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Industry outlook remains cloudy

Manufacturers' conflicting messages reflect mixed fortunes, reports *Robert Wright*

Mixed picture: the market for large jets has been strong but a recovery in midsize aircraft is more fragile — Patrick Lynch/Alamy

For anyone seeking to understand the state of the business jet market, the three weeks at the end of April and start of May were a confusing time.

On April 29, Phebe Novakovic, chief executive of General Dynamics, expressed cautious but unmistakable optimism about prospects for the US aerospace and defence company's Gulfstream business jet operation as she discussed its first-quarter results.

"We always pull production down in the face of weak orders," she said. "We have no intention of doing so this year."

On May 14, however, Canada's Bombardier, which in January had stopped work on its new Learjet 85 corporate jet, made it clear Ms Novakovic's optimism was not universally shared. Weak demand was forcing it to cut production of its biggest, most expensive aircraft — the Global 5000 and Global 6000.

"We have seen an industry-wide softness in demand recently in certain international markets and are taking steps to adjust our production accordingly," Éric Martel, the then president of Bombardier Business Aircraft, said.

The conflicting messages partly reflect how mixed 2015 has been for business aircraft makers. Teal Group, a Virginia-based aerospace consultancy, predicts that 713 business jets will be delivered during 2015. Although the figure is an improvement on the 672 delivered in 2012, it is a slight fall from the 722 delivered in 2014 and highlights how far the industry is from again hitting the record 1,318 delivered in 2008.

The picture has also been different for companies serving different parts of the world and in different size categories. Deliveries at the top end of the size range have held remarkably steady throughout the economic downturn. Gulfstream is projected this year to deliver 115 of its largest-cabin jets — the G450, G550 and G650 — down slightly from 117 last year. Bombardier's production of its flagship Global 5000 and 6000 is set to fall to 68, from 80 in 2014.

Chad Anderson, president of JetCraft, a North Carolina-based private jet broker, says the strength in big aircraft reflects the growing number of companies that need long-range, fast jets to visit locations across the globe.

"More often than not, our clients' business demands have globalised, not shrunk," Mr Anderson says. "That has required a lot more capable aeroplanes in terms of range requirements."

It is less clear, however, whether a recovery in midsize jets — anticipated since demand collapsed during the economic crisis in 2008 — will be sustained, even if there are optimistic signs. Cessna is due to deliver 170 aircraft this year in its midsize Citation range, up 7 per cent on 2014. That segment has benefited from robust economic recovery in the US, the biggest market for business jets.

"There's still an intra-continental requirement for some users," Mr Anderson says. "North American users who still have local requirements can very well utilise the midsize and light jet aircraft."

The smallest light-jet segment, which was once expected to boom as a series of manufacturers launched very cheap models, looks set to remain a modest part of the market. JetCraft says very light, light and superlight jets will account for only $25bn of the $271bn revenue that it projects the industry will earn from new jets up to the end of 2024.

Alain Bellemare, Bombardier's chief executive, cited the "very soft" market for smaller jets as the reason for cancelling the midsize Learjet 85 programme altogether, after the project was initially put on hold in January.

The whole industry's prospects, meanwhile, have been further clouded by the sharp falls in the price of oil and other commodities, and the poor performance of European and emerging market economies that had produced many of the industry's recent orders.

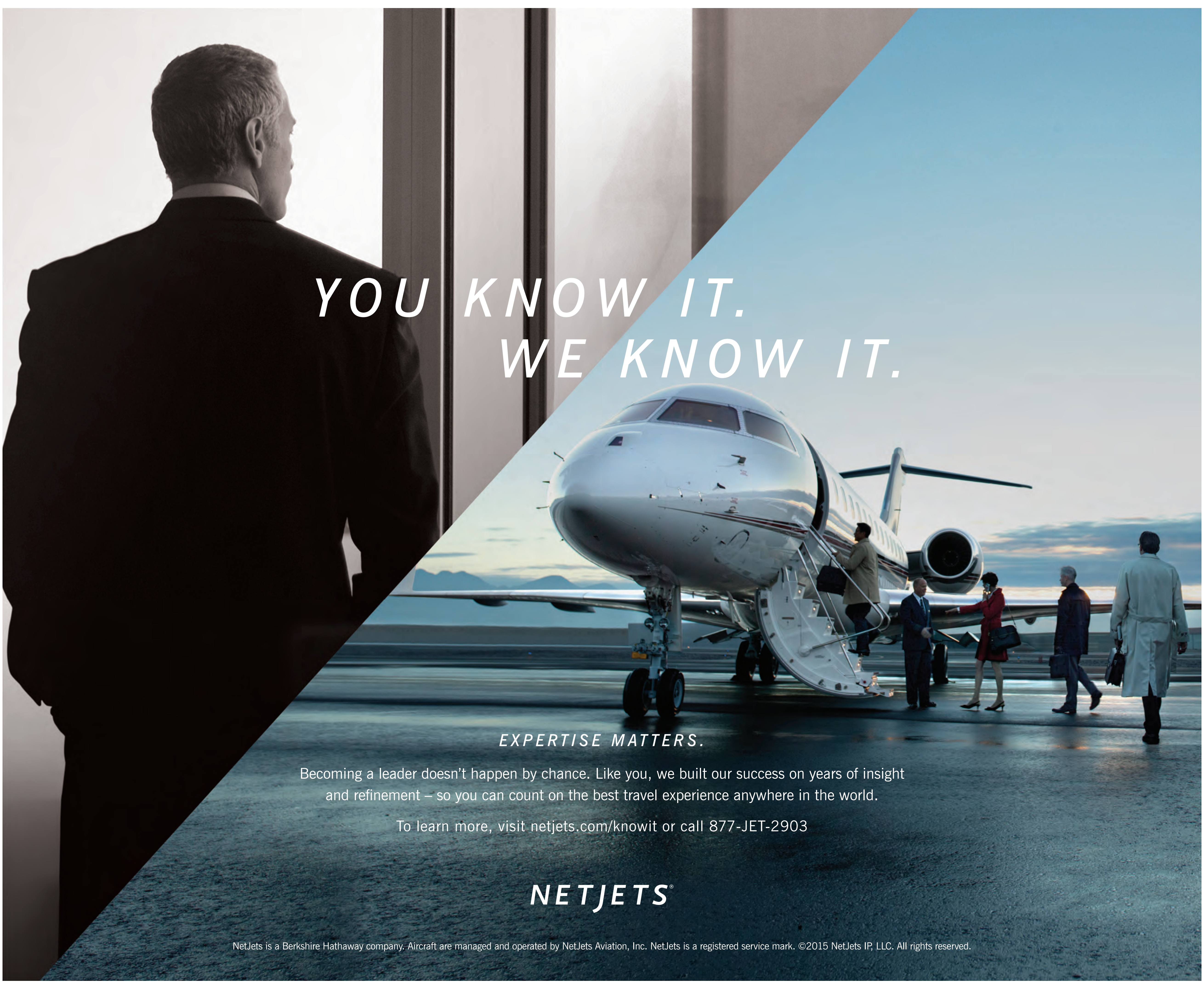
Scott Donnelly, chief executive of Textron, Cessna's parent, told investors during the third-quarter earnings call that he was "reasonably happy" with the US market for business jets.

But he went on: "There's no question that the markets in Europe and Asia are challenged. I think part of that is just the economies are in a pretty difficult spot. Of course, the US dollar being quite strong puts some additional pressure on that in terms of all the product lines."

Yet an important dynamic in the market, one critical in understanding Bombardier's take on market conditions, relates to the plight of Bombardier,

Continued on page 2

Inside



Need for speed overtaken by harsh economic lessons

Helicopters

Manufacturers have been dogged by events out of their control in a turbulent market, reports *Rohit Jaggi*

Helicopter manufacturers should be used to ups and downs. But they have had a number of events to contend with recently that have been completely outside their control.

The previously high price of oil, making more remote fields economical to explore, bolstered sales — along with the growing wind energy industry, which also requires helicopters for inspection and maintenance.

The plunge in the oil price, however, put a damper on more adventurous exploration plans — including some of the very ones that most required helicopter assistance.

Crispin Maunder, executive chairman of Lease Corporation International, whose LCI Helicopters specialises in leasing aircraft to operators, says the market overall has fallen. "At the medium and heavy end it has had a significant impact," he says.

However, he says manufacturers are nimbler than commercial plane makers at "cutting back production to mirror what they see as forward demand".

The manufacturers are pressing ahead with a number of projects that have a common theme of increased efficiency and usability. They have also been testing the edges of the speed envelope — to push speed limits on conventional rotorcraft that are slower than for fixed-wing aircraft.

Airbus Helicopters came up with one of the more elegant — and evolutionary — systems with the experimental X3 when the company was still called Eurocopter.

That aircraft did away with the power-sapping anti-torque rotor at the end of the tail boom and instead used two forward-facing propellers on the ends of stubby wings, not only to do the same job of preventing the body of the helicopter rotating in the opposite direction to the main rotor but also to pull the whole aircraft forward through the air.

This resulted in a record top speed of 255 knots (293mph) — somewhat above the theoretical top speed of a normal helicopter of about 225kt.

Some of the lessons learned in the X3, now retired and on display at the Musée de l'Air et de l'Espace at Paris-Le Bourget, are promised for future Airbus models. In the meantime, the 12-passenger H160 uses a fenestron tail-rotor tilted from the vertical, claiming various benefits including sapping less power. The H160, scheduled for certification in 2018, has achieved 176kt and has as its target cruise speed a rapid — for helicopters — 160kt.

The design of another model, the X6 heavy helicopter, will be finalised over the next two years and is intended to enter service in the 2020s.

There has been some rationalisation of the range, though. Airbus Helicopters is dropping the AS355 light twin.

The X3 is a much simpler solution to speed than the only combination rotorcraft currently in production — the Bell Boeing V-22 Osprey military tilt-rotor.

Its complicated and rather cumbersome solution is engines and large propellers on the end of wings. The engines point up for vertical operations and tilt forward for cruise — yielding a speed of about 275kt.

The civil version of the tilt-rotor, the nine-passenger AW609 being developed solely by AgustaWestland after Bell all but stepped out of the project, remaining only as a contractor, had weathered a number of delays but was on track for certification in 2017.

However, at the end of October, a prototype crashed near the factory in Italy, killing the test pilots. An accident investigation will determine whether there is likely to be a further delay.

The crash is a reminder of the troubled gestation of the V-22, which consumed more time, money and aircraft than planned. But orders for the AW609 continue to be added, even since the crash.

Sikorsky is the other helicopter manufacturer exploring high-speed rotorcraft — its self-funded X2, with twin, coaxial main rotors and a pusher propeller at the back, yielded a speed of 260kt. That has been developed into the military S-97 Raider rotorcraft, which had its maiden flight this year. This month the sale of Sikorsky by United Technologies Corporation to the Lockheed Martin aerospace company was confirmed — and Lockheed's mainly defence focus is unlikely to mean there will be a push for a civil version.

Away from the speed race, Bell Helicopter is pushing efficiency as the key attribute of its 525 Relentless, which has ticked up more than 50 orders and is set for certification in 2017.

Bell, part of Textron, is also fighting back in the very light sector. "The R66 from Robinson became the market leader in the under-$1m market," says Dominic Perry, news editor at Flight International, part of information provider RELX Group. "But Bell has come back with the 505 Jetranger X." First deliveries are expected by mid-2016.

Economy of operation is likely to be the main battleground for manufacturers in the near term. The ability to go faster is always desirable but, in the world of civil rotorcraft, cost-effectiveness is likely to win out, especially in a tight market.

Industry outlook remains cloudy

Continued from page 1

which manufactures more business jets than any other and is projected to have 32.2 per cent of the market this year by revenue.

The company faces a serious corporate crisis as it struggles to fund the costs — $5.4bn so far — of developing its C Series commercial jet, a competitor to Airbus's A320 family and Boeing's 737.

Richard Aboulafia, an analyst at Teal Group, says the crisis — which pushed net debt up to $6.8bn at the end of the third quarter — prompted Bombardier to increase Global 5000 and 6000 production to unsustainable rates in the hope of bringing in cash. "They just got very aggressive about commercial terms, did everything they could to bring in orders," Mr Aboulafia says.

May's announcement of a scaling-back of production reflected the unsustainability of Bombardier's earlier production levels rather than wider weakness in demand, says Mr Aboulafia.

The flood of new aircraft, many purchased at knockdown prices, has had knock-on effects across the market. Discussing General Dynamics' third-quarter results, Ms Novakovic referred darkly to "non-macro headwinds" in the third quarter because "a competitor" was selling some aircraft at "very low prices".

"Now, inevitably, that part of the market has problems," Mr Aboulafia says.

Yet Bombardier's cash crunch is likely to shape the long-term competitive landscape in the industry. The crisis has forced the company to postpone introduction of its long-range Global 7000 and 8000 aircraft by two years.

The company is falling behind a wave of innovation. Cessna will show its new midsize Longitude jet at this week's convention of the US National Business Aviation Association in Las Vegas. Gulfstream is developing the G500 and G600 as new, higher-technology replacements for its existing G450 and G550 models, and as competitors to the Global 5000 and 6000. France's Dassault Aviation is simultaneously developing its new Falcon 5X and 8X business jets.

$5.4bn Cost to Bombardier of building the C Series so far

713 Number of business jets likely to be delivered in 2015

Mr Anderson expects that the loyalty of Bombardier customers will ensure that it retains a substantial market share. JetCraft projects that the company will still take 30 per cent of industry revenues in 2024.

However, Bombardier's slow development of its biggest, newest aircraft has prompted a rash of speculation that rivals will develop big, new aircraft to take on Gulfstream's leadership of the lucrative luxury of the market. Cessna may unveil plans for a longer-range Longitude at NBAA, while Dassault may eventually, observers believe, produce an aircraft able to fly 7,000 nautical miles without refuelling, as the G650 can.

While Bombardier may continue to deliver more aircraft and bring in more revenue than its rivals, it is hard to avoid the conclusion that a gradual shift in the industry's leadership is under way.

Upstart in VIP market makes good on lofty ambitions

Embraer The Brazilian aircraft maker has turned a dream into reality, reports *Liz Moscrop*

Clean-sheet design: a Legacy 500 on the assembly line
Paulo Fridman/Bloomberg

Ten years ago, in an unassuming grey basement in São José dos Campos, Brazil, Luís Carlos Affonso, then executive vice-president of Embraer Executive Jets, solemnly told a group of journalists how his company was set to build on the success of a trial it had run with a VIP version of its ERJ135 airliner, created in 2000.

The resulting super midsize Legacy 600 was such a hit that the aircraft manufacturer had decided to commit fully to the private aviation market.

It was going to form a new division dedicated to the sector, and build a family of six more aircraft over the next decade. And it was going to eat up 20 per cent of the global market share in the sector.

With that, he announced the launch of two clean-sheet designs — the entry-level Phenom 100 and the light Phenom 300. The journalists listened politely, wished the company well and went away rather sceptical about such a wild claim.

Knowing it would have a fight on its hands with others in the sector, namely Bombardier and Gulfstream, Embraer worked hard to develop a reputation for excellent customer service.

It already had the maintenance skills to keep its jets flying, born from many years in the commercial and military sectors, but had the world to prove when its first all-new business jet, the Phenom 100, entered service in 2005.

Today, there are more than 300 of the type flying, and it has won recent fleet orders from two of the biggest Middle East airlines as a trainer.

Embraer now has four other new executive aircraft in its stable. Some are already upgraded, the biggest being the ultra-large cabin Lineage 1000E business aircraft, a derivative of ithe ERJ145 airliner. It also has roughly the slice of the market it had predicted.

The company has come a long way in an impressively short timeframe.

The latest of its products to hit the market, the $15.25m Legacy 450, has just earned its European certification and will enter service with its launch customer in the coming weeks.

The $19.95m Legacy 500, meanwhile, entered service a year ago. The two completely new designs share a 6ft stand-up fuselage cross-section, Honeywell HTF7500E engines, Rockwell Collins Pro Line Fusion avionics and, for the first time in an Embraer aircraft, a fly-by-wire control system.

US fractional ownership company Flexjet elected to order an unspecified number of Embraer 450s and 500 aircraft to replace the 60 Bombardier Learjet 85s the company planned to buy. Canada's Bombardier initially suspended and has now cancelled the Learjet 85 programme.

Flexjet needed a replacement for customers who bought shares in the planned new Learjet. The first Legacy 500 will join the Flexjet fleet in this year's fourth quarter, followed by the first Legacy 450 in the second quarter next year.

Claudio Camelier, demonstration pilot for the Legacy 500, and vice-president of sales for Europe, Middle East and Africa, says the aircraft have had a much smoother market entry than their big sibling, the Legacy 600, did in 2001. "People know us now, so the new Legacies are more readily accepted," he says.

He adds that the new 500 has a number of important safety features. "For example, pilots are unable to exceed structural limits, which is a characteristic normally only found in much larger, more expensive aircraft with a price tag of several million more, including our own Lineage," he says.

> Embraer has spent $200m building a global network of service and parts distribution centres

Embraer has spent $200m creating a global network of 75 owned and authorised service centres, and parts distribution centres.

It has also expanded production of its executive jet aircraft components and final assemblies outside Brazil.

Mr Camelier says the strong appetite for Embraer's latest offerings is the result of "10 solid years of good service, strong customer support".

The company has yet to finish building a complete range of business aircraft.

However, Mr Camelier is pragmatic: "We have dedicated 10 years of resources to building this portfolio, but we do have commercial and military divisions.

"For the time being, we are diverting most of our engineering development resources to focusing on two huge new projects — the E2 evolution of our regional jet family and the upgraded KC-390 tanker."

No company in aviation or elsewhere can rest on its laurels. But credit is due to the Brazilian aircraft-maker.

A decade after that basement presentation there are more than 800 of its business jets flying that existed only on paper in 2005.

Cessna makes light work of heavy economic weather

Midsize and light jets

New aircraft are focusing specifically on comfort, cabin size and efficiency, reports *Rohit Jaggi*

The Citation Latitude paused at the start of the long runway at London's Biggin Hill. When the twin-engined business jet from Kansas aircraft maker Cessna started its take-off roll at the south-east England airport, the acceleration took most of my companions in the spacious passenger compartment by surprise — champagne glasses went flying before the jet did.

The jolting start was not repeated in a flight that covered a surprisingly large stretch of the UK's east in a remarkably short time — maximum cruise speed of the midsize jet, which can go as far as 2,850 nautical miles in one hop, and carry up to nine passengers, is 446 knots (513mph).

The $16.3m aircraft from Cessna, part of the Textron conglomerate's aviation section, is one of a wave of new aircraft that place more emphasis on cabin size and comfort, and on efficiency. It competes with Embraer's well-received Legacy aircraft — the spacious Legacy 450 has a similar price of $15.25m

The Latitude takes advantage of the rising rate of improvement in avionics, with a touchscreen system from Garmin of the US that includes synthetic vision, and auto throttles, thereby easing the pilots' workload and improving safety.

Business jet makers have been slow to include some features most passengers consider essential, but the Cessna is now on top of this — onboard wifi is now standard.

Cessna says the Latitude's direct operating costs are $4.45 per mile and reckons a total trip cost from Los Angeles to New York of $7,756, or from London to Berlin of $2,318. The company says the Latitude could cost 20 per cent less to run than its rivals.

The formula is working for the midsize aircraft, which won US certification in June this year. Leading fractional operator NetJets ordered up to 150 and will start taking deliveries of its aircraft next year.

Not that this sector of the market has been easy for everyone. Canada's Bombardier cancelled its programme to build the eight-passenger Learjet 85 this year because it needed to concentrate on its commercial and heavier business jets.

The midsize and light sectors of the business jet market were hardest hit by the global economic crisis, not enjoying the buoyancy of that for heavier machinery. However, the smaller-aircraft sectors are doing better now that the US economy is recovering, according to the database at aerospace analysis specialist Flightglobal.

The light jet sector is eagerly awaiting the arrival of the HondaJet — as it has done for some years. The much-delayed project by the Japanese car and motorcycle maker to build its own business jet was started in 1997.

Provisional US certification of the $4.5m jet, which can be configured to carry up to seven people including one or two pilots, was granted earlier this year and full certification is expected imminently, with first deliveries following soon after.

The aircraft is not revolutionary, but does have some unusual features, including the placing of the two turbofan engines, developed jointly with GE specifically for the aircraft, on pylons above the wings near the fuselage. This, it is claimed, improves aerodynamics and cuts cabin noise levels.

Efficient: the Cessna Latitude

Honda Aircraft chief executive Michimasa Fujino has repeatedly claimed that his aircraft is the "world's most advanced light aircraft". Honda also says the jet is up to 20 per cent more fuel efficient than its rivals.

But the most important role of the HondaJet may be in winning public approval of private flying. The sector has still not shaken off the "fat cat" image of business jets that took hold especially during the early stages of the financial crisis.

Honda has a history of helping to turn around tarnished images. A slogan used in US advertising for its motorcycles was "You meet the nicest people on a Honda", which successfully shifted attention away from the oily rebel label that had hitherto hung over riders of two-wheelers. A cleaner, quieter private jet could help do something similar for business aviation.

Another light jet that is already helping to the address the wasteful image of private flying is the Nextant 400XTi. A remanufactured Beechjet, the process of reusing the airframe but incorporating modern, efficient engines, avionics and other features, makes the $5.3m jet — comparatively — green as well as economical.

Nextant has also turned its attention to turboprops, with its G90XT, based on the already economical King Air twin turboprop aircraft. And it is also announcing this week an update to the XTi's avionics, with synthetic vision and the provision for auto throttles helping put its electronics package on a par with the best of all-new aircraft.

Steps towards recovery in the lighter sectors of business aviation are as yet tentative. But some of the machinery on offer is well placed to reap any benefit.

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Corporate Aviation

Gulfstream jets ahead at the top of its sector

Large-cabin aircraft
The question for competitors is whether they can catch up, writes *Robert Wright*

In a low-rise building in a corner of Gulfstream's sprawling campus outside Savannah, Georgia, engineers work at a series of computers near mock-ups of a new aircraft's cockpit. Nearby, others are busy with an aircraft-shaped steel frame equipped with the moving parts of a new aircraft.

The workers are all engaged on development of Gulfstream's new G500 and G600 jets, the manufacturer's effort to reinforce its already powerful position at the top of business aviation's size and price range by bringing the latest technology to aircraft with ranges of 5,000 and 6,200 nautical miles respectively.

The company, part of General Dynamics, a military contractor, already has the largest end of the market to itself with its G650 jet and the G650ER, an extended-range version that can fly 7,500nm without refuelling. The new aircraft are intended to offer customers the benefits of flying just short of the speed of sound that the G650 aircraft offer, as well as some features such as a new cockpit layout, but which cost markedly less. The list price for the G500 is $43.5m, while the G600 is $54.5m. A G650ER's is $66.5m.

The question for Gulfstream's competitors in the large-cabin market — for aircraft costing more than about $26m each, capable of flying 3,000nm and carrying 15 or more passengers — is whether they can catch up with Gulfstream's lead in size and speed. France's Dassault Aviation has no immediate plans to match the range and speed that Gulfstream's large jets achieve. Canada's Bombardier, meanwhile, has had to push back launch of its ultra-long-range competitors for the G650 as it wrestles with financial problems.

It is small wonder that Phebe Novakovic, General Dynamics' chief executive, sounded robustly confident about the Gulfstream business when she spoke to investors on October 28 about the division's prospects after a buoyant third quarter.

Flying high: the Gulfstream G650
Paul Bowen/Gulfstream

"Gulfstream continues to perform well in the market," she said, before adding that the third quarter's order receipts were the strongest for four years. "Our pipeline is good, as it's been all year. It's heavily North American — public, private companies, high net-worth individuals."

Nevertheless, Alain Bellemare, Bombardier's chief executive, said during his company's third-quarter call that it remained the largest manufacturer of business jets and expected to remain so. "We are confident in our ability to maintain market leadership and provide strong value to customers with our best-in-class aircraft," he said.

At the heart of the topics facing the market is the question of how long loyal customers of Bombardier's Global series of aircraft, the first to offer truly long-range intercontinental ability, will wait for the company to produce its planned longer-range aircraft. The company announced on July 30 that, thanks to the financial problems stemming from its C Series commercial jet programme, it was delaying the projected entry into service of the Global 7000 jet, intended to have a 7,300nm range, by two years, to the second half of 2018. The company gave no date for introduction of the Global 8000 aircraft, intended to have a 7,900nm range, but its timetable has generally been around a year behind that for the 7000.

'We're not seeing a lot of clients saying, "Screw it, we'll buy a Gulfstream 650"'

The delay means that it will be more like three years until Bombardier can match the 7,000nm range of the standard G650, which entered service in 2012, and another four years before it overtakes the 7,500nm range of the G650 ER, launched in 2014.

Richard Aboulafia, an analyst at the Virginia-based Teal Group consultancy, calls it "one of the greatest self-inflicted wounds in the history of this business" that Bombardier has ceded its leadership at the top end of the business jet size range in order to fund the C Series.

It is likely to be still longer before Bombardier can update its existing Global 5000 and 6000 models to compete with the G500 and G600. "There's competition," Mr Aboulafia says. "It's just that Bombardier, because of the C Series, has had to keep delaying it."

The competitive picture might change further if France's Dassault, the only other manufacturer of the largest business jets, decides to start competing head-to-head to supply the longest-range aircraft. However, the company is currently developing both its new Falcon 8X jet (which first flew in February this year) and the 5X (which first flew in July). The 8X is intended to have a 6,450nm range. The company has also previously focused on ensuring its aircraft are fuel-efficient and can land and take off on short runways, rather than on more eye-catching features.

Dassault has made no official comment on the potential for a longer-range aircraft but Mr Aboulafia predicts Dassault will be "waiting and watching" to see whether Bombardier's business jet division can recover from the financial blows it has suffered and compete again for the largest-size aircraft.

"It could be that they see Bombardier as so fundamentally weakened they should fill that gap," Mr Aboulafia says. "Or it could be that Bombardier pulls through just fine."

Either outcome for Bombardier remains possible. There certainly are people who are optimistic about Bombardier's chances, even as Gulfstream starts to work on the next generation of advances beyond those that Bombardier is struggling to produce.

Chad Anderson, president of JetCraft, a North Carolina-based private jet broker, says dedicated Bombardier customers are responding to the delays by buying new Global 5000 or 6000 aircraft and waiting patiently for the new, bigger aircraft to emerge.

Mr Bellemare must hope that the reaction is typical.

"We're not seeing a lot of Global clients saying, 'Screw it, we'll go and buy a Gulfstream 650'," Mr Anderson says.

Commercial project leaves business jets up in the air

Bombardier

Cost overruns and long delays are not deterring staunch fans of the aircraft maker, says *Robert Wright*

Over the decade up until last year, there was little doubt which company was the leading manufacturer of business aircraft — and likely to remain so. Canada's Bombardier not only had a comprehensive range — starting with Learjet aircraft, running through the medium-size Challenger models and ranging up to the long-range Global aircraft — but also simply sold far more aircraft than any other manufacturer.

However, in January this year, Bombardier, struggling to fund development of its new C Series narrow-body commercial jet, announced it was pausing development of the Learjet 85, a midsize jet nearing the end of the development process. Subsequently, in July, the company announced that it was delaying by two years the planned entry into service of a still more important aircraft, the Global 7000 long-range jet, until the second half of 2018. There is no longer a planned entry into service date for the Global 8000, which is intended to be the world's longest-range business jet, capable of flying 7,900 nautical miles without refuelling.

The events are symptomatic of the crisis facing the company because of the big cost overruns and long delays in bringing the C Series into service as a smaller competitor to Airbus's A320 family of narrow-body jets and Boeing's 737 aircraft. The $5.4bn cost of developing the C Series has affected the company so severely that Alain Bellemare, the chief executive, said on October 29 when announcing a planned, US$1bn investment in the C Series by the Québec provincial government that it was intended partly to inspire confidence.

"Our first goal was to make sure that we would have sufficient liquidity to reassure customers and reassure all of the stakeholders that Bombardier was not going away and I think that we've done that," Mr Bellemare said.

Richard Aboulafia, an analyst at the Virginia-based Teal Group consultancy, says the agreement with Québec is only a memorandum of understanding, not a definitive agreement, and it will provide far less than the $2bn Bombardier says it needs to bring the C Series to maturity.

Liquidity: Alain Bellemare

Although the company says a plan to sell a minority stake in its train making business, the largest in the industrialised world, will provide further cash, there remain questions about the group's ability to continue in its present form. Its shares fell 19 per cent on the day of the Québec announcement.

"It's a non-definitive agreement to provide a woefully inadequate amount of cash and it's far from clear where the rest of the money they need is going to come from," Mr Aboulafia says.

'There's a good brand loyalty with the installed base of existing owners'
Richard Aboulafia, Teal Group

Chad Anderson, president of JetCraft, a North Carolina-based private jet broker, says customer loyalty will keep Bombardier narrowly ahead, both for overall deliveries and revenues. Textron's Cessna nevertheless is closing the gap in deliveries, while General Dynamics' Gulfstream looks set to narrow its sales revenue lead.

"There's a good brand loyalty with the installed base of existing owners," Mr Anderson says.

Until earlier this year, part of the answer to Bombardier's need for cash had appeared to be the still-healthy demand for its biggest current models, the Global 5000 and Global 6000. The company started producing the aircraft far faster than rivals could their equivalents — 80 in 2014 — in a move that many observers saw as a desperate effort to generate cash.

That strategy had to be abandoned in May with the loss of 1,750 jobs as the company consumed its order book at an unsustainable rate. The costs of the redundancies and the slowdown in cash flow from reduced deliveries meant the company ate through $816m cash in the third quarter, pushing its net debt up to $6.8bn. The company intends to produce only 69 Global 5000s and 6000s in 2016.

The delays to the 7000 and 8000, meanwhile, mean Gulfstream's G650 and its extended-range G650ER continue to have the longest-range business jets market to themselves.

Mr Bellemare has portrayed various decisions this year — the pausing then scrapping of the Learjet 85, for which the company took a $1.2bn write-off on October 29, the scaling back of 5000 and 6000 production and the delays to the newer aircraft — as part of an overall plan for the company's finances.

The company also says it will "soon" announce the placing of a minority stake in the Bombardier Transportation rail business to bring in further resources.

"What we've been working on was to have a game plan to shore up the liquidity and to ensure we would be able to bring all these programmes to fruition," Mr Bellemare said.

Yet, while many observers remain sceptical about whether the wider company has adequate resources in place to manage its plans, some customers appear to share Mr Anderson's fundamental optimism about the fate of the business jets arm. Excluding the effect of the 64 cancelled orders for the Learjet 85, Bombardier took in 32 business jet orders in the June to September quarter, up from 21 in last year's third period.

Mr Anderson says his customers are still buying new Challenger and Global aircraft, in spite of Bombardier's problems. "Bombardier's market share is incredibly strong," he says. "I think people take a bit of a look in the rear-view mirror to predict the future. I don't think Bombardier is ready to go away."

Appreciation of depreciation shapes an industry

Fractional ownership

Demanding customers are driving market leaders to invest in new aircraft and a more tailored service, reports *Liz Moscrop*

Private flyers who are airborne fewer than 50 hours a year benefit from chartering aircraft, rather than part-owning one, according to the rule of thumb. The same rule says that ownership of a whole aircraft makes financial sense if one is flying at least 250 hours a year.

The territory in between has been a fertile ground for NetJets, the global leader in long-term fractional ownership. Fractional stakes generally start at 1/16th of an aircraft, or 50 hours' flight time a year. There are tax advantages, too, on business ownership, which vary depending on where it is registered.

Another alternative to ad hoc charter for regular flyers is a jet card. This is essentially a prepaid debit card sold in 25-hour increments. Participants can book a flight on a jet anytime, anywhere, with little advance notice. After a flurry of entrants to the fractional market in the late 1990s, the two main players (for larger jets) are now NetJets — owned by Warren Buffett's Berkshire Hathaway — and Texas-based Flexjet, owned by aviation entrepreneur Kenn Ricci's Directional Aviation Capital.

Part of the appeal for clients is the familiarity and consistency on offer. Jets arrive with the same interior and agreed service standards — whether amenities on board or personal chauffeurs on landing. The strategy is working for Flexjet, which reports 31 per cent growth in bookings over the past quarter, with a 20 per cent lift in sales over the previous year.

In 2014, the company placed an order for up to 50 Gulfstream jets comprising G450, G650 and the new G500 aircraft. The first G650 is due to be delivered early in 2016, but Flexjet says it has moved the G450 deliveries forward in response to customer demand.

Matt Doyle executive vice-president of sales at Flexjet, says: "By the end of the year, we will have added 27 aircraft. We have Bombardier Challenger 350s and Learjet 75s coming, as well as Embraer Legacy 450s and 500s. Our customers are really excited by the new, more capable, efficient aircraft in each category." Connectivity, in-flight entertainment and longer legs are factors that help to attract customers, he adds.

Sister company Flight Options, meanwhile, is also seeing increased sales. The company mostly sells shares in smaller aircraft — the Nextant 400XTi (a remanufactured Beechjet/Hawker) and Cessna Citation CJ3 variants. "The Nextant enhances range and technology with its new engine," says Mr Doyle. "Our customers opt for range with the Nextant and speed with the Citation X."

Both Flexjet and NetJets are offering highly tailored programmes to their customers. The Flexjet version is called "Red Label" and offers what Mr Doyle describes as "state-of-the-art interiors the customers would choose for themselves". They also get crew dedicated to an individual aircraft, which is guaranteed to be less than five years old.

NetJets is offering a similar concept called the "Signature Series", which it says is countering a somewhat flatter market in Europe. NetJets Europe is selling its ageing Falcon 7X aircraft and taking delivery of new Bombardier Challenger 350s. NetJets became the launch customer for the type when it placed an order for 75 aircraft and options for a further 125 in 2013. The order could be worth $5.4bn (€4.8 billion), if all are delivered.

> Fractional ownership may make sense if one flies between 50 and 250 hours per year

NetJets also ordered up to 150 Cessna Citation Latitude business jets in 2012 and will take delivery of the first one in July 2016. Its new booking app has received about 20,000 bookings through its online customer portal.

While the fractional providers are doing well, jet card operators are also thriving. Switzerland's VistaJet is reporting a 17 per cent increase in flights globally over the past 12 months.

New York-based Wheels Up, which concentrates on the lower end of the market, signed 1,000 members by the end of 2014 and flies 27 new turboprop Beechcraft King Airs and 10 refurbished Cessna Citation jets.

Californian operator JetSuite operates a fleet of Phenom 100 and Citation CJ3 light jets. Alex Wilcox, chief executive, says: "Fractional ownership is twice as expensive and our passengers are buying lift not metal. Aeroplanes depreciate and are a liability. We also have no membership fee, which is very attractive for our customers."

He adds: "The larger jets market is saturated, and there is no one else competing in the light jet segment."

Sabre rattles long-distance travel hopes

COLUMN

Rohit Jaggi

The potential of the Sabre combined jet and rocket engine will come as no surprise to readers of the Financial Times.

Aerospace company BAE Systems this month announced an investment of £20.6m in the UK's Reaction Engines to develop a synergetic air-breathing rocket engine (Sabre), which could hold the key to developing highly competent, reusable, single-stage space vehicles that can launch themselves.

The Sabre technology has been in development since 1982. If it fulfils its promise, it will allow craft to take off from a runway, attain five times the speed of sound in the Earth's atmosphere, then transition to a rocket mode for space travel — and reverse these stages to land conventionally.

I wrote in the FT in 2009 that the technology, for which the European Union this year approved UK government plans to award a £50m grant, could also offer hypersonic travel from point to point on the Earth — with Brussels to Sydney taking just four-and-a-half hours.

Minimising travel time is always attractive. Commercial air carriers are once again offering ultra-long, nonstop flights. Qantas plans to offer a Perth-London route by 2017 that would take 19 hours — a touch longer than a Sabre-engined craft could theoretically achieve. And in the world of business aviation, buyers have a substantial appetite for greater nonstop range in large aircraft.

The Aerion supersonic business aircraft project also moves on. The US company started taking orders in 2007, and has since then unveiled an improved airframe design and an important tie-up with Airbus, but has still to choose the engines and an assembly site for its Mach 1.5-capable aircraft.

This is no story of the tortoise and the hare, but what is encouraging is that there are rival technologies offering the prospect of planet-shrinking travel.

Interiors

It's a far cry from the brown leather and gold fittings popular in private aircraft until not very long ago. Gulfstream will at the National Business Aviation Association convention in Las Vegas this week unveil a cabin design that is all cool, light colours.

The G600 mock-up refines the design ethic that was showcased with 2008's G650 from the Georgia manufacturer of business aircraft. That exploited the cabin's open feel provided by big windows with light colours and airy designs.

> Buyers have a substantial appetite for greater nonstop range in large aircraft

Units are slimmer, seats are more comfortable and there is more counter space in the galley. There is even stone flooring — a thin veneer to avoid adding too much weight — in the entry and the forward toilet.

The G600 shares the G650's large cabin — and with a range of 6,200 nautical miles, its occupants will benefit from not feeling as if they are cooped up in a tiny flying tube, even if travelling at not far off the speed of sound will minimise the time in the air.

Light in the sky: Gulfstream G600 mockup

Ubers of the skies challenge the traditional brokers of private jets

Technology Online companies are muscling into the executive air travel market, says *Tanya Powley*

Booking a private jet for a business trip or a last-minute luxury weekend away has become easier over the past five years as a number of new businesses have entered the market.

From UK-based PrivateFly to India's JetSetGo, the business of chartering jets has undergone a transformation with brokers that offer an on-demand service that lets customers search, compare and book private jets online or through a phone app.

These self-styled 'Ubers of air travel' are taking away business from the traditional brokers that have long dominated the market for private jet hire.

They have also unnerved the fractional ownership industry, in which clients pay an upfront fee for a guaranteed number of hours per year with the assurance that a jet will be available for immediate use.

PrivateFly was one of the first companies to enter the market and now has access to about 7,000 planes across the globe. The key to the company's success is its own software that checks availability with partner charter operators, matches clients with the right aircraft and provides a fixed-cost quote.

Adam Twidell, a former pilot who founded PrivateFly in 2008, believes there has been a definite market shift to online brokers, particularly for light and medium jets.

"The early adopters to PrivateFly were typically leisure-orientated, high-net-worths and individual business users, such as tech entrepreneurs," says Mr Twidell. "These are still important customer segments for us, but our client base is now much more diverse and includes international royalty, heads of state and well-known personalities from sport and entertainment."

At PrivateFly, its most popular route in Europe is London to Nice, and in the US, Los Angeles to Las Vegas.

US-based JetSmarter has also seen growth of about 15 to 20 per cent each month since its launch in March 2013. The company has even attracted funding from members of the Saudi royal family and American rapper Jay Z.

JetSmarter charges a yearly membership fee of about $9,000 to gain access to wholesale rates on charter jets, and concierge services.

Sergey Petrossov, chief executive and founder of JetSmarter, says its demographic is "diverse". "A typical user is anyone from the spontaneous traveller looking for a weekend getaway, to a businessman or woman who needs to book a last-minute trip," he says.

Most online brokers say they provide consumers with rates five to 50 per cent lower than a traditional broker, partly down to their more efficient business model. The attraction of the private jet market has seen a spate of new online brokers, including the UK's Victor and US-based BlackJet, backed by Uber co-founder Garrett Camp.

However, business jet experts believe this does not necessarily mean the end of the traditional broker. "For me, it's just an extension of a way to make a reservation on a private aircraft," says Brian Foley, an aviation consultant.

Planes at your fingertips: JetSmarter offers wholesale rates

> Online brokers concede both business models can coexist

"It used to be fax machine, then telephone, now there's the option of booking online. There's nothing revolutionary about this. In fact, it's very evolutionary." Mr Foley says for some, the need for human interaction will still remain — particularly for very rich customers booking a $100,000 flight.

Mark Briffa, chief executive of Air Partner, the corporate jet broker, agrees. "Many of our clients — both corporates and high-net-worth individuals — value the insight and service that comes with having an established relationship with a broker," he says.

"Air Partner does a lot of flying for governments, heads of state and large corporates with complex itineraries and an online booking service just wouldn't be viable for these types of organisation." This could include booking private jets for the music industry and group tours, which would need a large amount of planning.

Online brokers concede both business models can coexist. "Travel agents still exist and usually provide assistance with unique or exclusive travel packages that online travel agencies would have trouble calculating in real time," says JetSmarter's Mr Petrossov.

Mr Twidell admits there have been some areas typically dominated by traditional brokers that have been slower to break into, such as large corporate business. "We do now have a growing list of small- and medium-size companies — some of whom have grown with us from individual users," he says. "FTSE 100 companies and other major corporates have established, legacy-driven supplier relationships and contracts, so they take longer to change."

Cost of fuel is small part of complex formula that affects demand

Oil price fall

Low commodities prices are affecting executive travel, reports *Robert Wright*

When United Continental published its third-quarter results on October 22, it revealed it had been hit in two ways by the declining oil price. The company, United Airlines' parent, attributed a 5.6 per cent decline in its yields (revenue earned per passenger mile) partly to last year's fall in the oil price and hence its fuel surcharge revenue. It also, however, identified a second, less obvious factor. Spending by United's energy industry clients had declined 35 per cent year-on-year as the falling oil price prompted companies to cut back on expenditure.

The price fall has prompted some analysts to fear that permanently low oil prices could hollow out demand for commercial jets by reducing the advantages of new, more fuel-efficient aircraft and increasing the incentives to hold on to older, less-efficient planes. Lessors say they are already signing far more long leases for older aircraft than before.

The question for business jet manufacturers is whether those factors will further postpone the big demand recovery that manufacturers of light and medium-sized jets have been awaiting since the economic crisis, or whether demand will continue unperturbed, as it has for makers of bigger business jets.

Loren Thompson, analyst at the Virginia-based Lexington Institute, says low prices for oil and other commodities are affecting the readiness of some businesses to pay for executive travel.

However, few involved in the industry believe that the fuel cost of operating aircraft is a significant determinant of owners' decisions about aircraft that only the wealthiest individuals and organisations can justify maintaining.

Mr Thompson compares the corporate jet market to the luxury motor car sector, in which many vehicles are designed to operate only on premium fuels. "The assumption is that the owners don't mind paying the extra," Mr Thompson says.

Tanked up: an aircraft being refuelled

At the heart of the differing reactions from commercial airlines and business jet manufacturers to the falling oil price are the very different economics behind them. For airlines, whose passengers are generally price sensitive and whose profitability can hinge on slender margins, the priority is to eke out the maximum possible passenger revenue for the minimum possible spending on fuel. That imperative prompted airlines to order aircraft such as Airbus's A320neo, which can use Pratt & Whitney's more fuel-efficient geared turbofan engine, when fuel prices were high.

Business jet manufacturers have introduced many of the same improvements to engine technology and lighter materials for fuselages and wings, but used them to serve customers who worry far more about saving time and working efficiently than money.

Some manufacturers have focused on using the efficiency improvements to go faster. A new version of Cessna's Citation X will have a top speed of 0.935 times the speed of sound.

Other manufacturers have focused on allowing owners to travel further without refuelling. Gulfstream's G650ER, an extended-range variant of the G650 introduced in 2014, can fly 7,500 nautical miles (13,890km) without refuelling, while Bombardier's Global 8,000 is intended to have a 7,900nm (14,631nm) range when it enters service later this decade.

Many in the industry say that, even if cost were a significant matter for most business jet owners, the aircraft fly so much less than commercial jets, which on long-haul routes can fly as much as 15-16 hours every day, that fuel is a relatively insignificant factor in operating cost considerations.

Corporate jets are generally used for no more than 400 to 500 hours a year, against 10 times that for many commercial jets. Fuel costs are consequently only a relatively small share of corporate jets' running costs.

Mr Thompson says operators of smaller corporate jets are likely to be more sensitive to operating costs, and hence more likely to postpone purchases in light of low fuel costs.

But he adds: "At the top end of the business jet market, buyers are relatively [unresponsive] to changes in the prices for the jets or their operating costs."

Yet the fall in the oil price is still expected to have some indirect effect on the business jet market through its customers.

The demand from executives at commodity producers — including oil companies — to fly direct to negotiate with the leaders of mineral-rich countries or to remote production sites played a big role in keeping demand for the largest jets buoyant over the past eight years.

The reversal in prices — and the resulting cancelling and scaling back of oil company projects — looks set to depress demand from such customers just as demand from other businesses, at least in the US, is beginning to revive.

Mr Thompson says the signs are that demand for high-end jets appears still to be robust, despite the problems.

But he adds: "In areas where it's a tough decision whether to buy a business jet or not — in the middle ranges — there could be a problem."