997, selling more for 100-seat-plus aircraft than all other large-civil-engine manufacturers combined.

Although there is some dispute over the exact figure for the year, with some independent analysts claiming that the figure should be 1,034 without the inclusion of the large American Airlines order, which straddled the year-end period of 1996, the result compares favourably with that of 1996, a year when CFMI chalked up a record 1,280 sales.

CFMI is believed to be contemplating a further rise in production rates following the sales boom,

much of which is directly linked to the success of Boeing's Next Generation 737 family. CFMI plans to build 920 engines in 1998, compared with 750 in 1997, but may step this up to more than 1,000 in 1999, following a rash of recent Airbus and Boeing sales.

Arch-rival International Aero Engines (IAE) had a year of ups and downs, with the sale of 226 engines for the Airbus A320 family, some 160 of which were tied to the massive order from International Lease Finance. IAE says that its \$1.6 billion firm orderbook is for slightly more engines than 1996's record year, and it now claims 34% of the A320 market over which it competes with CFMI.

The company suffered a setback, however, in November 1997, when Boeing decided to close down pro-

duction of the MD-90, for which the V2500 is the sole powerplant.

In the larger thrust bracket, fortunes were mixed, with Rolls-Royce coming out slightly ahead for the first time in the top thrust category through Trent sales. Trent 800 sales for the Boeing 777 in the year accounted for 54 of the UK engine maker's 286 Trent-family firm orders in 1997, with the Airbus A330's Trent 700 accounting for 72 units and the A340-500/600's Trent 500 totalling 160. R-R also sold some 132 RB.211 units, including 90 -524s (Boeing 747/Boeing 767) and 42 -535s (Boeing 757/Tupolev Tu-204).

Pratt & Whitney, meanwhile, sold 20 PW4080/90 engines for the 777 family, out of a total of 128 firm big-fan-engine sales. A further 52 were sold in the sub-223kN

(50,000lb)-thrust category (PW2000 and JT8D-200).

General Electric matched R-R in the big-fan sales stakes, taking orders for up to 286 CF6 and GE90 engines, according to the US company. Of this tally, 42 were GE90s while the balance were CF6 models. Independent sources suggest that the figure may be closer to 159 CF6 sales, depending on what late year-end sales are included.

GE declines to confirm that \$2.3 billion in "special charges", referred to in write-offs revealed in GE Corporation's annual earning statement on 21 January, includes write-off payments on the GE90. GE will say only that, "...if it is part of a write-off, it will only make the programme stronger", and emphasises that it "...is not cancelling the programme". □

ROUTES

++ Northwest Airlines is suspending its three-times-weekly services between Detroit and Seoul, South Korea, from the beginning of February because of the economic downturn in the region. **++ Frontier and Mountain Air Express (MAX)** will start codesharing on 4 March at Denver International Airport, Colorado. **++ Canadian Airlines and LanChile** will begin an alliance from 11 March, initially on services from Toronto to Santiago, via Miami, and Vancouver to Santiago via Los Angeles. **++ British Airways** will resume flights between Scotland and the USA from June, having suspended services in November 1997. BA will operate five flights a week with a Boeing 757 between Glasgow and New York Kennedy. **++ Delta Express** is adding new services to Cleveland, Houston and Kansas City from Orlando from 1 May. The low-fare division of Delta is introducing services between Boston and Fort Lauderdale, between Columbus, Ohio, and Tampa and between Washington Dulles and Tampa. Delta Express now has 25 737-200s.



More ATPs could be on their way to Air Europa Express after re-organisation

Air Europa focuses on feeding Balearic Islands

AIR EUROPA has revised its involvement in its regional subsidiary, Air Europa Express, focusing on feed within the Balearic Islands in the Mediterranean.

Air Europa Express began operations in early 1997 as a 50:50 joint venture between Air Europa and Canary Islands start-up Canarias Regional Air (CRA). It initially operated its leased British Aerospace ATP fleet to feed Air Europa services within the Balearics, as well as to mainland Spain. Later, a second operation was set up within the Canaries.

Air Europa managing director

Juan Saez says that the airline has taken over the Balearic operation, and substantially reduced its involvement in the Canaries.

"We have split the two divisions up and now hold 100% of Air Europa Express operating in the Balearics," says Saez. "We now have just 10% of the Canaries division, which is still temporarily called Air Europa Express," he adds.

The Balearic-based Air Europa Express division, which operates from Palma, Majorca, has five ATPs in operation, while the Canaries operation, headed by CRA founder Juan Socastro, has

four ATPs, which now carry additional "Canarias Regional Air" titles. The two fleets are leased from British Aerospace Asset Management Turboprops, which is quietly confident that the each will require more ATPs.

Socastro, a Canary Islands resident, conceived the idea of a new Canaries-based regional to improve services between the islands. These routes had been operated by Iberia's loss-making Binter Canarias division. Significantly, Iberia recently disclosed that it was looking to shed its holding in the Canaries-based airline. □

Qantas and Virgin compete for Cathay's surplus 747-200s

PAUL LEWIS/SINGAPORE

CATHAY PACIFIC Airways has entered into detailed discussions with Qantas of Australia and Virgin Atlantic Airways to sell its fleet of seven surplus Boeing 747-200 passenger aircraft. Qantas is also being offered an interim development of the proposed 747-400 increased-gross-weight (IGW) variant by Boeing to meet the carrier's planned delivery schedule.

After more than two months of talks, according to industry sources, Cathay has narrowed down negotiations to Qantas and Virgin, both of which are expressing "strong interest" in the Rolls-Royce RB.211-524-powered aircraft. Other airlines had also looked at the Hong Kong carrier's 747-200s, including Ansett International, British Airways and South African Airways.

The main attention of Qantas is focused on the two Cathay aircraft equipped with -524D4-standard engines, which are common with its own existing fleet of four RB.211-powered 747-200s. The Australian carrier, however, requires a total of four aircraft and, in addition to Virgin, is also looking at the five aircraft fitted with the earlier, lower-rated, -524C2s.

Airline officials say that no final decision has yet been taken on the



Cathay's 747 Classics could soon be leaving Hong Kong for new owners

purchase, and that any deal would still require board approval. Qantas' recent decision to scale back services from Brisbane and Perth to Asia could also undermine the need for additional capacity, warns one company source. Virgin is also believed to be looking at Air New Zealand's similar 747-200s.

In the meantime, Qantas is pressing Boeing to advance the introduction of the planned 747-400IGW, which the Seattle manufacturer is now offering to the market following a recent board approval (*Flight International*, 24 December-6 January). The proposed 413,140kg maximum take-off weight (MTOW) development

of the 747 would not be available until late 2000.

The three new 747-400s already on order for the Australian carrier, which it wants completed to the new IGW-standard, are scheduled for delivery in October and November 1999 and March 2000. As an interim solution, Boeing is proposing to Qantas a 413,140kg MTOW "enabled aircraft" which would be operated initially at the existing 397,250kg MTOW, but would incorporate the 747-400 freighter's reinforced wing and modified fuselage and would be retrofitted with the redesigned wheels and brakes when they become available. □

R-R reaches deadlock in Trent investment talks

ROLLS-ROYCE has reached an impasse in its negotiations with Kawasaki Heavy Industries (KHI) and Ishikawajima-Harima Heavy Industries (IHI) on taking a risk-sharing stake in the development and production of the new Trent 500/600/8104 engine series.

The two Japanese manufacturers had hoped to sign memoranda of understanding with R-R for each to take a 4-6% stake in the new Trent developments. Uncertainty over the future status of the Trent 600 and 8104 is causing KHI and IHI to adopt a "...wait-and-see policy".

While the Trent 500 has already been launched with the go-ahead of the Airbus A340-500/600 programme, the other two more powerful derivative members of the Trent family await launch platforms. The 280-303kN (63-68,000lb)-thrust Trent 600 is targeted as an alternative engine for the new Boeing 767-400 or future 747-400 growth development, while the 454kN 8104 is intended for the now-delayed 777-200/300X derivatives.

R-R is discussing a Japanese investment in the three engines as a

single package, and KHI and IHI accordingly want to see a business case for the Trent 600 and 8104, as well as for the 500. There is also a suggestion that Japanese industry is politically reluctant to back the European-built A340-500/600 without a balancing commitment to a competing US development.

Sources confirm that a decision on Japanese participation is expected by March. KHI and IHI had planned to take part on the now-delayed Trent 900 programme and have smaller stakes in the Trent 700/800 and RB.211-524 series. □

NEWS IN BRIEF

■ FRENCH FIRST

The new first- and business-class-only French airline, Fairlines, began operations on 19 January after a one-month delay caused by a delay in delivery of inflight-entertainment equipment, poor weather conditions and final French certification. The airline is operating its two Boeing MD-81s on services from Paris to Nice and Milan Malpensa, and daily between Nice and Milan.

■ ALLIANCE EXPRESS

Alliance Air has confirmed that it has taken a 49% stake in Air Rwanda, which it will run as Alliance Express. The new airline will start operations on 1 March from Rwandan capital Kigali, using a leased Boeing 737-200. Alliance hopes to establish an African feeder network to support its international flights.

■ HONG KONG CHARGES

The Hong Kong Airport Authority has announced landing, parking and terminal user charges for the new Chek Lap Kok Airport. It will charge a flat rate of HK\$2,600 (\$334) per aircraft up to a maximum take-off weight of 20t and HK\$74 per every additional 1,000kg. The authority claims that the new charges represent a 20% increase in real terms over those of Kai Tak Airport.

■ RATIOFLUG GROUNDED

The German civil-aviation authority (LBA) has withdrawn the operating certificate of Cologne-based Ratioflug because of unspecified financial problems. Ratioflug now has six months to bring its house in order, otherwise "...one can assume that the company has ceased operations", says the LBA. The charter carrier operates two Fokker F27s, two Bombardier Learjets, and one Airbus A300B2, which was acquired in late 1997.

US giants digest their mergers

KEVIN O'TOOLE/LONDON

AFTER FIVE YEARS of a breakneck consolidation, positions are firming up at the top of the US aerospace league, but attention now turns to digesting the latest, and probably last, series of mergers and acquisitions.

With the 1997 round of annual financial results, Boeing reclaims its position at the head of the US league in the wake of the McDonnell Douglas merger, but Lockheed Martin is poised to underscore its second spot with the imminent \$11.6 billion merger with Northrop Grumman.

The last of the big three will be Raytheon. Its merger with Hughes, completed in December, and a full year of the Texas Instruments (TI) operation, will double the size of its defence-electronics business and, together with the civil-aircraft unit, will take aerospace sales above \$17 billion.

The preoccupation is now focused on making the acquisitions work, with re-organisations high on the agenda as the groups began to outline their plans for 1998.

Raytheon led the way, outlining a massive re-organisation of its new Raytheon Systems division in the wake of the Hughes merger. Divisional chairman William Swanson admits that it will see "some of the most dramatic changes ever at any defence company". The plan is to close 20 plants and shrink six more, reducing floorspace by 20% over the next two years. Some 8,700 jobs will also be cut, representing around 10% of the workforce within the division.

The aim is to integrate Raytheon's existing business together with Hughes, the TI defence-electronics business acquired earlier in 1997 and the E-Systems company, taken over in mid-1996, but still run as a separate unit. Swanson says that the overall target is to cut costs by 10-15% and pass the savings on to the Department of Defense.

Production of components and subassemblies for the whole division will now be consolidated at 14 "centres of excellence" covering

areas such as circuitry, electro-optics, cables and fabrication. The work is now carried out at some 68 sites. The main manufacturing operations will be re-organised around 17 sites, down from 136. The bulk of the job cuts come in California, where around nine plants are to close or move, although El Segundo will emerge as headquarters for the group's Sensors and Electronic Systems unit.

Boeing's year-end results were dominated by the massive provisions put aside to cover write-offs at the Douglas Products division and to put straight its own production problems in Seattle. The total could mount up to the \$4 billion mark as the full costs unwind.

The group had already put aside \$1.6 billion to cover the Seattle problems as the ramp-up in production ran into problems. Boeing also expects to put aside another \$700-800 million this year as the lines get back on track. A further

\$1.4 billion was set aside in the 1997 accounts to cover the cost of running down the lines at Douglas, pushing Boeing to its first net loss in corporate memory. Boeing's stock has been rising, however, with financial analysts now confident that the worst of the bad news is over, a view supported by the company's top management.

The main unfinished business is post-merger restructuring of the McDonnell Douglas businesses. Boeing says that a review of the military business, including the Rockwell defence and space units acquired in mid-1997, is under way and it promises to unveil a rationalisation proposal by the end of February. The costs and gains of the restructuring are expected to be relatively limited in the defence and space division, given the lack of overlap, but there will also be new investment plans to announce for the Douglas Long Beach plant.

Meanwhile, Lockheed Martin

has largely completed its previous round of rationalisation, including integration of the Loral units. Over the last year, \$1 billion-worth of non-core businesses have been sold, further units swapped in exchange for preferred shares held by General Electric and the materials business floated.

New chief executive Vance Coffman confirms that the group is on course to beat its goal of \$2.6 billion in annual savings, once the rationalisation is complete, with more promised following the takeover of Northrop Grumman, now due to be completed in March. Further down the league AlliedSignal, TRW and Litton have also been rising fast through a mix of healthy market growth and acquisition, with more in prospect to come as industry consolidation at the top continues to feed through to the second tier of US companies. □

Additional reporting, Ramon Lopez

MAJOR US AEROSPACE GROUP RESULTS 1997

Group/ division	Aerospace sales	Sales (\$ million)		Operating margins		Net profits (\$ million)	
		1997	change	1997	1996	1997	1996
Boeing	45,054	45,800	29.2%	2.3%	7.4%	-178	1,818
Commercial		26,929	35.2%	-1.6%	5.4%	-	-
Defense, Space & Info		18,125	21.4%	7.3%	9.3%	-	-
Lockheed Martin	27,885	28,069	4.4%	9.9%	10.2%	1,300	1,347
Space & Missiles		8,303	5.0%	13.7%	12.6%	-	-
Aeronautics		6,045	8.0%	10.9%	8.7%	-	-
Information & Services		6,468	9.8%	5.0%	6.4%	-	-
Electronics		7,069	5.9%	9.4%	10.1%	-	-
United Technologies	10,264	24,713	5.1%	7.9%	7.6%	1,072	906
P Pratt & Whitney		7,402	19.4%	11.0%	10.3%	-	-
Flight Systems		2,862	8.0%	10.0%	8.8%	-	-
Raytheon	9,488	13,674	10.9%	11.5%	10.0%	527	761
Electronics		7,042	29.8%	15.6%	14.1%	-	-
Aircraft		2,446	4.3%	9.8%	7.7%	-	-
Northrop Grumman	9,153	9,153	6.3%	9.6%	8.2%	407	264
Aircraft		4,405	7.1%	14.8%	12.1%	-	-
Electronics		4,101	5.6%	7.5%	9.3%	-	-
Info Technology		1,022	12.3%	9.3%	5.4%	-	-
General Electric	7,700e	90,840	14.7%	n/a	14.8%	8,203	7,280
Aircraft Engines		7,700	22.2%	n/a	19.0%	-	-
AlliedSignal	6,412	14,472	3.6%	11.4%	10.8%	1,170	1,011
Aerospace		6,412	12.2%	8.3%	6.7%	-	385
TRW	3,800	10,831	9.9%	8.8%	8.7%	-49	480
Space & Defense		3,800	12.9%	8.4%	7.3%	-	-
Textron	3,135	10,544	13.7%	11.6%	11.8%	558	482
Aircraft		3,135	16.0%	10.4%	10.0%	-	-
Litton	2,617	4,176	15.6%	7.5%	7.4%	162	151
Advanced Electronics		2,617	36.1%	6.5%	6.9%	-	-

DEFINITIONS: Sales = note that divisional sales may be before inter-company eliminations. Operating margins = operating profits (before interest charges and special items) as a proportion of sales. Net profits = group earnings after all costs and charges.

NOTES: Boeing margin excludes \$1.4 billion charge for Douglas write-offs. Net excluding charge and share scheme was \$832 million. Lockheed Martin divisions re-organised. 1997 net earnings include GE share transaction. Raytheon net figure includes restructuring charges of \$322 million after tax 1997. GE

Aircraft Engines 1997 figures are estimates based on latest published figures. AlliedSignal Aerospace margin is for net profits. TRW 1997 net result includes \$547.9 million R&D write-off. Textron net result for 1996 includes divestitures including Textron Aerostructures. Litton year to end July 1997.

US AIRLINE SCHEDULED PASSENGER STATISTICS - 1997

Airline	Traffic (RPK)		Capacity (ASK)		Load factors (%)		Passenger yields c/RPK		Seat costs* c/ASK	
	(millions)	change	change		change		change		change	
United Airlines	195,374	4.1%	3.8%	71.8%	0.1	7.80	1.6%	5.56	0.3%	
American Airlines	172,205	2.2%	0.7%	69.5%	1.0	8.31	2.6%	5.76	4.0%	
Delta Air Lines	160,398	6.1%	3.8%	71.8%	1.6	7.98	0.5%	5.49	2.3%	
Northwest Airlines	115,898	4.9%	3.2%	74.3%	1.2	7.53	-3.4%	5.36	-1.7%	
Continental Airlines	77,081	14.3%	9.9%	70.9%	2.8	8.05	-1.1%	5.64	3.4%	
US Airways	66,901	6.8%	2.5%	71.3%	2.9	10.63	-2.1%	7.66	-2.8%	
Southwest Airlines	45,624	4.7%	9.2%	63.7%	-2.8	7.98	6.4%	4.60	-1.3%	
America West Airlines	26,072	5.8%	9.0%	68.8%	-2.1	6.77	1.9%	4.52	-2.2%	
TOTALS	859,553	5.3%	4.0%	71.0%	0.9	8.12	0.6%	5.64	0.8%	
Fourth-quarter totals	208,751	3.8%	3.2%	68.8%	0.4	7.98	3.3%	5.69	0.2%	

*Unit costs exclude charges for share schemes and restructuring, and so on. TWA not yet available.

RPK= revenue passenger kilometre, ASK= available seat kilometre 1 mile=1.609km

US airline profits are 'best ever'

THE MAJOR US airlines ended 1997 with their strongest profits on record, but the celebrations were accompanied by the promise of more turbulence ahead, with the fall-out from Asian economic crisis and the prospect of a renewed round of consolidation closer to home following the Continental/Northwest Airlines tie-up.

With only Trans World Airlines (TWA) still to report, the major groups had already breached the \$5 billion net-profit barrier. Excluding one-off charges, the 1996 corporate total, itself a record, had come in just short of \$4 billion.

Traffic continued to grow at a healthy 5%, fuelled by domestic demand, while restrained capacity growth helped load factors to a system-wide high of 71%. There was more good news on yields, again led by US markets. Fuel costs were down by 10-15% after the 1996 hike, and look unlikely to soar again.

Financial analysts are upbeat that the industry will maintain its performance into the first half of this year, although uncertainties remain over the impact of a prolonged

\$3 billion in 1998. Dominant transpacific carriers Northwest and United Airlines have outlined plans to rein back on services to Asia. Northwest, which has already felt the impact of the tumbling yen on its international yields, plans to cut back on capacity to worst-hit Asian destinations, led by South Korea. Traffic to Japanese tourist destinations are also described as "soft". The airline plans to cut Asian capacity by 10% in the first quarter, with a further 13% by mid-year.

United also plans to bring down transpacific capacity by about 11% by the end of February as it moves off routes to Guam and Manila, and halves services to Hong Kong. The airline's yields on the Pacific slipped by 7% in the December quarter, while transatlantic and Latin American routes came under pressure from increased competition. The airline predicts that yields will fall by 5% across its international operations in the first quarter this year.

Although it sees no immediate cause for alarm, United officials admit that profits will be flat for the start of 1998, marking the end of 19

quarters of consistent improvement.

Elsewhere, Continental is cutting capacity within its Micronesia fleet, based at Guam, bringing five aircraft back to mainline services.

While the repercussions of the Asian crisis are, as yet, well contained, some financial analysts have warned of cut-throat competition breaking out in other markets if and when aircraft capacity is redeployed on other long-haul routes, in particular the North Atlantic.

Analysts have also speculated on the reaction of other US majors in the wake of Northwest's tie-up with Continental, to be sealed with a 14% equity stake. As the 1997 figures show, the airlines would have combined sales and traffic figures on a scale to stand alongside leaders American and United.

US Airways' shares rose sharply on the news, with anticipation that it could be put back into play as a merger partner. A year ago, it held exploratory talks with United, provoking American to open its own negotiations. TWA is also seen as a candidate for take-over, depending on the progress of its recovery. □

MAJOR US AIRLINE GROUP RESULTS (\$M) - 1997

Group (airline)	Revenue		Operating margins*		Net result - reported**		Net result - underlying**	
	\$ million	change	1997	1996	1997	1996	1997	1996
AMR/American	18,570	4.6%	10.4%	10.5%	985	1,016	972	854
UAL/United	17,378	6.2%	12.9%	11.0%	949	533	1,546	960
Delta Air Lines	13,946	7.7%	12.0%	10.8%	934	248	966	754
Northwest Airlines	10,226	3.5%	11.3%	13.1%	597	536	606	536
US Airways Group	8,514	4.6%	8.2%	6.9%	1,025	263	638	263
Continental Airlines	7,213	13.4%	11.7%	11.8%	385	319	389	348
Southwest Airlines	3,817	12.1%	13.7%	10.3%	318	207	318	207
America West	1,875	7.8%	8.6%	9.1%	75	9	75	49
TOTAL	81,538	6.5%	11.3%	10.7%	5,267	3,131	5,509	3,972

*Operating margins exclude costs of employee share plans, bonuses, retirement and other special charges

**Underlying net profits exclude one-off charges: AMR = 1996 pre-tax \$499 million gain on Sabre sales/\$251 million Canadian charges. UAL = 1997 gain on Galileo sale. Debt extinguishment and ESOP scheme effect in both years. Delta = Restructuring pre-tax charges \$52 million 1997 and \$829 million 1996. US Airways = 1997 tax gain \$467 million/pre-tax \$115 million retirement charge. America West = 1996 special charge \$65 million. TWA not yet available

NEWS IN BRIEF

■ FAIREY HYDRAULICS SOLD

Managers at Fairey Hydraulics are buying out the UK defence/aerospace engineering business, backed by the Candover investment fund. The unit will now trade as FHL, to avoid confusion with its former Fairey Group parent. FHL has sales of around £30 million (\$50 million), mainly for UK defence prime contractors, and employs 360.

■ ITP BUYS INTO MEXICO

Spanish engine venture ITP has paid \$20 million to take a 60% share in Turborreactores, the maintenance arm of Mexico's CINTRA group. The unit was originally created to service Pratt & Whitney engines, but has been mothballed since 1993. ITP now hopes to bring the plant up to annual sales of around \$50 million through the revival of maintenance contracts for P&W JT8D engines for local carriers.

■ BRIT FLOAT

French regional airline Brit Air has floated 37% of its shares with the aim of raising around Fr150 million (\$25 million) to help finance its new franchise operations for Air France. Under a deal signed in October, Brit Air will operate franchise services on 32 domestic routes. It is also re-equipping its fleet with Bombardier Canadair Regional Jets, but has a debt of Fr1.28 billion. The airline expects to secure a new technical equity partner, tipped as Air France Industries.

■ EURO GAINS WEIGHT

The International Air Transport Association says that its members have agreed to give customers the choice of using the euro when the new European currency begins to be adopted at the start of 1999. Airbus Industrie has already said that it is preparing to offer aircraft priced in euros.

USA makes last-ditch ASTOR effort

DOUGLAS BARRIE/LONDON

A HIGH-LEVEL US delegation visited the UK in early January in an eleventh-hour attempt to persuade the Government to procure a variant of the Northrop Grumman Joint Surveillance Target Attack Radar System (JSTARS) to meet its Airborne Stand-Off Radar (ASTOR) requirement.

The delegation, say US sources, included senior Northrop Grumman managers associated with the JSTARS programme, as well as US Air Force staff. They are understood to have held discussions with UK Ministry of Defence Procurement Executive officials, as well as

with Air Vice Marshal Chris Coville, Assistant Chief of the Defence Staff Operational Requirements (Air Systems).

One of the key areas of the discussion is a potential collaborative radar development, believed to be based on a "black" US programme. The US in-service date for this radar is around 2005, with the platform thought to be a low-observable manned, or possibly unmanned, aircraft.

Final responses for the ASTOR competition are due by the end of February. Northrop Grumman's last-minute proposal will be considered alongside offers from Lockheed Martin and Raytheon. The latter is in the process of

acquiring Northrop Grumman.

The US Government-brokered Northrop Grumman proposal, based on the Gulfstream V business jet, is being offered for the UK MoD's £750 million (\$1.1 billion) ASTOR programme, with the joint radar development also fulfilling a USAF requirement. It is possible that the USAF could procure the ASTOR platform.

The USAF, after suffering a cut in numbers of Boeing E-8C JSTARS aircraft to be bought, is considering smaller aircraft. The US Government offer, is based on joint radar development and procurement. This could also be offered for the NATO Alliance Ground Surveillance project.

The US Government initiative has proved highly contentious on both sides of the Atlantic. In the USA, at least one rival bidder is known to have raised questions about whether the proposal is in breach of Government guidelines.

Senior UK procurement officials, meanwhile, have been concerned over the UK Government's disregard for the acquisition process. Northrop Grumman has been eliminated twice before.

While the ASTOR requirement is thought to have been supported within the Government's continuing Strategic Defence Review, there is concern that the timescale may slip, and its entry into service be delayed. □

Australia could issue Air 87 RFP by May

THE AUSTRALIAN Army plans to issue a request for proposals (RFP) by May for Phase II of its Air 87 programme to replace six Bell UH-1H Iroquois and 43 Bell 206 Kiowas with a common type. Manufacturers will have "three to four" months to respond.

Speaking at a Shephard Conferences Fighter Helicopter meeting in London on 26-27 January, Lt Col Leo O'Reilly, deputy director of Army Aviation, said that its latest recommendation is that the originally planned invitation to bidders to register interest is expected to be superseded by issue of a full RFP before the details of the federal budget are announced in May.

This will allow more-detailed figures to be presented before the Government's expected endorsement of Phase II this year. A short-list of "three to five" bidders would lead to a request for tenders in April 1999, contract signing in "around 2000" and first delivery in 2003.

O'Reilly says that, although no decision has been made, "...I am recommending...the purchase of purpose-built attack helicopters", rather than another option which would involve bolting weaponry on to Sikorsky S-70s, and acquiring more "widebodied" helicopters for fire-support and reconnaissance. □



Kornukov has pulled a flanker on Deinekin's air force and air-defence merger plans

Russian air force chief overhauls merger plan

ALEXANDER VELOVICH/MOSCOW

PLANS TO MERGE the Russian air force with the country's air-defence forces are being overhauled by Col Gen Anatoly Kornukov, the recently appointed commander-in-chief.

Kornukov inherited the restructuring proposals from his predecessor, Col Gen Piotr Deinekin. While Kornukov, a former senior air-defence forces commander, is pushing ahead with the merger, he says: "I disagree with many aspects [of the Deinekin plan]. My task is to overcome the biased approach to restructuring."

The forces are being merged against a background of a desperate shortfall in defence funding.

Finance for procurement has dwindled to a trickle, as has operations and maintenance funding.

Kornukov, in an interview with Russian newspaper *Nezavisimoye Voyennoye Obozreniye*, spelled out the timescale for the merger. His intention is to have a merged headquarters staff by 1 March. The headquarters is also being relocated from central Moscow to the air-defence forces central command post near Balashikha, some 20km (12 miles) east of the city.

The merged force will be known as the *Armiya VVS i PVO* (Air Force and Air Defence Armies).

Kornukov intends to allow air-defence forces fighter-interceptor units to retain their status, with certain of these actually absorbing

some air force fighter units. This prospect would have been unlikely under the aegis of Deinekin.

While Kornukov says that the combat inventory of the merged force has been determined, no details have yet been made public.

■ The Russian air force has tested an air-launched cruise missile at a range in Kazakhstan. The missile was launched from a Tupolev Tu-95MS and flew a 1,500km (800nm) engagement profile. While cruise-missile design house Raduga is in the final stages of developing the Kh-101 cruise missile, the test launch is thought to have been of a Raduga Kh-55M (AS-15 Kent), since the launch aircraft was drawn from an operational squadron at Engels air base. □

IPTN battles to stay in RAAF light-transport competition

PETER LA FRANCHI/CANBERRA

INDONESIAN manufacturer IPTN has embarked on a desperate political campaign in an attempt to keep its CN-235-330 Phoenix in the Royal Australian Air Force (RAAF) competition for a tactical transport.

Indonesian science and technology minister Bacharuddin Habibie wrote to the Australian defence minister, Ian McLachlan, at the beginning of December 1997, expressing concern that a draft request for tender shown to IPTN by the RAAF project team contained several requirements which, if included in the final tender documentation, would have effectively excluded the Indonesian company. A similar letter was sent by senior IPTN officials direct to the Australian Department of Defence.

Exact details of the problem clauses remain classified. The letters, however, are known to have resulted in talks between Australia's Minister for Defence Industry, Science and Personnel, Bronwyn Bishop, and senior Indonesian officials during the Langkawi International Maritime and Aerospace Exhibition which was held in early December.

The Australian Department of Defence had been widely expected to shortlist just two contenders for the project, these being the Alenia-Lockheed Martin C-27J Spartan and the CASA CN-295.

Both aircraft were shortlisted in July 1997, along with both the CASA and IPTN versions of the CN-235. A final request for tender is due to be released to the contenders during February.

Political involvement in the

Australian project by Indonesia is known to have been met with much anger within key areas of the Australian Department of Defence, who had sought to keep the acquisition separate from the developing political relationship between the two countries.

The lobbying may have come too late for IPTN, however, following moves by the International Monetary Fund to block funds for Indonesia's aerospace industry as part of its multi-billion dollar bailout for that nation.

According to one Australian Defence Forces official, compliance with the IMF requirement by Indonesia raises questions about the long-term sustainability of IPTN. This will have to be taken into account in the final choice of aircraft to meet the the RAAF transport requirement. □

NEWS IN BRIEF

THAI HORNET STING

Thai and US military officials have begun negotiations over the fate of the Royal Thai Air Force's eight Boeing F/A-18C/D fighter aircraft, which Thailand says it can no longer afford. The Thais would like the USA to consider deferring payment or for the US Navy to try to find another customer for the aircraft, which cost \$400 million. Deliveries of the F/A-18 have not started.

DASSAULT FOR F-5

Northrop Grumman has picked Dassault Electronique as a preferred electronic-warfare supplier for proposed Northrop F-5 upgrades. The French company's EWS-A radar-warning receiver will form part of any baseline upgrade which is offered by Northrop Grumman.

US Navy launches study to look into P-3 replacement aircraft

THE US NAVY has launched studies into a replacement for its Lockheed P-3 maritime-patrol aircraft. Industry was briefed in late January on plans to field a Multi-Mission Maritime Aircraft (MMA) by 2015, to replace the Navy's land-based P-3s, electronic-intelligence EP-3Es, submarine-communications Boeing E-6s and tanker/transport Lockheed Martin C-130s.

The Navy is inviting international participation in a two-year requirements study begun in late 1997. Australia is believed to have signed up, with Canada, the Netherlands and Norway – all P-3 operators – expected to join.

The study will define requirements for the MMA and could lead to the award of concept exploration and demonstration contracts as early as 2000, but more likely by 2002.

Industry sources say that the Navy is looking at options ranging from remanufactured P-3s to an

all-new aircraft. New-build P-3s, a modified commercial airliner and a derivative of the planned carrier-based Common Support Aircraft (CSA) are also being examined.

A two-year requirements study into the CSA, intended to replace the Navy's Lockheed S-3s and ES-3s and Northrop Grumman E-2s and C-2s, has just been completed. Concept studies are expected to begin soon, and the CSA is planned to enter service in 2013.

Japan is already studying a P-3 replacement and this will also be evaluated by the Navy, industry sources say. The Japanese are looking at a four-engine turboprop as a potential replacement for Orions.

The Navy will also study the use of unmanned air-vehicles (UAVs) for at least part of the MMA mission, sources say. A UAV option is also being proposed as a potential candidate to meet the CSA mission requirement alongside a variety of crewed aircraft. □

See also P18.



EF2000 is refuelled in flight for first time

THE EUROFIGHTER EF2000 TEST TEAM has carried out its first in-flight refuelling trial, with Development Aircraft 2 being flown on an air-to-air refuelling sortie with a Royal Air Force BAC VC10 K3. Refuelling was carried out from both the VC10 fuselage and wingtip stations. The EF2000 also achieved Mach 2 for the first time in January.

NEWS IN BRIEF

■ JAPANESE FLANKER

The Japanese National Defence Directorate has reached agreement with Russia on allowing two military pilots to fly the Sukhoi Su-27 Flanker for evaluation. The Japanese Air Self-Defence Force is interested in the Su-27 because China and Vietnam operate the type.

■ SAFER US MILITARY

Despite a rash of aircraft accidents during the final weeks of fiscal year 1997, the US military completed one of its safest flying years on record. The accident rate was 1.5 accidents per 100,000 flying hours, unchanged from the previous two years. There were 68 major US military accidents, three fewer than during the previous year, and the lowest number since 1958 when the Department of Defense began keeping records. Aviation fatalities also declined, from 116 to 76, the second-lowest figure.

■ GREEK MIRACH

Alenia Difesa's Meteor subsidiary has signed a deal with the Greek defence ministry, worth L22 billion (\$12.5 million) for the supply of its Mirach 100 target remotely piloted vehicle to the NATO missile-firing range in Crete. The Mirach 100 is used by other NATO countries.

■ TANKER SAVINGS

The US General Accounting Office claims that the Department of Defense could save as much as \$209 million annually in Lockheed Martin C-130 and Boeing KC-135 costs – yet meet all mobility requirements – by requiring the US Air Force to re-organise the aircraft into larger-sized squadrons and wings. The watchdog agency recommends that C-130s and KC-135s in the Air National Guard and USAF Reserve be organised into larger wings at fewer locations.

France reconsiders multi-year Rafale purchase to aid exports

JULIAN MOXON/PARIS

THE FRENCH Government is reconsidering approving a multi-year procurement of the Dassault Rafale multi-role fighter in its 1998 defence budget, to bolster the programme's ailing credibility in the export market.

Defence minister Alain Richard told the French senate in December that the 1998 defence budget had "no provision" for purchasing air force Rafales. The need, however, to demonstrate the aircraft to potential customers in Saudi Arabia, Singapore and the United Arab Emirates, along with the recent go-ahead decision on pro-

duction of the rival Eurofighter, is said to have driven the review. Only 13 Rafales have been ordered so far, most of which are destined for the French navy, to equip the new *Charles de Gaulle* aircraft carrier.

The previous Government had promised to place a multi-year procurement order for 48 aircraft in the 1997-2002 defence budget, worth Fr17 billion (\$2.84 billion), after Dassault Aviation met demands for a 10% reduction in programme cost.

The initiative was cancelled by the incoming socialist government, which made any decision subject to its forthcoming defence review, due in March.

The 294-aircraft Rafale programme (60 for the navy, 234 for the air force) has already been delayed by reviews to an in-service date of mid-2001 for the Navy and the end of 2005 for the air force.

A multi-year order would provide for an initial squadron of up to ten air force aircraft for demonstration purposes, which Dassault says would be ready by 2001.

The Government, which had put on ice the planned merger between Dassault and Aerospatiale, is understood to be making new proposals to Dassault president Serge Dassault, who had rejected any plan which took away control by the Dassault family. □



Unmanned utility aircraft could take deck space on future US Navy carriers

US Navy eyes unmanned aircraft for utility role

DOUGLAS BARRIE/LONDON

A VERTICAL take-off and landing support unmanned air vehicle (SUAV) is being pushed as an alternative to a crewed design for the US Navy's future carrier-borne utility aircraft.

The USN's Common Support Aircraft (CSA) programme is intended to determine a successor to Northrop Grumman E-2C Hawkeye airborne-early-warning aircraft (AEW), Lockheed S-3B Vikings and ES-3A Shadows and Grumman C-2 Greyhounds. Up to 250 aircraft could be procured.

Speaking at the SMI Unmanned Combat Aerial Vehicles conference in London at the end of

January, Cdr Russ Bartlett, a member of the USN's Naval Operations Strategic Studies Group, said that an SUAV should be included "in the Common Support Aircraft study as an alternative" to a crewed platform.

Bartlett believes that an SUAV would fulfil the majority of the CSA requirements, excluding that of the Greyhound's cargo-on-deck capability. This, he says, could be met by an aircraft such as the Bell Boeing V-22 tilt-rotor.

A Lockheed Martin vehicle-design concept for the SUAV shows a delta lifting-body combined with an extended, straight, outer-wing section. Projected performance would offer a maximum

of 12h on station at a range of 370km (200nm). The design has leading-edge payload bays, into which modular sensor packages could be fitted for roles such as AEW, reconnaissance and surveillance, says the company.

The advantages of an SUAV in the CSA role, says Bartlett, include the vehicle's greatly reduced deck-footprint in comparison to that of a crewed aircraft, as well as large reductions in life-cycle costs.

The reduced size of the SUAV would provide space for more Boeing F/A-18E/Fs, and Bartlett suggests that annual operations and support costs of an SUAV would be around 15% of those of a conventional aircraft in the same role. □

Grob favoured for RAF trainer

KATE SANSFIELD/LONDON

A BATTLE BETWEEN the Royal Air Force and the UK's Department of Trade and Industry over the choice of a basic trainer aircraft to replace the RAF's fleet of Scottish Aviation Bulldog T1s has been resolved in favour of the military. The stand-off between the two sides has already led to a delay of several months in the announcement of a winning contractor.

The RAF's preference for the German-built Burkhard Grob G-115TA (rather than the UK contender Slingsby Aviation's Firefly) for its 100-aircraft requirement had previously run into stiff opposition from the President of the Board of Trade, Margaret Beckett. At one stage, Peter Mandelson, minister without portfolio and a close aide to Prime Minister Tony Blair, had taken a direct interest in the decision.

Both favour the Slingsby bid, fearful that the loss to Grob could bring into question the future of the company. Neither Government office will comment on the procurement. Slingsby managing director Jeff Bevan concedes, how-



British Bulldog will give way to Germany's G-115TA

ever, that "...there will be jobs on the brink", as a decision is made.

Military and industry sources say that the RAF's arguments that the G-115 meets its requirement better finally appear to have won the day, although it is possible that the decision could be overturned at a political level in favour of Slingsby.

A contract award is not now expected until the end of March. The previous intention had been to award the deal in November and have the contract start on 1 April.

Aircraft supply is part of a wider deal under UK Private-Finance Initiative rules which contractors FR/Serco and Shorts Support

Services (renamed Bombardier Services) are bidding for. They are competing to provide up to 50,000 flying training hours a year for ten years to university air squadrons and air cadets. Provision of aircraft, engineering support, maintenance and spares are included in the bids.

The contractors are offering both aircraft types for selection. FR parent company Cobham acquired Slingsby in 1997.

York-based Slingsby has recently faced a deluge of negative publicity over the long-term grounding of the Firefly by its biggest customer, the US Air Force, after a series of fatal accidents. □

Dragon goes to sea with USMC

THE US MARINE Corps (USMC) is to test a maritime variant of the BAI Aerosystems Exdrone unmanned air vehicle (UAV) following positive results during a recent series of exercises.

The USMC Warfighting Laboratory is upgrading ten BQM-147A Exdrones to Dragon drones with a shipboard launch and recovery capability, heavy-fuel engine (HFE), forward-looking infra-red sensor and differential global-positioning system. The USMC plans to deploy them on at least one ship, for demonstration purposes, this year.

The USMC and US Army have fielded the Exdrone as a low-cost reconnaissance air vehicle equipped with a colour television camera. The delta-platform flying wing is powered by the Quadra 100SS. It is launched by pneumatic rail and recovered by parachute.

The air vehicle has a service ceiling of 10,000ft (3,000m), mission endurance of 2.5h and operational range of more than 50km (30nm). An Exdrone system consists of ten air vehicles, two ground-control stations and ground-support equipment, including the launcher.

The BQM-147 modification with an HFE reflects the US Department of Defense's (DoD) continuing interest in fielding UAVs with this type of powerplant. This is despite its failure so far to qualify a diesel-burning powerplant for the aborted TRW/Israel Aircraft Industries Hunter drone as well as the troubled Alliant Techsystems Outrider tactical UAV.

The DoD says that the decision to replace the Outrider's HFE with the UK's UAV Engines 801R rotary engine "...recognises that HFE technology is not yet available for application to small UAVs."

It has created a consolidated HFE development programme to mature this technology independently of specific aircraft projects.

"A common HFE family appears unfeasible...significant common-technology applications at the subsystem and component level, however, show promise, such as compressor, fuel pump, injector, rings and perhaps pistons, rods and valves," the Pentagon says. □

Boeing ponders Chinook cockpit avionics choice

BOEING HELICOPTERS intends to select an avionics subcontractor for the \$3 billion Chinook Improved Cargo Helicopter (ICH) programme in the next few weeks, following a bidders' conference early in January.

Company sources say that Boeing wants to have identified its avionics provider before the requirements document and engineering and manufacturing development (EMD) are approved. The plan is to have the avionics vendor on the team by 31 March, which is when the US Army expects to have received US Department of Defense approval for the EMD, a 36-month effort.

The US Army plans to upgrade at least 300 ageing Boeing CH-47D Chinook transport helicopters. The remanufactured CH-47ICH will be powered by AlliedSignal T55-714A turbo-

shafts, which offer 22% more power than that of the current -712s. The helicopter modernisation also involves airframe strengthening and a partial digital-cockpit upgrade.

A request for proposals for the cockpit subcontractor was issued in early December, and Boeing Helicopters held a bidders' conference on 14 January.

Funding constraints mean that the CH-47ICH, which will stay in service until at least 2020, will not have a fully digital cockpit. It will incorporate two multi-function displays and an electronic flight-instrumentation system, while using a 1553 databus.

Bidders for the cockpit work are likely to include Honeywell Defense Avionics Systems, Lockheed Martin, Rockwell-Collins, Canadian Marconi and GEC-Marconi.

Honeywell's advanced cockpit-

management system, a fully digital glass cockpit, is installed in CH-47Ds sold to the Royal Netherlands Air Force. A version of that cockpit is offered on the export-model CH-47SD. Lockheed Martin, meanwhile, built the digital cockpit in the US Army's MH-47E special-operations helicopter. Despite the fact that all-glass Chinook cockpits exist, the US Army believes that it will spend less on a partial avionics upgrade development, since non-recurring research-and-development costs will be amortised over a 300-aircraft remanufacturing programme.

Two CH-47Ds will be remanufactured into the new configuration during the EMD. The procurement plan is to modify 26 helicopters a year until 2012. The US Army plans to convert 1,150 -712 engines to -714A standards under a separate contract. □

NEWS IN BRIEF

■ HELIBRAS SALES UP

Brazilian helicopter manufacturer Helibras sold 30 aircraft in 1997, worth real 50 million (\$45 million), reports *Gazeta Mercantil*. Itajuba-based Helibras licence-assembles Eurocopter AS350/355s and AS365s and plans to introduce the EC120 light turbine-single and EC135 light twin to the Brazilian market by 1999.

■ EJM EXPANDS FLEET...

Cincinnati, Ohio-based Executive Jet Management (EJM) has added four business jets – a Cessna CitationJet, Citation S/II, and two Citation V Ultras – to its fleet of 24 managed aircraft. EJM, an affiliate of Executive Jet, plans to add a further 20 managed aircraft in 1998.

■ ...AS WAYFARER GROWS

White Plains, New York-based Wayfarer Aviation has added a Gulfstream III business jet and Sikorsky S-76 corporate helicopter to its managed-aircraft fleet.

■ CITATION DELIVERIES

Cessna delivered 180 Citation business jets in 1997, up from 122 in 1996. Including 78 single-turboprop Caravan Is and 360 piston singles, the company shipped 618 aircraft in 1997. Business-jet deliveries during 1997 consisted of 63 CitationJets; 28 Citation Bravos; 53 Citation V Ultras; eight mid-size Citation VIIIs; and 28 Mach 0.92 Citation Xs.

■ ALASKA FBO IMPROVED

Signature Flight Support has revealed plans to expand its newly acquired fixed-base operation at Alaska's Anchorage Airport, which will be used exclusively for transient corporate aircraft, to meet operator concerns over the availability of overnight hangar space. The existing heated hangar can accommodate aircraft as large as the Boeing 737.

Bombardier creates more room for Global Express maintenance

GRAHAM WARWICK/WASHINGTON DC

BOMBARDIER has embarked on an expansion of its service centres to accommodate the Global Express long-range business jet, deliveries of which begin in the second half of 1998. The first Bombardier Aviation Services site to be upgraded is at Tucson, Arizona, where work has begun on a new hangar to be used for Global Express maintenance and Canadair Challenger completions.

The \$10 million expansion of the Tucson centre, to be completed by the end of July, will be followed by a \$7.5 million upgrade of the

company's Ft Lauderdale, Florida, maintenance base to cope with the Global Express, says aviation-services general manager Jim Zeigler. A third North American site will be expanded to accommodate the Global Express, with Bombardier's Montreal, Canada, headquarters and its Hartford, Connecticut service centre still being evaluated as potential sites, he says.

Bombardier is also looking at sites outside North America. Its new Berlin joint venture with Lufthansa Technik is already large enough to accommodate the Global Express, says Zeigler. Independent service centres are also being

examined. "The number one issue is capacity," he says, as the Global Express is a large aircraft. Regions of particular interest are the Pacific Rim and Latin America.

In addition to maintaining the Global Express, the expanded Tucson centre will handle more Challenger completions. Presently the site completes eight aircraft a year, but this will increase to 20 a year as Challenger work is moved from Montreal to make room for Global Express completions.

Learjet 31A and 60 completions are already performed at Tucson, which handles some 70 Learjets and Challengers a year. □

Cessna singles owners must replace silencers

OWNERS OF more than 300 Cessna 172R Skyhawks delivered since shipments restarted in January 1997 have been ordered to replace the exhaust silencers. The US Federal Aviation Administration issued an airworthiness directive (AD) on 13 January mandating replacement of the silencers, made by Aeroquip, because of leaking welds.

The FAA issued a similar AD on 30 December, requiring replacement of Aeroquip-manufactured silencers on 19 182S Skylanes. Both directives are intended to eliminate the risk that a leaking silencer could allow carbon monoxide into the cabin heater.

A cracked weld was noticed in 1997 during a 182 ferry flight, leading to discovery of exhaust-system problems on Skylanes on the pro-



More than 320 172R and 182S owners have to replace their exhaust silencers

duction line. Pressure tests revealed a 70% failure rate, with leaks at or around welds. Tests on Skyhawk silencers also revealed an unacceptably high failure rate. Aeroquip is delivering new silencers.

Skylane owners were required to replace the silencers before resuming flights. Skyhawk owners can fly their aircraft, provided the heater is rendered inoperative, until a new silencer is available. □

PZL-Swidnik upgrades SW-4 prototype with flight-control system

POLISH helicopter manufacturer PZL-Swidnik is fitting a hydraulic flight-control system from French manufacturer SAMM to its third SW-4 light-helicopter prototype.

The four/five-seat helicopter, powered by a single 335kW (450shp) Allison 250-C20R/2 turboshaft has undergone 70h of

flight testing since it was first flown on 26 October, 1996, and is now grounded until the second quarter of 1998 while the modifications are carried out. One hydraulic system has been delivered, says Swidnik, and, if flight tests are successful, more will be bought and the system will become a standard equipment.

The third prototype is the only

one of four which has been flown. The first two prototypes are being used for static and dynamic ground tests, respectively, while the fourth, now complete with improved skids, has yet to undergo its first flight.

The company now plans to offer a version powered by the 460kW Pratt & Whitney Canada PW200/9 turboshaft. □

Turbine-helicopter deliveries increase

GRAHAM WARWICK/WASHINGTON DC

DELIVERIES OF turbine-powered helicopters increased in 1997, buoyed by sales of new light single- and twin-engined aircraft. Bell shipped no fewer than 140 of its new single-turbine Model 407s in 1997, while Eurocopter delivered 28 of its new EC135 light twins.

Bell led deliveries in 1997, shipping 286 aircraft from its Mirabel, Canada, commercial-helicopter plant, compared with 217 in 1996. These figures include deliveries to civil and military customers, but exclude shipments of combat helicopters from Bell's Fort Worth, Texas, plant. Eurocopter, meanwhile, delivered 210 aircraft (see table, right).

Eurocopter says that it booked a record 303 orders for new aircraft in 1997. These consist of 102 AS350/550 and 68 EC120 light singles; nine AS355/555 and 58 EC135 light twins; 16 AS365/565s and seven BK117 medium twins; and 43 AS332/532 heavy twins. Bell does not reveal orders, but acknowledges that it has deposits in hand for "over 70" of its new Model

1997 TURBINE-HELICOPTER DELIVERIES OF MAJOR MANUFACTURERS				
	Boeing (total)	Bell (total)	Eurocopter (total)	Sikorsky (total)
Light singles				
	500E/520N/	206B/TH-67 (42)	AS350/550 (98)	-
	530F/600N (28)	206L (17)	EC120 (1)	-
	-	407 (140)	-	-
Subtotals	28	199	99	-
Light twins				
	MD900 (2)	-	AS355/555 (31)	-
	-	-	BO105 (7)	-
	-	-	EC135 (28)	-
Subtotals	2	66	-	-
Medium twins				
	-	212 (1)	AS365/565 (24)	S-76 (20)
	-	230 (4)	BK117 (6)	-
	-	412/CH-146 (72)	-	-
	-	430 (10)	-	-
Subtotals	87	30	20	-
Heavy twins				
	-	-	AS322/532 (15)	-
Subtotals	-	15	-	-
Total turbine-helicopter deliveries				
	Boeing 30	Bell 286	Eurocopter 210	Sikorsky 20

427 light twin's deliveries of which will begin in early 1999.

Bell says that it has shipped more than 225 Model 407s since deliveries began in February 1996, making it the fastest-selling helicopter in recent history. Eurocopter delivered the first of its new EC120 light singles in December, and says that it has orders in hand for "over 100".

The Franco-German company

says that sales of the EC135 have also passed 100, while 20 orders have been booked for the new EC155 medium twin. The EC155, the renamed, upgraded, AS365N4 Dauphin, will be launched officially at the Helicopter Association International show in Anaheim, California, on 15-17 February.

Boeing delivered 30 commercial helicopters in 1997, just one more

than the number shipped by the former McDonnell Douglas Helicopter Systems division in 1996. All but two were light singles, although Boeing declines to reveal the breakdown between MD500-series helicopters and MD600Ns. Boeing began MD600N deliveries in June 1997 and hoped to deliver 23 by year-end.

Only two MD Explorers were delivered in 1997. Production of the original MD900 was stopped early in 1997 while Boeing developed the improved, cheaper, MD902. Certification of the MD902 is imminent, and the first two aircraft are "on the ramp", ready for immediate delivery, Boeing says.

Rumours continue to circulate in the USA that Boeing is to merge its civil-helicopter activities with those of Bell. Neither company will comment on the reports.

Among the smaller manufacturers, Kaman Aerospace delivered seven K-MAX single-seat helicopters. Enstrom saw a similar number of 480/TH-28s leave the factory and Schweizer delivered five 330s. Italian manufacturer Agusta is unable to supply figures. □

BFGoodrich delivers two more private 'Super 27s'

TWO FURTHER Boeing 727-200s, modified to "Super 27" configuration, have been delivered to private customers by BFGoodrich Aerospace's Aerostructures group (formerly Rohr) in California.

The Super 27 upgrade allows the 727 to meet Stage 3 noise requirements and involves replacing the two outboard engines with

Pratt & Whitney JT8D-217Cs or -219s, reinforcing the pylons, adding a central engine-exhaust mixer and removing the cascade thrust reverser. The Super 27 programme was based on an earlier venture by Valsan Partners, which ceased trading in 1994 after 21 aircraft had been modified.

The latest programme, which was launched by Rohr in August

1996, has now come under the banner of BFGoodrich, which absorbed the engine-nacelle specialist in December 1997.

The two latest modifications, one for a Middle Eastern-owned 727-200 Adv and the other a Nomads Air Travel Club-200 Adv, brings the number of aircraft upgraded under the new Super 27 programme to six. □

AOPA criticises FAA wing-spar mandate

THE AIRCRAFT Owners and Pilots Association (AOPA) says that a proposed wing-spar airworthiness directive (AD) affecting 8,300 Aeronca and American Champion aircraft is unnecessary.

The private pilots' group seeks exemptions for all non-aerobatic, lower-gross-weight aircraft such as the original Aeronca Champ and Chief and derivative aircraft such as the American Champion Citabria and Decathlon.

The US Federal Aviation Administration is concerned about compression cracks developing in wooden wing-spars, cracks which cannot be seen through existing inspection holes. The AD would require the installation of two inspection covers and up to 24 new inspection holes in the fabric. The spar would have to be inspected annually, or after 500h of flight. □



Netjets Europe takes Citation VIs

NETJETS EUROPE HAS taken delivery of two Citation VII medium-sized, twin-engined business jets, which will form part of the company's fractional-ownership fleet. Netjets Europe, a joint venture between Air Luxor of Portugal, US Executive Jet Aviation and Switzerland's Zimex Aviation, says that shares in the Citation VIs are "sold out" and that it is hoping to "...receive a third aircraft in April". The company is also to receive two Citation IIIs around the same time, which will join four Citation S/IIIs and one Citation III.

Delta 2 problem will not delay launches

INVESTIGATIONS into a potential technical problem on the Boeing Delta 2 launcher will not delay the launch of the first two Globalstar mobile-communications satellites and a new set of five Iridium spacecraft scheduled to be placed into orbit in early February.

Although successful, the Delta 7925 flight carrying the UK's Skynet 4D on 10 January experienced two jolting motions during firings of the second stage. Boeing had earlier said that it would not relaunch the Delta until the events were fully investigated.

The first Globalstars will be launched from Pad 17A at Cape Canaveral, Florida, aboard a Boeing Delta II two-stage version, with three strap-on boosters, while the launch of the five Iridiums on a standard Delta II 7920 two-stage booster from Vandenberg AFB, California, will bring to 51 the number of Iridiums launched by a mixed bag of Deltas, Russian Protons and a Chinese Long March 2C. Three satellites are not functioning. □

Full control transfers to Russian Agency

THE RUSSIAN Space Agency (RSA) is to take control of Russia's space industry, including the supply of missiles and other military hardware, according to Russian President Boris Yeltsin.

The agency's previous role has been confined to controlling the civil space industry. The decision to extend its remit into the military sector has been made to "strengthen Russia's position in the world market", Yeltsin said on 20 January. ■ Valeri Ryumin, the 58-year-old veteran cosmonaut and Russian chief of the Shuttle *Mir* Mission programme will fly aboard the Space Shuttle STS 91/Discovery in May on the final US visit to the *Mir* I space station.

Ryumin, with 362 days space-flight experience, will fly as a mission specialist to inspect the *Mir* to decide how much longer it can be inhabited on future missions before its planned retirement and de-orbiting in late 1999. □



Spacecraft explores Earth

THIS IMAGE OF THE EARTH'S South Pole and part of South America was taken at a distance of about 640km by NASA's Near Earth Asteroid Rendezvous (NEAR) spacecraft. The photograph demonstrates the craft's charged-coupled device imager, which was used when the vehicle was flying past the planet at a speed of about 32,000km/h on 22 January. The NEAR *Discovery*-mission-series spacecraft was launched in February 1996. Its gravity-assist Earth fly-by sent it on a trajectory to orbit the asteroid 433 Eros on 10 January, 1999, coming as close as 16km from its surface during a one-year mission. The NEAR craft is also equipped with X-ray and infra-red spectrometers, a magnetometer and a laser altimeter.

Work halts on manned missions

TIM FURNISS/LONDON

WORK AT NASA on advanced planning for potential manned Moon and Mars missions has been stopped. Budget difficulties and anticipated future budget restraint have made it obvious to the agency that nearer-term goals must take priority.

NASA centres, including the Advanced Projects office at Houston, Texas, and an Exploration Transportation section in Huntsville, Alabama, have been working on the technology re-

quired to support a return to the Moon in about 2005 and a manned mission to Mars in about 2010. The work includes portable life-support systems and advanced transportation. Some research contracts have already been cancelled.

NASA's International Space Station (ISS) budget is \$200 million overspent this year and, in an effort to make up this deficit, cuts are being made to the Space Shuttle programme, with the United Space Alliance, which operates the Shuttle commercially for NASA, being told to lay off up

to 500 workers at the Kennedy Space Center.

The cuts will not affect current unmanned Mars missions such as the *Mars Surveyor 2001* lander, which will still carry an experiment to demonstrate *in situ* production of propellant from elements in the Martian atmosphere, which is related to a future manned mission.

The proposed *TransHab* Mars habitat module will still be flown aboard the ISS as planned (*Flight International*, 21-27 January), and some work is to be done on potential orbital-transfer modules. □

Israel's Shavit booster suffers a second failure

THE FAILURE of the Shavit booster on 22 January, with the loss of the Ofeq 4 spy satellite, was the second of five Israeli launches which has failed to put a satellite into orbit (*Flight International*, 28 January-3 February).

The three-stage booster, based on the two-stage Jericho 2 missile, was first flown in 1988 from Palmachim air base, near Tel Aviv, carrying the Ofeq 1 test satellite. The Ofeq 2 followed in April 1990, but a launch failure between then and the

launch of the Ofeq 3 in April 1995 (although not confirmed by Israel) is well known in military circles, says the Molniya Space Consultancy in London.

Video footage of the latest launch reveals a suspected malfunction at about the time of the switch from the first to the second stage.

The Ofeq 4 was to have followed the Ofeq 3 as an operational spy satellite equipped with El-Op 2m high-resolution remote-sensing cameras, to monitor activities -

particularly in Iraq and Iran.

The Shavit, equipped with a liquid upper stage and stretched first, second and third stages, and renamed the Next, is being marketed by Israel Aircraft Industries (IAI) for commercial launches of 400kg payloads to low-Earth orbit. It could also form the basis of Israel's next-generation Jericho 3 missile.

IAI has also entered an agreement with Coleman Industries of Orlando, Florida, to market the Shavit jointly. □

Early Bird remote sensor is lost four days after launch

US COMPANY EarthWatch has conceded that its first commercial remote-sensing satellite, the *Early Bird*, has been lost.

The spacecraft, built by CTA, now part of Orbital Sciences, was launched into a 470km polar orbit by a Start 1 booster from the

Svobodny Cosmodrome in far-east Russia on 24 December. Four days later, it suffered an "anomalous under-voltage condition".

EarthWatch had hoped that the satellite would provide 3m-resolution panchromatic and 15m colour images as the first of a series of

planned commercial satellites returning spy-satellite-class images for the civilian market. The loss could affect investment in the company - which has suffered lay-offs - and its plans for a follow-on spacecraft. Space Imaging EUSAT plans a similar launch in March. □

American chooses GEC HUD

IAN SHEPPARD/LONDON

AERICAN AIRLINES has selected GEC-Marconi Avionics to supply its HUD 2022 head-up-display (HUDs) system for 75 new Boeing 737-800s the carrier has on order.

The contract secures the UK company's place as a leading supplier of civil HUD systems for the Next Generation 737 family alongside Flight Dynamics, which had threatened to dominate the market with its head-up guidance system following major orders from Delta Air Lines and SAS.

At one stage it looked as though Flight Dynamics had secured the deal. American's concerns over GEC's ability to certificate its HUD on the 737-800 before the airline receives its first aircraft in January 1999 were finally overcome, however, by last-minute changes to the UK company's proposals (*Flight International*, 14-20 January). Several hundred more systems are expected to be ordered by American.

GEC principal systems engineer

Paul Wisely believes that its new HUD design is less bulky, easier to install and more "future-proof" than those of its rivals, as it is the first to use all-digital electronics and a novel "synthetic" hologram. He claims that, although existing HUD systems enable aircraft to land in Category IIIa conditions at Cat I-equipped airfields, the 2022 will also be ready to "plug in" to automatic-landing systems under development, creating a "hybrid Cat IIIb" capability.

Current systems use analogue electronics driving holographic technology, which relies on a combiner glass with a bandwidth which GEC considered too narrow for civil use. The synthetic hologram, or "rugate", uses a curved meniscus reflector allowing the image to be viewed from a greater range of angles, and to fade away at oblique angles rather than simply disappearing - "...the refractive index varies sinusoidally with depth".

At only 0.227kg, this combiner is also relatively light. "It does not need a heavy lump of glass in front of the pilot's eyes," says Wisely.

Instead the material is a metal oxide dielectric, "harder than glass" and better seals the reflective layer, which is prone to decay in moisture.

The overhead projector is also "slimline" because of its Gulfstream V heritage and the fact that, being fully digitally driven, the circuitry is all built into the combiner unit. "The advantage of the new Boeings is that they have a duplex EFIS [electronic flight-instrument system] computer which can directly drive the symbol generator in the overhead unit - the HUD picks the mode straight off the EFIS," says Wisely, who adds that the user "...can overlay any type of imagery" on the new display, "including future perspectives [eg, three-dimensional]".

Another advantage of the all-digital design is the "far lighter wiring looms", allowing Honeywell's display-guidance computer to "be fitted anywhere", allowing for simpler retrofits.

Although GEC expects retrofit sales, the goal had always been certification on new-build aircraft, particularly the new 737 variants. □

AVIC will make Boeing composite parts in China

BOEING IS TO team with aerospace-materials specialist Hexcel and Aviation Industries of China (AVIC) to establish a joint-venture composite-parts factory in the city of Tianjin, 120km (75 miles) south-east of Beijing.

The three companies are reported to have spent the past two years considering the move, which will create BHA Aero Composite

Parts, to supply components to Hexcel for integration into sub-assemblies for Boeing's commercial-aircraft range. Equity, risk and profits will be shared equally, according to Chinese sources.

The first parts are expected to be delivered in July 2000, while Boeing is believed to have committed to support the products of the venture until 2018.

Boeing has been exploring other joint ventures in China, as part of efforts to maintain its dominant share of the nation's airliner orders.

It negotiated continued contracts at AVIC for production of doors for Boeing models and empennages for the 737, and has been keen to produce parts locally for Next Generation 737s, the 767-400ER and the 777-200X/300X. □

Radiant de-icing system launched

PRIOR AVIATION Services has installed the first Infratek de-icing system at Buffalo Niagara Airport, New York. Its developer Radiant Energy says that de-icing a Learjet 35A costs only \$139 and it uses "clean" natural gas fuel. The infra-red radiation melts ice while not harming the aircraft.



NEWS IN BRIEF

■ GERMAN UNISON

Unison's SlickStart magneto start-booster has received a German supplementary type-certificate. The Jacksonville, Florida-based company claims that SlickStart boosts spark energy by 340%, reducing electrical-system load and increasing life. It also allows partially fouled plugs to fire and to ignite less-than-optimum fuel mixtures and eases hot- and cold-starting considerably. SlickStart takes 1h to install and can be used with 12V or 24V electrical systems.

■ AEI TO SUPPLY ACCESS

Aerosystems International has won a £20 million (\$32 million) contract to develop the Aircraft Computerised Equipment Support System (ACCESS) for the British Army's planned Boeing WAH-64 Apache attack helicopter fleet. Development is due to be completed by December 1999.

■ SIKORSKY SIGNS

Sikorsky has signed memoranda of co-operation with three Taiwanese manufacturers, as part of an offset agreement for S-70 helicopters. Chengfeng Machinery, Ta-Yih and Topkey will each be contracted to supply structural, landing-gear and lighting components.

■ XYVISION CONDUCTOR

Xyvision of Slough, UK, is to supply Swissair's SR Technics maintenance division with its SGML Conductor document-management system. SR uses Conductor for service bulletins, and is adding aircraft-maintenance and engine manuals and illustrated parts catalogues.

■ NEARER INFRA-RED

Sensors Unlimited of the USA has launched the SU320 infra-red camera, which it claims is the first to be based on a 320 x 340-element indium gallium-arsenide array.

Regional brinkmanship

Brazil and Canada have agreed to last-ditch talks in a bid to resolve amicably a 'difference of opinion' over government subsidiaries for regional jets

GRAHAM WARWICK/WASHINGTON DC

BRAZIL AND CANADA have been brought to the brink of a trade war by a dispute between Bombardier and Embraer over alleged Government subsidies for regional-jet development and sales. Now, representatives of the two countries have until the end of February to resolve the dispute, which threatens a wider trade agreement between Canada and the Mercosur economic bloc, which includes Argentina and Brazil.

The dispute concerns allegations by Bombardier that state-backed export financing provided to Embraer constitutes an illegal subsidy. The Canadian company is pressing its Government to file a complaint with the World Trade Organisation (WTO). Embraer, meanwhile, has protested about Canadian funding for regional-aircraft development at Bombardier.

At the heart of the dispute is the PROEX programme, established by the Brazilian Congress in 1991 and operated by state-owned Banco do Brasil. According to Embraer, PROEX is an interest-rate equalisation system set up to help Brazilian manufacturers arrange competitive financing for exports. According to Bombardier, PROEX is an illegal subsidy.

Embraer vice-president Fred Curado says that PROEX was set up to counteract the higher interest rates charged by banks when financing exports by developing countries such as Brazil. Interest rates are higher, he says, because banks perceive the risk of financing Brazilian exports to be greater than that of financing exports by a developed country, such as Canada.

PROEX provides buyers with an interest-rate rebate. The rebate, Curado says, offsets the difference between the LIBOR international rate and the interest rate charged to buyers of Brazilian exports. Bombardier argues that the rebate,



Large sales of ERJ-145s have been made to US regionals

"Bombardier argues that the rebate, which is paid direct to the buyer, constitutes a Government subsidy which reduces the cost of Embraer's aircraft."

which is paid direct to the buyer, is a Government subsidy which reduces the cost of Embraer's aircraft.

Bombardier says that PROEX provides an interest-rate rebate of up to 3.8% over 15 years, on 85% of the purchase price. This reduces the cost of the Embraer RJ-145 by \$2.5-3 million, the company calculates, based on a "typical" price of \$13-15 million.

The equivalent typical price of the Canadair Regional Jet (CRJ) is \$17-19 million, says Bombardier, which says that it can "...live with a \$4 million difference, but no more".

The firm believes that PROEX becomes more of an issue with Embraer's new ERJ-135 in competition with other 30-seat regional jets and turboprops "for \$10 million versus a real \$12 million".

Embraer refutes allegations that PROEX is an illegal subsidy. "It does not make Brazilian exports cheaper in the market or allow them to be sold below the price of goods produced elsewhere," the company says. Curado says that,

despite the CRJ's higher price, Bombardier can offer lease rates "about the same" as those available on the ERJ-145. "Otherwise we would have 100% of the market," he says. "We each have about 50% market share and almost the same backlog. We can live with that."

Bombardier has been pressing the Canadian Government to file a

WTO complaint "...as quickly as possible, before Embraer sells any more aircraft". Bilateral discussions have taken place between the two countries,

but were "inconclusive", says Canada's Department of Foreign Affairs and International Trade, which "...believes PROEX violates WTO rules and provides an unfair advantage to Embraer".

Matters came to a head during the January visit of a Canadian trade delegation to Brazil. Events leading up to this included large sales of ERJ-145s to American Eagle and Continental Express, and Bombardier's decision to drop Embraer from its NATO Flying Training in

Canada (NFTC) programme. With a framework agreement to streamline trade between Canada and the Mercosur nations at risk, Canadian prime minister Jean Chretien and Brazilian president Fernando Henrique Cardoso consented to last-ditch negotiations.

Each agreed to nominate a trade representative, expected to have been appointed by the end of January, to look into the dispute and report back in 30 days. They will examine Canadian claims about PROEX and Embraer's concerns about the cancelled NFTC contract and Technology Partnerships Canada (TPC) programme, which provides Government support for the development of regional aircraft.

Bombardier acknowledges that the TPC programme is providing 25% of the development funding for the stretched CRJ-700, in the form of a loan repayable with royalties, but says that this is within the internationally agreed limit of 30% on Government support for civil-aircraft development.

The Canadian firm also says that its decision to switch from the Embraer EMB-314 turboprop trainer to the Raytheon T-6 for the 24-aircraft NFTC contract was unrelated to its dispute with Embraer, but was made because of concerns about Embraer's ability to meet the timescale for delivery of aircraft to the Bombardier-run NFTC programme.

Curado describes the NFTC decision as "unjustifiable retaliation by Bombardier" after it lost the American Eagle 50-seat regional-jet order to Embraer.

Bombardier believes that Canada will pursue a WTO complaint if this latest round of negotiations fails, although the Government declines to confirm this. Curado says that Embraer has no plans to take its concerns to the WTO. "This is not a country issue, it is a company issue," he argues. □



Norway's masterpiece

Norway is to open the last new European international airport this millennium

IAN SHEPPARD/OSLO

WITH ENVIRONMENTAL issues more pertinent than ever, it will not be a moment too soon for Oslo's population when its Fornebu Airport closes on 8 October. Operations will be switched overnight to Gardermoen, Norway's new Nkr21 billion (\$2.8 billion) flagship airport, 47km (29 miles) north of the capital. Gardermoen proudly boasts that it is "...the last new international airport to open in Europe this millennium".

Fornebu has reached capacity, says Knut Staebak, manager of traffic development for airport manager Oslo Lufthavn (OSL). "It is very packed and cramped," he says - it has exceeded its 9.5 million capacity, with well over 10 million passengers in 1997. In addition, the largest aircraft which can be used at Fornebu is the Boeing 767, whereas Gardermoen has periodically seen

Northwest Airlines Boeing 747s, and Copenhagen-based charter operator Premiair uses its McDonnell Douglas DC-10s there.

Gardermoen, development of which started in 1993, will keep its incumbent Norwegian air force presence in the shape of a new base to the



Fornebu is limited by out-dated infrastructure, environmental restrictions and capacity

north of the 13km² (5 miles²) site for its squadron of five Lockheed Martin C-130 Hercules, which do "mainly United Nations work".

The old runway was closed for resurfacing on 1 January, and is being extended to 3,500m (11,500ft), with existing operators using the new 2,950m parallel runway 2,100m to the east. This separation will allow simultaneous operation 24h a day from 1 July, when the first aircraft will use the resurfaced runway, says Staebak. Fornebu has one long runway and is limited to 07:00-23:00 opening. Total runway capacity will be "more than 80 movements an hour", although a peak of 50 an hour is expected at first.

The new terminal, situated between the two runways, is based on the "Atlanta model" (the airport at Atlanta, Georgia, was the first to use parallel piers) and has a capacity of 18 million passengers a year, a figure not expected to be reached until 2015. Staebak says that "...12-13 million are expected in 1999". Pier A is complete, while Pier B is likely to be added in around 2002 for "non-Schengen" traffic - Norway is considering becoming a signatory to the Schengen agreement, joining the subset of ►

European Union countries which allows unrestricted movement within its borders. The original plan had been to add Pier B in around 2005 but, as growth outstripped expectations at Fornebu, the plans had to be revised, but did not incur an addition cost. It will "probably" have only eight gates at first, says Staebak, whereas Pier A has 34 stands, expandable to 52.

An express-rail link between the airport and Oslo's central station will take only 19min, although Staebak says that the airport expects to attract far more international traffic which will fly on to other destinations in Europe. Flooding in an ambitious 14km-long tunnelling project at the Oslo end of the link is still causing problems, but OSL remains confident that the date of the opening will not slip.

Braathens SAFE will move its base to the new airport, although its technical centre will remain in Stavanger, on the south coast, while SAS has already constructed significant new 20,000m² (215,300ft²) premises at the site. Anders Fougli, Braathens director of planning, says of the airport's effect on the airline: "It is more a question of our role in the KLM-Northwest feeder network...on the other hand, it does give us more opportunities." For example, he says, services to Amsterdam Schiphol are likely to increase in frequency from four to "six or seven" a day.

Fougli believes that Gardermoen will be the main airport serving western Sweden, effectively a "new market" for Braathens, while the rail catchment area serves a population of 2 million. Fougli is concerned, however, that a new Norwegian environmental tax on seats operated, intended to force operators to use smaller aircraft, is "a really big headache". Braathens is likely to be hardest hit when the tax becomes law in April. At Fornebu, which handled 53% of domestic traffic in 1997, Braathens accounts for 51% and SAS for 31% of the passengers, although Staebak says that this is fast approaching 50:50, with "a surprisingly high proportion of business travellers". This is what prompted Ryanair to start operating to Norway, to Törp Airport, outside Oslo, as it saw unfulfilled demand from "leisure travellers".

SAS Commuter and Widerøe, in which SAS acquired a controlling stake in November 1997 – foiling Braathens' ambitions – will have their own areas at the airport. SAS had plenty of time to plan its involvement, says Staebak, as the idea

for an international airport at Gardermoen was first mooted in 1968. The Scandinavian airline has been involved with much of the construction and will occupy some of its buildings on 20-year leases. It was not until 8 October, 1992, that the Norwegian Government finally signalled the go-ahead, however, and the target was set to open the airport six years later to the day.

Although the Norwegian civil-aviation authority owns Gardermoen, through OSL, it is "effectively a private venture", says Staebak, and could be floated. Loans and share capital for the project are to be paid back over the next 30 years through the "generation of new capital".

The old airport terminal is being developed for "business and VIP traffic", but the general-aviation (GA) element is being forced out. "The 50,000 annual touch-and-gos have to go," says Staebak, who adds that the CAA has had "no success yet" in finding an alternative GA field.

Floatplanes, which frequent the waters next to Fornebu, will also have to leave, although most are "...amphibians which could be accommodated in the harbour", says Staebak.

Gardermoen is likely to give Norway significant bargaining power in attracting traffic which would otherwise use Scandinavia's main hub at Stockholm's Arlanda Airport, although Arlanda has other worries, including absorbing 20% passenger growth in the Baltic Sea region.

SWEDISH DECISIONS

Sweden is due to make "political decisions" affecting the airport in April, having been warned by the Ingemar Skogö, director-general of Arlanda's operator, LFV, that it will be in deep financial trouble without Government support measures. Skogö cites the end of tax-free sales in Europe by 1999, Sweden's becoming a Schengen signatory and the cost of adding the proposed third runway, which, if approved would become operational by 2002.

LFV disputes any threat from Gardermoen, which it believes will have a "marginal effect on traffic development" at Arlanda. The authority cites Delta Air Lines' decision to move its regional office to Stockholm from Copenhagen as evidence of its growing status as the region's international hub, and says: "We are even seeing increased demand from the Far East and Asia." Fougli, however, believes that, with the possibility of Northwest operating from Minneapolis to Gardermoen, the airport is in with a chance of "rivaling Stockholm".

To feed Gardermoen, Braathens is co-operating with smaller carriers such as British Aerospace Jetstream 31 operator Coast Air, says Fougli. Meanwhile, the carrier is expecting to take delivery of the first of six Boeing 737-700s from International Lease Finance in March, and will receive others later this year. Braathens will progressively replace the leased -700s with aircraft ordered from Boeing.

Staebak says that Gardermoen will target mainly charter traffic, although he admits that the growing KLM-Northwest connection is good news for the airport. With the Star Alliance now having a presence in the region through SAS, British Airways' recent tie-up with Finnair and, finally, Delta, Staebak is confident, saying: "There is more competition for SAS now." □



Pier A is complete while the old airport terminal (background) will be for business and VIP traffic



Raytheon's control tower systems use two ground radar "golfballs" and a terminal area radar



The world's largest laminated wooden beams give Gardermoen's new terminal a Norwegian look

The impossible target

Europe's new flightcrew licensing standards will be more challenging

DAVID LEARMOUNT/LONDON

TRAINING TO BE a commercial pilot under the new joint European rules is going to be harder, the training industry warns. With the first of the new courses about to start, this is not exactly what aspiring fliers were hoping, or even expecting, to hear.

Under the new European rules, however, obtaining a commercial pilot's licence requires only 155 flying hours instead of 200, and is accordingly cheaper, on the face of it, by about £3,000 (\$5,000). The training industry, however, unanimously accepts that the "human product" of the redesigned course is an unknown quantity. Some are sceptical about the ability of the average student to achieve the piloting skills demanded under the new Joint Aviation Requirements - Flight Crew Licensing (JAR FCL) in the 155h minimum time. The hours may have been cut, the schools emphasise, but the skills required have not been.

Not only that, but those for whom costs are the most critical (students who are receiving no sponsorship and therefore have not been filtered by selection boards and aptitude tests) are the ones most likely to need extra hours.

The JAR FCL criteria, however, have been adopted, even though final implementation does not come until 1999. According to the training industry, JAR FCL flying standards are at least as high as the licensing requirements which they replace, so achieving them in less time is a greater challenge.

JAR FCL implementation in practice is difficult because, although all the JAR FCL flying-training test standards, knowledge requirements and licence privileges have been defined, the written-examination "question-bank" is still being compiled. In some respects the question-bank poses the greatest problems. Not only do the multi-national regulators have to reach consensus on the questions, they have to be made available to any student in any JAR country either in English or in the language of the nation where the examination takes place.

Some approved flying-training schools, however, are designing "hybrid" JAR FCL courses to be approved by their national aviation authority



Winning a licence is not enough. Multi-crew co-operation skills are a JAR FCL requirement

so that they can offer training immediately, which was the original intention of the European Joint Aviation Authorities (JAA). In the UK, all approved colleges are working on hybrid courses. In mainland Europe it seems to be harder for schools to persuade their respective national authorities to approve the concept of hybrids. Lufthansa Flight Training, however, plans this year to start its first courses leading to the award of the European licence. By then, the school hopes, the question-bank will be completed. Meanwhile, Lufthansa is training students to the JAR FCL syllabus, both flying and academic, but graduates have German licences.

Among UK schools, the Bournemouth-based European College of Aviation (ECA) is in the process of having its hybrid course approved by the UK Civil Aviation Authority, and the Oxford Air Training School (OATS) has approval to start its first JAR FCL course on 17 May, when British Airways cadets start the long haul to an air-transport pilot's licence (ATPL).

THE SAVING MOTIVE

British Aerospace Flight Training (BAeFT) marketing director Capt Chris Long says that it is the airlines which are pushing for the earliest possible conversion to the new syllabus, partly because they can see potential savings in it. Many airlines are sponsoring, or part-sponsoring, *ab initio* pilots, he points out.

BAeFT wants to offer its first hybrid course from April, he says, adding that no-one is quite

sure how the quality of the "product" is going to compare with traditionally trained pilots. Even the CAA, which ultimately has to approve the schools' proposals for implementing a hybrid JAR FCL syllabus, is showing "a degree of uncertainty" in its deliberations, says Long.

OATS' vice-president Peter Moxham says that BA's motives for choosing the JAR FCL option were not so simplistic. It would give BA, which does not specify UK nationality in its recruitment advertising, ultra-flexible pilots who could work for any of the airlines in its European group. A BA pilot with the licence flexibility and skills could fly for the main airline, German-based Deutsche BA and French subsidiary TAT, perhaps in one duty period. Whether that would make practical rostering, industrial or cultural sense is another matter.

Meanwhile OATS, during its study of the feasibility of creating a hybrid course, has analysed the JAR FCL requirements, according to Moxham. He says that, when the "sum of the parts [for achieving the flying syllabus]" is analysed, especially with the full instrument rating (IR), the total flying time comes to more than 155h. It is, he says, closer to 170h. There is some slack, he admits, in the amount of "solo consolidation" required under the old syllabus, but the implication is that there is not enough slack.

David Hoy of Cranfield, UK-based Cabair College of Air Training, which is to start its first hybrid course in July, admits that the 155h target is a challenge, but says: "I think that soon ►



The airlines argue for abandoning the single-pilot nature of the JAR FCL general flying test

we will be able to produce pilots to standard within 155h." Most of Cabair's students now complete the syllabus with 181h flying, and some need less time, he says. OATS' Moxham, more sceptical, says: "Do you want a machine to fly a machine, or a human being who is capable of responding to situations?"

The airlines, however, seem to have adopted "...a tacit recognition that the task of the training school is to get the student a licence", says BAeFT's Long. That truism is intended to emphasise his contention that it is after the pilot graduates with a commercial pilot's licence (CPL) and a "frozen ATPL" (all the qualifications for the ATPL, but not enough flying hours) that the airlines diverge most clearly in their training policies.

BRIDGE TRAINING

The divergence is over what "bridge training" graduate students need to turn them from licence-holders into airline pilots capable of acting as full crew-members on a jet-aircraft flight-deck. The most assiduous customers, Long says, demand about 60h of jet-simulator line-oriented flight training (LOFT) before pilots are allowed to join the airline to start type-rating courses. Most demand far less.

The JAR FCL's general flying test (GFT), the ultimate hurdle in the CPL/IR course, is still not a crew-oriented test. It requires the exami-

nee, without assistance, to handle the aircraft and its systems, the radio-telephony and the navigation, under instrument flight rules, including some real or simulated instrument meteorological conditions. Despite the fact that airlines protest that this "one-armed paper-hanger" test is inappropriate for the airlines' crew-orientated requirements, the JAA argues that the licence privileges allow the pilot to command, under certain circumstances, public-transport aircraft with a flightcrew of one, so the GFT has to be able to confirm the pilot's capacity to do it all without help.

The JAR FCL, however, specifies that pilots must receive multi-crew co-operation training after the GFT, but before working as part of an airline crew. The main components of bridge training are cockpit resource-management training, LOFT and "jet-familiarisation". The latter is an important component even for those bound for turboprop operators, and can be undertaken in any type of multi-crew jet-aircraft flightdeck. The primary aim is to speed up a pilot's thinking and acting rate from the 160kt (300km/h) of twin-piston-engined aircraft to the 250kt-plus of jets and turboprops.

Bridge training has been highlighted for reasons other than those of FCL requirements. There seems to be a general airline acceptance that employing a just-graduated pilot with a "frozen ATPL", and hoping that a type-rating

course will accomplish all the LOFT and jet familiarisation that he or she needs does not work. Extending a type-rating course is an expensive undertaking.

Moxham confirms this airline policy, explaining: "Today, the CPL/IR is a glorified private pilot's licence with qualifications. It is the bridge training which turns [the student] into an airline pilot." The ECA's marketing chief Colin Green confirms what the airlines want: "They like first-time GFT/IR passes, plus LOFT and jet familiarisation," he says.

Southampton, UK-based ATP Academy (ATPA) specialises in tailored bridging courses which can include type rating if the customer wants it. If the customer is an airline, the course can include company-standard operating procedures. ATPA chairman Capt Chris Clarke admits that a combination of JAR FCL requirements in the "multi-crew co-operation" training sector and airline realisation of its value has brought good business.

INTERNATIONAL COMPETITION

Meanwhile, since Europe has adopted the JAR FCL, its newly unified training market is much more attractive to US flying schools. OATS believes that, in due course, the USA, with its lower costs, will find irresistible ways of entering the European marketplace in a big way.

Chief instructor and head of OATS, Bruce Latton, says: "We intend to win on quality, but not on that alone. We have to be competitive. We may have to slaughter a lot of sacred cows." All OATS' flying is in the UK, but it is considering basing about half of its single-engined flying-training in the USA, Latton says.

Mike Daws, the new head of OATS' parent company, CSE Holdings, says: "We're running a business which happens to be a flying school...I see JARs as a tremendous opportunity. Oxford is well-placed to be the primary air-training school in Europe."

If Daws is right about increased competition within and beyond Europe, pilots looking to qualify under JAR FCL appear set to be able to choose good value. □

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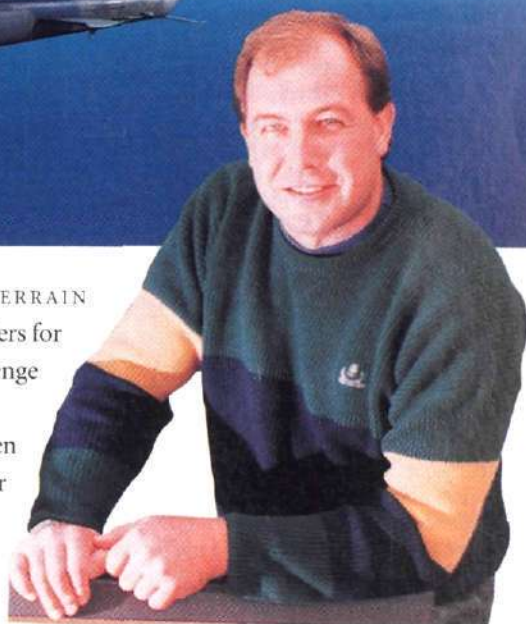


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Cockpit inadequacies

Cockpit resource management might displace vital skills

DAVID LEARMOUNT/LONDON

THOSE WHO ARGUE that there is a degradation of basic flying skills in line pilots ascribe it to many things, the favourite being flightdeck automation. Parc Aviation consultant Capt Russell Kane, a former Aer Lingus captain, says that there is evidence that giving undue importance to cockpit resource management (CRM) as a part of line-pilot training can result in a shift of emphasis away from skill and knowledge training.

This conclusion resulted partly from studies after Parc, which provides a training and a crew-assessment service for airlines all over the world, found a consensus of opinion among its staff that many of the pilots assessed showed "a disturbingly low level of knowledge and skills".

In a subsequent study aimed at identifying the level of pilot skills, three skill-categories were marked: simulator-tested flying skills, technical knowledge, and CRM. Parc found that the best-developed skill in most of the pilots was CRM. It was also the skill at which fewest pilots were rated "poor". This analysis involved a batch of 72 pilots who were selected "on the basis of their experience and qualifications", from 1,110 who applied for posts "...considered highly desirable in the pilot community". In the lowest-skills category, 42% of the pilots were "poor" at flying, 35% poor at technical knowledge and 25% below standard at CRM. "Average" gradings was assigned to 33% of the pilots for flying



CRM is useless without basic flying skills

skills, to 47% of them for technical, and 49% for CRM. The small numbers listed in the above-average grade and in the "A-minus" level between average and poor were relatively insignificant. Even among the above-average pilots, however, CRM was the subject at which the largest number excelled, and there were only three pilots who achieved above-average marks in all three categories, Parc reveals.

FLYING SKILLS EMPHASIS

The simple implication of this limited study is that CRM needs less attention than the other skills, so if any redistribution of training time or emphasis were to be allocated, flying and technical skills should be the beneficiaries.

Kane maintains that there are other insidious influences which, while they look good in their

own right, can produce unintended side-effects. The US advanced qualification programme (AQP) is a case in point, he says. Although intended to target training to those who most need it, and to areas where it is most needed, Kane fears that this will not be the AQP's only effect. He quotes the US Federal Aviation Administration Human Factors (HF) Team 1996 report *The interfaces between flightdecks and modern flightdeck systems*, which says: "The HF Team is concerned that the economic benefits of AQP may be receiving emphasis over the need for enhancing safety." That is, instead of just targeting those who definitely need corrective training, those who apparently do not need it are having their training reduced.

The HF team also observes: "As training footprints shrink, or as more knowledge or skill items must be addressed, it becomes increasingly important that critical knowledge and skills are mastered...trying to squeeze more from a shrinking investment in human expertise will not help prevent the kinds of incidents and accidents that are being labelled as human error."

About the Parc study, Kane comments: "While the limitations of the summary of results are readily acknowledged, reading the reports themselves is a troubling experience...Pilots apply incorrect or no rudder input on engine failure, over-use the rudder, or even use it to make course corrections. Others fly with both feet on the floor rather than on the rudder pedals, and use of the stabiliser-trim to make pitch-changes is frequent. Far too many pilots have problems with their scan."

It is relevant that all the sloppy practices observed by Parc were used by pilots who were aware that they were being assessed. Airlines might well wonder what the same pilots would have been like on unsupervised line flying. □

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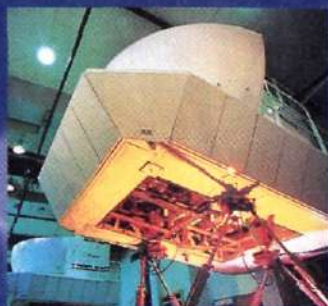


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Marking territory

The Australian-based pilot-training industry is defining its marketplace

PAUL PHELAN/CAIRNS

IT WAS CLEARLY strategic planning and global thinking, rather than short-term opportunism in the volatile pilot-training market, which recently impelled British Aerospace to boost its investment in Australian-based pilot-training schools. The training needs of the Asia-Pacific region, despite the recent economic downturn, are considerable, and Australian schools are well placed to compete in the marketplace there.

A measure of BAe's long-term commitment to the region is that, although its accounts for the last financial year showed that it had written off a \$28 million loan to provide the Australian Air Academy (AAA) at Tamworth with a fresh start on a viable footing, the company has since reinforced its Australian involvement with the acquisition of the Adelaide-based Australian Aviation College (AAC) (*Flight International*, 12-18 June, 1996). That move has now given British Aerospace Flight Training Australia (BAFTA) a formidable presence in an assured regional market.

This is despite British Airways' recent decision not to renew its contract with the Adelaide college for some of its *ab initio* pilot training. The airline says that this is because the huge

geographical separation of BA's UK base from its students makes it difficult to monitor individual progress. The decision tends to confirm the Australian schools' natural marketplace as Australasia and the Asia-Pacific region.

Brian Parsons, director of the Tamworth school, says: "We now have a strategy. First, we want to build long-term relationships with airlines. Second, we're looking closely at the military training sector and, third, there is considerable business in university and self-sponsored students." He adds that BAe is prepared to undertake "...whatever financial restructuring is necessary" to make the business viable, but in turn it must show that it can capture the business. "We're moving quickly towards that, with current orders covering 80% of the coming year's business, and we expect the college soon to be running close to maximum capacity. More than 75% of our training is now repeat business, and over 60% of our airline customers have been doing business with us for three years or more," he says.

ANSETT PARTNERSHIP

Originally established in partnership between Ansett Australia (when Sir Peter Abeles was its chief executive) and BAe, the Tamworth, New South Wales, school was founded on criteria

unlikely to be reproduced in today's competitive market and with its associated cost restraints. Although Abeles chose the Tamworth location in part as a political manoeuvre, the choice has since proved sound, having enabled the school to be designed as a complete, integrated university-style unit on relatively cheap unoccupied airport and adjacent land. It takes advantage of the inland region's good average climate, a controlled airport with all radio-navigation aids and a low air-traffic volume which minimises disruption to training.

Abeles' plan was to establish self-sponsored cadet pilot training for the Ansett group, to sell individually funded and airline-sponsored training to other users and to seek military training contracts. The college was to be Ansett's preferred source of cadet pilots, and revenue from cadets was expected to make the plan self-funding. With a Level C Boeing 737 simulator for jet familiarisation, cadets could graduate with a jet type-rating after completing training at Ansett's simulator centre.

Almost from the beginning, however, variance between the goals and strategies of Ansett and BAe made life increasingly difficult for the management at planning and operational level. Growth was slow, with the academy showing large losses on Ansett's accounts.

Nevertheless, the academy has steadily increased its business volume and market share since BAFTA appointed Parsons, and has further consolidated since Harry Bradford, the former chief executive of AAC (then owned by

BTR), switched to BAe to head its Warton, UK-based British Aerospace Training Services division, the global training organisation which is now the parent company of both colleges. By the time BAe made the take-over decision, AAC estimated its forward orders for training at two to 2.5 times those held by the Adelaide college at that time. The group will now rename its total Australian organisation BAFTA, and the AAA and AAC acronyms will be replaced by Tamworth and Adelaide identifiers.

BAe's decision to take an initial 50% stake in the business was, in retrospect, probably also a long-term strategic one, since most industry observers predicted even then that Ansett would be compelled by the fall-out from some of Abeles' other business decisions to shrink its non-core activities.

In late 1991, the newly completed college began accepting "preferred" Ansett cadets, who (although self-funded) underwent the Ansett selection process before acceptance, and were guaranteed a subsequent flying job with Ansett or one of its regional-airline subsidiaries, subject to graduation. At the same time, the college marketed itself extensively to airlines in the region, and to the military. Japan Airlines-owned domestic carrier ANK was the academy's launch customer and, almost from inception, Tamworth has held a contract for Royal Australian Air Force (RAAF) flight screening.

DEFENCE CONTRACT

Before BAFTA's acquisition of AAC, the Tamworth and Adelaide colleges had been shortlisted, along with Bombardier Defence Services Australia and Australian defence-support contractor Airfreight, for a major new Australian Defence Force (ADF) pilot-training contract. The successful bidder, to be named in May, will conduct flight-screening of up to 220 candidates annually for all three services, and basic flying training for up to 160 recruits, in a contract which could provide more than 20,000h of aircraft utilisation annually. Parsons is confident that BAFTA is well positioned for what would be Australia's biggest-ever flight-training contract:

"Flight screening would involve 15h each for up to about 236 candidates for the three services," says Parsons. "For basic flight training, the numbers could be up to about 120 entrants per year. If all elements are taken up, the ten-year contract will be worth around AS\$100 million [\$65 million] at 1998 prices." An additional contract is also likely to be attached for training RAAF Central Flying School flight-instructor courses on the basic flight-training aircraft. BAFTA is also discussing flight screening and basic training contracts with possible Asian military customers, which are showing "medium to high" interest, Parsons adds. Tamworth, he says, provides a structured and disciplined environment, intended to harmonise with the needs of its military, as well as civil, customers.

BAFTA Tamworth is conducting basic flying



To complete future courses, students may leave Tamworth's sun and space for the UK's fickle climate

training for 24 Australian Army pilots (with another two on attachment from Malaysia) and Army flight screening. The college accommodates an ADF detachment to conduct its own checking, and ADF instructors who are suitably qualified work as seconded instructors within the college. "We don't get involved in failing ADF students; they do the testing. That would be a model for the contract, which would obviously be on a larger scale," says Parsons.

Present cadet courses include 16 students each for Malaysian Airlines and Vietnam Airlines, seven for Japanese domestic carrier ANK, 15 for Air China, 12 for National Taiwan University and 20 self-sponsored students in two courses. The last Ansett course ended recently, and the graduates are being taken on as second officers on the carrier's Boeing 747 and 767 fleet for long-haul augmented-crew operations. Having met that requirement from available graduates, Ansett, which has a slight current-pilot surplus, has no immediate plans to re-introduce cadet training.

A feature of BAe's strategy yet to be implemented is a combined course for airline cadets, in which the basic training phase would take advantage of Australia's benign climate and uncluttered air traffic, after which advanced trainees would be moved to Prestwick where training would be completed in a more complex air-traffic-control environment and in a fickle climate. That scheme has not yet been marketed and does not have a launch customer, but has attracted interest from places such as Hong

Kong, because graduates would have UK licences, says Parsons. "We are working very closely with the other flight-training organisations within BAe. We had a strategies session in October in UK for the first time, and we've been working with Prestwick in all areas," he adds.

AUSTRALIAN CULTURE

The college is residential, but, by arrangement with the Tamworth community, each overseas student is "adopted" by a local family, which helps them make local friends to overcome homesickness problems, experience Australian culture and improve their English.

"Course size is normally 12-16, which we and our client airlines think is a good teaching size," says Parsons. "Although we sometimes have groups of 24 or so trainees, the client airlines have accepted that this is too large a class size, so we split it to 12/12 or 12/14."

A computerised student-response system takes account of cultural and language sensitivities: an instructor poses a multi-choice question and each individual student keys in the answers on a private console, explains Parsons. "There's no loss of face. Using this system, only the student and the instructor are aware of any learning difficulties, and the student can receive feedback privately. The results are also linked to a database, so we can follow up deficiencies and track improvements."

The Asia-Pacific economic downturn may eventually have its affect, but Tamworth has not felt the draught yet.



Tamworth was set up when business styles were more generous. It lacks for nothing



With its strongest marketplace in Asia-Pacific, Tamworth provides for overseas students



Robin runs smoothly

Avions Robin, famous for its wooden aircraft, has expanded, transforming its product line-up in the process

JULIAN MOXON/DIJON

DRIVE OUT OF DIJON on the N71 and, after a few kilometres of winding road, you come to a place called Darois, where you may have to stop, or at least slow down, while an aeroplane is taxied across the road from where it was built to where it will fly.

If you are visiting Avions Robin, the second pleasure is more evocative – at least to one who spent hours of pre-teenage youth building model wooden aircraft. It is the smell of pine, mixed with glue. Oregon pine, to be precise, chosen for its specialist task by one of Robin's seasoned woodsmiths and used to build the only all-wooden touring aircraft in the world.

This year marks the 40th anniversary of Avions Robin, which, before it was taken over by Pierre Robin (now in retirement nearby), manufactured the Jodel, recognisable immediately by its distinctive dihedral wing profile.

Now, the 11-aircraft Robin range consists of metal and wooden aircraft, but it says something about the success of the original design (which has changed little since the Jodel) that 2,500 of the 3,500 aircraft manufactured since then have been wooden, with the share of 1998 production

expected to be even higher, at around three-quarters of the 60 or so aircraft which Robin expects to produce (against 54 in 1997). Most of these will be destined for French aero clubs, where the type has remained popular as an easy-to-fly trainer doing much the same job for first-time fliers as the Cessna 152 has done for thousands in the USA. The DR400 is also popular in Germany, and in the UK, where, in 1996/7, the first sales for many years were made.

WOODEN PROPERTIES

Why wood? Avions Robin president Jean-Paul Pellissier says: "Wood remains the best compromise between high performance and low cost. It is easy to maintain, and the aero clubs know how to repair it. Because it is lighter than metal, the aircraft performs better. It is also cheaper to manufacture than composite materials."

Pellissier admits that Robins do not thrive on being left outside to endure the elements. "They must be hangared – but what you get in return is the complete absence of corrosion, fatigue and mould. With the right care, a Robin can still be in excellent condition 25 years after it was built," he points out.

Unexpectedly, the 60-strong workforce at

Darois does not consist solely of ageing artisans, who, when gone, will take irreplaceable skills with them. A tour of the different workshops reveals that the average age of the incumbents is closer to 30. "We find the people we need without difficulty," says export manager Francois Billet. "Often, they come from a background in furniture repair and, after about six months training in the ways of aircraft wood construction, they're ready to build aircraft." They do so using the original jigs to lay up and clamp the wooden components, all of which are cut and shaped in-house. The final finishing is done manually, leaving aircraft which, outwardly, are identical, but which have their own characters inherent in the tiny differences between each.

The entire aircraft is glued together, modern synthetic glues providing the necessary flexibility to allow the slight movement of the airframe during its working life. Interlocking mortise-type joints would not only be more complicated and expensive to shape, but would also tend to work loose. The aircraft is then covered in Dacron (which has replaced the original doped linen), and finished to a high standard in the paint shops. It takes around three months to build an aircraft, and the average order-to-delivery delay is between two and three months.

In the past two years, Avions Robin, which will celebrate its 40th anniversary with a fly-in to its Darois airfield, has been through something of a revolution, both in management and organisation. The end result is that Dijon is now the headquarters of Aeronautique Services, a

Fr30 million (\$4.7 million) company which owns not only Robin, but aerobatic aircraft manufacturer Avions Mudry, Bul Ultralight and glider manufacturer SN Centrair. The latter companies are based, respectively, in Dijon and Le Blanc, near Chateauroux.

Mudry, famous for its Cap 10 and Cap 232, went bankrupt in 1997, giving the Pellissier brothers (Jean-Paul's brother, Guy, is president of Aeronautique Services) an unmissable chance. Pellissier had already decided to get into the business through a US company, Akrotech USA, designer of the all-carbonfibre composite G202 kitplane. Akrotech USA was looking for a partner to certificate the aircraft when Avions Mudry was going bankrupt. It became clear that the Mudry and Akrotech aircraft were complementary. Pellissier then took a risk. "We signed with Akrotech before the Mudry business had been settled, so there was a possibility we would have lost Mudry and actually been in competition with them," he says.

The deal meant that Aeronautique Services was able to bring a range of aerobatic aircraft under one roof – the all-wooden side-by-side seat Cap 10, the single-seat wood/metal Cap 232 and the tandem-seat G202, now available as a complete aircraft, using carbonfibre composite parts and renamed the Cap 222.

French certification of the Cap 222 is expected around mid-year, bringing to the market a machine which Pellissier says will offer a "completely new dimension" to aerobatic competitions. An indication of how seriously the aircraft is being taken is the recent engagement of 1995 world aerobatics champion Dominique Roland as president of the Akrotech division, to help develop and market the Cap 222. "With a roll rate of 500°/s, 180kt [330km/h] cruising speed and a 6h ferry endurance, we believe we have a winner," says Pellissier.

EARLY SALES

His predictions are backed up by the sale of seven aircraft before gaining European Joint Aviation Authorities certification, which is expected in March. The cost of the fully assembled aircraft will be \$170,000, while the original G202, sold as a fast-build kit and not including engine, propeller, avionics and engine instruments, sells at \$60,000. A further option is with the airframe built from the kit by Akrotech Europe, with new



The DR500 President, the luxury version of the DR400, has a wider, longer, cabin and better visibility

engine and propeller, but with painting and setting up left to the customer. This costs \$145,000.

Robin introduced its first all-metal aircraft in 1980, and the series today consists of the two-seat R200; its aerobatic derivative, the R2160; and the four-seat R3180. A version of the 2160, with an enlarged canopy, was proposed to the Royal Air Force for its Bulldog replacement requirement, and is now used for demonstrations. The R200, at Fr500,000, is described by Robin as "one of the lowest-cost trainers available in its class", while the T-tail R3180, which sells for Fr980,000, remains in production, with around 50 examples having been sold to date.

The four-seat wooden aircraft for which Robin is so well known are sold in several versions, beginning with the original 90kW (120hp) DR400 Dauphin, priced at Fr710,000, and extending up through the fuel-injected Dauphin, the 120kW Regent, 135kW Regent, the Remo 180R and 200R glider tugs and, at the top of the range, the DR500 Super Regent and its fuel-injected counterpart, the President. The latter two types introduced the first major change to the original design since its debut in 1958. This centres on a wider, longer, cockpit, with space for three passengers, and allows for further room on the instrument panel to accommodate a more-comprehensive avionics fit.

For the President, four examples of which have already been sold, much attention has been paid to passenger comfort, with extra noise suppression, improved ventilation and a luxury interior. Robin says that the aircraft "...cannot be beaten" for performance, because of the

lighter weight of the wooden design, claiming a 1,850km (1,000nm) range, flying at 260kt.

Robin is also working on a contract for French unmanned-air-vehicle specialist Sagem, in which it is responsible for designing and producing 35 delta-winged all-composite drones. The first two were metal, allowing the basic profile to be settled, with the remaining 33 on order being made from glassfibre composite.

NEW AIRCRAFT

Pellissier provides little indication about any new types. "We're working on improving our production methods, and we have a number of ideas that may lead to the development of new aircraft," is all he will say.

A re-organisation is under way at Dijon to better accommodate production of the Cap 222 and any new aircraft. A new static-test rig is under construction, initially to prove the airframe strength of the Cap 222, but capable also of testing aircraft "larger than the DR400", says Pellissier, a former design engineer at Dassault. In 1991 he joined Reims Aviation, leaving it in "good shape" after five years. If the activity since he joined Avions Robin is anything to go by, it will not be long before another new aircraft is taxied to Darois for its first flight. □



The new G-222 tandem-seat aerobatic aircraft will "set new standards", says Robin



All-wooden construction makes Robin's DR400 and DR500 unique in the touring market



Going with the flow

The first US payloads for the ISS are being processed at the Kennedy Space Center

TIM FURNISS/KENNEDY SPACE CENTER

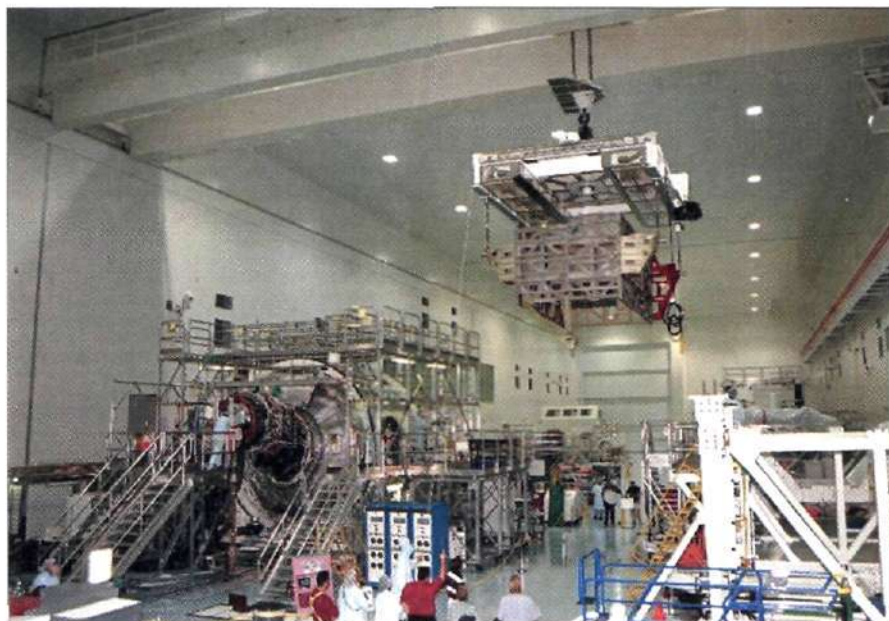
WITH SIX INTERNATIONAL Space Station (ISS) assembly missions scheduled for 1999, and 18 more due to take place between 2000 and 2002, NASA's Space Station Processing Facility (SSPF) at the Kennedy Space Center, Florida, is soon going to be a hive of activity.

The Photovoltaic Module P6 Integrated Equipment Assembly (IEA) for the ISS arrived in Florida on 12 January. The 4.8m-long, 7,640kg, IEA joins the Node 1 and Pressurised Mating Adaptors (PMAs) 1 and 2 at the SSPF. The Node 1 and the PMAs are scheduled to be launched on the first US assembly mission for the ISS, the STS88/*Endeavour* in July, while the IEA is due to be launched in April 1999.

The Node will provide access to other ISS elements which will be connected eventually to six PMAs. The PMA 1 will be the docking port for the Russian Control Module, to be launched on the first ISS mission aboard a Russian Proton booster in June (*Flight International*, 28 January-3 February). The Shuttle's remote-manipulator-system robot arm will grapple the Control Module and draw it into the PMA 1's port.

The PMA 2 will provide future Shuttles with a docking port. Later PMAs will support the attachment of an airlock, cupola, mini-pressurised logistics modules and the US laboratory and habitation modules.

The IEA, which will accommodate one of several planned sets of solar arrays, power-storage batteries, power-control units and a thermal-control system, will be launched on the fourth NASA assembly mission, the STS97/*Discovery* in April 1999 (*Flight International*, 11-17 June, 1997). Preparations for the intervening ISS missions are also being made in the SSPF. The STS96/*Endeavour* mission, due for launch in December, will be a logistics flight using a Spacehab Double Module which will not arrive at the SSPF until October after a non-ISS mission payloads, including the Z1 truss, to be launched in January 1999, will begin this month.



The US Node 1 (left) and Photovoltaic Module P6 Integrated Equipment Assembly (suspended by a crane) in the Space Station Processing Facility

"Our job basically is to make sure everything fits," says Mary Poulin, NASA customer-support manager for the SSPF. Poulin works with payload contractors, as well as ISS prime contractor Boeing. The SSPF was designed for the ultimate user by the former McDonnell Douglas Space Systems (now part of Boeing).

Poulin says that the SSPF will also support payloads for some of the other non-ISS Shuttle missions scheduled in this period. "The first payload processed in the SSPF when it was opened in 1994 was the Docking Module," she adds. This was linked to the *Mir* space station in 1995, to support further Space Shuttle *Mir* missions. Other processed payloads include pallet-mounted payloads for Shuttle missions.

FLOW SCHEDULES

Processing flow schedules have already been produced for the SSPF, allocating each mission's payload one of the eight "cells" or "footprints" in the high bay at Kennedy. An SSPF team has produced a 1998 "time-slice" programme, which consists of a two-dimensional computer-generated plan and isometric layouts of how the SSPF will be laid out each month, showing the location of every piece of equipment during the year's ISS payload processing programme.

Each of the eight footprints' Launch Package Integration Stands can be moved on air-bearing supports on the floor. Each footprint is equipped with services such as electricity and air

conditioning through stub-ups on the floor.

An intermediate bay will be used to process payloads for utilisation missions, such as payload racks to be fitted into the Italian Mini-Pressurised Logistics Module, due for a 1999 launch.

The processing team in the SSPF consists of NASA and Boeing payload managers. The former McDonnell Douglas was contractor for the Payload Ground Operations work, with Boeing as the Space Station prime contractor. NASA provides a customer-services responsibility to Boeing and to contractors for international payloads such as the Japanese Experiment Module.

The Node 1/PMA processing schedule to support the first mission in June is typical of the SSPF's work. This consists of:

- acceptance testing;
- cargo-element integration test;
- communications end-to-end test with mission control;
- air-leak check;
- installation of survey and optical targets;
- toxicology test, where samples of air inside the Node will be collected;
- payload/orbiter interface verification test, carried out on the launch pad after the completed payload has been delivered in a canister from the SSPF to the payload change-out room.

The SSPF is also engaged in post-mission processing of returned payloads, which means a doubly difficult planning job to meet the ISS assembly schedule. □

■ NORTHROP

Pittsburgh, Pennsylvania-based Northrop Grumman's Electronic Sensors and Systems division (ESSD) has appointed **John Stuelpnagel** director and deputy for science and technology, succeeding **Clifford Jones**, who is to retire. Stuelpnagel, with the company since 1964, was most recently director of research and development at ESSD in Baltimore.

■ BOEING

Brad Cvetovich has been named vice-president and general manager of the customer-services organisation of the Boeing Commercial Airplane Group of Seattle, Washington. He was most recently vice-president for quality assurance and process development. Former astronaut **Richard Covey** becomes deputy programme director for operations for the Boeing team's NASA consolidated space-operations contract phase 2 programme bid. Before joining Boeing in 1996, Covey was deputy programme director for space operations at Unisys Information Management Services in Houston, Texas.

■ C-S AVIATION

Peter de Beer has been appointed director for technical operations at New York-based aircraft-leasing company C-S Aviation Services. De Beer has worked for South African Airways and, in 1993, joined start-up airline Phoenix as

chief flight engineer, later becoming director of engineering and maintenance.

■ AIRCLAIMS

Tony Latham, managing director of the global-risk division of Royal and Sun Alliance, has become a director of the UK Airclaims Group, which provides services to the aviation and insurance industries. He succeeds **Peter Ward**, executive director of Commercial Union, and also becomes chairman by rotation from **Jacques Gangloff**, chairman and managing director of La Réunion Aérienne, who remains a director. **Rodney Butcher** has retired as managing director of Airclaims after more than 20 years with the company. **Paul Clark** becomes principal surveyor and director and **Trevor Light** general manager and director of the hull and claims department.

■ BRITISH AIRWAYS

Terry Daly, general manager for passenger and cargo business at British Airways, has been named area manager for the Middle East, based in Dubai, from 1 May. He replaces **Alan Burnett**, who becomes general manager for the UK, Africa and the Middle East. **Neil Harrison**, now area manager for the South West Pacific, based in Sydney, Australia, takes over as general manager for passenger and cargo business from 14 April. **Andrew Crawley**, general manager for com-

mercial agreements in UK sales, replaces **Harrison**. **Jenny Lourey**, sales manager for Australia, becomes area manager for the Mediterranean, based in Rome, Italy, from 1 March. She replaces **Stuart Fisher**, who is to retire.

■ AMERICAN

Thomas Horton has become vice-president-Europe for American Airlines of Fort Worth, Texas, based in London, UK. He succeeds **Hans Mirka**, who retires at the end of February. Horton is now vice-president and controller, responsible for corporate accounting and financial planning. He will be replaced by **Jeffery Jackson**, now vice-president for corporate development and treasurer.

■ ANSETT

Ansett Australia has appointed **Colin Currie** regional marketing manager - Asia, based in Hong Kong. He was most recently group marketing manager for the Shangri La Group, also of Hong Kong.



Steve Clarkson

■ H+S AVIATION

Steve Clarkson has been named programme manager of H+S Team 250, the UK company's Allison 250 engine-repair and overhaul business, based in Portsmouth, Hampshire. Clarkson, who was formerly fleet business manager with the Pratt & Whitney Canada customer-support centre, replaces **Tony Russell**, who becomes director of special projects.



■ FOKKER AEROSTRUCTURES

Seen (right) is **CAM de Koning**, president of Fokker Aerostructures, receiving from **JW Weck**, director-general of the Netherlands Aviation Authority (for the European Joint Aviation Authorities) a certificate of Joint Aviation Requirements 21 subpart JB approval, the first granted to any company in the world. The certification allows Fokker to design and build aircraft components independently, thus eliminating the need for lengthy qualification procedures by final customers/aircraft builders.

ATI

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WHAT'S ON

Asian Aerospace '98 24 February-1 March, Singapore. Contact: Clive Richardson, Director International Sales & Marketing, Reed Exhibition Companies, Oriel House, 26 The Quadrant, Richmond, Surrey TW9 1DL, UK; tel: +44 (181) 910 7746; fax: +44 (181) 910 7747

RAES Conferences: Sir Frank Whittle Lecture 10 February; Henson and Stringfellow Lecture 12 February; Testing and Proving of Weapon Systems 18 February; Head-up Display Systems 19 February. Contact: Conference Department, The Royal Aeronautical Society, 4 Hamilton Place, London W1V 0BQ, UK; tel: +44 (171) 499 3515; fax: +44 (171) 493 1438; e-mail: conference@raes.org.uk

Middle East Defence Procurement 11-12 February, London, UK. Contact: SMi, No 1 New Condordia Wharf, Mill Street, London SE1 2BB, UK; tel: +44 (171) 252 2222; fax: +44 (171) 252 2272; e-mail: 100531.3067@compuserve.com

ATC Maastricht '98 17-19 February, Maastricht, Netherlands. Contact: Rupert Newell, Miller Freeman Exhibitions, 630 Chiswick High Road, London W4 5BG, UK; tel: +44 (181) 742 2828

Geneva Forum on Aircraft Finance & Commercial Aviation 19-20 February, Geneva, Switzerland. Contact: The Geneva Forum Administrator, ICBI, 8th Floor, 29 Bressenden Place, London SW1E 5DR, UK; tel: +44 (171) 915 5103; fax: +44 (171) 915 5101

Chek Lap Kok Airport briefing visit, and evening event 21 February, Hong Kong. Contact: Martin Craigs, President, China (HK) International Aerospace Forum, GPO Box 10797, Central, Hong Kong; tel: +852 2869 8483; fax: +852 2869 5783

AFA Air Warfare Symposium 26-27 February, Orlando, Florida, USA. Contact: Jennifer Krause, Air Force Association, 1501 Lee Highway, Arlington, Virginia 22209-1198, USA; tel: +1 (703) 247 5838; fax: +1 (703) 247 5853; e-mail: jkause@afa.org

Aircraft Icing 2-5 March, Lawrence, Kansas, USA; **Airplane Preliminary Design** 23-27 March; **Hazardous Flight Tests** 23-27 March, Williamsburg, Virginia, USA. Contact: Maureen Raymond, The University of Kansas, Division of Continuing Education 12600 Quivira Road, Overland Park, Kansas 66213-2402, USA; tel: +1 (913) 897 8500; fax: +1 (913) 897 8540

Air Freight Asia '98 4-6 March, Hong Kong. Contact: Asian Media Services, 20 Keong Snik Road, Singapore 089127; tel: +65 226 3723; fax: +65 221 1123

CFIT: blame the flightcrew again...

Sir — "Yet again" the solution to controlled flight into terrain (CFIT) is to castigate the flightcrew, suggests the Comment "Out of control?" (*Flight International*, 21-27 January).

Although flightcrews are ultimately responsible for the safety of a flight, others have a contribution to make. Perhaps we should also ask whether it is "negligent":

- for agencies to publish league tables of airline punctuality, with the attendant time pressure on those concerned;
- to have a different convention for naming radio aids in electronic and paper databases;
- for a flight-management system to be built in such a way that its workings are shrouded in secrecy, its display ambiguous and its manual almost unintelligible;
- to dissuade a pilot from hand flying, with the consequent degradation in skills — such that he does not take the vertical-speed indicator into his monitoring scan.

Is the only solution to CFIT for it to be a new offence for flightcrew? It is time for regulators and other flight-safety bodies to get their heads out of the cockpit, and to start to address the other factors involved in CFIT, which, when combined, make it surprising that so few flightcrews are "negligent".

PAUL INGOE
Old Woking, Surrey, UK

... 'NFI' must not apply only to pilots

Sir — The suggestion that CFIT accidents should be renamed NFI (N for negligence) is acceptable only if the "N" applies to the industry as a whole.

How is it that highly trained and experienced pilots can fly their aircraft several kilometres off course and hit mountains when most people can drive a car safely in driving rain at high

British Airways and its amazing technicolour coat

Sir — After doing walk-round checks on large aircraft for many years as a flight engineer, I wonder just how much more difficult it is to spot any damage or defects on the fin of such aircraft as operated by British Airways with its new livery.

Possible damage or defects must be well-disguised under the multi-coloured paint job.
DAVID DRINKWATER
Howden, Yorkshire, UK



Any defects underneath?

speed, when a deviation of less than 1m (3ft) can mean a serious accident?

Perhaps this is because car drivers receive clear navigational information from the road and its markings. By contrast, pilots navigate either by interpretation of needles moving round a dial or, in a glass cockpit, by interpretation of computer symbology, which is not intuitive in its design. The opportunity for modern technology to provide easily assimilated information is wasted by numeric clutter and a thin magenta line.

There is ample scope for the design of displays optimised to the needs of pilots. Good design need not be expensive — it just needs a willingness to involve the users and an absolute commitment to safety.

IAN McGRATH
Geneva, Switzerland

...does 'UFIT' fit the bill?

Sir — The word "negligence" is one which the law uses to describe acts of omission and commission by those persons who have a duty of care to others. Such persons are aircraft commanders, who have a duty of care to passengers and crew, among others. "Honest" mistakes, as you describe them, are mistakes nevertheless and, therefore, acts of negligence — however

inadvertent or unintended.

What may make an act of negligence a criminal act is recklessness, an act causing personal injury or death where the actor is recklessly uncaring of the consequences of his act.

Pilots, usually the first at the scene of an accident, are rarely reckless to the point of criminality, but they can be and, sadly, occasionally are careless and, therefore, negligent.

There is no euphemism for negligence, however much we would like one. As liability questions always depend on fault, whether proved or assumed, it is just not possible to "de-link" wilful from "honest" mistakes. It is certainly possible, however (in theory at least), to de-link from criminal negligence.

I suggest, as a compromise, that the words "inadvertent" or "unintentional" be used to describe the kind of flight into terrain which you have in mind. Try "UFIT"!

PETER MARTIN

EDITOR

Shawcross & Beaumont Air Law
Swindon, Wiltshire, UK

...or 'UNFIT'?

Sir — The alternative "UNFIT" for "unintended flight into terrain" could be the answer. At least it avoids the perhaps pejorative use of the word "negligent".

ALASTAIR ALLCOCK
Pinner, Middlesex, UK

The opinions on this page do not necessarily represent those of the editor. Flight International cannot undertake to publish letters without name and address and reserves the right to select or edit letters

WEATHER

An arid island. Prevailing wind E'ly which can be strong presenting crossword difficulties. Thunderstorm activity in Winter.

Uncle Roger's Total Aviation Bookshelf

Supersonic Flight - Breaking the Sound Barrier and Beyond, by Richard P Hallion; Brasseys, 33 John Street, London WC1N 2AT, UK. Revised edition of a

1972 book, covering the USA's pioneering supersonic work with the Bell X-1 and Douglas D-558, and beyond.

Breaks: extremely comprehensive account; excellent index, bibliography

Airtours International Airfield Brief, April 1997

and references (some of which are summarised and explained); chronologies of most of the flights of the X-1s and D-558s; good period pix.

Barriers: bounces back and forth between the two types, so a bit disconnected; tantalisingly mentions but doesn't go much into the subsequent X-planes.

TAB Rating

[X] Top Shelf

1997 Airliner Market: "If you meet anyone of Asian heritage, give him a big hug."

1998 Airliner Market: "If you meet anyone of Asian heritage who hasn't cancelled his order, give him a big hug."

■ Leisure International Airways is re-registering its fleet, changing the "G-UKL" prefixes from its days as part of Air UK to "G-UNI" to reflect its now being part of Unijet. They've reserved -UNIA through -UNIJ. Wonder what they'll do when they get to K...?

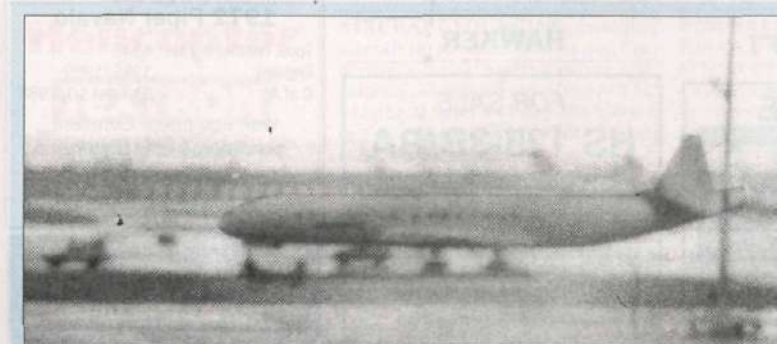
Logo for Leisure International Airways



"Darling, how many times..."



"...have I told you not to call me in the office?" Sabreliner, Istanbul (top); Saab 340, Linköping



The last flight of a Comet, ever... possibly! In the middle of a gale on 4 January, Gatwick's ground-handling trainer (which must be the last Comet working for a living) took off from its parking place, and had to be retrieved by a pair of Land Rovers. You just can't keep a good aeroplane down, they say...



75 YEARS AGO

◆◆◆

Extracts from Flight, February 1, 1923

Dutch Air Service to Cologne

The Royal Dutch Air Service is organising a regular air service between Amsterdam, Rotterdam and Cologne, as the entire railway traffic between Holland and the occupied part of Germany has been discontinued. Machines will leave Amsterdam at 8 in the morning and Rotterdam at 8.45, arriving at Cologne at 10.45, returning from Cologne at 3 o'clock in the afternoon. The service will begin immediately after the receipt of the consent of the military authorities at Cologne.

◆◆◆

New Air line to Near East

An agreement has been concluded between the British and Czecho-Slovak Governments whereby a daily air service is to be established this spring between London-Cologne-Prague-Budapest. A British company will be designated for the operation of the line, with the assistance of the Czecho-Slovak Government on the Cologne-Prague-Budapest section... Already on the London-Prague section the saving in time will be tremendous - something like 9 hours as against 36 hours by ordinary train and steamer service. Thus, the London morning newspapers should reach Prague by about 6p.m., while in the case of passengers and goods, a similar saving in time will be possible.

◆◆◆

A Self-Supporting Airship Service

Now that it is definitely known that the Admiralty are favourably disposed, and that it is mainly a question of Treasury red tape (the excuse apparently being that it is against the accepted practice for a Government Department to have direct dealings with a commercial organisation), it may be hoped that the long-delayed scheme will go through, and that after three years' "We will, we won't, we will", a service will come into being.

◆◆◆

The Paris Aero Show

It is an unfortunate fact that gradually French aircraft firms are acquiring titles so long that it becomes quite impossible to refer to their products by the full title of the firm, with the result that half of the modern French machines are always identified by a series of initial letters.

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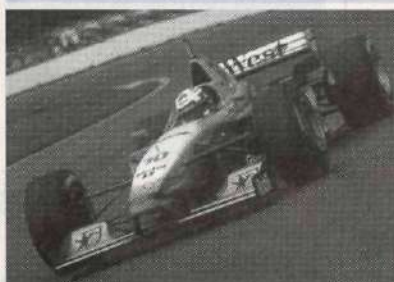
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This position would possibly suit a recent graduate, with a good degree in Aeronautical or Mechanical Engineering (First or 2.i), and a passion for aerodynamics.

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Enquiries: Miles Flanagan (02) 6268 5691 or +61 2 6268 5691 overseas.

Job Description: Dianne Gertzel (02) 6268 4569 or +61 2 6268 4569 overseas.

Email: Dianne.Gertzel@airservices.gov.au

Confidential applications in writing should be forwarded by 6 March 1998, addressed to:

Miles Flanagan, Manager, Human Resources
Air Traffic Services, Airservices Australia
25 Constitution Ave, CANBERRA ACT 2600

For more information on Airservices Australia visit website
www.airservices.gov.au

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Closing date for all applications is Friday, 27th February 1998.



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PA

POLICE AUTHORITY for NORTHERN IRELAND

LINE PILOT - RUC AIR SUPPORT UNIT

- Have you
- a valid UK Commercial Pilot's Licence or ATP Pilot's Licence with a class 1 medical and Instrument Rating;
 - a minimum of 1500 hours flying experience. At least 1000 hours must be P1 fixed wing experience, including 500 hours as P1 in multi engine aircraft;
 - a full current driving licence enabling the holder to drive in Northern Ireland and a car available for official business or access to a means of transport which will permit the applicant to meet the requirements of the post in full.

The RUC have a Turbine Islander aircraft which is used in a wide variety of police operational duties. The Unit needs a line pilot to fly the aircraft and carry out the necessary inspections as required by the Police Air Operations Certificates to ensure commitments are met.

Initially this appointment will be for a fixed term of 3 years with a possibility of converting to a permanent appointment should the Authority deem the successful candidate to be qualified in all respects and subject to certain conditions. There is, however, no obligation whatsoever on the Authority to convert the appointment to a permanent post.

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An application form and job description can be obtained by writing, enclosing a stamped addressed envelope (26cms. x 18cms.), to:

Recruitment Services, 5th Floor, River House, 48 High Street, Belfast BT1 2DR.

Photocopies of pilot licence and last current page of log book **MUST** accompany the application form and relevant annex which must be returned to the above address **not later than 5.00pm on 20 February 1998**. Late applications will **not** be considered.

THE POLICE AUTHORITY FOR NORTHERN IRELAND IS COMMITTED TO EQUALITY OF OPPORTUNITY IN EMPLOYMENT. ALL APPLICATIONS FOR EMPLOYMENT ARE CONSIDERED STRICTLY ON THE BASIS OF MERIT.

THE POLICE AUTHORITY WELCOMES APPLICATIONS FROM ALL SUITABLY QUALIFIED APPLICANTS IRRESPECTIVE OF RELIGION, GENDER, DISABILITY OR RACE. AS ROMAN CATHOLICS AND WOMEN ARE CURRENTLY UNDER-REPRESENTED IN THIS GRADE APPLICATIONS FROM THE ROMAN CATHOLIC SECTION OF THE COMMUNITY AND FROM WOMEN WOULD BE PARTICULARLY WELCOME.

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- A300 B4 Europe long term.
- ATR 42 Line Maintenance Europe long term.
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Please send your application with detailed curriculum vitae, quoting reference: DS.FI to:

**The Recruitment Officer, NATO,
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*Only those candidates who meet the specified requirements
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Please send CV together with letter outlining why you are the right person for the job to:

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Qualcast Road, Lower Horseley Fields, Wolverhampton, West Midlands, WV2 2QP, UK.

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Please forward your CV to: Mrs G. Longhurst, The European College of Aviation, PO Box 2323, Bournemouth Int'l Airport, Christchurch, Dorset, BH23 6YG.

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Requirements: ☐ higher secondary education or equivalent professional experience; ☐ at least 5 years controlling experience in Area Radar Control in an automated ATC centre, preferably with OJT experience; ☐ knowledge of aviation, ATS and their expected evolution; ☐ specialist knowledge and experience in at least one training subject relative to ATS; ☐ the ability to instruct in English; ☐ controller licence or certification at least in the Area Radar Control, additional qualifications in TWR and APP Control would be an advantage.

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Application forms and detailed competition notice can be obtained from EUROCONTROL, Selection & Assignment Section, rue de la Fusée 96, B-1130 Brussels (fax: 32.2.729.90.70) or EUROCONTROL Institute, 31, bd Konrad Adenauer, L-1115 Luxembourg (fax: 352.4.86.69) quoting the reference.

Completed application forms clearly indicating the reference must arrive at EUROCONTROL Selection & Assignment Section, rue de la Fusée 96, B-1130 Brussels by 12th of March 1998 at the latest.

Candidates are advised in their own interest to ensure that they meet the above deadline since closing dates are applied strictly.



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Interested? Then contact us, quoting reference 184, on (01202) 365294 for an application form, or post/fax your CV to, the Recruitment Manager, Bombardier Services, Bournemouth International Airport, Christchurch, Dorset BH23 6NW. Direct Confidential Fax: (01202) 365416.



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EMPLOYMENT SERVICES INDEX

EMPLOYMENT SERVICES INDEX

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E-mail: jobair@compuserve.com
website: www.inter-plane.com/jobair

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Ware, Herts SG12 9EG
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Aviation Limited**

Jan Philippe
Timberham House
London Gatwick Airport
West Sussex RH6 0EY
Fax: +44 (0)1293 568699
E-mail: europacific@msn.com

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Contact: Dick Osguthorpe/Geoff Miller
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Tel: +44 (0) 1904 430233/+44 (0) 1904 414181
(ask for Butler Aerospace)
Fax: +44 (0) 1904 430608

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 Fax: +31 (0)20 316 3253
 E-mail: jobair@compuserve.com
 website: www.inter-plane.com/jobair

ENGINEERING

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 Fax: +44 1279 680294

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SWINDON
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 or Ms. Karin Kastner
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 E-mail: wynnwith@wynnwith.co.uk

SIA (MAURITIUS) LTD REQUIRES B747-400 CAPTAINS FOR OPERATING SINGAPORE AIRLINES SERVICES OUT OF LONDON

REQUIREMENTS

FOR CANDIDATES WITH B747-400 RATING:

Applicants should have a current rating on the type with minimum type experience of approximately 1000 hours as pilot in command, with a total pilot in command experience of at least 3000 hours. The minimum total flying experience should be 7000 hours.

FOR CANDIDATES WITHOUT B747-400 RATING:

B747-400 conversion training will be considered for those who have at least 7000 hours total inclusive of 3000 PIC hours on long range wide-bodied commercial jets. Preference will be given to applicants with experience on airplanes with Flight Management Systems.

TRAINING BOND

Those given B747-400 conversion training are required to enter into a training bond, which is supported by a bank guarantee.

REMUNERATION

Approximately STG 65,000 per annum made up of the following components:

• Basic Salary

During the period of training, the salary per month will be:

	Rated	Non-Rated
During ground training	STG 3,150	STG 2,600
During line training	STG 3,150	STG 3,150

From the date a pilot is cleared to operate as a B747-400 Commander, after completion of line training, the salary per month will be STG 3,750.

- **Flying Allowance:** STG 19 per scheduled flying hour.
- **Year-End Bonus:** One month's basic salary.

In addition, the following will be paid:

Subsistence Allowance: STG 2.60 for each hour away from Base (for meals and incidentals whilst on flying duty).

Profit Sharing Bonus: Varies according to Company's performance.

Gratuity: STG 21,000 payable on completion of the contract period of 3 years.

Privilege Travel: Free air travel on SIA services for employee, spouse and eligible dependants once a year. Discounted travel on other occasions.

Annual leave: 4 calendar weeks.

Other Benefits: Free private medical insurance.

AGE LIMIT

Maximum 56 years at time of joining if B747-400 rated.
Maximum 54 years at time of joining if given B747-400 conversion.

APPLICATION

Contact the nearest Singapore Airlines Office for an application form and return it, or write directly to:

SIA (Mauritius) Ltd
General Manager Mauritius
5 Duke of Edinburgh Avenue
Port Louis
MAURITIUS

www.AA98.com

the official website for Asian Aerospace '98

For up to date visitor and exhibitor information:

DATES & TIMES: exhibition dates and entry times for trade and public visitors.

EXHIBITORS: A-Z of organisations who have confirmed they will be exhibiting.

TRAVEL: details of local transportation in Singapore and hotel accommodation.

TICKETS: details of visitor and exhibitor admission to the show.

SITE MAP: a plan of the exhibition site showing hall layout and display areas.

CONTACTS: details of Asian Aerospace representatives to help answer queries about the exhibition.

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