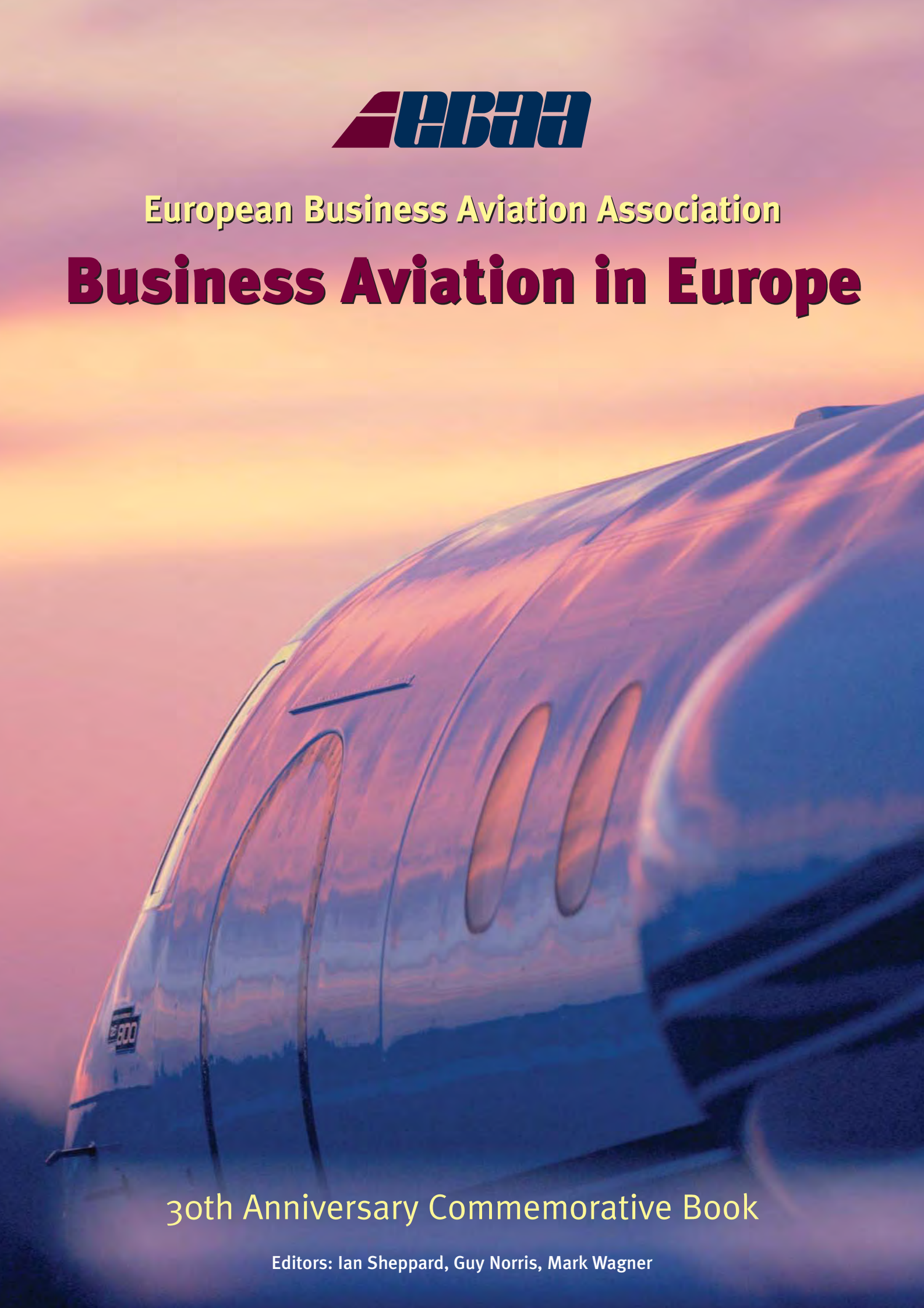
EBAA

European Business Aviation Association

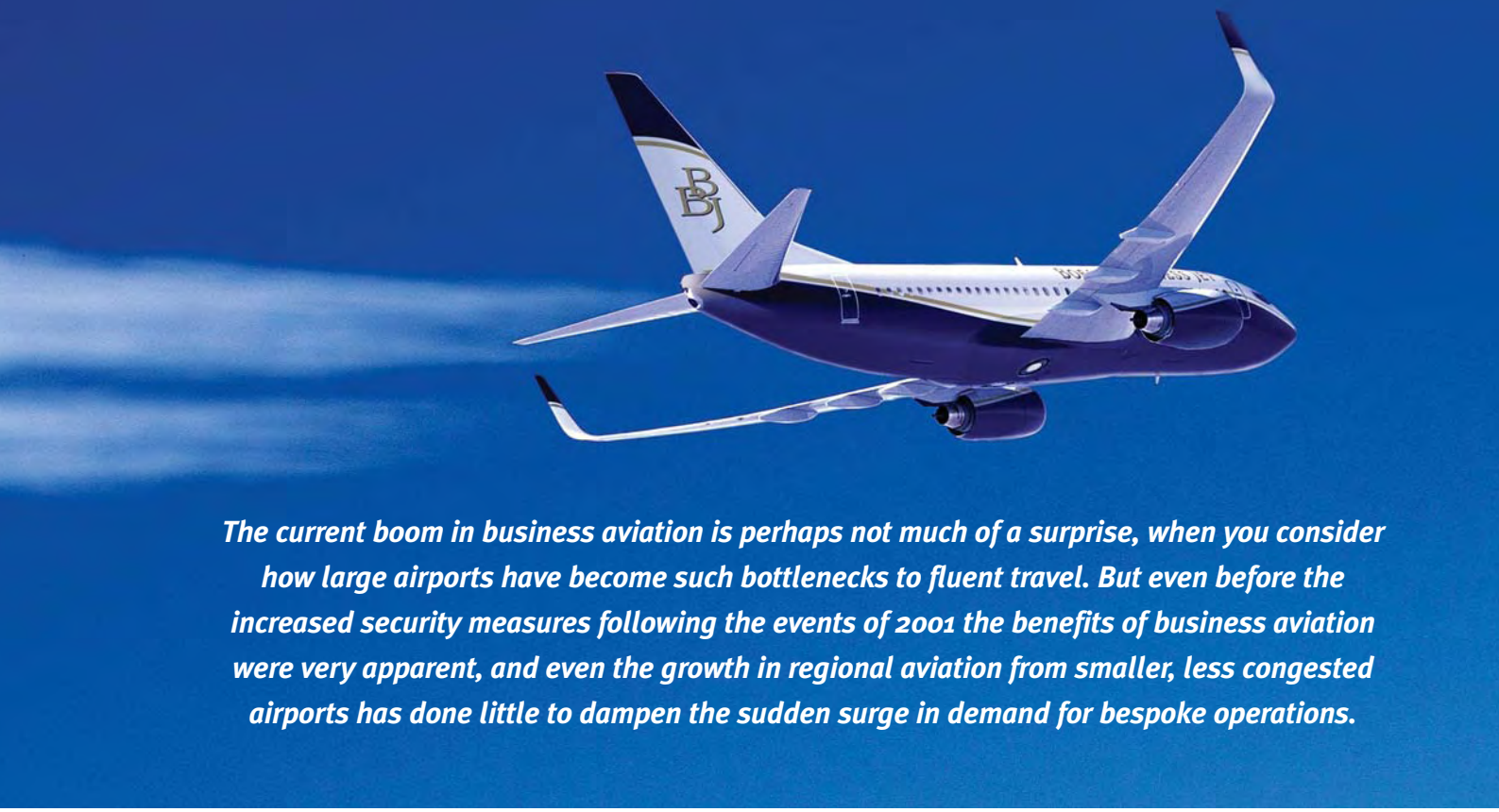
Business Aviation in Europe



30th Anniversary Commemorative Book

Editors: Ian Sheppard, Guy Norris, Mark Wagner

The Business Aviation Market



The current boom in business aviation is perhaps not much of a surprise, when you consider how large airports have become such bottlenecks to fluent travel. But even before the increased security measures following the events of 2001 the benefits of business aviation were very apparent, and even the growth in regional aviation from smaller, less congested airports has done little to dampen the sudden surge in demand for bespoke operations.

Boeing Business Jet (BBJ)

On the surface, using a corporate jet looks to your average man in the street like an extravagance, and there is no denying that in some cases it is. Accepting that justification is a central plank of acceptance has led the industry to come up with various novel schemes for shared fractional ownership and buying bulk hours, thus bringing the benefits of fast, flexible point-to-point travel to businessmen around the world.

In addition the shere variety of models compared with 20 years ago, when there were but a handful of such aircraft, allows for 'right-sizing' for a mission and gives economies of scale as the numbers increase. At the lower end, with a raft of very light jets (VLJs) starting to take to the skies, the benefits of larger scale production will start to kick in in a significant way, if predictions are to be believed.

However, there is more to the story than the demand side alone. If the US Congress had not listened to the general aviation community in the early 1990s, things might have been very different in the US, which currently produces that greatest number of business aircraft by far. The problems with frivolous product liability claims of the 1980s crippled the sector, so that when the General Aviation Revitalization Act (GARA) was enacted in 1994, it marked a real turning point in the industry's fortunes, both in the US and with ramifications rippling around the world.

The General Aviation Manufacturers Association (GAMA), which is based in Washington DC but represents most of the worlds general/business aircraft manufacturers and some component manufacturers (a total of 60), says in its Statistical Handbook that “In the 13 years since GARA the general aviation industry has seen a rebirth.” It adds that since then, manufacturers have shipped 33,000 type-certificated, fixed-wing GA aircraft worth over $130bn. Turbine aircraft deliveries in the sector have risen from 511 in 1994 to 1,292 in 2006 (from $3.6bn to $18bn).

The US has been the engine of this rebirth - in 2006 US manufacturers exported 891 general aviation aircraft, representing 28.3% of production and 42.4% of total billings worldwide. The US market itself is by far the busiest, with over 5,000 paved runways compared with 2,241 in Europe (according to the *CIA World Factbook*). It is interesting to note however that Europe has 134 heliports compared with 155 in the US.

GAMA predicts that more individuals will turn to GA to save time and increase productivity, especially in smaller communities where airline services are most lacking. It

Aircraft Manufacturer Profiles

Embraer Legacy 600

Adam Aircraft

Based at Centennial Airport in Englewood, Colorado, Adam Aircraft makes extensive use of carbon composite materials and has additional sites in Ogden, Utah and Pueblo, Colorado. The A500 twin-engine piston aircraft has been type certificated by the FAA, and the A700 AdamJet is currently undergoing flight test and development. In February 2007, Adam Aircraft appointed former Raytheon, Fairchild Dornier, Lockheed Martin and Bombardier manager Duncan Koerbel as president. Koerbel is responsible for guiding the company as it continues to move forward with certification of the A700 AdamJet, as well as managing the A500 production and delivery programs. Koerbel reports to company founder, chairman and CEO Rick Adam through John Wolf, who has joined the board.

www.adamaircraft.com

Aerion Corporation

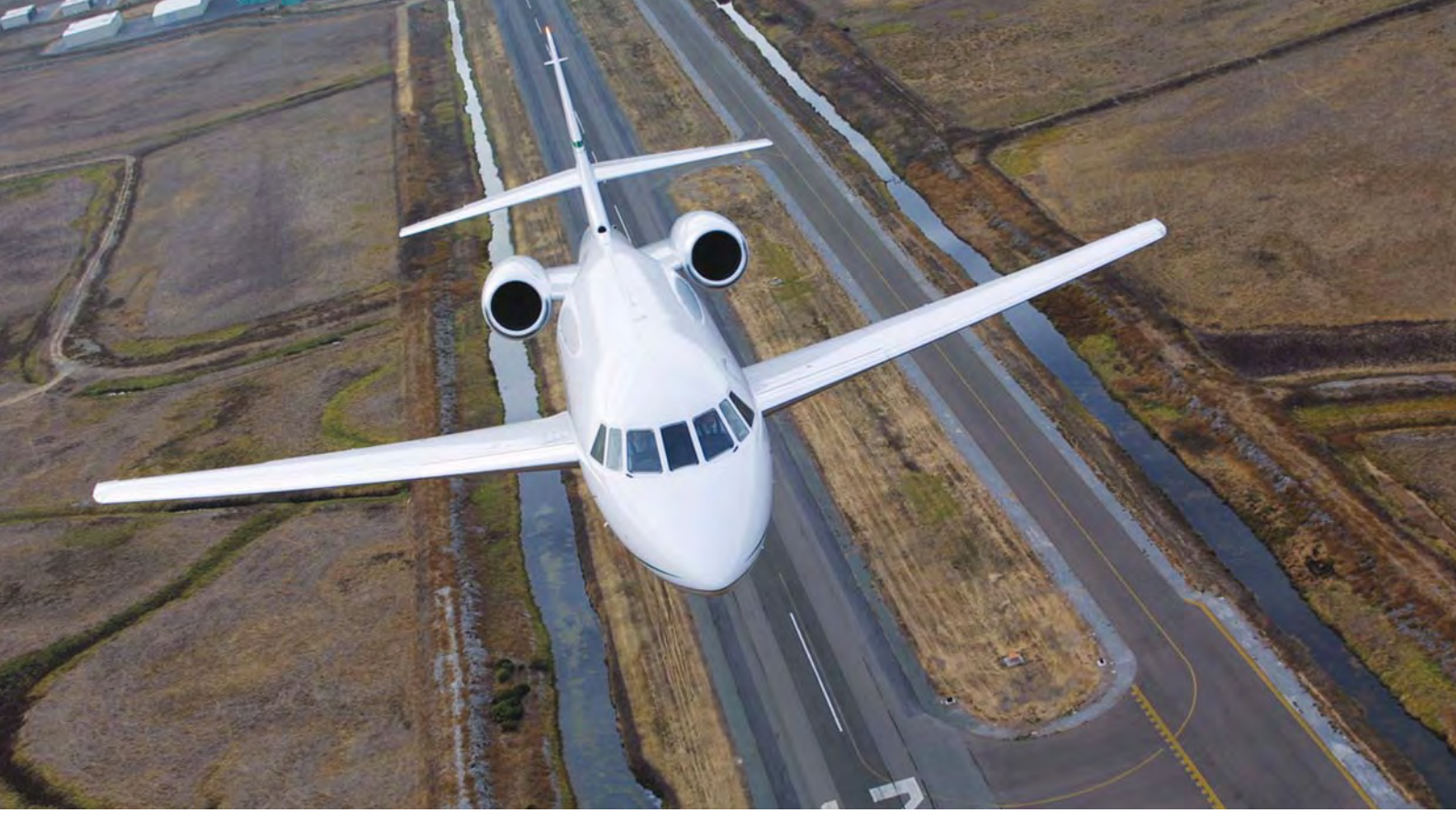
Reno, Nevada-based Aerion Corporation is at the forefront of efforts to develop new concepts for a supersonic business jet, principally based on an advanced supersonic natural laminar-flow wing design. In addition to the Reno organisation, Aerion includes an engineering group in Palo Alto, California specialising in advanced computational methods for flow analysis and design optimisation. An affiliated company in Arlington, Virginia has received several US defence contracts for Aerion wing studies, research and flight tests. This organisation has participated in DARPA's Quiet Supersonic Platform Program. Aerion hopes its concept will form the basis for a production supersonic business aircraft to be developed, certificated and assembled by an established manufacturing team.

www.aerion.com

AgustaWestland

A wholly owned part of Italian aerospace conglomerate Finmeccanica, AgustaWestland brings together two famous names in the history of helicopter design and manufacture with both Agusta and Westland each having entered the industry over 50 years ago. Created in 2001 as a joint venture between GKN and Finmeccanica's Agusta subsidiary, the GKN shareholding was bought out in 2004. Main programmes are the A109 light twin, A119, A129, AB139 medium twins, EH101 medium-lift multi-role helicopter and its US101 derivative for the US Presidential helicopter programme in association with Bell Helicopter and Lockheed Martin. The company also participates in several joint ventures and collaborative programmes with other European and US manufacturers including Bell/Agusta Aerospace and EHI.

www.agustawestland.com



Dassault Falcon 2000

industry, the initial effort was aimed at the HF120, a 2,000lb thrust engine that has been launched on Spectrum Aeronautical 'Freedom' as well as the HondaJet. The HondaJet itself s distinguished by its unusual over-the-wing engine configuration. Because no carry-through structure is needed in the aft fuselage for the engine mounts, this allows for a full-width cabin further aft thus allowing 30% extra space within the same dimensions. Honda plans to begin deliveries of the $3.65 million jet in 2010, and is offering an air taxi configuration.
www.honda.com

Piaggio Aero Industries

Founded in Genoa, Italy in 1884, Piaggio originally fitted out ocean liners and manufactured railway rolling-stock. Transitioning to aircraft and aero engine making in the early 20th century, Piaggio's modern era began in1948 when it launched the P136, a twin-engined seaplane operated by the Italian Air Force to perform liaison and transport missions. In 1960 Piaggio began manufacturing jet engines with the production, under licence, of the Rolls-Royce Viper. Owned mostly by the Di Mase and Ferrari automotive families since 1998, Piaggio's current focus is the P180 pusher turboprop project, which was originally tested as long ago as 1980 and certificated in the US in 1990. A new generation of the P180, the Avanti II, is gaining popularity in Europe and the US. Claimed by Piaggio to be the fastest and most advanced turboprop in the world, with a range of over 1,800 miles, speed of 398kts (450 mph) and a maximum cruising altitude of 41,000 ft, the aircraft is said to have 30% lower operating costs than equivalent jets. Some 35 Piaggio-built aircraft currently operate in Italy, with another 125 in the rest of Europe, North and South America.
www.piaggioaero.com

Piper Aircraft

Florida-based Piper Aircraft, was originally founded in 1927as the Taylor Brothers Aircraft Manufacturing Company, and has subsequently developed more than 160 certificated models. Approximately 90,000 of those aircraft are still flying and are supported by Piper's 65 service centers, 40 dealers and 2,500 field personnel. Although production ceased altogether in the mid-1980s, the company was gradually rebuilt following its acquisition by US investment firm American Capital Strategies, and production restarted in 1995. Based on a growing range of top-line piston singles and twins, Piper announced its long-anticipated move into the VLJ arena in 2006 with the launch of the Williams FJ44-3AP-powered PiperJet. Capable of a cruising speed of 360kts and a maximum operating altitude of 35,000ft, the six passenger PiperJet will have a range of 1,300nm. The $2.2m PiperJet is due to begin deliveries in 2010.
www.newpiper.com

Raytheon Aircraft *(see Hawker Beechcraft)*

Sikorsky Aircraft

Formed by Ukrainian-émigré and helicopter pioneer Igor Sikorsky in 1923, the company has become synonymous with rotary-wing developments since Sikorsky produced the first stable single-rotor helicopter to enter full-scale production. Since becoming part of what is now United

Technologies in the 1930s, the company went on to develop the S-51 and S-55 helicopters which demonstrated the utility of these machines for medical evacuation, search and rescue, and utility missions in the Korean War. The piston-engined S-58 and S-56 gave the U.S. military the first helicopters large enough to mount air assaults. The turbine-engined S-61 spawned a family of submarine hunters, airliners, and rescue helicopters with offspring still serving around the world, and which led to the current generation of S-76/92 civil machines. The growing fleet of S-92s, which was the first helicopter in the world certificated to the latest FAA and EASA/Joint Aviation Authorities joint airworthiness safety standards, is currently approaching 45,000 flight hours after just over two years in service. More than 650 S-76 helicopters have also been delivered, with EASA certification of the latest C++ version achieved in July 2006. Development of the more advanced S-76D is on track for initial certification in late 2009.
www.sikorsky.com

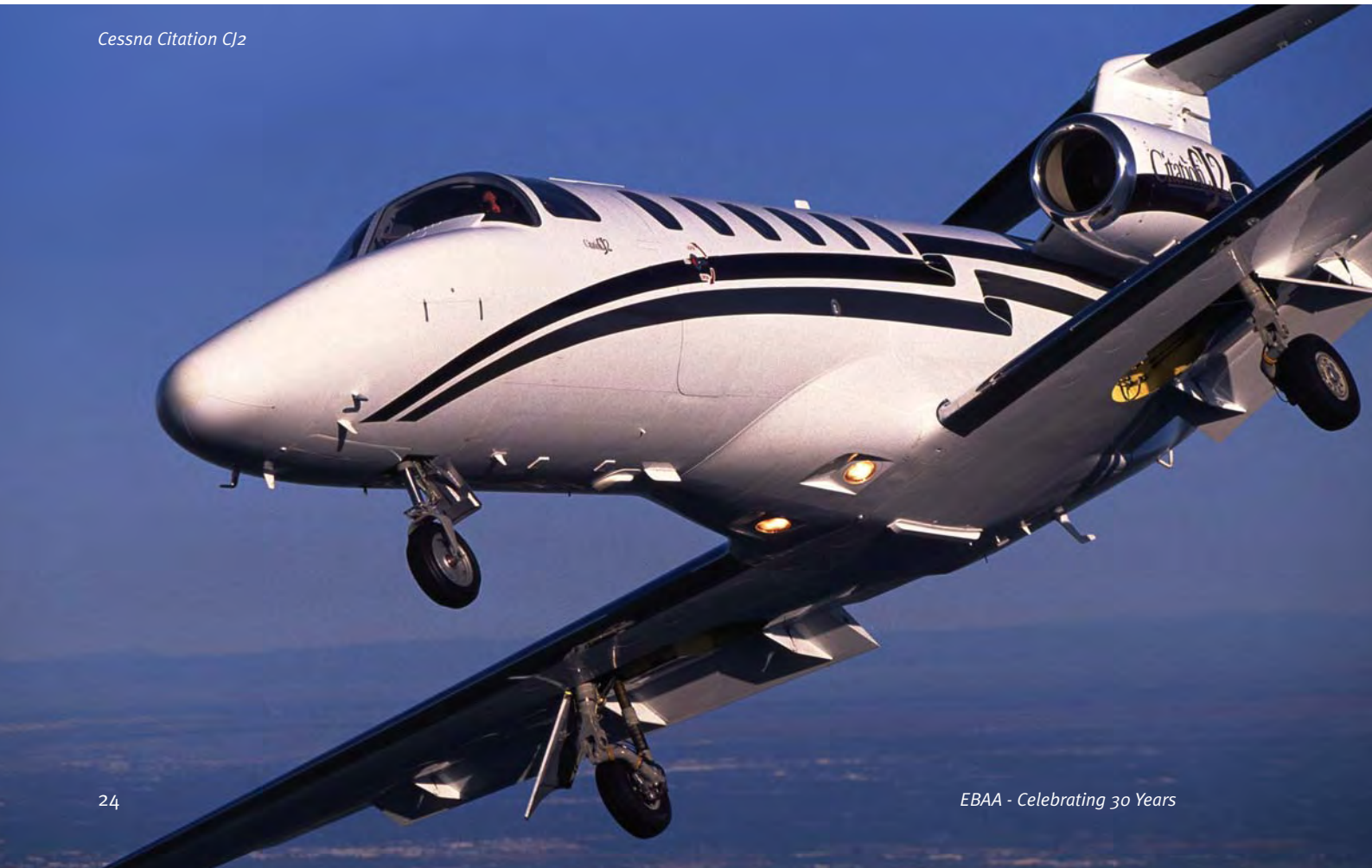
Sino-Swearingen Aircraft

The Sino Swearingen Aircraft Corporation makes the high-speed SJ30-2 light business jet. Formed originally in 1995 as a partnership between Swearingen Aircraft Company of San Antonio, Texas and Sino Aerospace Investment Corporation of Taiwan, it was formally incorporated in 1997. Headquartered in San Antonio, Texas, the company currently employs more than 400 people at its facilities in Texas and Martinsburg, West Virginia. In December 2006 Sino Swearingen received FAA approval to inspect its own products, representing a key milestone towards obtaining its production certificate in the near future. Despite the long development time of the SJ30, the model remains popular, with more than 300 on order. With a range of over 2,500nm and the highest cruise speed in the light jet industry (Mach 0.835), the aircraft will cruise at altitudes to 49,000 feet and maintains a "Sea Level Cabin" of 12 psi through 41,000 ft.
www.sj30jet.com

Spectrum Aeronautical

Southern California-based Spectrum Aeronautical is developing two new all-composite business jets at its production site in Utah. The first product, Spectrum's 'Independence', is the re-named Spectrum 33, the prototype of which crashed during flight tests in 2006. Meanwhile the 'Freedom' S-40 will be powered by the GE Honda HF120 engine and is aimed at the mid-size market. The Freedom is designed to cruise at 45,000ft at speeds up to 435nm with ranges up to 2,200nm. Freedom is targeted for certification and entry into service in 2010, while the Williams International FJ33-powered Independence is targeted for certification and service entry in 2008-9. The nine-place Freedom will have guaranteed transcontinental range eastbound and marginal westbound capability. Priced at $6.2 million, the aircraft will have direct operating costs “comparable to the S-33” says the company.
www.spectrum.aero

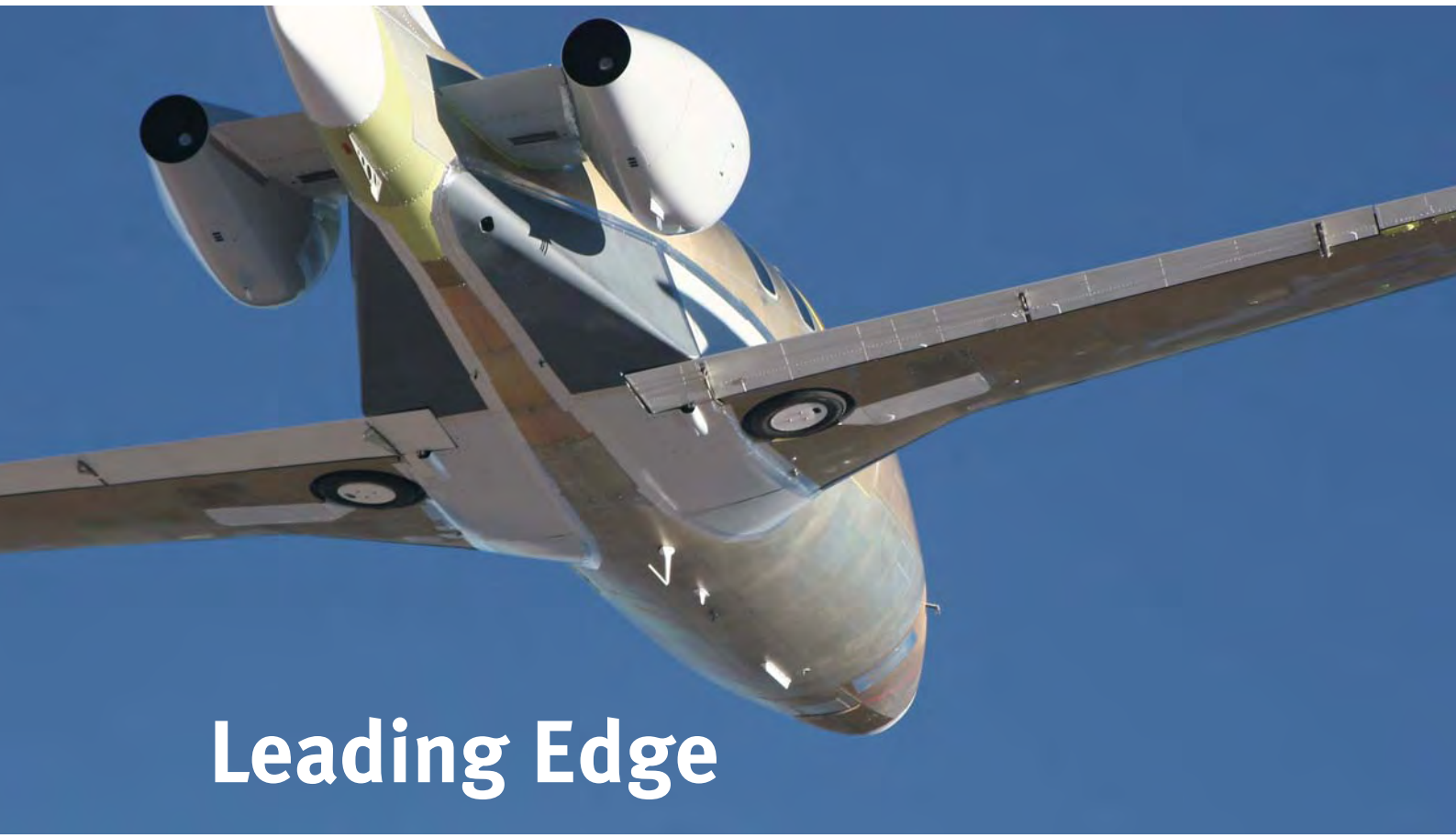
Cessna Citation CJ2



Agusta 109 Power landing at London Battersea Heliport (Photo Courtesy: Mark Wagner/Aviation-Images.com)

capability of a helicopter with the higher cruise speeds of a fixed wing turboprop. Designed with a useful load of more than 5,500lb (2,500kg), a max speed of some 275kt (510km/h) and a range of 750nm, the nine-passenger configuration has the ideal characteristics for corporate shuttles in areas like the eastern seaboard of the US, or between the major cities of western Europe. Powered by twin 1,680shp (1,250kW) P&WC PT6C-67A turboshafts, the BA609 will have a maximum ceiling of 25,000ft. Based heavily on tilt-rotor technology developed for the much larger Bell/Boeing V-22 Osprey, the BA609 made its maiden flight in March 2003 and achieved the first helicopter to aeroplane in-flight conversion in June 2005. With continued flight tests planned in both the US and Italy, the second prototype took to the air in November 2006 at AgustaWestland's facility on the Italian air base at Cameri, Italy. Two other prototypes are to join the flight test program.

To ensure the effort stays on track while Bell puts more short term focus on the troubled ARH military programme, Agusta is believed to be pushing for a ramp-up of the Italian-led portion. Certification in Europe and the US is still some way off, however, but despite not being due until around 2010 the team still holds firm orders for around 60. Tilt-rotors, while theoretically appealing, are proving harder and more time consuming to develop than expected - as proved by the prolonged gestation of the V-22. Although more than 50 of these remarkable machines have now been built, it is worthwhile recalling the first flight of the V-22 prototype was made as long ago as March 1989. Bell meanwhile continues to develop its portfolio with an updated variant of the 427 dubbed the 429. The company's plans to develop the 417 light single, a development of the 407 which was itself derived from the classic 206 LongRanger, were meanwhile abandoned earlier this year after Bell decided the product did not deliver sufficient 'value'. Another workhorse which continues in production is the 412EP (enhanced performance), the latest derivative of the 212, which again was derived from an earlier model - in this case the famous UH-1 Huey. The 412EP makes use of a "Twin Pac" powerplant which is two PT6T-3Ds combined through a single gearbox. Although more usually seen on the helo pad of an oil rig, corporate variants of the 412 seating around seven are offered. Recent entrants to the Bell stable include the eight-place 427 twin which grew out of efforts to develop a twin-variant of the 407. The first Bell civil machine to be developed using computer-aided design technology, the helicopter incorporates a relatively high proportion of composite materials. The 429 Globeranger, continues to show "stable and predictable" handling in flight testing. The certification and test effort includes verification of new production standard rotor blades which are being incorporated as one of 10 new technologies under the Modular Assembly Production Line (MAPL) concept. Top



Leading Edge

Eclipse 500 during flight testing

Business aviation, far from being the frivolous fringe of aerospace dedicated to aircraft for the privileged few, in fact plays a pivotal role in advancing the state-of-the-art for the industry at large, and has done since the 1960s. Countless technical advances in structures, aerodynamics, systems or propulsion, once driven by military requirements and the needs of war, are in use on today's commercial airliners thanks to the pioneering bizjet industry.

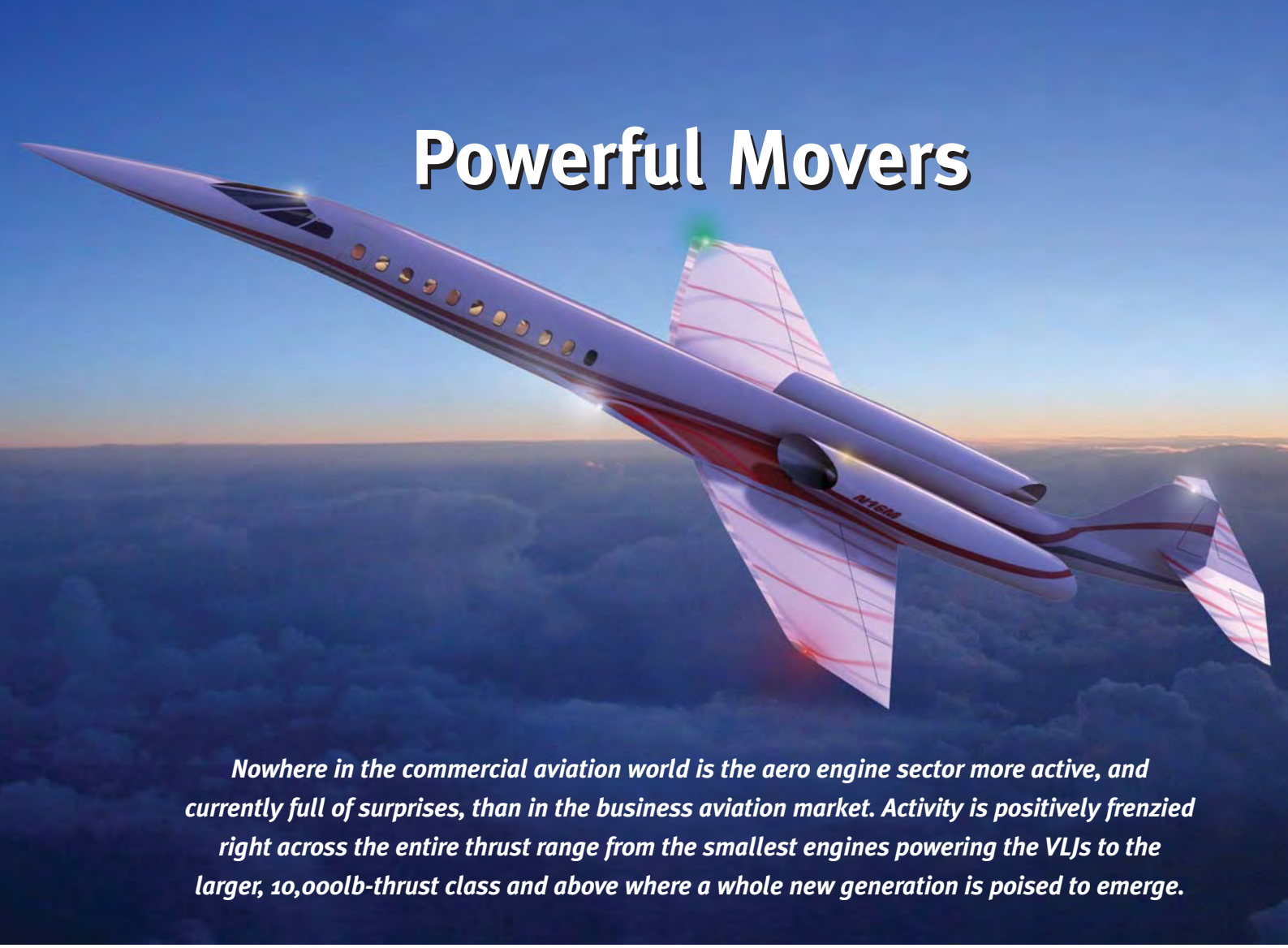
For the first six decades of the 20th century all major breakthroughs in aerospace technology stemmed from military projects, or from advanced civil airliner programmes such as the Anglo-French supersonic Concorde, which itself was based exclusively on military know-how in structures, design, avionics and engines.

However with the first major downturns in the commercial jetliner business in the 1970s and the thawing of the Cold War and subsequent slowdown in military spending in the 1980s and 1990s, the driving force for future civil advances moved increasingly to business aviation. Competitive forces in the business aviation market continued to push innovation, often in a counter-cyclical way to its commercial counterparts. Yet no matter what happened in the military and jetliner worlds, the bizjets of tomorrow constantly called for technology that would make them go further, faster, higher, quieter and with the greater degree of safety that their high-paying passengers demanded.

Business aviation helped develop industrial-level production techniques for advanced commercial aircraft, beginning with the iconic Learjet 23, the first small civil jet aircraft to enter mass production. The aircraft, which emerged from a failed attempt by a Swiss aircraft company to build the FFA P-16 ground-attack fighter aircraft, was adapted by Bill Lear into the SAAC-23 civil jet design. Assembly kicked-off in Wichita, Kansas in 1962 as the renamed Learjet 23, marking the start of a new era for business aviation as well as the midwest US city.

Since then business aviation has led to further production innovations such as the development of large-scale composite structures, and the use of unprecedented mass-production modular assembly techniques now gearing up to support the coming wave of Very light Jets (VLJ). Much of the original credit for the leap to composites must go to California-based experimental designer and aerospace maverick Burt Rutan. Having pioneered the use of glass reinforced

Powerful Movers



Nowhere in the commercial aviation world is the aero engine sector more active, and currently full of surprises, than in the business aviation market. Activity is positively frenzied right across the entire thrust range from the smallest engines powering the VLJs to the larger, 10,000lb-thrust class and above where a whole new generation is poised to emerge.

Proposed Aerion supersonic business jet (SBJ)

Dominant players in the burgeoning lower thrust arena include General Electric and Honda with their new combined HF120 family, Pratt & Whitney Canada with its phenomenally successful PW600 and the increasingly widespread Williams International FJ33/44 families.

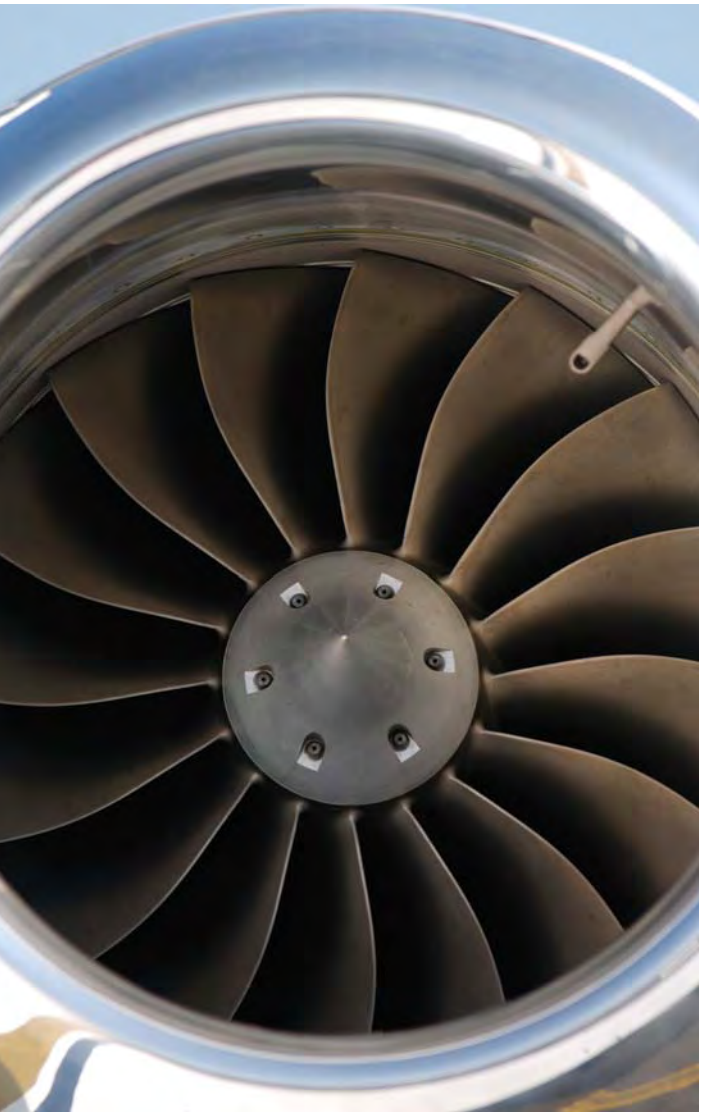
Since combining forces in 2004, GE and Honda have developed and tested components for the new HF120 engine, which was created with the VLJ and light jet markets in mind. With the first engine scheduled to run by mid-May, GE Honda plans to clinch certification in 2009. Initial applications include the HondaJet, which is targeted for certification and entry into service in 2010, and (around the same time) Spectrum Aeronautical's all-composite Freedom

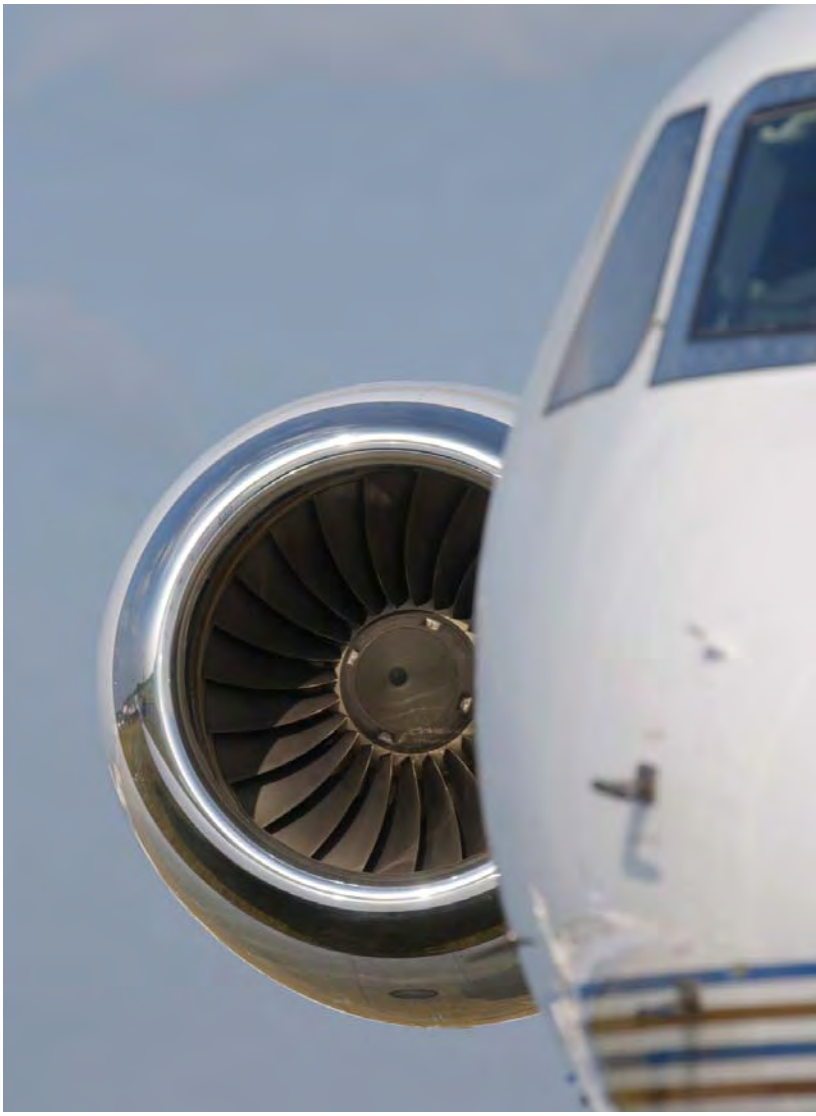
A derivative of the HF118 powering the proof-of-concept HondaJet, the higher-thrust HF120 has a 470mm (18.5in) diameter, wide-chord swept fan, a two-stage low-pressure (LP) compressor and a Honda-developed counter-rotating high-pressure (HP) compressor. Revealing the depth of technological resources available to the team from within their parent organisations, the compressor is based on a titanium impeller design while the reverse-flow combustor is lined with high temperature Hastelloy.

The little engine, which will be capable of more than 2,000lb thrust, also incorporates single-stage HP and two-stage LP turbines. The design was changed considerably after the HF118 lost to the Pratt & Whitney Canada PW617F in Embraer's Phenom 100 competition. Changes include a more efficient compressor, a smaller core and higher initial thrust.

Meanwhile P&WC goes from strength-to-strength in the VLJ market as its made-to-measure PW600 engine begins its working life on two of the 'big three' new models being produced by Cessna, Eclipse and Embraer. The first shipset of PW617F engines were meanwhile delivered in March 2007 to Embraer for the Phenom 100, marking the third delivery milestone for the new very light jet PW600 family.

The PW617F, which completed its maiden flight on P&WC's Boeing 720 flying testbed in mid-October 2006, was selected by Embraer for its VLJ contender in May 2005. Design work on the derivative, rated at 1,695lb (7.5kN) thrust for the Brazilian application, began in July 2005 with first run to full take-off power at the company's Mississauga, Ontario test site in 29 June, 2006. The engine is expected to be granted Transport Canada certification in the fourth quarter of 2007.





Final assembly of the Phenom 100 prototype is almost complete at Embraer's São José dos Campos site in Brazil, with first flight scheduled for mid-year and certification and entry into service for mid-2008. First deliveries of the 1,350lb-thrust rated PW615F variant for the Cessna Citation Mustang meanwhile took place in March 2006, two months after engine certification, while the 900lb thrust PW610F, the first production version of the family, was certificated for use on the Eclipse 500 in late July 2006.

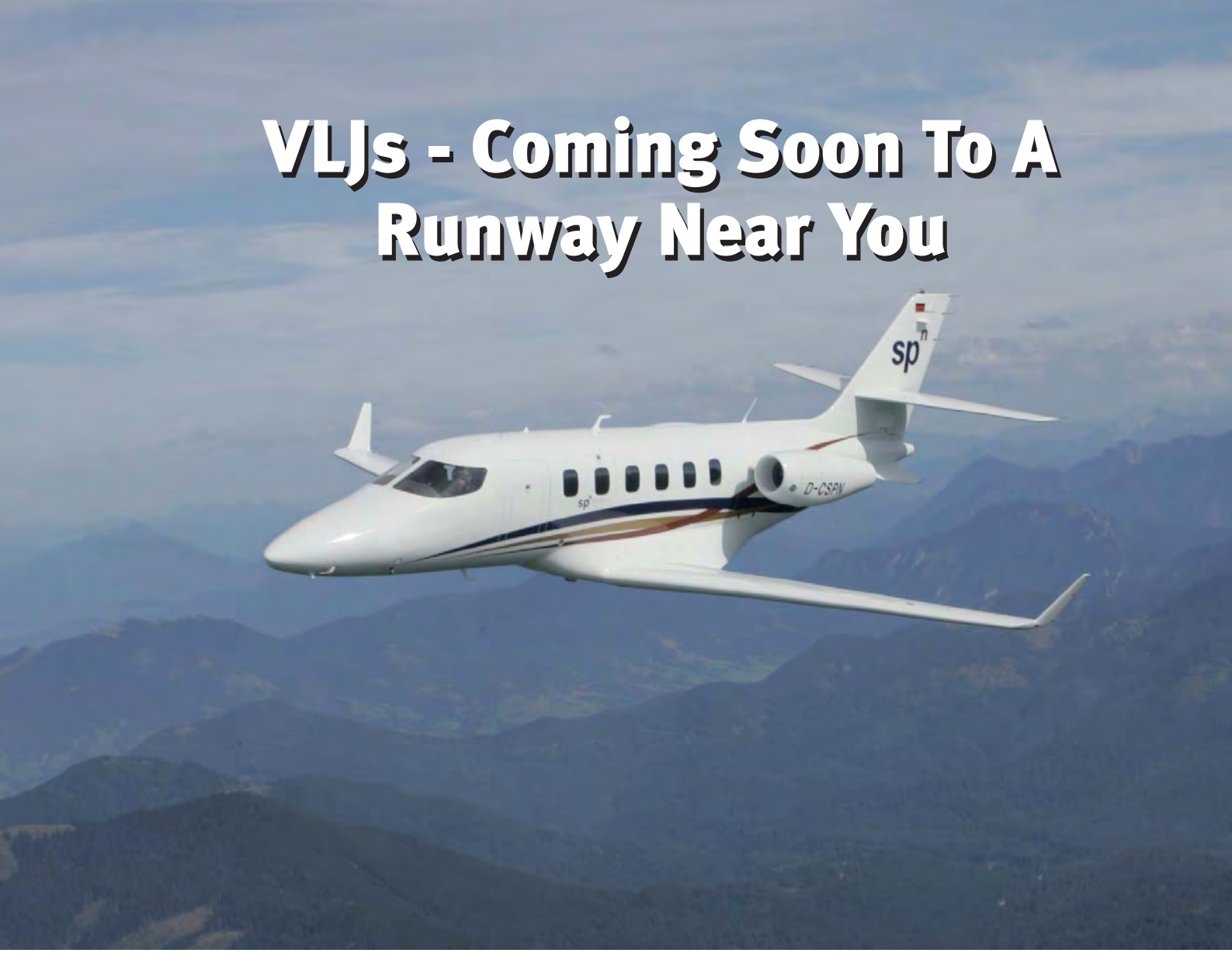
All three members of the PW600 family stem from technology demonstrated on the 2,500lb thrust PW625F which first ran back in 2001. P&WC believes its decision in 2000 to develop the simple PW625F demonstrator and grab the initiative in the emerging very light jet market was pivotal.

The Mustang's PW615F was the first of the new-generation light jet powerplant family to be certificated. Rated at 1,350lb thrust, the PW615F has a 40.6cm (16in) diameter, solid titanium, wide-chord fan and a two-stage axial-centrifugal high-pressure (HP) compressor, a mixed flow half-axial/half-centrifugal stage and one centrifugal stage. The engine includes single HP and low-pressure (LP) turbine stages, a reverse flow combustor and forced mixer/common exhaust. Control is provided by a dual-channel, full-authority electronic engine control system developed by Hispano-Suiza Canada.

The engine has around 40% fewer parts than previous powerplants in a similar thrust class, such as P&WC's PW500, and is made up of a handful of interchangeable modules. The result is an engine that is not only easy to mass produce, but easy to inspect, overhaul and maintain. A hot section inspection, for example, is achievable on-wing within eight hours and engine accessories are “one deep” - they are accessible without requiring removal of other parts. P&WC plans to build one PW600 every 8h, an unprecedented rate not achieved before for an aircraft engine, or attempted in peacetime.

In early April 2007, Cessna for the first time flew the new Williams FJ44-4A engine aboard a Citation test bed aircraft in the build-up to its use on the upcoming Citation CJ4. The flight is the latest milestone for the increasingly

VLJs - Coming Soon To A Runway Near You



Grob sp>n

Whether or not you believe forecasts that the skies are about to turn black with very light jets (VLJs), the fact remains they are on their way – and very likely in unprecedented numbers.

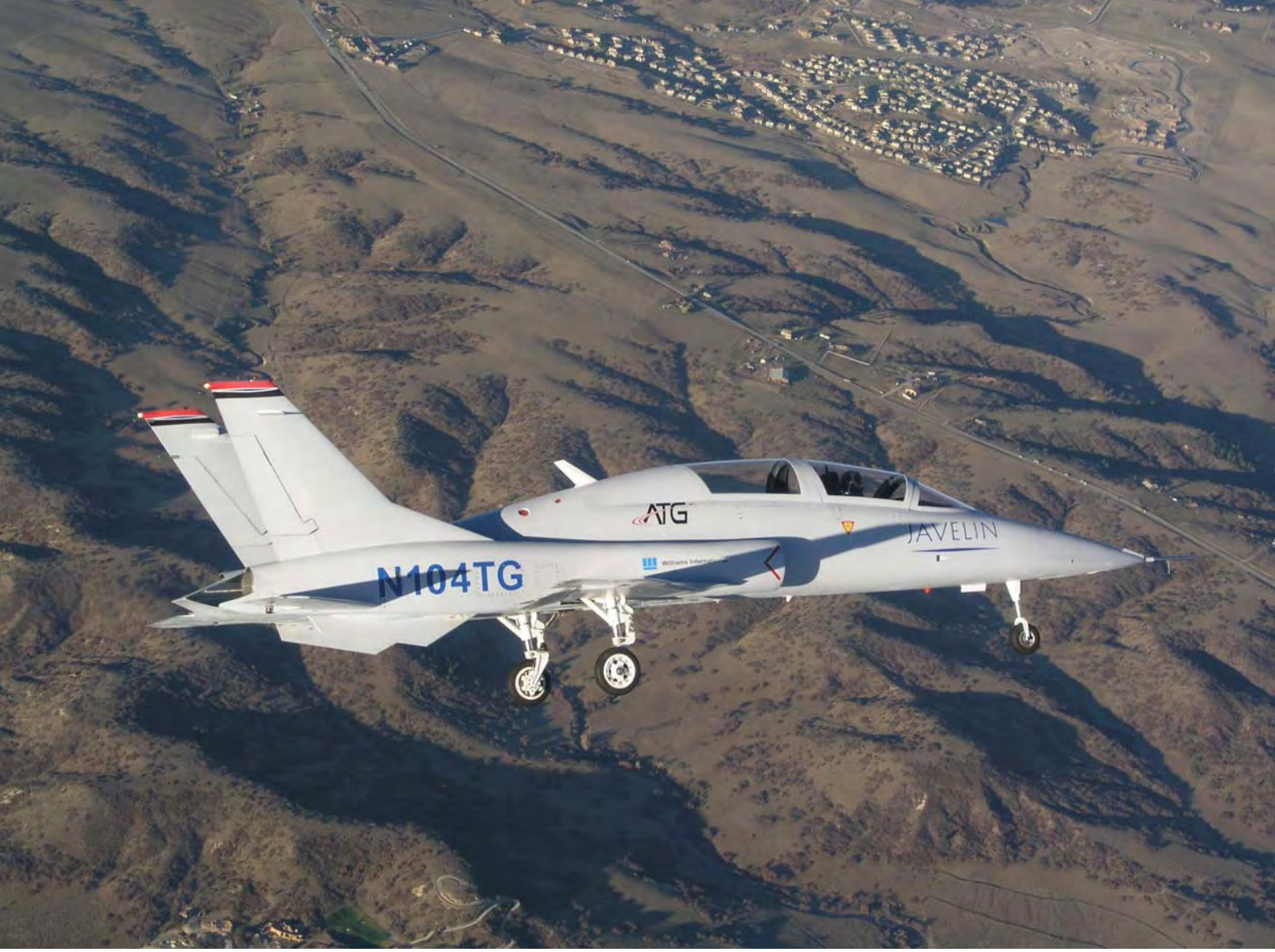
Part of the problem with predicting this great unknown is defining which of the nicknames in the VLJ glossary actually constitute very light jets. The class has been variously described in terms of personal jets, ultra light and very light jets, micro jets, mini jets or even 'Barbie' jets, but many industry forecasters increasingly seem to agree that anything below 10,000lb maximum take-off weight can justifiably be considered. Others define them more generically as lightweight, low cost aircraft costing below $4 million and seating a maximum of eight.

To the traditionalists aircraft previously considered as 'entry level' such as the Cessna Citation CJ1+ and Raytheon Premier 1 remain in a class above the VLJs which themselves can be usefully divided into three main sub-sets. These include personal jets such as the Javelin and Diamond Aircraft D-Jet, ultra light jets such as the Adam Aircraft A700 and Eclipse 500, and a very light jets such as the Citation Mustang, Spectrum and Embraer Phenom 100.

So how big will the market actually be? Much of the answer depends critically on whether or not the much speculated air taxi market really takes off. As VLJs and the jet-powered air taxi concept are symbiotically linked, the fortunes of the two are therefore inextricably linked. If the market booms, and jet-powered air taxis become a reality, some like Rolls-Royce predict the VLJ market could be as large as between 7,000-8,000 aircraft worth as much as $25 billion over the next 20 years.

Forecast International believes sufficient demand has already indicated VLJ production levels over the next 10 years that could pass the 500 unit per year level by 2011, while consultants PMI-Media predicts more than 4,120 VLJs will be delivered between 2007 and 2016. The company also says that the firm VLJ backlog now exceeds 4,000 for around 14 new models in the sector.

Although Eclipse Aviation formally delivered its first aircraft to a paying customer on the last day of 2006, the



ATG Javelin 'fighter lookalike' personal jet

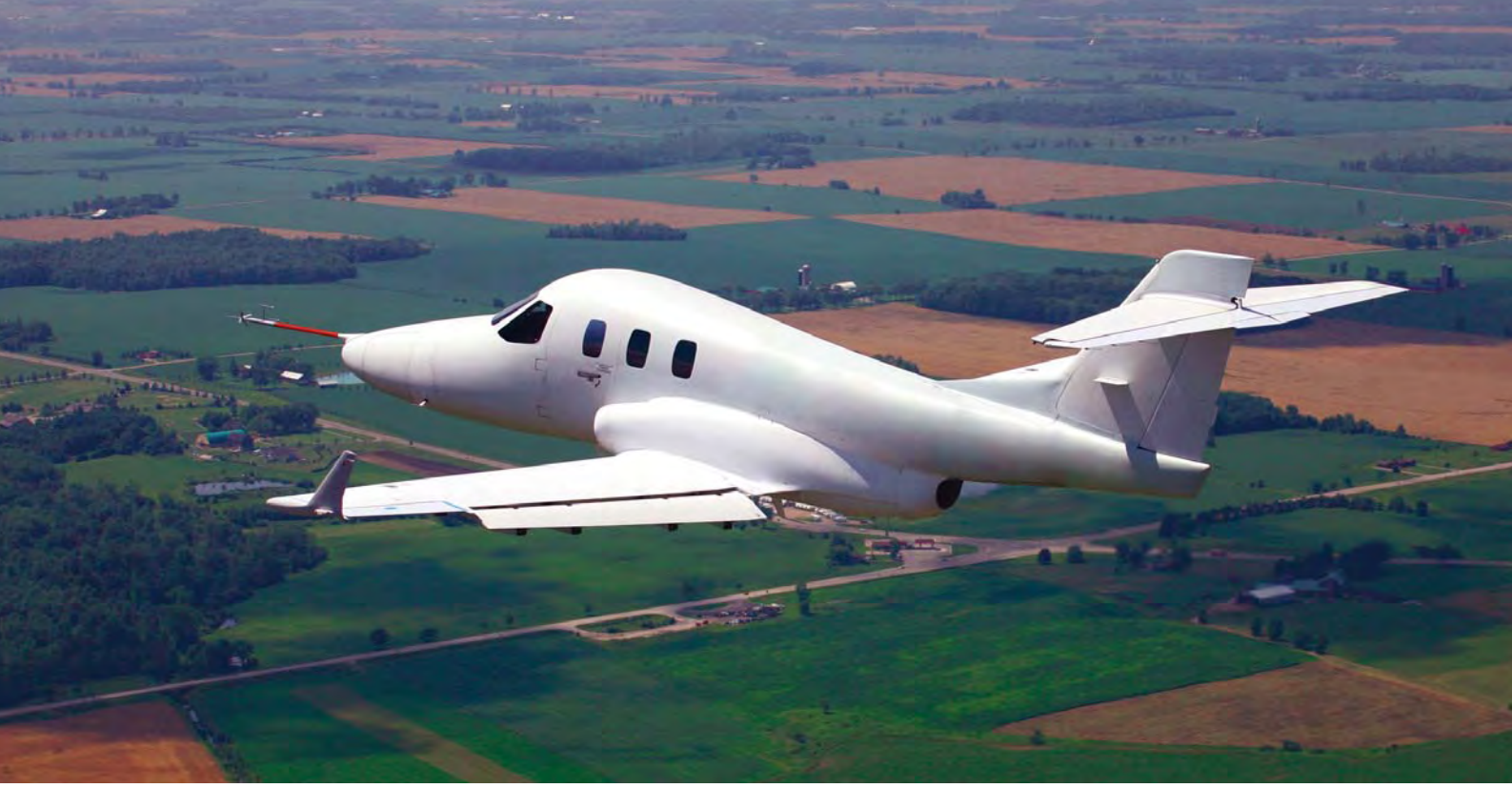
Thus were sown the seeds for the VLJ revolution of today, and the first tangible evidence of the coming wave was the appearance at the 1997 Oshkosh show of the Scaled Composites-built, and Williams-designed V-JET II. Although powered by lower thrust FJX-1 proof-of-concept engines, the highly unusual little jet was mobbed by crowds at the show. Designed purely as a concept demonstrator, the aircraft had forward-swept or V-shaped wing, and V-shaped tail and attracted far more attention than even NASA expected and was a basic litmus test for the coming enthusiasm over VLJs.

At the show that year was Vern Raburn, a dyed in the wool aviation fanatic, pilot and wealthy IT entrepreneur. Raburn, the son of a McDonnell Douglas engineer, became the 18th employee hired by Microsoft and later worked at Lotus as well as for Microsoft co-founder Paul Allen. Raburn, who saw the new GAP engine as the breakthrough he needed to create an affordable twinjet, met up with Willams boss Sam Williams to discuss the possibilities of the FJX-2 and the Eclipse dream was born.

The following year Raburn established Eclipse Aviation and in April 2000 announced that that the EJ22 (the newly named commercial Williams International derivative of the NASA/GAP FJX-2) would power the Eclipse 500 aircraft. The plan at the time was to introduce it in 2003, but problems inevitably lay ahead. Although the EJ22 eventually powered the Eclipse for its maiden flight in August 2002, the engine was underpowered and it became immediately obvious that more thrust would be required, and quickly. Too quickly, it seemed, for Williams to be able to meet the aggressive Eclipse timescale, and so in November that year the agreement between the two was terminated.

The fall-out from the decision was to have far-reaching impacts for the business aviation market and the VLJ sector in particular. Williams went on to focus resources on the FJ33/44 engines and powers the vast majority of the VLJ newcomers on the market today, while the contest to power the Eclipse 500 allowed Pratt & Whitney Canada to step in with what promises to quickly become the first mass-produced light jet engine in history – the PW600.

P&WC had been waiting in the wings with the PW600 ever since taking the strategic decision in 2000 to develop the simple PW625F demonstrator and grab the initiative in the emerging VLJ market. With the philosophy



Diamond D-Jet

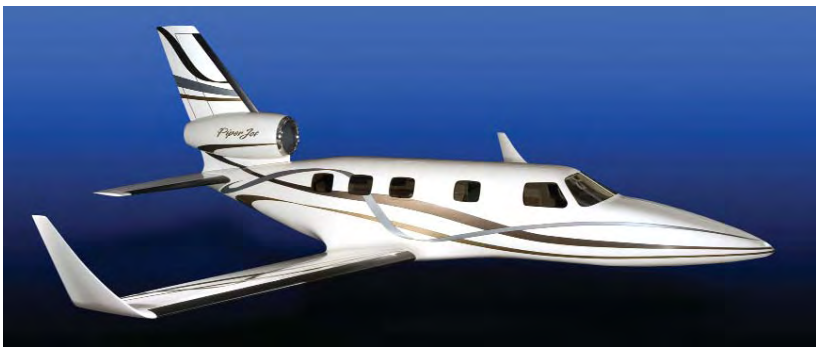
HondaJet which will be powered by the jointly-developed General Electric-Honda HF118 engine. Also in the running is the Spectrum Aeronautical S-33 Independence. Again FJ33-powered, this all-composite twin first flew in January 2006 but the programme was hit by the crash of the prototype in July of that year. Seating up to nine, and priced around $3.7 million, the company remains optimistic that its very lightweight (MTOW of only 7,300lb with a useful load of 3,680lb, will provide excellent operating economics.

But with so many products in the market, the recurring questions over the future of the VLJ sector refuse to go away. Even if the air taxi market emerges the questions continue to be asked over the true size of the owner/operator contingent. How many private pilots or owner groups can really afford to swap their Cessna, Piper or Beech for a jet? Perhaps surprisingly, or not – depending on who you ask, the answer may be quite a few. Rolls-Royce's forecast for instance, projects a 50 percent increase in millionaires over the next 10 years (from 9 million currently to around 13 million by 2015-16). In addition, there is expected to be a doubling of billionaires to around 2,000 over the same period, compared to around 800 today.

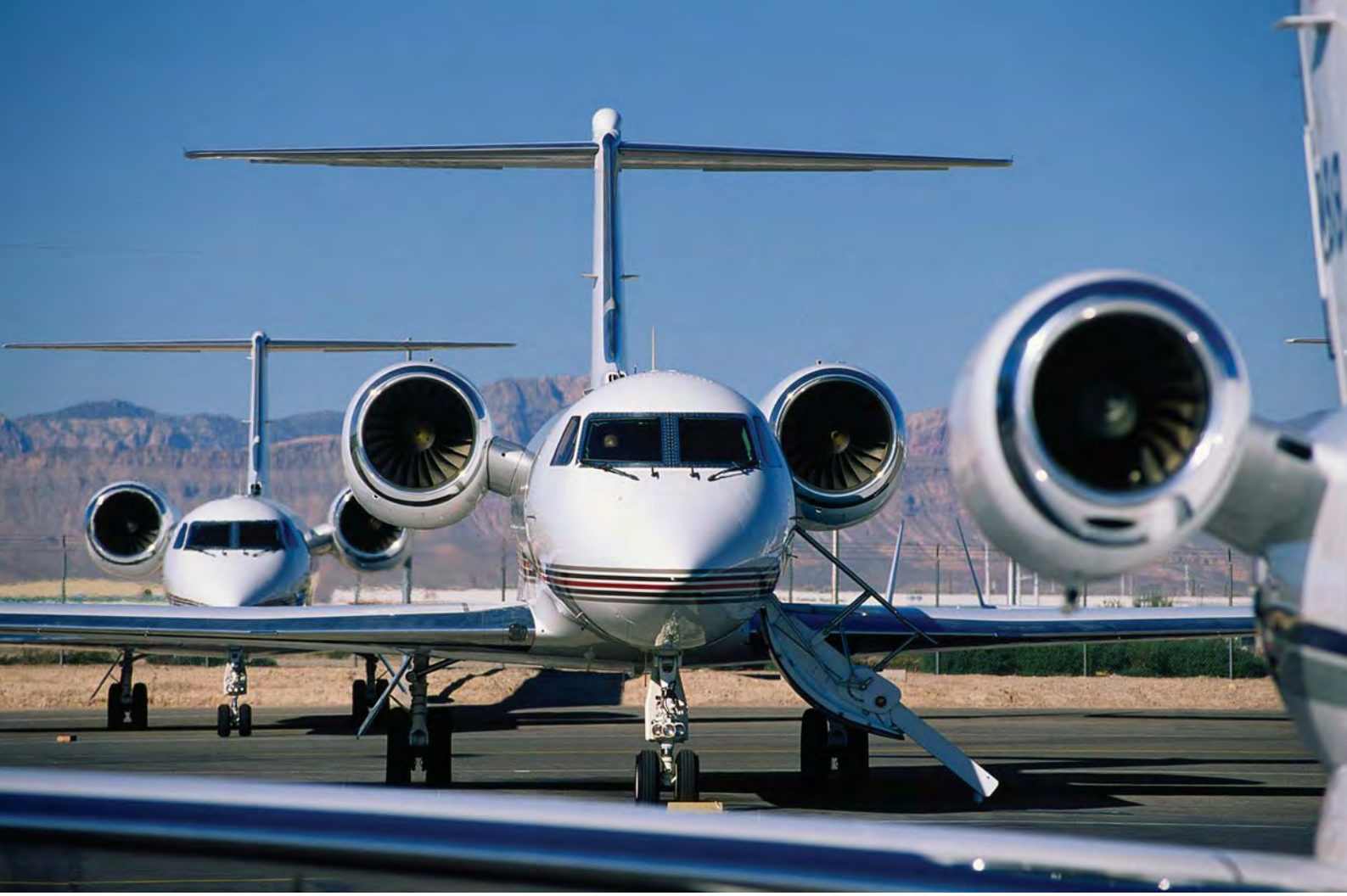
Certainly wealth helps, but it seems the true answers to the future viability of the VLJ market continue to rest with the success or failure of the air taxi concept and the various business models they plan to pursue. DayJet, for instance, will offer point-to-point "Per-Seat, On-Demand" services to regional communities. Launched in 2002, DayJet plans to set up bases at a network of underused local airports, called DayPorts, from where it will try to match travellers who want to go from one to the other at roughly the same time.

Others, like Magnum, in Stamford, Connecticut – which has ordered 110 Adam A700s and 50 Embraer Phenom 100s, is taking a different tack and markets itself as an "air limousine". Linear Air meanwhile plans to serve the most densely populated region of the USA, around New York City and Boston. The company started operations in 2004 using Cessna Caravans, and once it starts receiving Eclipse 500s plans to open bases near Boston, New York, Washington DC and then on the West Coast, each airport serving a radius of around 800km. Pogo, which originally selected A700s in May 2004, does not plan to launch operations until mid-2008 and is evaluating several VLJs including the Eclipse 500.

Although the pessimists predict the air taxi bubble will burst as quickly as it inflated, there can be no underestimating the enthusiasm and determination of the VLJ manufacturers to make the concept work. Equally, anyone used to traveling the congested airways of the US in particular, can be in no doubt as to the pent-up desire of the airline passenger's wish to try something new. At least all agree on the continued growth of air travel, it is simply a question of how these journeys will be made.



PiperJet



Gulfstream GIV on the ramp at Signature Flight Support (Photo Courtesy: Mark Wagner/Aviation-Images.com)

Own or Charter?

Owning a business aircraft is extremely expensive but like anything, it depends what the cost of not having one is. For large corporations whose executives' time is worth an absolute fortune, a business jet can be justified fairly easily when one looks at the benefits - point-to-point, leave when you want, stress-free, work on board, sleep properly on board, and so on.

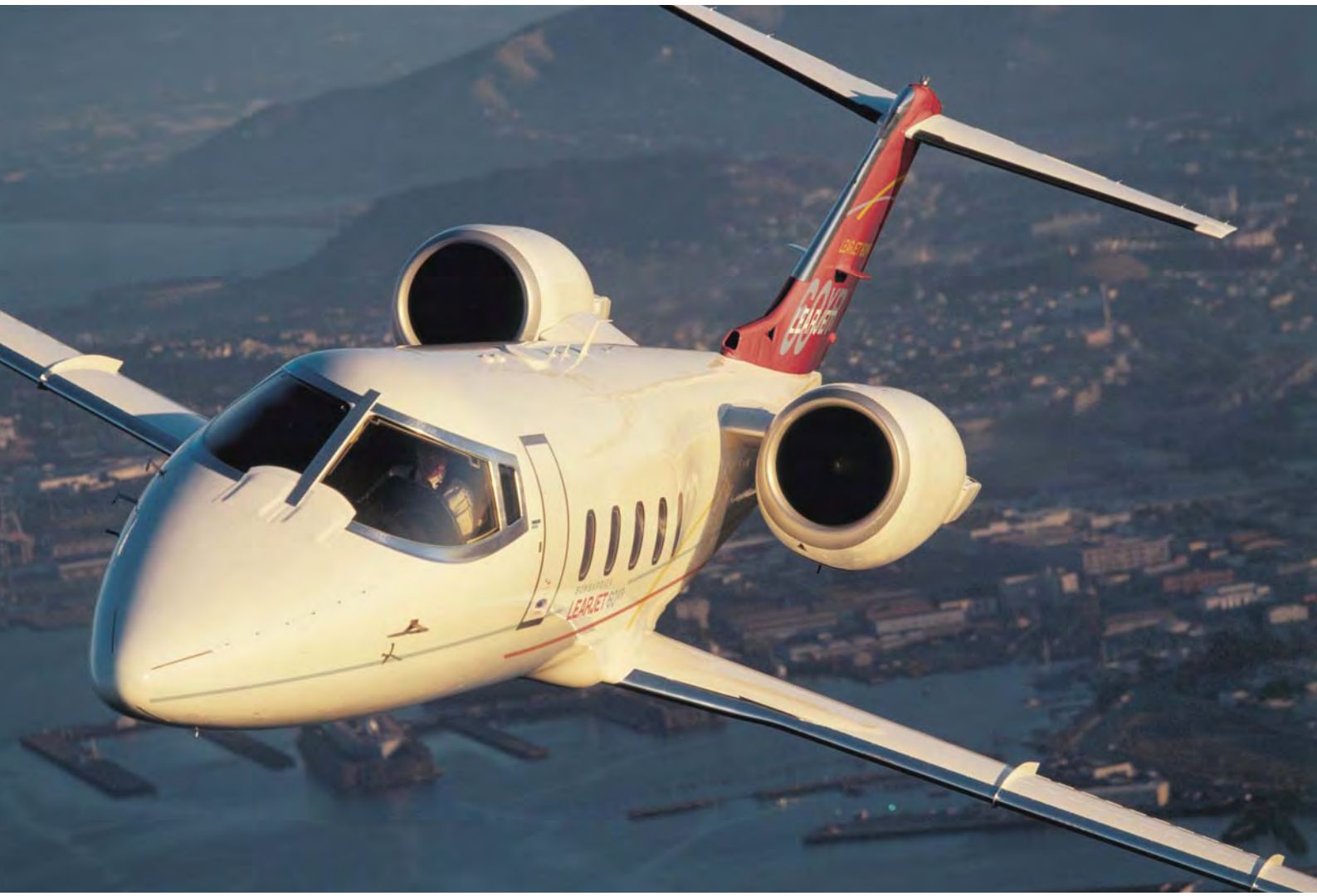
Nevertheless companies are cost-conscious, and there is a huge untapped market outside the big corporations, right down to the small company run by a busy entrepreneur. How to tap this market has increasingly become the theme of the industry, and has seen numerous models of business aircraft spawned over the past decade or two - culminating now in the advent of VLJs.

Perhaps the most significant development in this respect however has been the advent of fractional ownership as a concept, in that it started an exploration into what was possible. That in turn has boosted the non-fractional market, where individuals or companies can own a bizjet but allow the aircraft to be used for charter work by an aircraft management company, which also takes responsibility for maintenance and crewing.

Fractional Ownership

NetJets Inc pioneered fractional ownership in the US in 1986, although the company can trace its roots back to 1964 when it was the first private jet transportation company in the world to offer charter and aircraft management services. It now has more than 600 aircraft worldwide.

NetJets Europe was founded in 1996 as the marketing agent for NetJets Transportes Aéreos, a new company based in Portugal as a subsidiary of Netjets Inc. Berkshire Hathaway became involved as a major investor in NetJets Inc in 1998 - but in Europe it wasn't all plain sailing, with only 89 customers and 14 aircraft by 2002. However, by 2006 it was easily the largest single operator of business jets in Europe, with 120 flights a day on average through the year. In March 2006 it added its 1,000th customer and



Learjet 60XR

This uncertainty has not been missed by some in the industry, who have been turning a weakness into a selling point. An example of a company which has really taken the corporate jet market by storm is TAG Aviation, which has even gone as far as to purchase Farnborough Airport near London and develop it as the UK's only dedicated business/private aviation airfield.

Andrew Pethen, commercial manager with TAG Aviation at Farnborough, says that aircraft management has really taken off over the past two years or so, and it has 25-30 aircraft now in the programme. In some cases this has involved sourcing aircraft for customers and then managing them, while in others the company has sold its own aircraft to customers (in fact it only owns four aircraft now).

Pethen says that the advantage of chartering through a larger organisation is the quality of maintenance and service, in particular the modern facilities somewhere like Farnborough, and for those owning aircraft they can rely on high quality maintenance and operations staff in the same way.

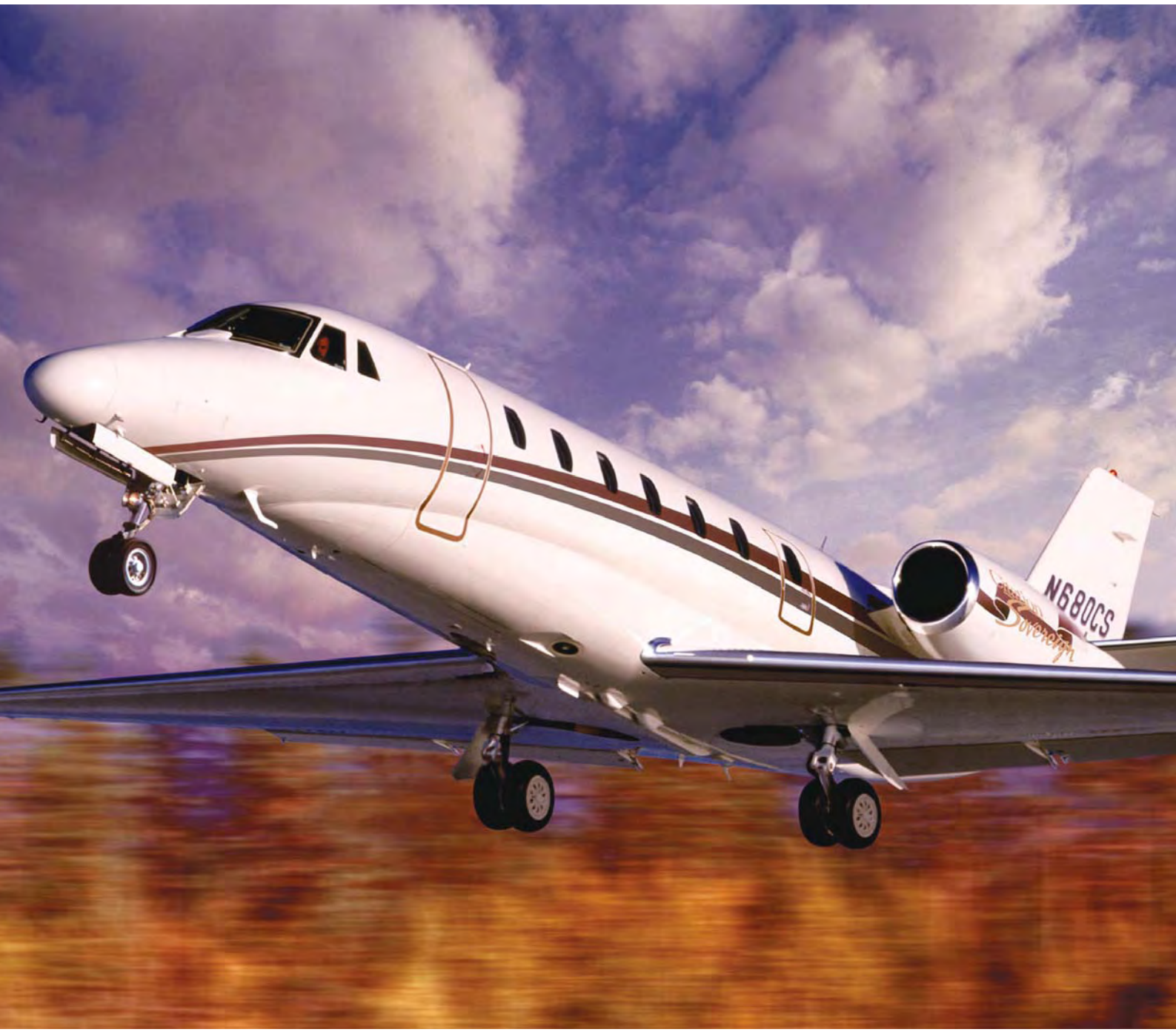
Its charter operations are a mixture of direct and broker clients, with families, individuals and companies using it like a “one-stop shop” with various aircraft to choose from - primarily Falcon 900EX, Falcon 50 and 2000EX, Learjet 40/60 and Challenger 604.

The charter operations generally feed up to the managed programme - “each department feeds off the others” he says, while sharing administration, crewing, flight planning, dispatch and other functions makes for a more efficient operation.

Pethen says that he is a great believer in Skyjet International, which has offices at the top of the TAG Aviation terminal at Farnborough. He does not see it so much as a competitor as providing something different - “if the ad hoc profile does not suit someone, we send them to Skyjet”, he says.

Skyjet International

In January 2005 Bombardier launched Skyjet International, “the world's first truly international jet charter service”, consolidating some of the world's leading charter operators into a single network, with 24-hour operation centres based in London, Dubai, Hong



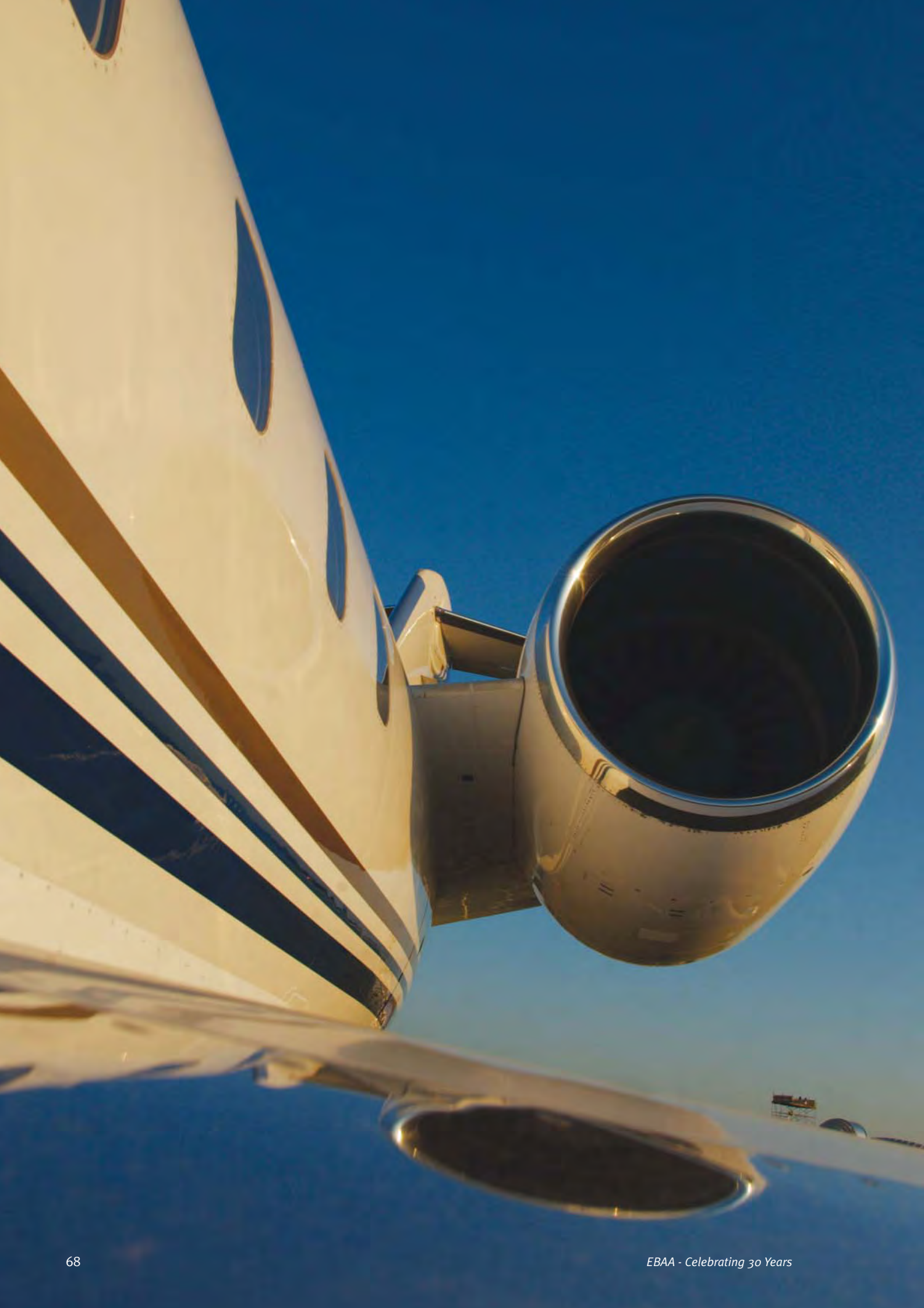
Cessna 680 Sovereign

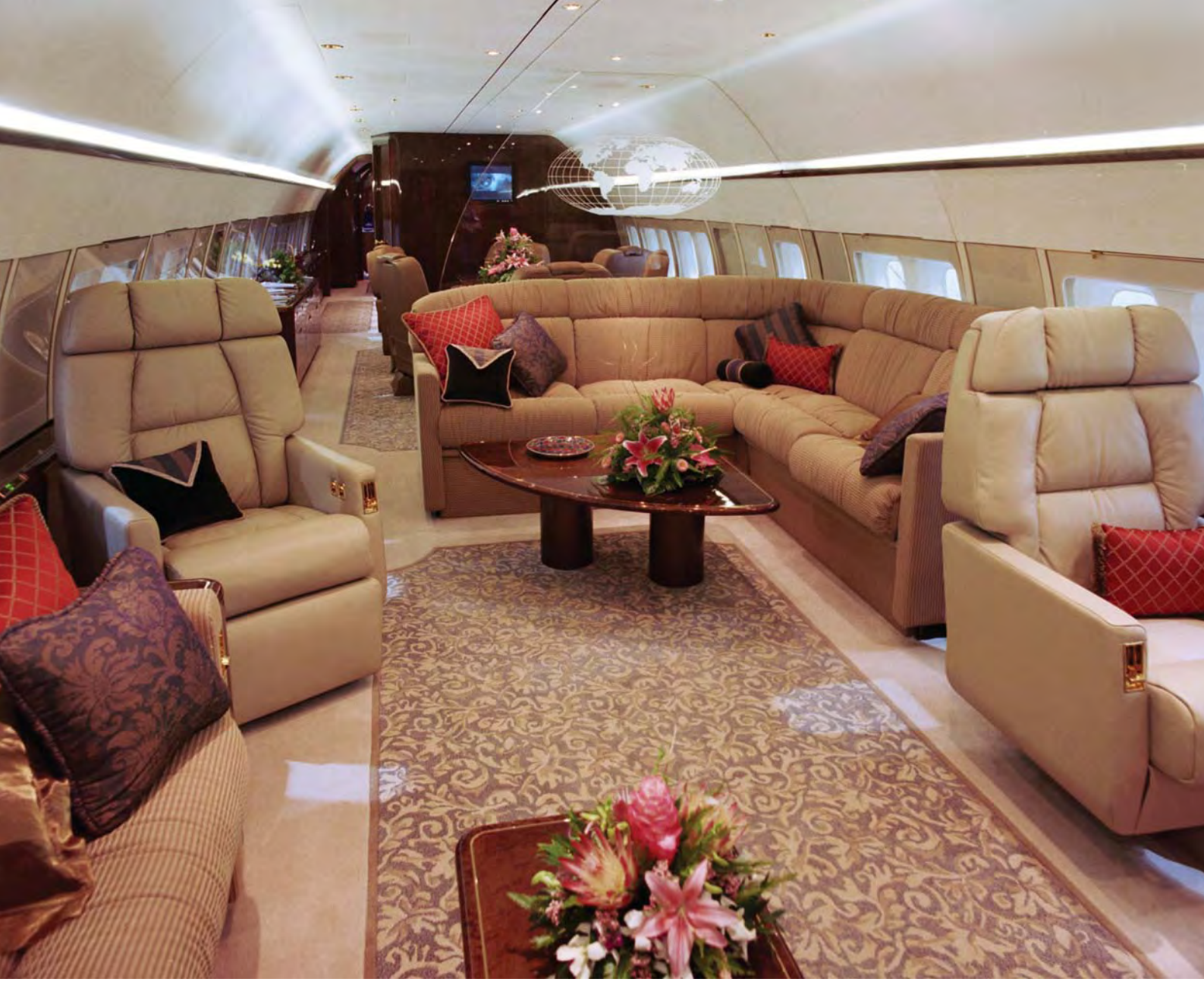
Farnborough. It owns five of the aircraft, which general manager Dave Edwards illustrates to customers that GAMA has first-hand experience of owning aircraft. It also has a well-known maintenance operation.

"People like Netjets revolutionised the industry by making corporate jets more widely known about", says Edwards, who is clearly enjoying the current economic boom which is allowing it to expand further. It is the second largest UK company in business aviation and now has a presence at Teterboro, New Jersey, next to the Jet Aviation facility there. He believes that growth and consolidation will be the hallmarks of corporate aviation worldwide in the future, with the larger operators swallowing up smaller ones and more seamless product offerings becoming the norm. "This is how Jet Aviation and TAG have done it", he concludes.

Conclusion

Key decisions must be faced by those purchasing corporate aircraft, shares or flight time, and by those owning and then placing the aircraft with a managing charter company. Due diligence is of paramount importance, as is market knowledge - product offerings change and it is imperative that contracts are fully understood if future disputes are to be avoided.





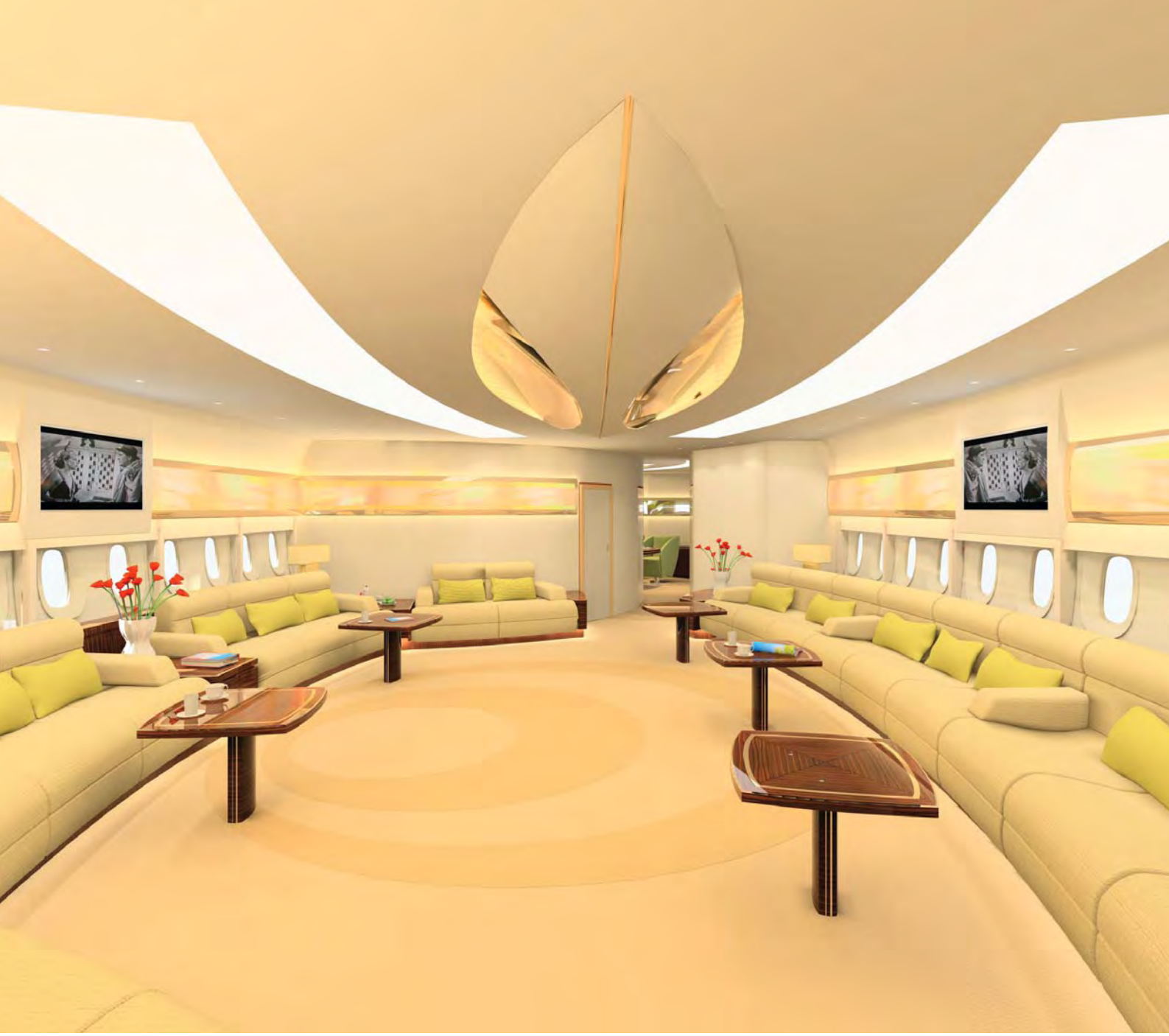
Boeing BBJ interior

Aircraft Interiors

In early business aircraft little importance was given to the design of the inside of the passenger cabin, apart from the comfort of the seats and the position of the galley and toilet. Today, that is so very different. Many business aircraft manufacturers have to sell their products on the interior as well as the performance of the aircraft. Manufacturers will have their own specialist interior designers who will create a special look for each individual client, if that client wishes. For manufacturers, this point often sells the aircraft and is extra revenue for the manufacturer as a consequence.

In the early days of business aviation, adding a telephone and television would have been seen as a real luxury. Early business aircraft were seen as nothing more than a limousine with wings; you just needed to get to meetings and did not need to conduct business in the aircraft. Taking a look inside an early business aircraft and comparing it with today's interiors, it becomes obvious just how far the inside has been improved and how important the comfort of the business traveller is to the manufacturers and operators in business aviation.

Nowadays businessmen need to be in touch at all times and therefore today's modern business aircraft must have the most up to date devices on board. So today's business aircraft will be fitted with the internet and global



Lufthansa is offering this as a possible Royal Lounge option for the main deck of an executive Airbus A380

as a number of business aviation companies such as Jet Management Europe, Jet Support Amsterdam and Shell Aviation.

• Burnet Interiors, Meyrin, Switzerland

Burnet Interiors was founded in 1966 and began to design aircraft interiors for the industry. In 1998, Franck Burnet took over the running of the company from his father Jacques.

Today, Burnet Interiors is able to design layouts for individual business aircraft and has particular expertise in wood, leather and ornamental ironwork for the inside cabin of the aircraft, adding an individual style to every aspect of the passenger interior. The whole of the cabin including the flight deck seating can be designed by Burnet Interiors using their own design or from ideas provided by the customer.

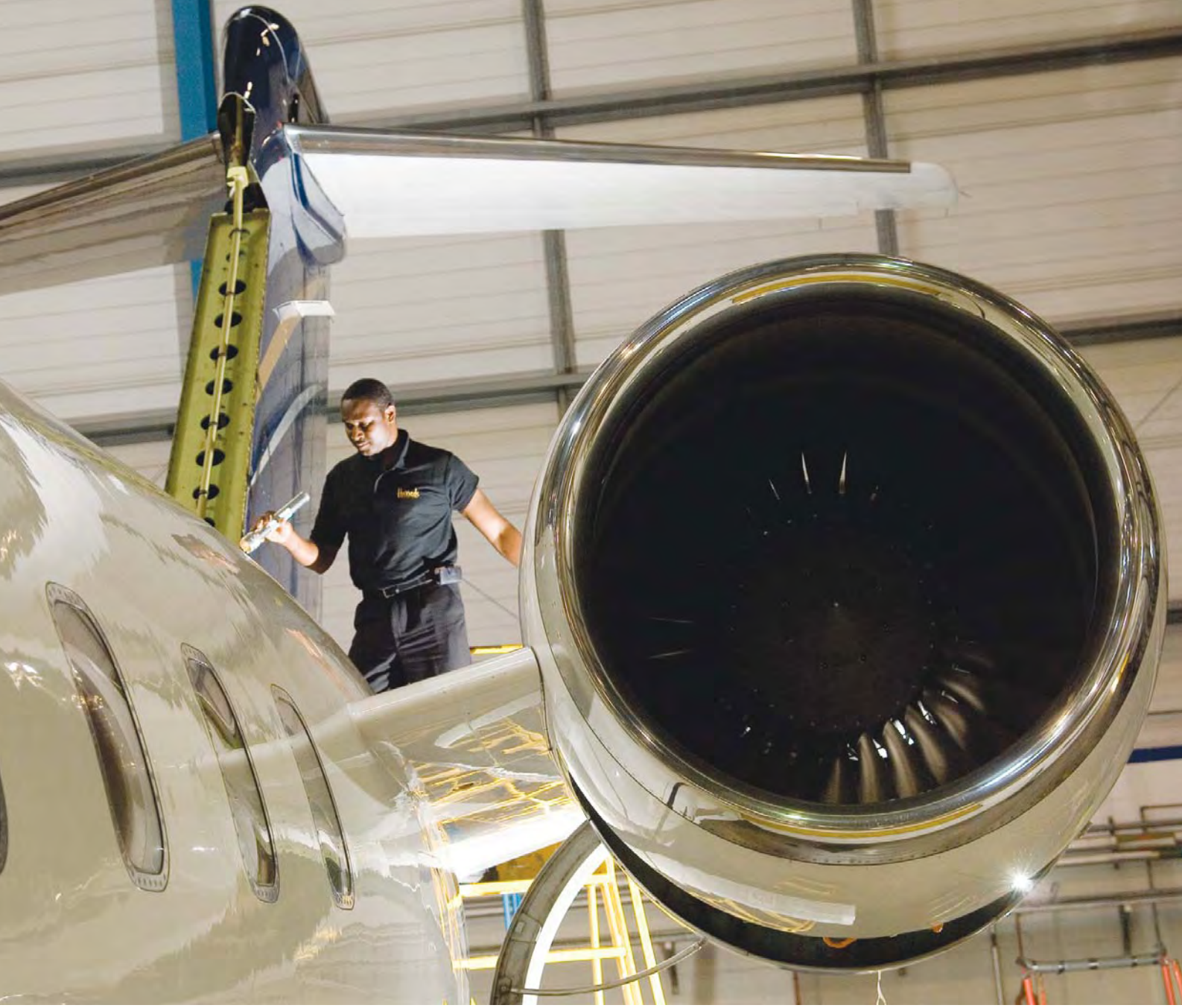
They are able to offer designs for smaller and larger business aircraft as well as helicopters used by businessmen.

Burnet Interiors has many clients from business aviation such as Aviaxess, Dassault Falcon, Helifrance, Jet Aviation, Mont Blanc Helicopter, TAG Aviation, TSA Transairco and many others.

• Lufthansa Technik

Lufthansa Technik is part of Deutsche Lufthansa and is one of the world's leading maintenance and refurbishment companies. It offers a comprehensive support and technical service to business aviation companies and are able to offer rework, design and interior installation on a wide range of business aviation aircraft including the Airbus Corporate Jetliner and Boeing Business Jet.

They are able to offer the same service and support to operators of smaller business aircraft from Learjets to Dassault Falcon jets and many aircraft in between.



Harrods Aviation maintenance (Photo Courtesy: Harrods Aviation)

Maintenance For Business Aircraft

As well as a predicted growth in business jet numbers, the size and type of aircraft is changing, with potential for considerable changes in maintenance requirements.

The range of aircraft available for business and VIP use has grown considerably in recent years. The traditional types such as Learjets, Citations, Falcons and Gulfstreams are set to become the middle of the market as a new generation of Very Light Jets (VLJ) gets ready to enter service and more airliners are developed for corporate use - even the Airbus A380 and Boeing 787.

Bombardier's Business Aircraft Market Forecast for the 10-year period from 2007 to 2016 predicts that corporate aircraft manufacturers will deliver approximately 9,950 business jets, excluding the very light jet segment, a substantial increase from the industry average of over 572 business jet deliveries annually during the 1997 to 2006 period. At last year's NBAA, Rolls-Royce predicted a continued growth in business jet deliveries through the remainder of the decade, and a need over the next 20 years for 24,000 new aircraft; from very light jets to business jetliners, with medium and large business jets representing nearly half. Medium jets will account for 7,330 aircraft, second only to the Very Light Jet (VLJ) category in volume at 7,649 deliveries. Long range and ultra long range aircraft will account for another 4,600 deliveries.

Traditionally, business aircraft have always had low utilisation compared to aircraft in airline operation. This occasional use meant that maintenance programmes

Flight Operations

While the past 30 years have seen tremendous growth and many advances in business aviation, the basic principles of a safe and efficiently operated flight have remained much the same. You need a departure point, a destination, an aircraft, some qualified pilots and - to hold it all together - a plan. In this increasingly demanding airspace environment and the highly competitive commercial world of aviation, a good plan makes all the difference. A good plan will consider more than the basic principles. So, how is this best done today? The answer for many is ARINC Direct, and is best illustrated by taking a look at their planning process using a generic case study.

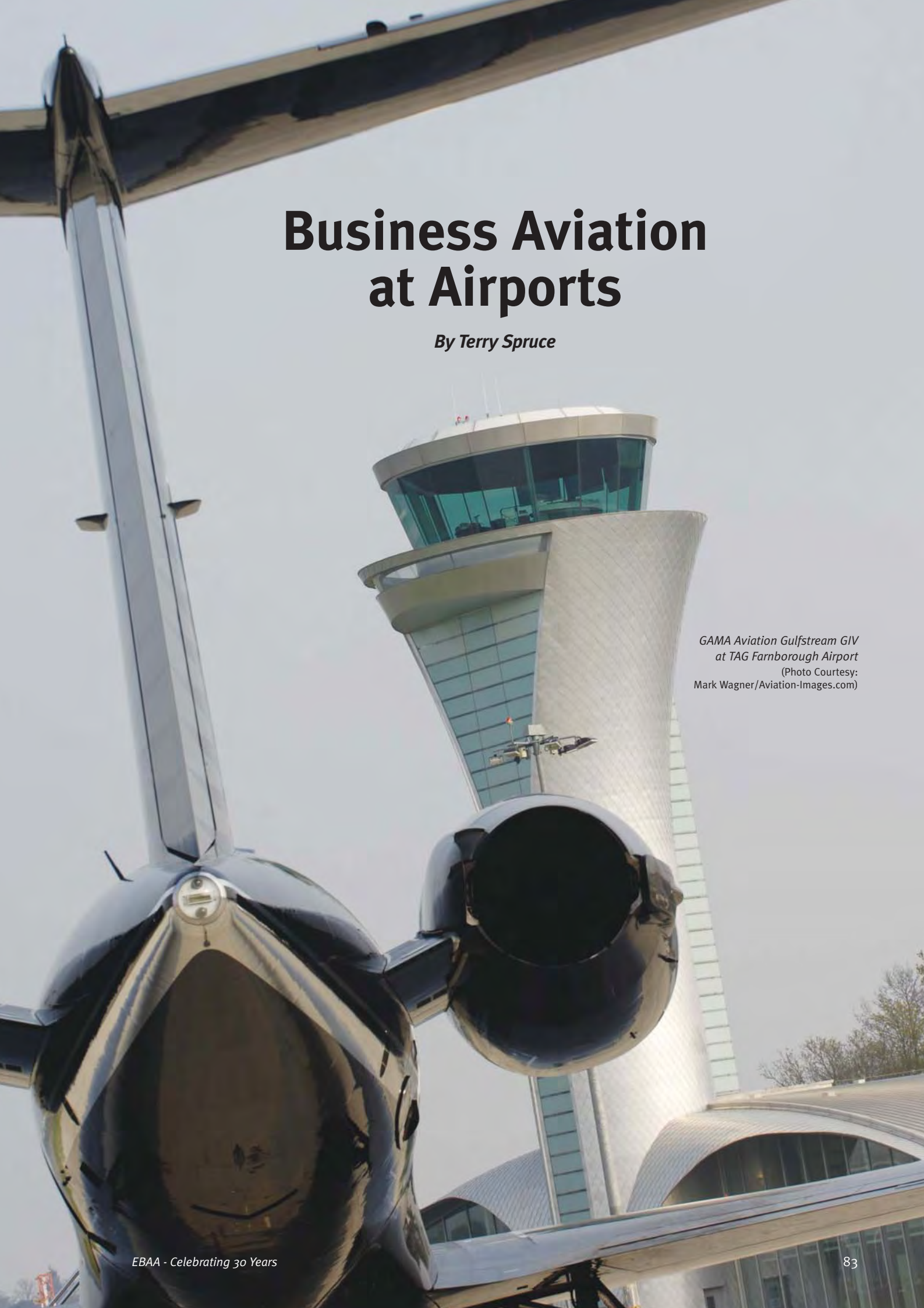
ARINC Direct's Operations Centre. In spite of the high degree of automation in flight planning today, ARINC Direct has a team of highly qualified Flight Co-ordinators on call 24/7. In the foreground is Anja Heflin, Senior Supervisor, International Planning.

ARINC Direct users have easy access to an integrated web-based suite of applications that enables flight planning, datalink communications, runway analysis, weather, and NOTAMS. Additionally it provides team of flight co-ordinators available 24/7 on the phone to provide support.

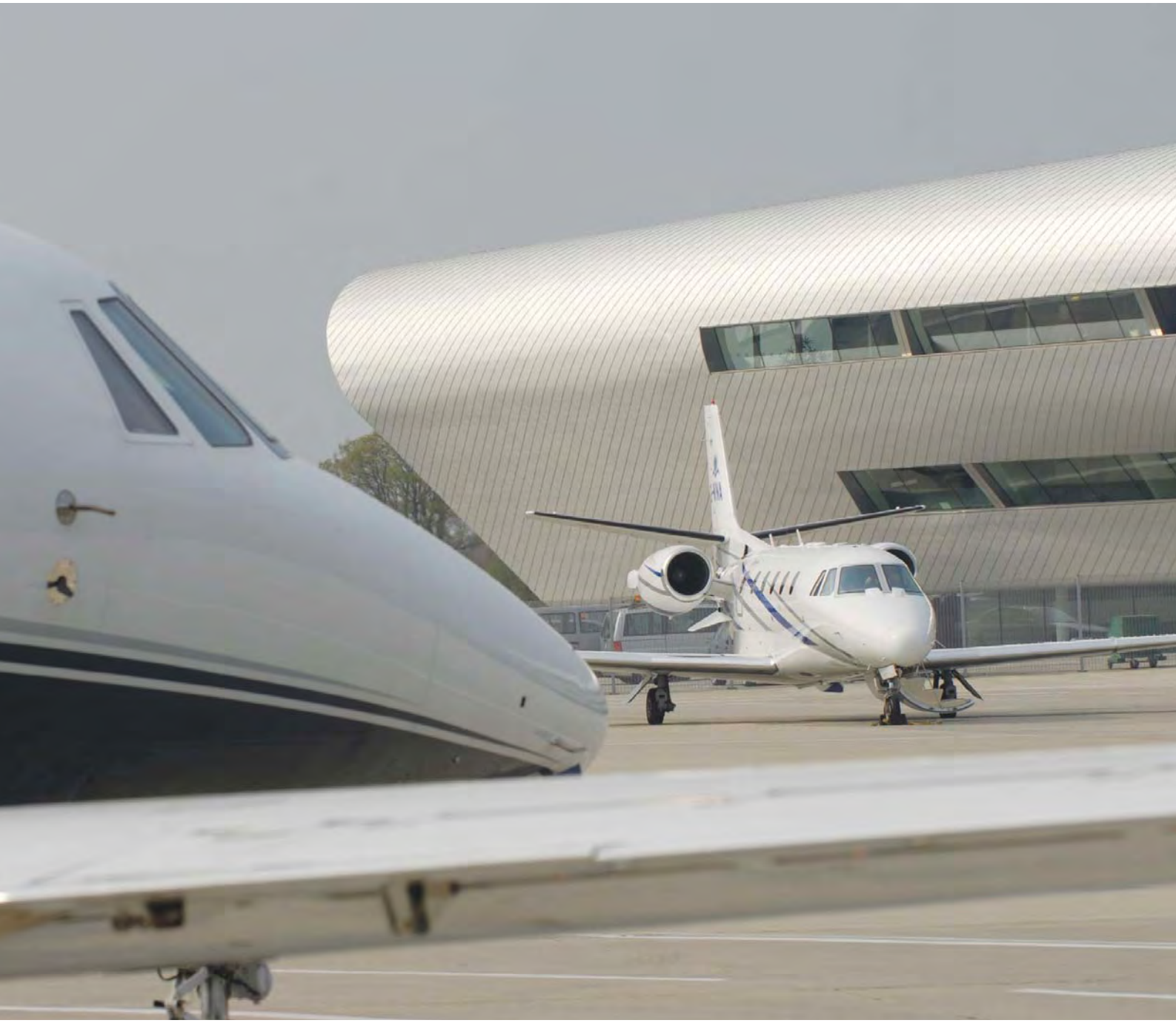
Whether or not you are a pilot or a dedicated dispatcher, at some point you are going to get that urgent call to get the client somewhere fast. This is the nature of business aviation. With ARINC Direct you have two immediate options: Login online or make a phone call. After that the process is similar, as the flight co-ordinator will login to your

Business Aviation at Airports

By Terry Spruce



GAMA Aviation Gulfstream GIV at TAG Farnborough Airport
(Photo Courtesy: Mark Wagner/Aviation-Images.com)



Citation XL at TAG Farnborough Airport (Photo Courtesy: Mark Wagner/Aviation-Images.com)

will organise all aspects of the travel arrangements for the client.

Other companies with business aviation facilities based at Biggin Hill are Markoss Aviation and Interflight Air Charter.

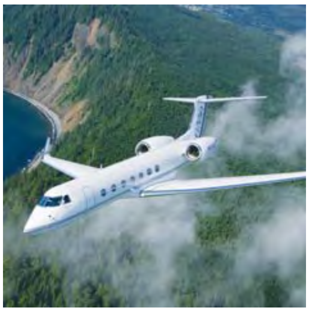
Brussels

There has been an airfield at Brussels for nearly 100 years, when in the Great War the Germans needed to build a Zeppelin hangar. The airport has over history been involved in many aviation firsts and has grown in importance thanks to the main European institutions being is based in the Belgium capital. The airport needs to be able to handle a growing number of business aviation aircraft.

Abelag is based at Brussels and has been a leading operator of business aircraft for over 40 years. The company has three bases in Belgium and one at Lille in Northern France.

The facility in Brussels has a hangar space totalling 2,500 square metres that can accommodate aircraft up to Gulfstream IV size and offers full FBO services in a recently refurbished passenger and crew lounge.

The facility regularly handles very high profile European government delegations at the complex. The company has outside ramp space to handle and maintain aircraft as large as Boeing 747 aircraft.



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