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CRAIG R SINCOCK

AVFUEL PRESIDENT & CEO – FULLY FUELLED AMBITION

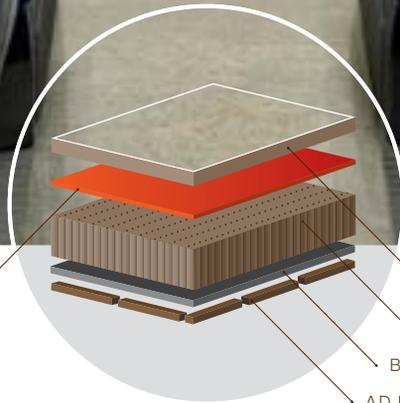
HONDAJET: DESIGNING THE FUTURE –
MICHIMASA FUJINO, HONDA AIRCRAFT COMPANY PRESIDENT & CEO

VIASAT: CHANGING THE CONNECTIVITY GAME

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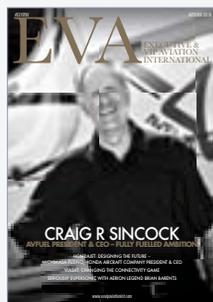
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Bombardier stole the show in Geneva at May's European Business Aviation Convention and Exhibition, with its spectacular revelation of a pair of new models. Meanwhile, a true pioneer of the bizjet industry, Michimasa Fujino unveiled the latest version of his exceptional creation, the HondaJet Elite. We're honoured to feature the great man and his aeroplane in this issue.

Now all eyes are on Orlando for the National Business Aviation Association Business Aviation Convention and Exhibition, where Embraer has taken the stage with its own surprising performance. Add to that the official confirmation of an engine core choice for the supersonic Aerion AS2 and the industry is clearly witnessing most exciting times.

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Fully Fuelled AMBITION

Avfuel President & CEO Craig R Sincock

Craig R Sincock bought Ann Arbor, Michigan-based Avfuel in 1985. Today, it boasts in excess of 5,500 flight department customers, 650 branded FBOs and more than 3,000 fuelling locations globally, supplying fuel to passenger and freight airlines, corporate flight departments, FBOs, helicopter operators and the military. Through 28 further acquisitions, growing sales and marketing alliances, Sincock has not only expanded Avfuel into a worldwide fuel supplier, he's also grown it into other, sometimes loosely related areas...

Avtank, for example, designs, engineers and builds fuel storage systems and refuelling equipment, while Avlease manages and leases that equipment. Avsurance procures insurance cover for pilots, airports, equipment manufacturers, distributors and other facilities, and Avplan is a full-service flight-planning and trip-support company. Meanwhile,

Sincock's sights are set firmly on the future, through the Avfuel Technology Initiatives Corporation.

Even more remarkable than this extraordinary success is the fact that Sincock barely left home to achieve it! A graduate of the University of Michigan, located in Ann Arbor, he still lives in the city and says: "Ann Arbor is my home and I've lived in Michigan most of my life. Avfuel was in Ann Arbor when I acquired it and there's never really been a reason to move. We built a new office, but the city continues to be ideal for Avfuel for a number of reasons. We're right next to the city's general aviation airport, Ann Arbor has a thriving economy, which is good for business and our employees – as well as for attracting and retaining them – and it's where our long-time employees have established their families. We have several off-site employees in key territories around the US and Europe, plus an office in Texas, but the vast majority of Avfuel employees are in-house, right at home in Ann Arbor."

Sincock says he bought Avfuel because he intended "...to do something significant with it. I've always had big plans for Avfuel and believed ►►





Not only does Avfuel lease fuelling equipment, it also engineers and builds it.

» in what the company could do from the very beginning. Stagnation is not an option – Avfuel will always grow and adapt. I'd like to think Avfuel's growth was slow and steady, but when I look at its history, we really have covered a lot of ground in a relatively short time in the fuel business. We've never had a negative year and there's a lot of reliability behind that statistic that our customers – and employees – can count on.”

Taking on a company with such grand plans for success inevitably meant accepting risk, but Sincock reckons that's just part of the business. “There's no growth without risk, but you should only take smart risks. We look at a potential acquisition from every angle and consult with experts inside and outside the company to make sure what we're doing best serves our customers and employees.”

Fuel and more

Fuel supply accounts for 90% of Avfuel's business, yet the company actually does so much more. Services, including Avsurance and Avplan, are perhaps unlikely offerings for a fuel

supplier... “Our customers' needs have always and will always drive the direction of our business. Listening to their pain points and finding an opportunity to fill that void in the market is the way Avfuel has grown.

“That's exactly the mentality that went into the acquisition of Avplan and Avsurance, as well as the development of numerous programmes: Avfuel Contract Fuel, AVTRIP loyalty rewards, Avfuel Network Referrals, Avfuel Network Rewards, in-house marketing



I've been flying since college and relish every moment I have in the cockpit. It is the most unique way to see the world

specialists, an in-house tax department, 24/7 quality assurance, FAA-approved training systems and more. We've learned that it's not enough to supply fuel – we've spent 45 years adding to and refining such solutions to become an all-round aviation facilitator providing the best service possible to our customers. We work nonstop to be the one-stop shop for the aviation community.

“These additional offerings are just as important as the fuel we sell, because they differentiate us from our competition. Fuel is fuel, but no other fuel supplier manages such an array of services from one collaborative location. When a customer chooses Avfuel, they're not just buying our fuel, they're buying into our suite of services, from back-of-office solutions to fuel handling and customer care, and the support that comes with it all. It's comprehensive and it has helped us maintain loyalty among customers. It also means it's necessary to hire and retain a much larger staff, so it's great for our local economy, and it means we have a large breadth of diverse expertise to draw from.”

Examine the Avfuel operation at a more fundamental level and it's clear there's also an ambition to facilitate connections between aviation professionals, something like an aerospace-specific LinkedIn. It seems a great deal of effort for no direct return, so why bother? “Because when our customers win, we win. Everything we do is with the customer in mind. With a plethora of operational support, if our customer is succeeding, it means

we're succeeding too, and it makes for a stronger Avfuel network."

More than fuel

When it comes to fuel, simply supplying product was, predictably, not enough for Avfuel. It has developed a range of fuel-focussed services, managing, leasing and building aviation refuelling equipment and offering a variety of retail and loyalty cards. Sincock confirms: "We're a leader in leasing refuellers, with expertise in designing, assembling and maintaining a fleet of 700+ vehicles out of a designated building next door to our headquarters office. We take a personalised approach to business, which means our employees develop relationships with customers and understand their unique operations.

"This way we learn more about their needs and desires, then look to satisfy them. It's one of the most successful ways to grow a company; it fosters loyalty and helps us stay at the forefront of innovation. Through this process we became the first fuel supplier to develop a loyalty programme for pilots, the first and only fuel supplier to develop a loyalty programme for FBO staff, and the first and only fuel supplier to develop its own online FAA-approved fuel handling and supervisor training."

Considering fuel is its major business, Avfuel places critical importance upon training to ensure safe operations. But training is also essential to the wider Avfuel network, including the many FBOs globally that carry the Avfuel logo. It's branding that reassures customers they'll be receiving top quality, fairly priced fuel, and, by association, that the FBO's services will reach a similarly high standard.

"Pilots absolutely have expectations for quality service when they see the Avfuel sign and we help our branded FBOs by offering training tools to assist with the customer support side of their business. The online Avfuel Training

System [ATS] includes lessons on proper fuel handling and safety, front counter operations, including how to efficiently use Avfuel's programmes, and customer service training to help FBOs stand out from the competition."

And when it comes to the more prosaic principles of fuel safety, Avfuel offers multiple training options to its branded FBOs. Its online Line Fuel Service and Supervisory Fuel Service Training lessons are FAA approved, satisfying safety regulations outlined by 14 CFR 139.321. They're part of the online ATS, which includes ramp safety, customer service and the front counter training.

The ATS also offers branded FBOs free regional Quality Assurance and Fire Safety Seminars (14 CFR Part 139 Approved) at select locations throughout the year, backing these and its online lessons up with an expert, fully-staffed quality assurance department. Available 24/7/365, it responds to branded FBOs' needs on fuel handling and safety. "It takes any question. Any concern. Anytime. Anywhere. All our customers have to do is pick up the phone to get a real person for immediate attention.

"And considering our own employees, I think it's crucial for them to be highly trained and engage in ongoing professional development too. Avfuel has a programme where its employees can elect to take classes for continued education."

Education for the future

Evidently a man who appreciates his success rather than taking it for granted, Sincock works a variety

of educational and philanthropic interests, with aviation education key among them. "It's no secret our industry is experiencing a pilot shortage and struggling to attain new talent to aviation careers – fostering a passion in the next generation of leaders should be high on the priority list of all aviators. If we let that passion show and share it with others, whether during a tour, at a school, or at fly-ins, like EAA AirVenture, we can maybe ignite the aviation spark in another person.

"Further supporting the next generation of pilots, this year Avfuel created the Pilot-in-Training Scholarship, supporting students who aspire to become aviators, in addition to its AVTRIP Scholarship, which is now in its 20th year. Avfuel is also active with and on the boards of trade organisations that have in-house initiatives to bring new people to the industry."

While many in aerospace bemoan its apparent inability to attract new talent, even some of those companies actively trying fail to appeal to half the population. The 'employment radar' of girls and young women who might ▶▶



Fuel is fuel, but no other fuel supplier manages such an array of services from one collaborative location

▶ otherwise seek aviation careers rarely even detects the industry’s signals. Sincock, quite predictably, has strong views on the issue.

“With any young person it’s about awareness, education, role models and encouragement. We need to help young folks realise the opportunities available in our industry. At Avfuel we have a breadth of roles from accounting to marketing. We have a good mix of employees who began their careers in aviation, and others who hadn’t previously realised it was an option for them and have since become immersed in the industry. There is something for everyone.

“In terms of role models, over the years Avfuel has had the pleasure of sponsoring a number of women aviators specialising in aerobatics, and a number of women have been awarded the AVTRIP Scholarship.”

Avfuel naturally supports a variety of fuelling options, including contract fuel.

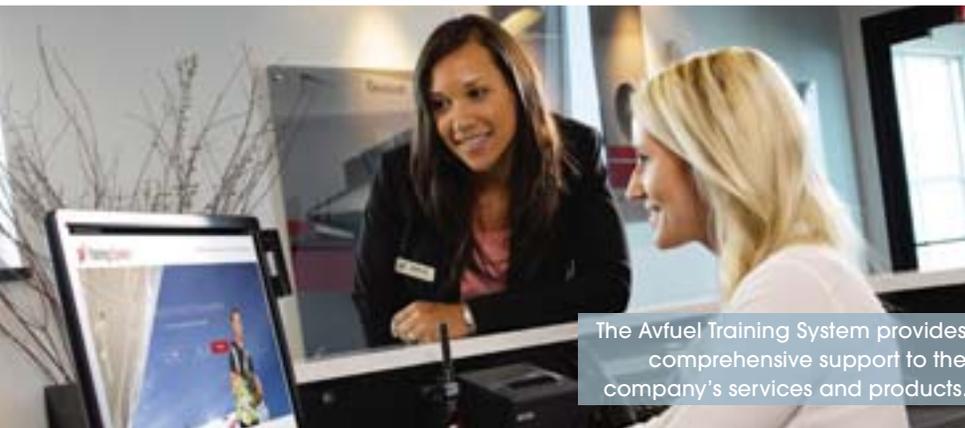
love! If you’re going to spend your life working, it better not feel like work. And that’s what being a part of aviation has done for me. I found my passion. I thrive on being an integral part of the industry. And I fly regularly.

“I’ve trained with FlightSafety for 30 consecutive years and fly the company’s Cessna Citation XLS+. There’s no better feeling in the world. I’ve been flying since college and relish every moment I have in the cockpit. It is the most unique way to see the world. It empowers me and the Avfuel staff to be personally in front of

“One of my favourite roles is mentoring our younger leadership team and one of our golden rules is: ‘Build the job around the person, don’t fit the person to the job’. We’ve found that once you’ve built up a person, they can be successful. It’s so important to develop and invest in team members. We celebrate what makes each person unique and capitalise on what they bring to the team as an individual.”

Going forward, Sincock expects Avfuel to engage in: “A whole lot of listening, adapting and doing. That’s been our secret and it’s not going to change. In the more immediate future, we have many exciting developments. Of course, we will continue to expand geographically and be best in our class in supplying fuel.

“But beyond that, in January 2012 we formed Avfuel Technology Initiatives Corporation to further industry advancements, including those in bio and renewable fuels, on several fronts, plus no-lead avgas replacements, domestically and internationally. You can expect Avfuel to take a lead in the supply of sustainable alternative jet fuel [SAJF] and alternative avgas. We’re rolling out prototype locations for the immediate supply of SAJF, in an exciting advancement to integrate the product into the market.” It’s a typical Avfuel programme – listen to the customer to establish the need, then set up a quality, dependable, supportable solution, and invest in the people and facilities to achieve it. ■



The Avfuel Training System provides comprehensive support to the company’s services and products.

Driven by passion

There are successful aerospace executives who are very good at business, but it might just as well be in the automotive or pharmaceutical industries, they’re just great at doing business. Others, those who leave a lasting impression and somehow change aerospace through their efforts and legacy, add something indefinable to their business acumen, and it’s clear Sincock has that in abundance.

“Aviation is not just my business, it’s my passion. You have to do what you

more customers than could be imagined using airlines alone.”

Sincock has created today’s Avfuel through determination, well-judged acquisition, care for his employees and a little risk. It’s a recipe that’s worked but, blessed with three decades’ of hindsight, is there anything he’d do differently?

“There are numerous small things I may have changed along the way, but I think the real question is: What have we done right? And that’s building our staff and having faith in their judgment.

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Leonardo's AW169 A New VIP Standard?

Safety, high performance, comfort, elegance, operational flexibility, customisation options, reliability and exceptional aftersales support are among the more important qualities private and VVIP owners require of a modern helicopter. They expect operational capabilities rather than just an aircraft, an efficient tool that's always ready when they need it, helping save time and maximise resources.

Among the world's leading rotorcraft manufacturers, Leonardo is confident that its latest products not only meet, but exceed the most demanding customer expectations thanks, the company reckons, "...to an unequalled combination of Italian style and

technological innovation. Combined, these factors have made Leonardo helicopters the rotary-wing benchmark in the worldwide executive/corporate sector." There's no arguing that many heads of state and senior corporate and government leaders employ Leonardo's products, and its latest civilian offering, the AW169, reinforces the Italian airframer's reputation for delivering the highest levels of excellence in the global VIP/corporate helicopter market, where it boasted a 50% share for multi-engine types in 2017.

Market demand

In creating the AW169, Leonardo responded to market demand for a new-generation, versatile, light-intermediate twin-engined helicopter that meets the most stringent operational and safety requirements of the

The AW169 features an electrically-retracted, wheeled undercarriage



certification authorities and operators. The type was EASA certified in July 2015, to the latest EASA CS-29/FAR Part 29 standards, and FAA certified in February 2017.

The 4.8-tonne AW169 was the first all-new aircraft in its weight category in more than 30 years, setting new certification and safety standards as it came to market. It is the lightest machine in a family of new-technology helicopters that also includes the 7-tonne AW139 and 8.6-tonne AW189. All possess similar high-performance flight characteristics and safety features, while sharing a common cockpit concept and design philosophy.

It's an approach that facilitates training, flight operations, maintenance and support synergies for fleet operators working across the 4- to 9-tonne categories, some customers having decided to adopt a mix of two or all three types; the so-called AWFamily helicopters are well placed to deliver VIP transport regardless of aircraft size.

The AW169 has been delivered off the Vergiate final assembly line in Italy since the end of 2015 and more than 60 are in service today, having accumulated in excess of 17,000 flight hours between them. More than 180 AW169s have been ordered for a variety of missions, including executive/corporate transport.

High-tech solutions

New technology features in the AW169's rotor system, engines, avionics, transmission and electrical power generation and distribution systems. Comfortably seating up to ten passengers in its large, unobstructed cabin, in VIP configuration the aircraft includes a range of wireless cabin control and streaming options, the finest Italian craftsmanship and air conditioning. Executive and VIP flying seldom involves a capacity passenger load and as such, customers may specify reduced seat numbers while revising seat position, creating an even more comfortable and spacious environment.

Power comes from a pair of Pratt & Whitney PW210A turboshafts in the 1,000shp class. The powerplant includes an auxiliary power unit (APU) mode for continued operation of the environmental control system, radios and other systems when the rotors are stopped. A potentially important safety feature, APU

mode also ensures maximum passenger comfort, ensuring the cabin remains air conditioned while awaiting passengers in high ambient temperatures.

Leonardo offers a variety of customer options and solutions across its helicopter range, enabling a degree of individual customisation, and the AW169 is no exception. Helicopters purchased as Leonardo executive/corporate products, however, attract a much greater degree of personalisation. A wide variety of AW169 interior layouts and styles, crafted in the most refined materials, is available, complementing the machine's fundamental versatility.



The AW169 delivers operational flexibility through a modular cabin equipment principle centred on optimised passenger cabin functionality within the available space. Various combinations of seat number, position and direction are possible, while a quick conversion from transport to mobile office or flying conference room and back may also be accomplished. In addition, the comprehensive equipment list includes a range of modern entertainment solutions.

A variety of cabin arrangements and finishes is available

Flying the AW169

The aircraft's state-of-the-art avionics suite includes a fully digital night-vision goggle (NVG) compatible cockpit with three 8×10in large-area, active matrix liquid crystal displays

(AMLCDS) featuring touchscreen technology with enhanced 3D graphics for maximum situational awareness. A four-axis digital automatic flight control system (DAFCS) with dual flight management system (FMS) minimises crew workload, enabling single/dual-pilot VFR/IFR operations.

The avionics suite also satisfies satellite-based navigation, communication and surveillance requirements, and has the capability for satellite-based IFR localiser performance with vertical guidance (LPV) approaches to maximise round-the-clock helicopter availability. Safety enhancing avionics, including terrain awareness warning and airborne collision avoidance systems, can be added to the standard avionics configuration as customer options.

The AW169's advanced variable-speed main rotor improves efficiency and reduces the helicopter's external noise footprint, while it is also the first helicopter in its category with electrical landing gear retraction, reducing complexity and easing maintenance requirements compared to conventional retraction mechanisms.

Furthermore, the AW169 embodies several advanced aerodynamic solutions identified under the European Clean Sky Green Rotorcraft (GRC) 2 drag reduction programme. Together, these main rotor, undercarriage and airframe drag-reduction features combine to make the AW169 an extremely environmentally friendly helicopter



The avionics suite also satisfies satellite-based navigation, communication and surveillance requirements

that also causes minimal noise disturbance during urban operations. It will also become the first light helicopter to include a full ice protection system (FIPS) for flight into known icing conditions, providing true all-weather capabilities for safe operations when other types are confined to their hangars.

The AW169 has been designed to deliver reliable service under intensive use in the most demanding conditions, with high time between overhaul (TBO), minimal life-limited parts and inherent ease of maintenance. Time between successive inspections has been optimised to maximise aircraft availability and reduce maintenance man hours per flight hour, adopting the MSG-3 (Maintenance Steering Group-3) approach to maintenance processes. At the same time, maintenance programmes may be tailored to an operator's specific requirements, helping maximise aircraft utilisation regardless of mission type.

Complementing the AW169's mission capability, a full flight simulator (FFS), flight training device (FTD) and maintenance training simulator are available at Leonardo's Sesto Calende Training Academy in Italy. ■



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Serving Oklahoma City



Chip Smith, Director Line Services/Facilities, AAR Aircraft Services FBO, has worked at the Oklahoma City facility for more than three decades

Independent FBOs are rare in an industry where consolidation, building and buyouts are the norm. An independent FBO, owned by a company with no other interests in the sector, is perhaps even rarer.

Illinois-based AAR is a global aviation powerhouse, specialising in component supply and MRO, particularly for airline and military operators, as well as delivering airlift and search and rescue services with a fleet of helicopters and fixed-wing transports. It also owns and operates a Phillips 66 Aviation-branded FBO at Oklahoma City's Will Rogers World Airport, a somewhat unexpected jewel in a vast aviation crown.

Chip Smith, Director Line Services/

Facilities, AAR Aircraft Services FBO, says the OKC facility has been in AAR's portfolio for 47 years, after it was purchased from a company called Air Craftsmen in 1971. "At one time, AAR owned three FBOs, but the Oklahoma City station is the only survivor. It's a full-service facility operating 24/7/365 and provides services ranging from refuelling and defuelling, through line maintenance, to catering, to both private and airline customers.

"If required, customers also have access to AAR's MRO facility, collocated at Will Rogers, including oxygen and nitrogen service; wheel assembly replacement; strut services and component replacement. We also have base customers that we hangar on a monthly basis, with executive jets ranging from a Phenom up to a Gulfstream."



Regardless of branding or ownership, the best FBO staff combine service industry experience, customer service excellence and aviation passion in equal measure and Smith is certain AAR Oklahoma has people as good as the very best. “Myself and my colleagues are a committed group. My head customer service rep has been here more than 35 years. And there’s a group of five or six of us that have worked here for over 30 years –we’re passionate about what we do.

“I came to work for AAR after graduating high school. I’d always liked aviation and while attending the University of Oklahoma, I applied and was hired – I’ve been here ever since. I’ve learned the business from the ground up and I’ve spent most of my time at AAR on the line in the FBO.”

Service & Safety First

AAR Oklahoma’s modest webpage makes no mention of the standards or associations so commonly accepted in the industry as marks of quality; there’s no Wyvern or IS-BAH certification, for example, yet the FBO’s safety, service and training standards are exceptionally high and it’s regularly audited for safety and service quality.

“Training is an ongoing process,” Smith says. “We follow NATA [National Air Transportation Association] service standards, under a programme called Safety First. Our staff receive training tailored to each airline customers’ specific safety protocols. Phillips 66, our fuel provider, also provides training, teaching our

people how to handle and fuel aircraft, and instructing them in customer service. In addition, we have two employees whose job it is to ensure we’re meeting training protocols. We’re an ISO member and audited on average twice a month, but mainly it’s the airlines that audit us.

“We’ve always had a good relationship with Phillips 66. We’re a Phillips dealer and Phillips 66 has a lot of advantages. They’re a name brand, they advertise in the trade journals and they have various contract fuel programmes. Plus, they’re easy to work with and they do a lot of good things for us.

“We take pride in our customer service, which is the most important quality in the FBO business. When an aircraft pulls up, we’re representing

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We're a Phillips dealer and Phillips 66 has a lot of advantages. Plus, they're easy to work with and they do a lot of good things for us



not only AAR but also Oklahoma City. We train our people to be polite and friendly, know what they're doing, be positive and never say 'No' to a request. We think we can do just about anything and do it well, while our independence allows us to tailor our services to meet customers' needs."

As an example of AAR Oklahoma's tailored service, Smith says it sources its catering from a regular vendor, but also has access to five upscale restaurants in Oklahoma City. "Our customers generally know what they want ahead of time and the typical turnaround is 12 hours from order to service. But if something comes up, we can usually get it here in an hour, maybe 90 minutes. We can cater for just about anything – we hardly ever turn a request down."

Unusual demands

Rare for its independence, AAR Oklahoma also attracts an unusual, yet regular client set. Thanks to the Oklahoma City Thunder squad, it's a favourite with National Basketball Association (NBA) teams and, inevitably, regularly attracts fan and media attention. Smith confirms: "Every visiting NBA team comes in through here. We take care of the Thunder in Oklahoma City and have always had a great relationship with them. I work with their director of basketball operations. If he has a request, he goes through me.

"There's a group of Thunder fans that likes to greet the team upon their arrival. It could be 3 o'clock in the morning and they'll still be standing out there. We have a designated place that

we light for them. The Thunder players are aware they're there, and they'll wave or go over and greet them. We also get a lot of media and we help them out as best we can."

Less predictable even than the media, Oklahoma City experiences a full range of severe weather, including high winds, tornadoes, ice and snow storms, plus extreme summer heat. "We watch that weather every day and even have tornadoes in November," Smith notes. "Pilots are usually on top of the weather and leave before a storm arrives. But we have a protocol for severe weather. If passengers are here, we have a specific area we take them to and if anything does come up, we keep everybody informed."

Six years ago, AAR unveiled a new, 6,000sqft state-of-the-art FBO facility at Will Rogers, capable of handling more than 10,000 flight operations per annum. It represented a significant investment for a global company with only one FBO and Smith reckons it signals AAR's long-term commitment to provide Oklahoma City's visitors with superior service, even though other FBO provision is now available at the airport.

"We were the only FBO here for 45 years, and although we have competition now, we've been independent since 1971 and I think that's how we'll remain. We provide great services, we're proud of what we do and we're going to stay on top." ■



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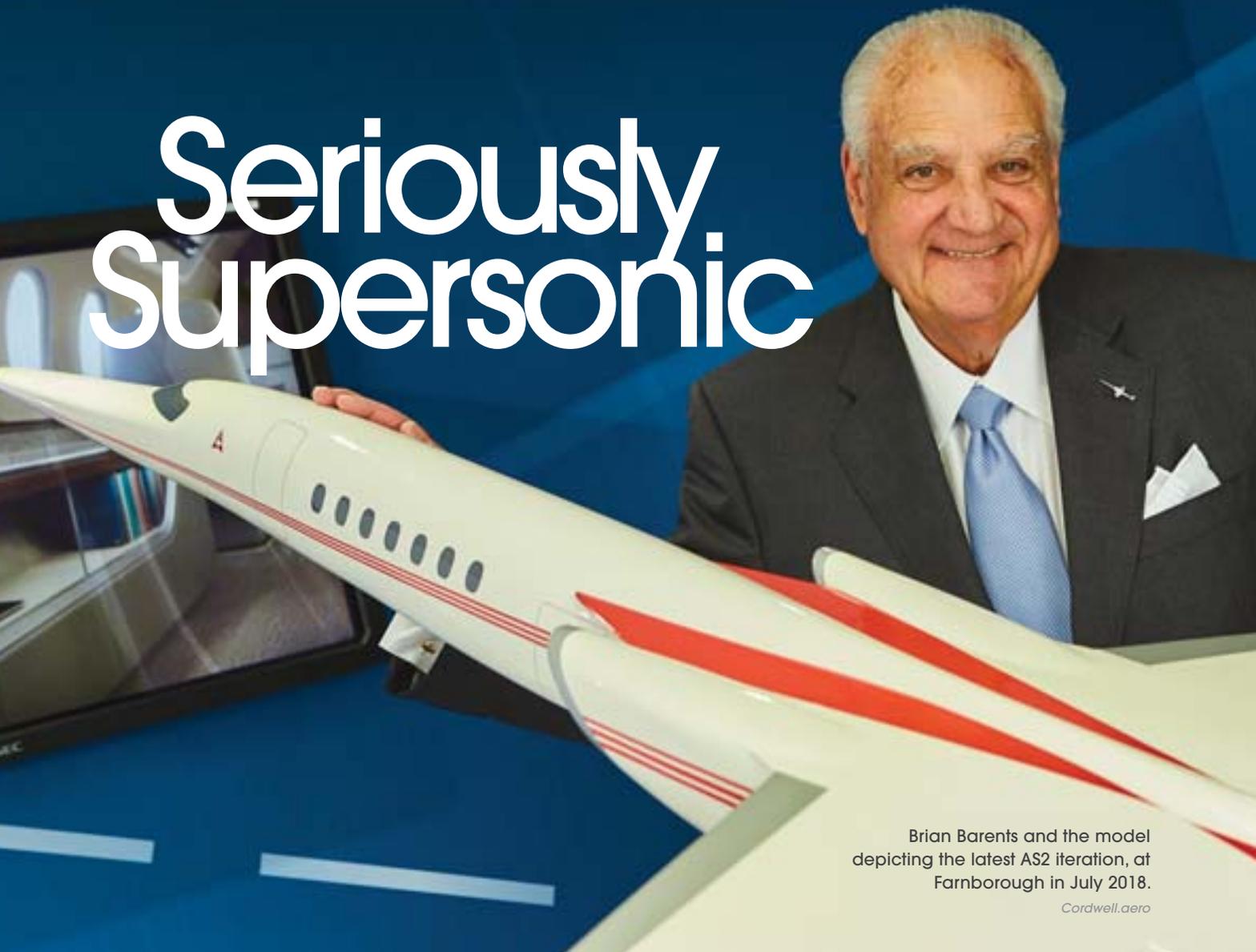
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Seriously Supersonic



Brian Barents and the model depicting the latest AS2 iteration, at Farnborough in July 2018.

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It's important, I believe, to approach every interview with an open mind. The interviewee holds the key to the real story and the interviewer's job is really to listen. But when the opportunity was offered to meet and chat with then Aerion CEO Brian Barents at July's Farnborough International Airshow, I was fairly certain I knew the story.

Judging by the size of its NBAA-BACE booth, Aerion is a major player, yet the supersonic business jet it has been promising for so many years seems only to be inching closer.

Add to that the recent addition of Lockheed Martin to the mix and I was firmly sceptical. Lockheed Martin (LM) knows how to build seriously supersonic aircraft, but did Aerion? I thought not.

Breaking all my own rules, I sat down with Brian expecting to discover that the company's AS2 was little more than wishful thinking. I reckoned there'd be a run of half a dozen or so jets, before the programme disappeared into a deep pit of wasted dollars.

LM magic

I spoke with Brian alongside a huge model, in a slightly ramshackle room.

The model depicted the AS2 in its latest form, after the application of a little LM magic. Coincidentally, LM's wand has left the concept with a passing resemblance to a Lockheed of legend, the F-104 Starfighter, and Brian agreed there was a similarity in planform. In fact, the AS2 has a military fast jet feel to it and Brian explained: "Fast airplanes have certain characteristics in common and clearly the AS2 has them!"

On the Aerion board since 2003, and executive chairman and CEO from October 2017, Barents stood down to remain only on the board of Aerion directors this past August, handing the reigns to former

Northrop Grumman Aerospace Systems president Tom Vice. Brian's knowledge of and passion for the project are without measure, but I felt that bringing LM on board as recently as December 2017 may have been a response to the sudden realisation that building a supersonic jet was beyond Aerion's means, even with Airbus already signed up as a long-term partner.

"Lockheed Martin hadn't actively participated prior to our December 2017 announcement that they and General Electric were collaborating with us, but we'd been having active discussions for quite some time," Brian recalled. "They'd been assessing the programme and all our activities over the previous 15 years. Early on in our programme we identified a number of critical phases where we'd need to collaborate with other companies. We're aerodynamicists, we're not airplane or engine builders, but we designed an airplane that we felt addressed market needs at a price the market was willing to pay. We always knew it would take a credible, established OEM to build it and support it. And an engine that would comply with the very demanding requirements for noise and emissions. All those elements, in addition to financing the programme, were essential to our success."

Sweet spot

Back in 2003, Aerion judged the business and VIP aircraft market ready for a supersonic jet. But that was a decade and a half ago. Is the market still willing to accept such dramatic change? "Even more so. The economic globalisation and need to travel intercontinentally lends itself to a fast airplane.

"And among the large segments we'll address is high net-worth

individuals. The number of billionaires has almost tripled in the last decade and I believe it's forecast to double in the next decade. These are people that value their time. They can afford this type of airplane and they'll represent a good portion of our buyers."

And yet, the latest competitor models already have maximum operating Mach numbers around 0.92, while Aerion expects the AS2 to long-range cruise at 0.95. Is that tiny Mach increment between Aerion and existing high-performance jets really worth the additional investment? "The difference is that when we go .95, that's our sweet spot, for maximum range. When a competitor aircraft goes .92, it's typically sacrificing around 30% of its range to do so – their long-range cruise is more like 0.85. Historically, we've seen competitors argue over 1/100th of a Mach to be able to say which has the faster airplane, but when you mention 'supersonic', they say speed isn't all that important; you have to decide one way or the other!

"Our airplane really has two sweet spots. On a mission profile where you can use the supersonic speed, it's there. On a mission profile where you may be prohibited or restricted on how fast you can go, you aren't paying a range penalty for going transonic."

Powerplant decision

While the AS2's configuration may have something of the fighter jet about it, its powerplant does not. Based on the core of CFM International's best-selling CFM56, the jet's three-engined powerplant will satisfy international noise and emissions regulations. There'll be no afterburning, or reheat, a common feature of military engines, where fuel is injected into the hot exhaust

efflux, generating a dramatic increase in power at the expense of a massive spike in fuel consumption; afterburning enabled Concorde to take-off and reach supersonic speed, but was also responsible for its smoky, noisy departures.

Brian stresses that the AS2 powerplant is not derived from military technology and yet the chosen core was derived from that developed for the supersonic General Electric F101 engine still powering the US Air Force's B-1B Lancer bomber fleet. It's a relationship not lost on Brian, since his 34-year military career included a period in command of a B-1B wing.

Unlike the Lancer, or Concorde, Brian says: "We have to comply with the most stringent noise restrictions and they're going to be even more demanding after 2020, when Chapter 5 comes into compliance. We're ready to do that now, but the reason it's taken so long for us to get the airplane where we are today has primarily been propulsion. We studied engines for a long time, looking at cores that met our performance requirements and satisfied the environmental and noise regulations. They had to be exportable too. Some military engine cores may have the potential for modification to meet our needs, but their technology isn't always exportable to every country.

"It took us a long time to reach the correct conclusion, and even when we'd chosen to select from the General Electric product line, it still took us five years to identify an engine that would support our performance requirements, was practical for what we wanted to do and was supportable. We've chosen an engine core with over one billion hours of service and that's supported around the world – that's clearly important when you're buying a US\$120 million aircraft."



With a very mature global support network ready to apply itself to the AS2's modified GE core, Aerion is satisfied that its customers' engines will be easily taken care of. But what about the airframe? In military aerospace, exotic materials are part and parcel of achieving high-speed. Will the AS2 require specialist techniques, even new technologies, to support its airframe maintenance?

"It's supportable around the world and we'll have an MRO network set up, including established organisations. That's why we've stayed in this 'space'. We chose 1.4 Mach, so we don't need exotic materials like titanium. We've taken a very pragmatic approach to everything. The airplane will be composite. The systems will be similar to those you'd find in an airliner or large business jet, there's nothing unique about them. The powerplant is proven. There's nothing out of the ordinary. The only thing remarkable is that it goes fast!"

But supersonic aircraft typically have complicated engine air intake geometry, often featuring systems providing variable area to control mass flow. Has Aerion avoided that issue too? "If we were going Mach 1.8 or above we'd need a much more elaborate intake design. It'd add a lot of complexity; some day we may be there, but today we feel we have a first-mover advantage and we wanted to eliminate all that risk.

"And that's even true of certification. We've developed our business plan

assuming we'd have to fly subsonic over the US, where supersonic flight is prohibited by law. Some day that may change, but we wanted to do things we could manage. We can't guarantee that we can persuade congress or the regulators to change the rules. If they do, we'll benefit, but we didn't want that as a constraint in our development." The crux of the Aerion offering is therefore that as soon as the aircraft enters service it will cruise faster and more efficiently over the US than any existing jet; should the regulations change, it'll immediately be ready for supersonic cruise too.

"And don't forget that if we wanted to, we could fly at 0.99. There's nothing to stop us. It wouldn't be as efficient, it would be like one of the current heavy business jets flying at 0.92, but we could do it. In fact, and although it'll require a degree of acceptance, we could already exploit boomless flight outside the ICAO. Travelling at around 1.2 Mach, the aircraft's sonic boom doesn't reach the ground, that's a proven fact. It means we can fly supersonically over land.

"But in the US, it's prohibited by law. It's not a noise restriction, it's a supersonic restriction. It was primarily an anti-competitive measure from when the French and the British were flying Concorde and the US airlines weren't. Once we're flying and we demonstrate to the FAA and the regulators that we can manage the boom, that it won't hit the ground, we may see that change. But still, we tell our customers, 'Don't buy

the aircraft expecting to go supersonic over the US anytime soon'."

Sizeable machine

In its current configuration, AS2 is 170ft long; a Gulfstream G650 is just a shade under 100ft and an ACJ320 a little over 120ft, so the AS2 is a sizeable machine. "We're looking at an adaptation where it might get shorter. In an earlier iteration the aircraft had all three engines at the rear and we needed the length for balance, but we've moved the two side engines under the wings, for a number of reasons.

"One was for improved balance and another was that the fuselage now blocks some of the engine noise. We also moved them to satisfy rotor-burst criteria. There was nothing wrong with the initial design, but this evolved version is better and may enable us to shorten the airplane by as much as 10ft."

But isn't that still a large aeroplane to fit into available hangar spaces? "It's a consideration, but we're serving a narrow-niche market, maybe around 30 airplanes per year. We're not looking at a huge global fleet. In future, as the fleet grows, there'll be economies of scale and we'll make an investment to ensure it is supported."

Developing a supersonic aircraft is undoubtedly an expensive business and with Aerion predicting a maximum market of 36 AS2s per annum, are its investors looking at a very long wait before they see money in the bank?

"Not as long as you think... ▶▶



Brian with a model of his favourite aircraft, Republic's F-105 Thunderchief.

Brian Barents

CAREER CREDENTIALS

A retired US Air Force pilot and Air National Guard (ANG) brigadier general, Brian Barents flew fast jets ranging from the F-100 Super Sabre and tricky F-84, through the F-105 Thunderchief, his favourite aircraft and one he believes was well ahead of its time, to the RF-101 Voodoo, F-4 Phantom and B-1B. At the finish of his military career, he had under his command a wing of B-1B bombers, another of F-16s and a third of KC-135 tankers. He was also instructing on the F-16, a type still essential in the frontline inventory of the US Air Force and many other air arms.

Between 1970 and 2000 he flew with the ANG while also serving as senior vice president of sales and marketing for Cessna and becoming general manager of the company's Citation Division. Moving on as president and CEO of Learjet, Barents brought the company out of bankruptcy and prepared it for sale to Bombardier in 1991; he also oversaw the development and introduction of the classic Learjet 45 and 60.

Managing partner and CEO at Galaxy Aerospace between 1996 and 2001, Barents introduced the first super midsize business jet and negotiated Galaxy's sale to General Dynamics. He continued to serve on five boards even after joining Aerion in 2003, helping assemble a team of experienced industry colleagues as he worked to make the Aerion concept a reality. ●

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» We believe the price is competitive, while the business plan is very attractive to investors.”

Brian was persuasive, but I struggled to understand how a price could be competitive when there was no competitor. Isn't Aerion actually in a market place where customers either have an AS2 or they don't? “We have what we call first-mover advantage, where we control the cost. The price is competitive, but it doesn't necessarily reflect what it costs us to bring it to market. Look at the empty weight, at around 62,000lb, and compare it with a current heavy jet, which is typically around 60,000lb. Do a parametric analysis, including cost per pound and, other than the engines, the cost to build AS2 is comparable to a current heavy jet.”

And why wouldn't it be, because other than the powerplant, there's nothing really new or exotic in the aircraft? “We'll have to recoup our development costs over a smaller number of airplanes,” Brian reminds me, “but even then, it's a very attractive investment.”

The partnership with LM may also open Aerion up to military and government markets; the AS2 might

appear as a head-of-state transport. Brian also sees the jet continuing to tempt the fractionals. “It's not an airplane you'd use every day – if you're flying 300 miles, you won't take an AS2, unless you want to show it off – but if you have a mission that requires speed over distance, it's what you need. And, of course, our first customer was Flexjet, with an order for 20 airplanes.”

Still determined to find a reason not to like the AS2, in a last-ditch attempt at derailment, I put it to Brian that anonymity is much valued among business and VIP aircraft users. The option to arrive at a small airfield in a white jet without anyone noticing can be very attractive. Arriving anonymously in an AS2 is not an option...

With its balanced field length of 7,500ft, Brian recognises the AS2 won't be using small airports, “But that's at full gross weight for a 5,000nm mission and it's about what you'd expect for an airplane of this size. If you have a mission of 2,000nm or less, you'll use around 5,000ft or less.

“And in this market, customers will not care that the world knows they have arrived. *The Wall Street Journal* quoted me as saying that high net

worth individuals will buy the AS2 because they can. The reality is that they will be important to this market, because they'll talk to their friends and they'll want one too.

“We've been at this a long time. I boast a little bit, but in my 52-year career I've been privileged to introduce 13 brand-new airplanes that have all been successful and are all still flying. I'm not sure there's anyone else left who can say that. At Aerion we put together a team of similar experience, including Brian Moss, former CEO at Gulfstream, who's on the board as a senior advisor. He brought seven airplanes to market, so that's 20 between us, and I was involved in other programmes as a board member as well.

“The Aerion team is knowledgeable and credible and we're in our comfort zone. We've said we'll fly in 2023 and I'm certain we will. We'll certify in late 2025, after a two-year flight test programme, and start deliveries in early '26. Everything about this airplane is conventional. We may meet unforeseen challenges as we work with the certification authorities, but not with the technology.” ■



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Great Scheme Believers



Dumont Group applied Craig Barnett's colour scheme to its own Learjet 45, using Sherwin-Williams coatings. The result is spectacular.

Via Scheme Designers

Founder and CEO of New Jersey-based Scheme Designers, Craig Barnett is a happy man. A self-confessed aviation junkie, he combines his passion for flying with an unusual background in art and engineering to create individual and fleet colour schemes for aircraft ranging from the smallest homebuilt, through helicopters and business jets, to entire airline fleets.

A great deal of Scheme Designers' work comes from individual VIP clients, keeping the demands on Barnett and his small team varied, since no two clients are alike, and each completed aircraft is the product of a careful, detailed process of evolution. "There's no consistent ask," Barnett says. "Every VIP client has a different angle, but many want to remain 'below the radar'. They tend to go for something very conservative, understated and unbranded, they don't

want to be noticed. But then at the other extreme we have people looking for something unique.

"It could be they just want a unique stripe pattern or artwork, from airbrushed artwork all over, to nose or tail art, or they want an overall darker colour instead of the more typical white, or, less commonly, a dark colour on top of the fuselage as an alternative to the more usual darker colour below. We've done a lot of beautiful stripe patterns recently, with a dark colour on top of the aircraft – in fact, we did an entire fleet of different types."

Owners opting for extremely unusual schemes, particularly those incorporating personalised artwork, must recognise that the decision comes with a number of consequences. "Once an owner is identified with that aircraft, they'll be known everywhere they go. And then, when it comes to sell it, the unique paint reduces the market of interest. Owners of business aircraft generally make financially sensible decisions about their ownership and



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therefore seldom want to go in the direction where paint will affect their ability to sell the asset.”

Scheme scheming

Some customers begin the design process with a firm idea of the finished scheme in mind, others less so. “The client that doesn’t know what they want is actually more difficult to accommodate. I have three other full-time designers. Whichever one of us handles a project has their own unique style and it takes a while to adapt that to the client’s satisfaction. We might go through ten or 20 unique design concepts and perhaps more than one designer before we arrive at a concept that interests the client, although we try to understand the owner’s taste at the very beginning. We also have returning clients who always use their preferred designer, but then we’ll also change designers if a project seems not to be making progress. We check our egos at the door to ensure we do the best thing for the client.”

But how does Scheme Designers learn a customer’s preferences at the outset? “In 21 years, we’ve done 13,000 or so successful designs for clients in around 150 countries,” Barnett says, “so we have a database of just about every aircraft type, with many paint schemes that we’ve already done. We’ll share part of that database to see what they find interesting and what they don’t like. Positives and negatives are equally useful to us.

“I’ll show them other aircraft types as examples. Perhaps they find a Cessna 150 scheme interesting, for example? And do they love the shape of their Porsche? Or the pattern on the curtains in their living room? Anything an owner wants to share with us is of interest and helps guide us. The precise colour is often secondary at the outset, although it’s good to know, ‘Hey, I love blue, black and gold, but I hate green’. We work out the exact colour as we go through the design process and towards the end we’ll send the client a set of colour charts and work down to the individual shade part number.”



It’s common practice to present a scheme in a variety of colours early on, gradually focussing in on the preferred options. Barnett is pragmatic about defining schemes on screen, recognising that colour representation can vary widely between monitors. Thus, he considers colour charts essential, the majority of Scheme Designers’ work relying on the accuracy of Sherwin-Williams charts and finishing products for their ultimate expression.

“But we don’t send out the entire Sherwin-Williams chart, which can be overwhelming for a client. We’ll do a lot of direction based on knowing them and the design direction we’re going in, narrowing down the shades from which they should choose. Normally we can predict early on what shade they’ll pick. We may go through a process of looking at 20 colours before they decide, but we can usually predict which one they’ll go for.

Julie Voisin, Global Marketing Manager at Sherwin-Williams Aerospace Products, concurs. “We custom match colours to clients’ favourite shades every day, but it’s also important not to overwhelm them with



We like Sherwin-Williams for a variety of reasons... We believe in it enough to stand tall with a long warranty on the finished work

Dan Piraino, Director, Dumont Group



Dan Piraino extended the Dumont Group fleet scheme to the company’s Cessna 172.

Via Dan Piraino

A Dumont-operated Falcon 2000 in an alternative scheme, but again recently completed in Sherwin-Williams colours.

Via Sherwin-Williams



too much choice. It makes it difficult for them to decide, so we try to focus on colours that we know look great – there are some we’ve been supplying for 40 years, but we know they look good and people are drawn to them.

“We’ve developed a colour tool, or colour card, broken up by colour type and containing 333 colours. We have solid, metallic, mica and other cards that we’re putting into a new selector booklet. It’ll include the most popular options and we’ll expand the palette, but it’ll be more focussed.”

Nonetheless, Sherwin-Williams still offers its full back catalogue of shades and has options for custom matching those colours with a particular effect. With the mica effect, for example, the mica is contained within the colour-matched paint, but for the last 12 months or so, the company has been offering SKYscapes Shimmer Basecoat as an option that lays the mica effect on top of the colour coat. “We especially like it for its ease of repair and maintenance, since micas are traditionally difficult to maintain,” Voisin says, “while designers can choose to mask the colour coat and apply the shimmer effect in selected areas if they wish.”

FLEET SCHEME

Dan Piraino, director of the Dumont Group, which specialises in business jet charter, operations and MRO, is both a client of Scheme Designers and Sherwin-Williams. His own paint shop uses only Sherwin-Williams’ products, while he turned to Craig Barnett when he needed a fleet livery for his aircraft.

“We own several planes and find branding very important,” Piraino explains. “We were looking for a common design that would look good across the fleet, including the Cessna 172 our employees use for personal flights. We worked with Scheme Designers to see the scheme on several aircraft models to make sure it would work well for the current and planned fleet.”

Looking back on the design process, he recalls: “I love it. I personally design the exterior and interiors of our fleet. Working with Craig on the exterior is a really fun experience – a change from daily company management. He has the uncanny ability to put on paper what you describe in words. It takes some back and forth, but it’s really easy and very enjoyable.”

“We paint our own planes, and those of external customers, exclusively using Sherwin-Williams – we’re very happy with the quality of the product. Dumont operates its own paint and interior facility, with a focus on large corporate jets, including quite a few Gulfstreams and widebody Falcons.”

“We like Sherwin-Williams for a variety of reasons, including the quality of the product and ease of application. We believe in it enough to stand tall with a long warranty on the finished work. We use a lot of really bold colours and their product is simply better than any other.”

Given that Dumont applied the bold fleet colour scheme to its own aircraft, Piraino has an interest both in the perceived quality of the finish and how it’s received by his charter customers. “We’re looking at branding as key to our continued growth model. We hear customer’s comments and they’re all positive. We also hear from aircraft buyers and charter customers alike when they say: ‘I want to see the red jet’. And we get a lot of comments from FBO personnel, competitors’ pilots and even air traffic controllers!” ●





Relatively simple yet highly effective Scheme Designers' concept for an Airbus Helicopters H125 at right... and as it appears on the finished aircraft.

Via Scheme Designers



Barnett notes that his team does occasionally select coatings from other manufacturers, but Sherwin-Williams is by far its brand of choice; he's very clear on why. "I've experienced the product on my own plane and it was excellent. I painted my first aircraft with their coatings 24 or 25 years ago. It sat outside for eight years and when I sold it, it still looked brand new. In my experience, the majority of paint shops in the general aviation industry use Sherwin-Williams products too, so from a business point of view it's very convenient and we've found their colours and support wonderful.

"It's important for the client to go through the colour choices, even though it can be a long, difficult process. I'm having one of my own planes painted. I chose from Sherwin-Williams and agonised over the colour for two weeks. So, I can understand the difficulty, yet for a client I can instantaneously choose the colour, shade and part number and be right 90% of the time."

Given his designers' shared expertise in matching colours to clients, wouldn't it have made sense

for Barnett to have them suggest a shade for him? Clearly the thought hadn't occurred to him. He pauses before agreeing... "Yes, probably!".

Design process

"I believe design is a process – you don't know what's going to go in or what'll come out at the end and so we structure our service on a flat fee basis. You can't load a person with worries that every time they speak to you they'll be charged, because you can't be sure you'll reach the correct result. Some people think it's an odd approach, but we think it makes every client happy in the end." It's clearly a design process in which Barnett has faith, but it's also true that in the massive, yet apparently tiny global aerospace industry, one happy client is very likely to recommend his services to others.

Evolving a customer's dream finish on screen is one thing, developing it into a set of precise instructions and colour specifications for a paint shop is something else again. "It's incredibly important to have super accurate drawings and well thought

out, careful specifications. Our specification packages are ten to 20 pages long, with dimensions down to the millimetre, set up to provide paint masks for anything complicated.

"A specification begins with a colour definition, down to the part number, then goes through the placement of every element with reference to fixed points on the aircraft. Whether we're working for an airline, manufacturer, homebuilt owner or bizjet operator, they all get the same level of engineered specification; we don't complete projects without specifications and we supply masks too."

Julie Voisin says Sherwin-Williams is equally attentive to its customers, regardless of whether they're painting a piston single or a multimillion dollar jet. "The aircraft may well represent their most expensive purchase and for that reason they're all VIPs from our perspective," she says.

Creating the very best quality business and VIP aircraft colour schemes is demanding, exacting and at times complex work. Does Barnett have fun? "Are you kidding? It's why I do this! I've always lived an aviation life and now my passion is my work. I'd drawn aircraft all my life, but never thought you could do it for a living. When I wake up in the morning, I can't wait to get to work!" ■

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Designing the Future

HondaJet's Michimasa Fujino

Business aviation is an industry of contradiction. While the realities of aerodynamics and engineering mean bizjets generally look similar to one another, they don't need to look quite so cool as they do – the industry has come to expect and accept a formula that produces great-looking, high-

have the desire to arrive without anyone noticing.

On top of those contradictory requirements, aviation in general tends to be tremendously conservative. Few manufacturers dare break the established mould. When they do, the result is frequently spectacular, but the market acceptance of their more conventional competitors difficult to achieve – consider Piaggio's superlative Avanti as a great example.

Defining a dream

The HondaJet he created is very different. Park it among its peers and it will stand out. And not only because of the over-the-wing engine mounts Fujino designed; it also has a very distinctive, surprisingly proud, Fujino-designed forward fuselage and nose section, plus a dramatically glazed, prominent cockpit, crafted, like everything else on the aeroplane, through the best aerodynamic and engineering principles, yet simultaneously placing the pilots in a position where one can't help but notice they're flying a HondaJet.

The controlling influence behind such a vision ought to be a larger-than-life character, brimming with confident enthusiasm, a person that stands out in a crowd, just the way the HondaJet does. In fact, Fujino is a quietly determined, disarmingly modest man. He thinks carefully before responding to questions, then reacts expansively and intelligently. He listens intently and answers naturally, seemingly unaware of his own genius. Ask other folk in the industry for their opinion of Michimasa Fujino and they all agree he's a force of brilliance, vision and rare determination.

He's needed all that determination to bring the HondaJet to market, in a process he began during the late 1980s and patiently stuck with, creating a new aeroplane in his own vision and now, recognising the march of technology – and competition – continues working relentlessly to improve. Honda had long dreamed of creating an aircraft and it fell to Fujino



performance, high-tech aircraft that don't really stand out. The ability to slip into an airport without raising awareness is keenly important to many bizjet users, of course, and an aircraft similar to its peers helps achieve that, albeit an aircraft that looks incredible. On the one hand then, we have an immensely smart machine that oozes ramp presence, and on the other we

And then there's the HondaJet. Michimasa Fujino joined Honda's research and development effort in 1984 and was involved in the company's business aircraft vision from its origin in 1986. He became HondaJet project leader in 1997 and today he's President and CEO of Honda Aircraft Company, producing the HondaJet in its Greensboro, North Carolina facility. Fujino broke the mould. In fact, he seems unaware it ever existed...



to realise the dream. He recounted the story to *EVA*, after unveiling the new HondaJet Elite at the European Business Aviation Convention and Exhibition in May.

“When I was considering my career, I thought I might become a scientist or engineer, then realised that I wanted to create something that people could use, something that benefitted them, rather than only doing research. When I graduated from college I decided to work in the automobile industry because it was a more exciting business in Japan than aviation.

“I ended up working on research and development projects, rather than products. When I was assigned to the HondaJet programme I determined that we would create an aircraft that came to market. That was always my motivation, I wanted to create something that people could use.”

HONDAJET ELITE

Speaking to *EVA* after unveiling the HondaJet Elite at EBACE, Michimasa Fujino, president and CEO of Honda Aircraft Company, said: “I like to meet customers face-to-face, to see their excitement at owning the HondaJet and their appreciation of the product, that’s the real reward for me. At the same time though, today’s aircraft is not the final product. We have to improve it continuously to keep satisfying customers as their demands on us increase. That’s why we immediately began working on the HondaJet Elite as soon as we’d achieved certification of the ‘HondaJet 1’.”

In a nutshell, compared to the original aircraft, the HondaJet Elite goes further (1,437nm) and introduces cabin and airframe improvements, while it’s also the quickest (422kt at FL300) and fastest climbing (4,100ft/min) aircraft in its class, and offers a 15% fuel saving on a typical mission. Statistics tell only part of the story though, for there’s more to the Elite than improved performance.

The OTWEM has been aerodynamically tweaked and HondaJet claims the jet now generates less drag at high speed than a conventional ‘clean wing’ design. Optimised aerodynamics and a little extra fuel combine to stretch the HondaJet Elite’s

legs for longer trips, while cabin modifications ensure maximum passenger comfort. Most notably, an industry-first Bongiovi Aviation speakerless sound system is installed, integrated into the interior panels, from where it adapts to flight conditions.

In the cockpit, the HondaJet Elite features an updated version of the Honda-customised Garmin G3000 suite. Among its new capabilities, the system reduces flight planning time and enhances situational awareness and safety.

On the outside, new, perforated, honeycomb sandwich engine air inlets reduce fan blade passage noise for lower noise levels, reducing airport noise. Honda Aircraft has also looked at the HondaJet’s only real shortfall compared to competitor jets, improving its hitherto less than optimal runway performance so that a number of shorter airfields have become viable even at higher maximum take-off weight. And should the aircraft’s looks be insufficient to announce its arrival, the choice of Ice Blue, Monarch Orange or Ruby Red paint ought to say “Hello, I’ve arrived in a HondaJet...”

The company delivered its first HondaJet Elite, from the Greensboro facility, on 3 August. ●



Today, ‘strange looking’ has become ‘distinctive’ and the over-the-wing engines are considered a bold Honda feature

Over three decades – the HondaJet achieved FAA certification in 2015, EASA following in spring 2016 – Fujino built Honda’s aircraft capability from nothing, developing every aspect of that capability, as well as the aircraft itself. Involving himself at every stage, working to understand the processes and define solutions, his has been an involvement unlike anything since the pioneering days of aviation, seven or eight decades ago. For his role in founding and defining the Honda Aircraft Company and in creating its product, Fujino has received many awards, but ought to be recognised as a modern day Clyde Cessna or Geoffrey de Havilland.

Unlike Cessna and de Havilland though, Fujino designed his aircraft in an era where just about everyone on the planet has a fairly clear idea of what an aircraft looks like. And he built his aeroplane for business aviation, a market pretty much certain it knew what its products would and should always look like.

They certainly didn’t have their engines over their wings, yet Fujino designed what HondaJet calls the Over-The-Wing Engine Mount (OTWEM), to maximise fuselage space – there’s no carry-through structure as there would be with conventional rear-fuselage engines – and reduce cabin noise, although he also found aerodynamic advantages. He created an elegant, narrow-chord, natural laminar flow wing, applying the same drag-reducing principles to the forward fuselage, helping achieve lower aerodynamic drag for greater efficiency at high speed. Beneath its skin, the unusual fuselage introduced

new structural techniques, employing a unique combination of advanced composite honeycomb sandwich and stiffened panel structures joined, according to HondaJet literature, "...using a patented integral co-curing process that reduces weight for optimal performance and payload capacity, while also reducing manufacturing complexity."

That said, Fujino still needed to sell aeroplanes, so how did he resist the temptation to move away from the dramatic low-drag, aerodynamically efficient configuration he'd arrived at, towards something less unusual but with more obvious customer appeal?

High-tech strangeness

"How customers would perceive the aircraft was a big concern. When I began the HondaJet project, I considered why Honda was taking it on? We had to deliver not only performance, but also uniqueness. At the same time, we knew many business jet customers were very conservative and they often wanted to remain low key. I wanted us to achieve a technological breakthrough, but that meant we had a conspicuous, unusual-looking design.

"So, I conducted market surveys and focus group interviews in major US cities. I watched the discussions from behind the mirrors when the moderator showed sketches of a conventional rear-engine configuration, underwing and over-the-wing.

"Maybe 80% preferred the conventional configuration, they thought the over-the-wing engines strange. But I was encouraged when a single pilot said: 'If this aircraft was being built by the Lockheed Skunkworks, I'd think it was really advanced.' It was just one person, but he began a conversation during which perhaps 70% of the group agreed that it might be an advanced configuration."

Based on that observation, Fujino decided that if potential customers were convinced he'd hit upon a high-tech solution based on sound technical principles, they might come to accept over-the-wing engines as an advantage. "This was around 1994/95 and from then on I worked to validate the configuration by experimenting in Boeing and NASA wind tunnels. I also decided to write a paper on the subject, hoping for academic approval for the work.

"But I was concerned academia might not understand my theory and it took me almost a year after I'd written the paper to submit it. I was worried that I might have made a mistake and if people realised, I'd lose my credibility and perhaps my career. Eventually, I made up my mind to email the paper to the AIAA [American Institute of Aeronautics and Astronautics] and I was surprised to receive a very positive message back from the AIAA reviewer within

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a month. I was really encouraged and while it usually takes the AIAA 18 months to two years to publish a submitted paper, mine was out in less than six months.”

Thus HondaJet’s ‘strange design’ became a ‘high-tech design’, with important academic support. Further encouraged, Fujino took the opportunity to discuss his concept with established aircraft engineers and designers, all of whom found it convincing. Next, around a decade after that focus group epiphany, in 2005 he took an experimental

HondaJet to the Experimental Aircraft Association AirVenture Airshow at Oshkosh.

“We had an overwhelming response. People were really excited and thought the aircraft looked very high-tech. Many people described it as beautiful, often describing the engine pylon shape as their favourite part of the design. If I’d introduced the concept in Japan, people probably wouldn’t have understood, but I introduced it at Oshkosh, in front of aviation enthusiasts – it was a strategic approach to gaining appreciation and

support in what was then our primary market – the US.

“There were good reasons why I wanted the engines over the wings, but I had been correct to worry about how people would perceive the aircraft. Today, ‘strange looking’ has become ‘distinctive’ and the over-the-wing engines are considered a bold Honda feature.”

Honda power

Honda builds millions of internal combustion engines every year, for road cars and motorcycles, but also to power its glorious motorsport achievements, boats, generators and even lawnmowers. There was perhaps never any chance that the HondaJet would take anything other than a Honda engine, but designing a powerplant from scratch while simultaneously designing the aircraft it is to power, is a task that has stretched, even overstretched, well-established manufacturers before. Yet here was Fujino, building a company and an aeroplane, and at the same time integrating a brand new engine.

Having worked on its own prototype, Honda joined with General Electric to produce the definitive HF120 turbofan that powers the



production aircraft. Fujino confirms the size and complexity of the task.

“Simultaneously developing the airframe and engine was perhaps the greatest challenge of all. We couldn’t be sure of the engine characteristics and performance when we were designing the airframe; if we’d used an already certified engine it would probably have reduced the complexity by half.

“Conversely, if we’d used an existing engine, only our airframe design would have differentiated us from other manufacturers, but our engine was new technology too, and that gives us a greater advantage. So yes, it was a major challenge, but it worked and helped us create a successful, unique product.”

HondaJet future

While the US remains a key market, Fujino sees great potential in China where, he says, modern young people take a very Western attitude and are realising the importance of speed and time-saving in competitive business. The region’s paucity of airports remains an issue and business jet flights in China generally still make inefficient use of aircraft too large for the mission, but Fujino expects that to change and his aircraft to take a good proportion of the market that opens up as a result.

With increasing sales, he also expects more than enthusiasm from HondaJet owners. “My goal is for many people to use the HondaJet, but with increased business jet ownership comes greater environmental responsibility. Because of its design, a HondaJet flown between 300 and 400 hours annually will use as much as 8,000US gallons less fuel than any comparable light jet on the market. I don’t really think so much of that as a benefit for now, I think of its effect in the future. That’s what the HondaJet is designed for, the future.” ■

FLIGHTDOCS DEAL

On 6 August 2018, Bonita Springs, Florida-based Flightdocs announced that it had partnered with the HondaJet Owners & Pilots Association (HJOPA) to offer its cloud-based Enterprise aircraft maintenance tracking, compliance, and inventory management services at a discounted annual cost and with no enrolment fee.

Extensively employed by MROs, maintenance tracking software is less prevalent among business aircraft operators, especially individual owners, but Flightdocs President Greg Heine says there are multiple benefits to be had. “Although these types of software are generally termed as ‘maintenance tracking’ tools, they also gather data to ensure the appropriate maintenance for safety and regulatory reasons is done.

“Our platform is designed to make flight operations – whether you’re a single owner/operator or you operate a large fleet – far more effective and much more efficient. We built our platform to be suitable for any size of operation; if you look at owner/operators in the US, they average out around 1.5 aircraft each and we wanted to ensure we could serve that end of the market as well as multi-aircraft fleets.”

The owner/operator model is especially significant to HondaJet and with Flightdocs’ vast technological expertise behind its cloud-based platform, HondaJet owners anywhere in the world can experience the same maintenance tracking benefits as a major airline. “With in excess of 100 aircraft among its members, we saw the HJOPA as an opportunity to offer our platform under a much more attractive financial deal. It gives members access to our full state-of-the-art product, including global 24/7 customer service; everyone gets the same level of service – we answer the phone within two rings, whether you’re an individual HondaJet owner or you are a fleet operator.”

Heine also advocates industry-wide conversion to a paperless environment and Flightdocs supports fully paperless operation, including pilot interaction via iPad from the cockpit. It’s an obvious progression for customers employing cloud-based maintenance tracking and brings ancillary benefits. Documentation required for regulatory audit is easily and very quickly gathered, as it is when the time comes to sell the aircraft and a potential new owner requests a complete set of ‘paperwork’.

The HondaJet is still relatively new to the market, but easily generated, complete documentation is historically important to retaining asset value and, Heine says, “I believe Flightdocs will also help HondaJet owners retain their aircraft values. It’s all about the completeness and integrity of the data. We’ve concentrated on the ease of use and intuitiveness of our platform, customer service and data integrity. We go through periodic validations to ensure we begin with accurate data and continue with accurate, pristine data throughout the aircraft’s lifetime.” ●

AVANCE to the Future

These past 18 months have been busy for Gogo. On 24 August 2017, Gogo Business Aviation announced FAA Supplemental Type Certification (STC) and Parts Manufacturer Approval (PMA) for the dual-directional antenna required by its AVANCE L5 system, effectively heralding a new era in business and VIP aircraft connectivity through its Gogo Biz 4G network.

At the time, Gogo expected to deliver AVANCE L5 equipment from first quarter 2018 and, on 13 June, it revealed that the 200th L5 installation had flown. With expectations of completing as many as 500 L5 installations by year end, Gogo has also started building its Next Gen network and is flight-testing the

new technology, evaluating its performance. According to Gogo, the Next Gen network will use a proprietary modem, a new beam-forming antenna and unlicensed spectrum. It will utilise LTE technology and leverage Gogo's existing North American network and infrastructure.

While Gogo Business Aviation's air-to-ground (ATG) portfolio for CONUS has expanded to include four primary hardware options – AVANCE Smart Cabin Systems (SCS) Media, AVANCE SCS Elite, AVANCE L3 and AVANCE L5 – plus a variety of network solutions based on the company's 250 antenna towers covering the US, parts of Canada and Alaska, it's also extending to satellite coverage for global connectivity. The result is a comprehensive customer offering Gogo will be showcasing during October's NBAA-BACE show in Orlando. Additionally, Gogo will be highlighting its cybersecurity capabilities, a subject on which Mike Syverson, SVP of Technology and Operations, has particularly strong views.

"We've seen lots of connectivity providers jumping on the cybersecurity bandwagon lately and the difference between Gogo and the rest of the market is that we're a vertically integrated player; from being the network operator to the design and manufacture of the equipment and software. Data security is something we've had at the forefront of everything we do. It's built into the Wi-Fi solution we put on the aircraft and into the design, deployment and backhaul of our network and our NOC [Network Operations Center] – and we've been doing it for

Lisa Peterson,
SVP, Global
Marketing
& Digital
Strategy (IoT)



more than a decade. We're an end-to-end cybersecurity provider – it's in everything we build. We have a much higher level of service and security as a result.

“Keeping our customers’ data safe is a top priority. Cybersecurity isn’t an afterthought for us – our security is built in, not bolted on. Unlike any other provider of connectivity in business aviation, we own the connectivity experience from end to end: we own and operate our own network, the towers, backhaul and spectrum. We own and operate our data centres, and we have two, which provides redundancy for added security and reliability. And, since we manufacture our systems, we own what goes into those as well – no one else can say that.”

“Are cybersecurity threats in our industry real? Yes, they are but that doesn’t mean you should be paralysed by fear. You have to be sensibly safe and take the same measures to protect your data in the air as you do on the ground.”



Mike Syverson, SVP
of Technology and
Operations

Gogo network

Gogo’s ATG network serves thousands of commercial airline and business aviation customers over North America. Gogo has built its reputation on this unique network and it is for this that the company is perhaps best-known. Yet its Business Aviation products reach globally, as Lisa Peterson, SVP, Global Marketing & Digital Strategy (IoT), explains: ▶▶

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AVANCE DEMAND

In July, business aviation MRO specialist Flying Colours announced contracts to install AVANCE L3 in a pair of Bombardier Challengers. Kevin Kliethermes, Director of Sales, Flying Colours, says the company is seeing increasing demand for the system, which he unhesitatingly recommends.

"It's a great solution for any mid-sized aircraft flying in the US and lower parts of Canada. The L5 4G network delivers internet streaming, email with attachments, web browsing, VPN support and Gogo Vision – it's a similar experience to that on the ground. The market has responded very strongly to the new 4G system and overwhelming demand has created a backlog – we encourage anyone wanting the new products to plan well ahead in order to ensure parts availability."

Kliethermes needs no convincing of the quality of the AVANCE offering, but even a quality product – especially one delivering connectivity – is only as good as the customer service available when something goes wrong. On

that front, he says, Gogo excels. "Their customer support team constantly monitors the AVANCE products and can proactively generate a case when it recognises a failure.

"The Business Services Gateway (BSG), a cloud-based system controlled by Gogo's ground team, provides real-time system monitoring and allows them to identify issues and proactively address them, sometimes without the customer being aware there is an issue. The BSG also enables customers to make service upgrades on the L3 system 'on the fly'.

"Gogo's customer service rates high for us as an installer and the feedback we hear from clients is positive. The company has increased the support it offers to its customers, with a dedicated field service rep for each of its regional sales territories.

"They've also developed the Gogo DASH app, which provides system information for diagnostics, connectivity information and general operating overview. Plus, every dealer has a field service

engineer to engage with when an installation facility needs extra support."

When it comes to installation, Kliethermes confirms the L3 LRU is almost half the size of the L5; it also uses original ATG antennas, while the L5 uses the new dual directional antennas. "Neither L3 nor L5 is a direct replacement for an existing ATG system. While some wiring may be reused, there are other new parts to install, including terrestrial modem Wi-Fi bridge antennas and remote Wi-Fi cabin antennas. The systems can be integrated into an existing cabin management system (CMS) or inflight entertainment (IFE) system, but the process requires evaluation and in almost all cases additional software is needed from the CMS/IFE provider.

"Flying Colours loads all the required software as part of the installation process, while Gogo can provide customisation of the splash screen on the Gogo Vision App. The customer can upload a company logo by logging into the www.mygogoair.com website and making changes as required." ●

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► “We have a three-pronged approach to serving our global customers. First is 2Ku, where our satellite network has been providing global connectivity for VVIP aircraft and the airlines.

“Second, we’ve announced the deployment of a new Ku product aimed at the business aviation market. The Ku network leverages an open architecture, which means we aren’t limited and can add capacity by expanding our commercial agreements with the satellite providers. We can also deploy high-throughput satellites [HTS] faster than anyone else. And third, we’ve announced an agreement to be a service provider and value-added manufacturer for Iridium Certus, allowing global coverage for smaller airframes and the opportunity to provide safety services.

“It means our international product offering will include Certus, the Gogo Business Aviation Ku system, which is in development, and our 2Ku system for VVIP aircraft. Add that to our ATG offering, the tools we’ve built into the AVANCE platform that all of those network systems will leverage, and there’s no other company that can provide the level of global service Gogo delivers.”

AVANCE

Designed for optimum results across the Gogo network, the AVANCE systems are essential enablers to the company’s connectivity.

The AVANCE platform is a software-rather than hardware-centric product enabling features not seen in the market today. The software-centric design allows for the system to provide better performance, enhanced predictability capabilities and visibility into its performance. Installed as a compact set of hardware and software under STC, the product range opens the door to comprehensive service, customer support and diagnostic capabilities.

Customers have the option of adding considerable functionality to their existing ATG 1000/2000/4000/5000 systems through the standalone AVANCE SCS Elite and Media products, enabling them to “...better manage and deliver their existing data and voice services via advanced WAN and router functionality. We consider SCS Elite the ‘King of the cabin’ solution, while SCS Media enables easy, affordable inflight entertainment and information services.”



For those seeking further optimisation, AVANCE L3 and L5 suit somewhat different applications, but Peterson confirms that both include all the features of SCS Elite and SCS Media, avoiding the need to install both the L3/L5 and SCS ‘boxes’. Designed to operate specifically on Gogo’s ATG networks, L3 and L5 provide in-cabin connectivity and entertainment through Gogo Vision. “As Gogo deploys Ku for business aviation the AVANCE platform will also be the heart of the system connecting to the Ku network.”

Peterson notes that L5 and L3 offer different experiences designed to meet different needs. “In short, L3 is designed for smaller aircraft or for business travellers who simply want email and/or light browsing. L5 is designed for much heavier use, for larger aircraft with more people on board. It has streaming capabilities and can enable video conferencing. I suggest L3 delivers something like a 3G experience while L5 delivers a 4G experience.

“Generally, AVANCE L5 customers are looking for more robust services, particularly streaming, while AVANCE L3 is great for individuals looking for basic internet and

email. And given the slightly smaller size of the hardware and its service plan options, we’re seeing a higher AVANCE L3 uptake in the light jet and turboprop segments. The L3 system has attractive and affordable service levels from as little as US\$99 per month.”

Once an AVANCE system is installed, future functionality and updating are achieved through software rather than hardware changes, a fact Peterson says leaves the platform “...extremely flexible and scalable, even customisable to an individual user. For example, if an aircraft equipped with L3 is sold, the new owner can select the profile they need without changing out hardware. But for me, one of the coolest qualities of the AVANCE platform is that it’s among the first real examples of the Internet of Things [IoT] in aviation.

“Sensors in our AVANCE units detect problems in ‘real time’ and report them directly to Gogo technicians. Obviously, our goal is to have no issues, but if there are any, we want to know about them before they become a problem for the users on the aircraft. And it’s important to note that customers have a real-time window into their AVANCE system. They can see which software version

Detail of the AVANCE L5 hardware



they're running, which features are enabled, and monitor their system's performance. If they want to change service plans or add capabilities, they can simply contact Gogo Customer Support and it's done, quickly and easily."

DASH to the future

Thanks to AVANCE, Gogo is already offering to fix issues before customers are aware they have them, a futuristic capability that Peterson admits is having "...a big impact on our bottom line, because we're not having to send out a technician at every issue. And it's having a big impact on the bottom line for our customers too, because they no longer have to ground an aircraft while we resolve an issue."

As more information becomes available, Peterson explains Gogo has recognised that its business aviation customers want visibility into the connectivity systems and networks on their aircraft, so they can see and resolve issues as quickly as possible. And they want visibility for personnel on the aircraft as well as for operations personnel on the ground.

Gogo delivers this capability through its DASH product, featured at this year's NBAA-BACE. DASH can be accessed in two ways: via the DASH mobile app for iOS, launched in July 2017, or through the DASH ground portal, which recently launched, and offers more in-depth monitoring and analysis by personnel on the ground. DASH provides visibility into system health aboard the aircraft and the networks available, as well as enabling access to the Gogo Vision inflight entertainment catalogue.

"The DASH ground portal was built for the technical personnel responsible for monitoring

and resolving connectivity issues aboard an aircraft or fleet. It's web-based, device agnostic and provides a rich toolkit. It provides near-real-time information on system and network status, and even lets them see how much data is being used in aggregate and by device type on the aircraft," Peterson says.

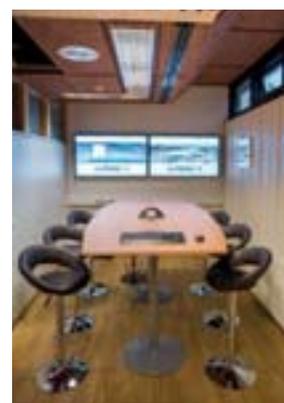
"They can monitor information by specific aircraft tail or report on aggregate performance of a fleet. DASH provides the tools and visibility needed to speed issue resolution by the customer or, if necessary, it gives them and Gogo technical support the information needed to diagnose a problem and solve it."

Future challenge?

Having founded its business aviation product on an extensive, proven ATG network, Gogo now faces imminent competition in the US ATG market. Peterson's reaction? "We welcome others to this space. With more than 25 years in the business, we know how difficult it is to deliver a product that meets the demands of this audience. It's a complex business and we believe we are well positioned to compete not only today but well into the future. We have a roadmap, we have a network, and we have the platform to enable the future of connectivity.

"Something that impressed me from day one about Gogo was the relentless pursuit to anticipate our customers' needs and issues. With AVANCE we now have a platform that will allow us to innovate rapidly. Couple Gogo's infrastructure with its talented team and you create a winning combination for today and the future." ■

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Changing the Connectivity Game

Whether it's watching football, joining a video conference,

getting the low down on your children's latest school achievements or simply catching up with friends, the real measure of inflight connectivity is in the phone ringing or the email chiming, isn't it? Passengers expect the phone to work in the air just as it does on the ground and, if they're entirely honest, most bizjet and VIP flyers really don't think about the network, service provider or hardware... if it works, it's good. If it doesn't, it's not.

There are multiple connectivity options to consider, and while each provider has a USP or two, is there actually more to it than that? What if the connectivity buying decision ought to consider an even bigger picture?

What if satellites and constellations really do matter when it comes to individual users? Viasat says they do, and now it's setting out to change the connectivity game.

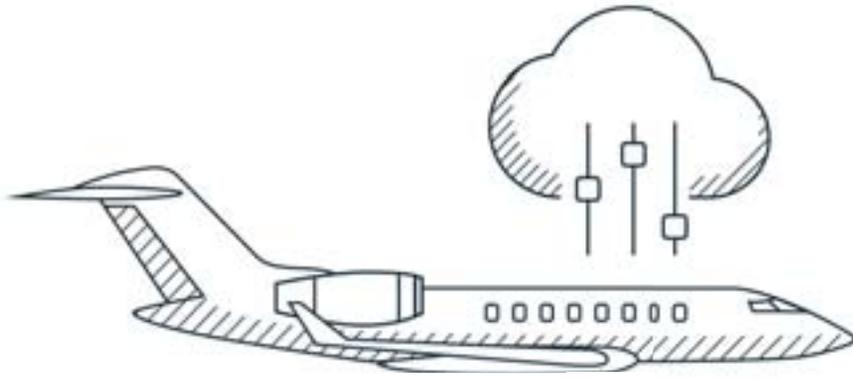
There was a frisson of excitement on Viasat's newly rebranded EBACE booth, reflecting its freshly announced deal with Embraer for Ka-band connectivity on the Legacy jet and a slightly earlier agreement with Honeywell's GoDirect (previously Satcom1).

Jerry Goodwin, Executive Vice President Network Services Portfolio explained: "We've been watching our colleagues in the commercial group delivering connectivity through our latest satellites for a few years, waiting to give our business jet customers the same standard of service. We've been working hard to pull together everything that we need to do it, including the correct terminals, because for the most part we can't use the same, large terminals the commercial airline group uses.

"Now we have the technology in place and we feel this is a tipping point of lots of good things to come. Building transition pathways for our many existing customers to upgrade over time has also been an important part of the process. Plus, we're super excited about the deal with Embraer, which was competitive – we had to compete for it against other vendors.

"We've been working with them a little over six months and the partnership is going really well. We're concentrating on STCs and radomes, and concluding test work on the terminals, which are almost ready to go. Now we're talking with them to define the end-user experience, which is so important. Embraer is telling Legacy customers the package will be available as line fit from second quarter 2019, which is really comfortable for us."

The engineering, trials and certification effort for the line fit offering will also inform the STC



for adding Viasat's system to earlier Legacys. Combined, the line fit and retrofit options bring high-speed connectivity to the mid-size market in a way never before attempted. "Four or five years ago, almost none of the mid-cabin business jet manufacturers were interested in this type of connectivity system, because they'd need a radome design for the tail and other work, and the market wasn't ready for that," Goodwin says. "Manufacturers questioned whether principals would want connectivity on shorter flights and we were almost competing with non-use. But a coast-to-coast US trip isn't short and it's really different now, with everyone looking to figure out their connectivity story."

The implication is that thanks to improved comfort and performance, the latest mid-size jets, exemplified by the Legacy, are tackling longer trips, but for operators flying coast-to-coast, how does Viasat's Ka-band offering make sense compared to a well-established competitor's air-to-ground service, for example?

"Our advantage is in the network; it's about capacity. That's what defines how many aircraft you can add simultaneously. Because of our network size, we offer a superior quality of service since our network capacity is orders of magnitude greater. That means that when demand on the network is high, we have the bandwidth to cope, while other providers do not.



With our multi-cast system, we send live high-definition TV signals – news and sport – over our Ka-band network

James Person, Director of Global Business Development for Business and VVIP Aviation

"Our competitors suffer those same issues if we compare satellite networks, although the imbalance is less stark – we offer in the region of 100 times greater capacity, while if you compare our satellite service with the air-to-ground example, it's more like 1,000 times greater. And what's more, aviation takes only a small percentage of Viasat's total network capacity."

Capacity and Experience

Listening to Goodwin enthuse over Viasat's Ka-band system, it's easy to forget the company's long experience in Ku-band service offerings. James Person, Viasat's Director of Global Business Development for Business and VVIP Aviation, says: "We've been active in business aviation with our global Ku-band network for more than a decade and at one time it was the premier network. But we always anticipated that we'd need to go on and establish a highly differentiated network. That's what we've done now and although it happens to be in the same Ka-band frequency band as a competitor's satellites, really that's the only thing they have in common, because we have so much more capacity.

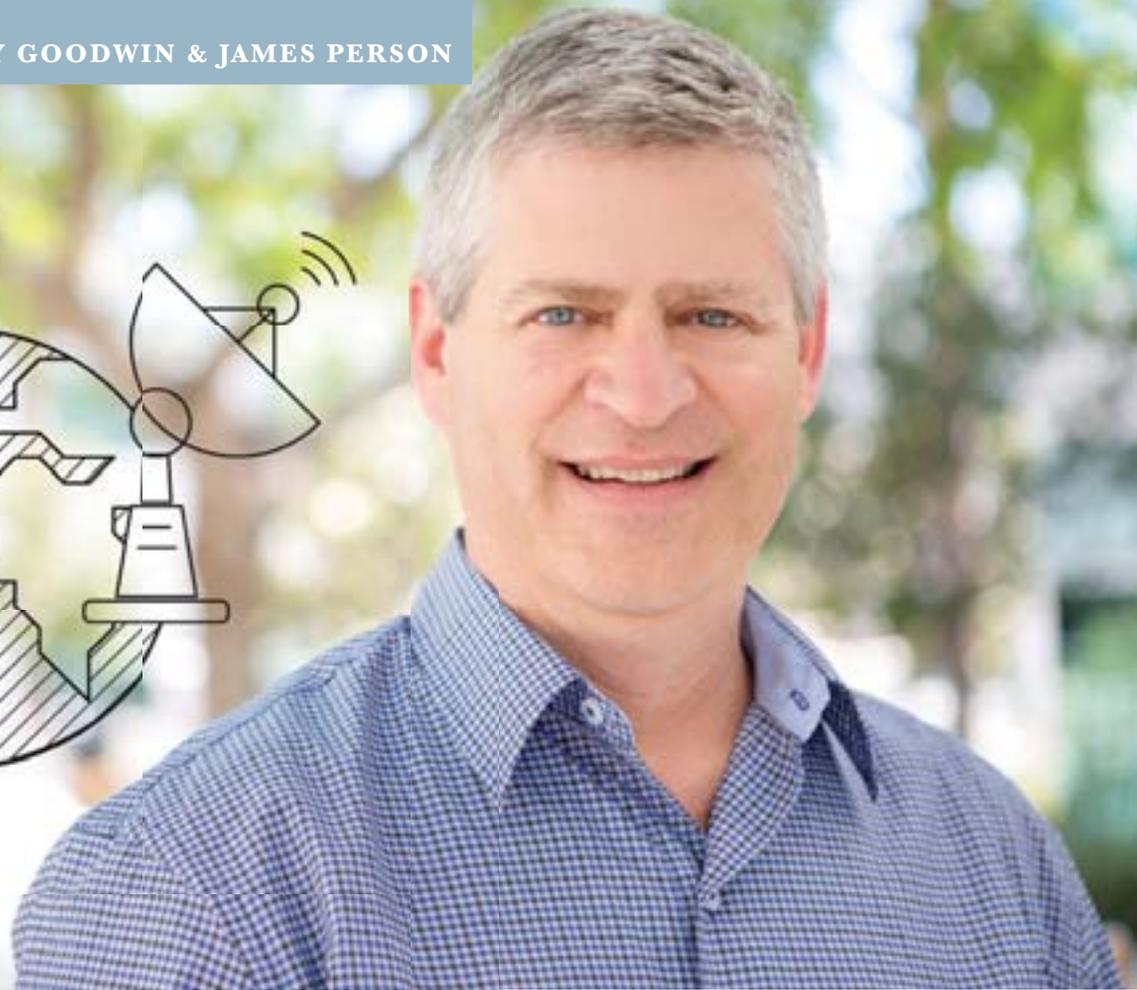
"And we focus on capacity where business jets fly. We started in North America, then extended to Europe through a joint venture, and most recently we launched ViaSat-2, which

added coverage in the Caribbean and North Atlantic. All in, Viasat covers about 85% of business jet flying hours. Our capacity over that combined area is more than 500Gbps, while our nearest competitor covers one third of the world with a 7Gbps satellite. That's what enables our differentiated experience."

Goodwin and Person are extremely proud of the 'differentiated experience' they say Viasat offers, but it sounds suspiciously like marketing speak to describe something that's just a little different from the competition. What exactly does it mean to the customer? "All our plans are 16Mbps," Person explains. "We don't reduce the speed if you buy only a small amount of data. We can do that because we have so much capacity and we put it where principals fly. That's the standard our new Embraer customers can expect too."

Ku-/Ka-band

The GoDirect deal marks another significant Viasat advantage. "GoDirect has a number of customers with Viasat Ku-band equipment on board. The new agreement gives them an opportunity, as it does Satcom Direct, which has already extended its agreement, to not only upgrade customers to Ka-band, but dual-band. It's something no one else can offer.



“It’s about the network, but also about our shipset. It’s very compact, the antennas are all the same size and we only need three LRUs [line replaceable units]. It means we can put two antennas on a large-cabin Gulfstream or Bombardier Global; we’ll see Gulfstreams flying with dual-band this year.”

Viasat is also looking out for customers operating jets equipped for its Ku-band, but with no space for a second antenna – in the bullet fairing of a Falcon, for example. The Ka-band antenna is a straight swap with the Ku-band equipment, while the mounting points and connections of the associated LRUs are identical, facilitating a simple, one-for-one exchange. “Several of our Ku-band customers saw the change to Ka-band coming,” Goodwin says. “They thought about it early and now they’ll benefit from the commonality between our Ku- and Ka-band equipment.”

With a dual-band fit, customers will enjoy 16Mbps via Viasat Ka-band over the majority of their routes, with the company’s Ku-band providing up to 6Mbps when the jet flies out of



...we’re super excited about the deal with Embraer, which was competitive – we had to compete for it against other vendors

Jerry Goodwin, Executive Vice President
Network Services Portfolio

Ka-band range. Remarkably, Person says: “We’ve priced it through our suppliers so that customers pay the same monthly fee for dual-band as they’re currently paying for Ku-band; we can do that because we own the Ka-band satellites.”

Customers upgrading from Ku- to Ka-band have traditionally needed to modify their aircraft with aerodynamically and structurally identical radomes in a different material, since a Ka-band antenna sitting under a Ku-band radome delivers less than optimal performance. Yet Viasat is offering dual-band, via two antennas under the same radome; with a smile on his face, Person notes: “We have that technology available for large-cabin aircraft – we’ve been delivering ‘Ku-/Ka-band’ radomes to commercial airlines, as well as senior leader government aircraft for years

now, and we’re applying that same proven technology to the business jet market. Dual-band complements our highly differentiated Ka-band for mid-cabins and other aircraft that can only accept one antenna, plus we have the satellites up, the STCs in process and the line-fit agreement with Embraer – it’s all coming together this year.

“And another big advantage is that we’re going to be offering TV over the Ka-band. Many aircraft have a TV reception antenna, for standard definition [SD] broadcast, but those broadcasts are set to be discontinued, rendering the antennas as little more than ballast. With our multi-cast system, we send live high-definition TV signals – news and sport – over our Ka-band network.”

Goodwin has good news on TV pricing as well. “It won’t count against the monthly data allocation, it’ll be

through a flat-rated subscription, so customers can watch as much TV as they want.” Person expands: “Operators might have 40Gb or 100Gb of combined Ku-/Ka-band data, then add TV service as required by subscription, without needing an additional antenna.

“We’ve been waiting to do what we do for the commercial airlines for a while and now we’re very excited to have everything in place, ready to deliver our unique product to business and VIP aircraft operators. Right now, we’re offering a high-quality Ka-band service, plus dual-band for those with aircraft large enough to accommodate two antennas. And from 2020, we’ll launch three satellites in our global ViaSat-3 satellite constellation, which will deliver global Ka-band service. “Meanwhile, our specialist VVIP team has been really busy working with

customers to supply the Ku-/Ka-band solution for ACJs, BBJs and other large platforms, especially in Europe, where they’re engaging completion centres across the region.”

Viasat sees internet use continuing to increase exponentially and Goodwin reckons it has the requirement well in hand. “We take pride in designing and constructing satellite constellations that are vastly different to any other satellite constellation out there. We started with ViaSat-1 – which offered more capacity than any other satellite in orbit at launch, we sought to double capacity and increase the coverage by seven times with the ViaSat-2 satellite and our ViaSat-3 class takes capacity and coverage to a whole other level – and we don’t plan to stop there. Our initial three ViaSat-3 class satellites will provide global coverage

and enable us to put capacity where demand is – it provides an immediate, dynamic response that might move capacity from the East to West Coasts as required, for example, or perhaps cover all the business jets flying into a region for the World Cup or other global sporting event. It also means we won’t be constrained for capacity.

“When those satellites come into service, I expect our product to be so reliable and interesting compared to what the world has seen from satellites before, it’ll be fascinating to see how customers adapt to its quality. Our current Ka-band LRUs are capable of handling 16Mbps, but they’re forward compatible with our ViaSat-3 system – meaning they’ll be able to handle twice that, even on a large-cabin antenna. We don’t do business unless it changes the game and that’s what we’re doing.” ■

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Safety & Service First

Signature Flight Support

Group Chief Executive of BBA Aviation and CEO of Signature Flight Support since April 2018, Mark Johnstone runs a growing global network of 200 FBOs. While Signature's largest presence is in North America, it also boasts important facilities in the Caribbean, Latin America, Europe, Africa and Asia. He considers that network a clear differentiator between Signature Flight Support and its competitors.

"We have 139 locations in North America, the next largest FBO operator has 70," he explains. "Access to the financial resources of its parent company, BBA Aviation, also allows Signature to be innovative, and to invest in technology, facility upgrades, additional acquisitions and training. Our global network is therefore the greatest asset we have. And customers expect a premium experience when they land at a Signature Flight Support FBO, so we expect all our team members to be ready to provide that experience in a world-class manner and with an exceptional focus on safety."

So important is safety to Signature Flight Support's offering that it has developed

proprietary safety and service training modules. "Our Service with a Leading Edge programme was developed in coordination with a highly-renowned five-star hotel chain. All employees, from the CEO to a new line service technician, are required to take this training both initially and in subsequent refresher courses. We look very closely at our customer surveys to spot service deviations and quickly respond not only to the customer but also to correct the deficiency at the location with additional training.

"Safety with a Leading Edge has evolved over time from our SafetyFirst programme, which has since been donated to and is now provided by NATA – it's available to all FBOs. We've further defined our safety standards and we hold one another accountable for our service and safety standards; we instil these beliefs from day one of an employee's time with us."

Signature's proactive pursuit of the global IS-BAH standard is a further demonstration of its commitment to safety and its willingness to partner with the business and general aviation industry to identify and implement best practices. "We also have exacting internal audit and safety management systems that adhere to the best practices in the FBO industry and are continuously updated."

Signature service

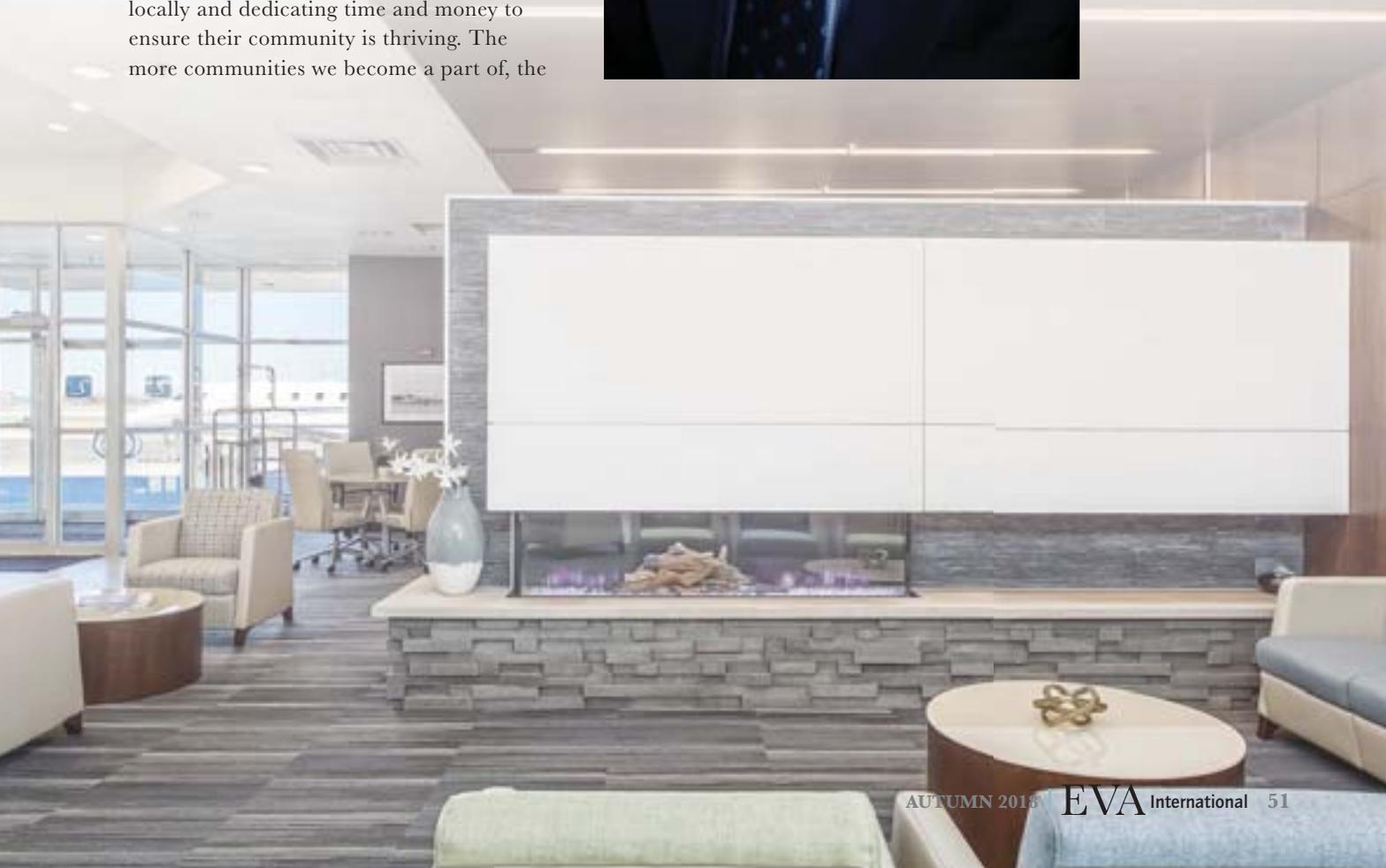
Safety and exceptional customer service are the foundations upon which Signature stands but ask any other FBO operator what they offer, and the response will likely be similar. But, Johnstone insists, “Signature is uniquely positioned to provide personalised, world-class service to each and every customer no matter the size of the location or the number of competitors on the field. We invest heavily in our facilities and training to be able to provide that premium customer experience. We feel this is a differentiator. The size of the network also allows us to really get to know our customers and we’re able to transmit customer needs and wants to other bases, adding additional value to the experience.”

Given its overseas footprint, Signature is obviously a company of international significance, yet each of its FBOs also seems to play an important role in its local community. It’s a peculiar counterpoint to supporting VIP customers, but Johnstone considers Signature’s community presence essential.

“Each of Signature’s locations is tied to its community, with employees volunteering locally and dedicating time and money to ensure their community is thriving. The more communities we become a part of, the



Mark Johnstone,
Group Chief
Executive of BBA
Aviation and
CEO of Signature
Flight Support



more our larger Signature community will grow. And I don't see this element being lost or diluted as our own community grows – I foresee even more engagement as we expand.”

Last year, in the wake of Hurricanes Maria and Irma, from August through September and into October, Signature FBOs played an important role in receiving and fuelling military and civilian relief flights. A far cry from handling VIP clients, it nonetheless says much for Signature's ability to keep delivering even when the going gets tough.

Johnstone reckons the effort was entirely typical of Signature's employees. “At our location in Key West, for example, our people worked through the night to ensure the location would be able to receive supplies and relief workers after Irma made landfall. In fact, our teams coordinated transport of a generator from Texas to Key West to allow the airport to restart operations quickly after the storm passed.

“And at Signature Austin, employees marshalled, fuelled, and loaded more than 25 small aircraft so that pilots could bring school supplies to children across the state after Hurricane Harvey.

“During the fires in the Santa Barbara area last year, our employees ensured aerial firefighters

had everything they needed to save the area from further destruction. Responding to the needs of the local community, no matter what those needs may be, is just business as usual.”

Signature TECHNICAir

Beyond FBOs, Signature also has an MRO company, Signature TECHNICAir, positioned at 17 airport locations throughout its network. And there's more to this aspect of its capability, as Johnstone relates: “We're expanding our Mobile Service Units across the network to provide AOG and light maintenance support. Our team is highly experienced and we're going to continue driving this business forward. Where we don't have a physical presence or Mobile Service Unit, we carefully select MRO partners to support our customers.

“With the majority of business aircraft operating in North America, it's natural that our network is most expansive in that region, but the UK is also an important market and includes a Signature TECHNICAir presence at Biggin Hill and Bournemouth, supporting aircraft in Europe. We can support all our UK locations with Mobile Service Units and have a significant physical presence in Bournemouth,



which offers a portfolio of services from simple AOG, to heavy maintenance and inspections.

“We’re also equity partners in Gama Aviation Signature Aircraft Management, providing management and charter for more than 200 aircraft.”

Changing world

Mark Johnstone took over as Signature Flight Support CEO in April, at which time he saw that the aviation workforce shortage was going to be among the first challenges he faced.

“The aviation industry is evolving rapidly, and we must evolve with it. We need to reach out to new job pools to fill the roles we currently have and find the many more dedicated individuals we’ll need to meet the demands of a changing world. Right now, the future of aviation is bright and full of possibilities as the older workforce begins to retire and provides vast opportunities for those searching for a career in aviation.

“One of the areas we are focusing on is investment in promoting the education of the next generation of aviation professionals. BBA Aviation is dedicated to being an exceptional corporate citizen. Since 2010, we’ve donated over US\$1.6 million to non-profits that focus on STEM and aviation education. The aviation workforce has to grow, and it needs to grow in new directions. We’re going to need people with a diverse set of skills to meet future challenges, whether they be in automation, from a desire to improve the environment, or to facilitate an increase in aviation traffic.

“I’d like to see these efforts start at high school level, encouraging young students to get interested in STEM fields, providing internships and externships so that young people can see the benefits of an aviation career. We’re also key supporters of the Aviation Community Foundation, which seeks to empower the next generation through aviation education. And we offer educational support programmes to our employees, helping them further progress their education should they so desire.”

Still though, aviation is failing to reach the majority of the female population with its employment possibilities, a situation far from lost on Johnstone. Navigating through its

website, it’s noticeable that more than usual of Signature Flight Support’s corporate images feature women. How does he propose making the industry a more obvious career choice for school-leaving girls and young women?

“We have to start the process at high school level. Women and girls are not choosing aviation as a career because they don’t see women in these roles. Everyone knows about Amelia Earhart, but she was born in 1897. Most people probably can’t name a female pilot. Most people have never been flown by a female pilot. Representation matters. We have to do more to highlight the women who are already at all levels of the aviation workforce, which is what we’re trying to do in a small way by prominently displaying images of women in these roles. We’re facing an aviation workforce shortage and statistics like ‘only 7% of pilots are women’. There is untapped potential there that we as an industry have to do more to realise.”



Signature is uniquely positioned to provide personalised, world-class service to each and every customer no matter the size of the location or the number of competitors on the field

Ensuring its ongoing viability through an active role in educating and encouraging the next-generation workforce is therefore a key driver for Signature Flight Support’s future, but what does that future look like? “We continue to expand our network outside North America, with new acquisitions and via our licensing product, Signature Select, which provides for independently owned and operated FBOs to become part of the Signature network. They’re supported with sales, marketing, training, back office support and other features and benefits that assist them to be more competitive.

“Indeed, in July we acquired EPIC fuels, which brings 200+ independently owned FBO locations to our network. We’re looking to develop the network further and we’ll continue to evaluate business opportunities where they make sense and are relevant to our customers.” ■

Canadian Ambition

Sean Johnson,
F/LIST Montreal CEO



Founded on the age-old craftsmanship of Franz List's 1950s' carpentry business, F/LIST has expanded globally, adding facilities and staff, but never losing sight of the qualities and technologies that so appeal to its VVIP customers. Its recently opened Montreal, Canada site is generally typical of the company's overseas ventures, but also represents the first fully operational production centre outside F/LIST's Austrian headquarters. Other facilities, including that in Florida, offer product support and promote customer relationships, primarily offering repair and support services.

Sean Johnson, F/LIST Montreal CEO, says the company's origins and traditional qualities are never forgotten, and Canada works very closely with the Austrian office. "We receive a lot of support from them in terms of expertise, process and quality management, sales support, procurement and so on. We're one family and try to maintain the same operational excellence evident from our foundation in Austria.

"Designated as a veneer centre of excellence, Montreal is the first F/LIST location outside the home country to produce our high-quality veneers and is designed to serve the North American market, while Austria continues to produce veneers for the rest of the world; the business is growing, which is why the decision was made to create the facility in Montreal."

F/LIST

Veneer of excellence

F/LIST is especially well respected for its veneer work and Johnson says the materials and processes involved are subject to constant technological innovation, especially in the areas of flame treatment, de-risking the process of certification, while preserving the colour and quality of the wood; in addition, there are continuous advances in varnishing and finishing techniques to keep up with commercial interior design.

Johnson also explains the extent of F/LIST's Canadian offering beyond veneers. "It covers the entire value chain of aircraft interiors from the initial sales contact up to comprehensive refurbishment services. This includes the development, engineering and manufacturing of all aspects of the cabin interior, including floorings, linings and systems integration. Our product support teams are at the disposal of our major customers, to provide on-site assistance with touch-ups and repairs of delivered cabinetry, for example, and final polishing before approval by the principal.

"F/LIST has made a name for itself as a provider of high-quality flame retardant wood veneers thanks to its proprietary REACH [Registration, Evaluation, Authorisation and Restriction of Chemicals] compliant flame retardant formula that avoids milky surfaces, greying and salt-crust stains. Besides a rich portfolio of available veneers, many of them available with live-log samples, F/LIST offers extensive consulting services, digital layout schemes of selected veneers to help customers visualise their cabin interior, and Microlumber, a unique multi-layered veneer that matches the look of solid wood.

"Naturally, we use our veneers ourselves in our floorings and cabinets, but a large part of our production is sold as custom multi-ply,



Above: Official inauguration of the Montreal facility on 14 May 2018. Sean Johnson is at left, with F/LIST CEO Katharina List-Nagl third from left and F/LIST CFO Michael Groiss to her left



non-flammable veneer. This is a focal point for F/LIST Canada's work, we produce custom veneer projects for customers in the region. It shortens lead times and offers improved service compared to ordering veneer from Austria, providing our customers with a competitive advantage."

Over the next few years, F/LIST plans to expand its Montreal presence to more than 100 employees, depending on how quickly the market responds to the new facility, which only opened in May this year. Speaking in



August, Johnson confirmed: "We're already actively producing veneer shipsets and we'll add varnishing and refurbishment in coming months.

"Meanwhile, F/LIST's strong aftermarket division provides a broad range of refurbishment services, including touch-ups, repairs, re-varnishing and re-veneering of cabinetry, replacement of floors, re-upholstery of seats, divans and linings, and more. We also have mobile repair teams, agile groups of specialists available worldwide on short notice to conduct

urgent touch-ups and repairs on board an aircraft.”

Location choice

F/LIST’s choice of North American location was in part influenced by local industry, not least Bombardier Business Aircraft, and personnel resources. “In the Montreal cluster and surrounding region, we’re serving a great concentration of existing and potential F/LIST customers, and it’s also a great base for all of North America. And there’s a deep aerospace talent pool here, given that Montreal is quickly becoming an industry hub with close proximity to many major US cities and aerospace customers.”

Although the area is rich in talented people with the skills F/LIST requires, the company is obliged to compete for their services with a large number of potential employers. But Johnson

feels F/LIST has an advantage: “Our hiring has been successful so far – the company’s reputation as a great place to work is definitely generating interest. Its culture, passion for finest craftsmanship and dedication to quality are convincing arguments for local talent seeking the ideal job.”

Johnson himself is an experienced aerospace leader, having worked in the industry, mostly for Bombardier, for more than 20 years. “I led customer-facing teams configuring Global Expresses for customers, and I led Global 7000 interior development for six years, developing a relationship with F/LIST as a consequence. I was always impressed with the quality, customer relationship and company culture they exhibited. When I had the opportunity to join them and help create this new facility I didn’t hesitate. It’s an opportunity to be part of a well-regarded company, offer my experience and leadership, and bring the next wave of growth for North America.”

Mining local talent is a good employment policy for the short term, but arguably short sighted over the longer term. As such, F/LIST has begun

engaging local schools with a view to eventually participating in aspects of their training and development programmes. It’s a well-founded company ambition, Johnson explains: “F/LIST Austria has a long tradition of apprenticeships – its apprentice programme has been lauded with Austrian national honours, so we already know how valuable it is. We definitely intend to pursue the apprenticeship route to bring in the best people, and we’ll use the training know-how our Austrian colleagues have built up.”

Before F/LIST Montreal begins nurturing the next generation of high-tech craftsmen though, its primary attention is elsewhere. “Our main goals are to establish all the production capabilities and transfer the main on-going work for our North American customers to this facility,” Johnson says. “After that we hope to engage new customers, encouraging them into trying our innovative, well-crafted and reliable products.” ■

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Lifting off Landing on



Flying helicopters off ships has, until recently, been pretty much the preserve of the military and specialist operators. But that's changing as the world's superyacht fleet grows. According to *Boat International* magazine, a helicopter deck is the second most popular design feature aboard these exclusive vessels, with only the private deck more desirable. A new breed of explorer vessel is also appearing, aboard which a helicopter is typically considered an essential tool rather than transport convenience.

Airbus Corporate Helicopters (ACH) CEO, Frederic Lemos reckons more than 300 superyachts, around 5% of the global fleet, are aviation capable,

with numbers growing year on year. Of these, ACH estimates around 10% are equipped with a certified helideck. "We are seeing a trend where helicopters are increasingly seen as a key yacht-based capability, matching the rise in popularity of explorer yachts and yachts with limited exploration capability, which enable private owners access to unique, and at times inhospitable locations where a helicopter helps to extend the capability.

"We're also seeing increasing numbers of support vessels, the majority of which have at least limited helicopter capability. Finally, the trend for ever-larger yachts continues and this allows designers and shipbuilders to better cope with the requirements for fully certified helidecks and larger aircraft."

Safe operations to and from ship require extensive training that extends

far beyond the helicopter pilot; in an ideal world, it might extend to the vessel's entire crew. Safety also derives from an understanding of the vessel and how it interacts with the helicopter, and the environment... The weather is never more important to safe flying when you're operating with a vessel.

The helicopter therefore adds mobility, practicality and considerable style to a yacht, but is surprisingly complex to integrate and operate safely. Charlotte Pedersen, CEO at Luxaviation Helicopters and a former military helicopter pilot, says: "We've seen an increase in requests for helicopters on board both superyachts and explorer yachts. Since the latter are capable of sailing in polar seas, it's very important that shipyards and owners engage with professional helicopter operators."

Modern helicopters are extremely reliable, but special equipment for maritime operations includes emergency flotation gear, fitted here to an ACH145's skids.

Airbus Corporate Helicopters



At a very basic level, helicopter/yacht operations might be considered as those where a helicopter shuttles passengers between vessel and shore but isn't embarked, and those where the helicopter is on board for the voyage. Luxaviation Helicopters supports both models, but, Pedersen insists: "Even though aviation regulations and requirements around the world differ, it requires both experience and strict procedures to safely operate helicopters to and from yachts. We recommend using a professional helicopter company, with the correct approvals and procedures in place.

"There are regulatory challenges too. When charter clients are flown to a yacht under commercial air transport regulations, the helicopter may only land on a commercially approved helideck. It's up to the helicopter

operator to ensure that the yacht's helicopter landing deck is the correct size and has the approvals necessary for commercial operations."

Jonathan Turner, Director at Maritime Aviation Support & Training (MAST), describes yacht helicopter operations in terms of commercial helideck versus non-commercial helicopter landing area (HLA). "But irrespective of the way the helicopter operation is categorised, there are many factors to consider when planning to operate helicopters from

vessels, including large yachts," he says.

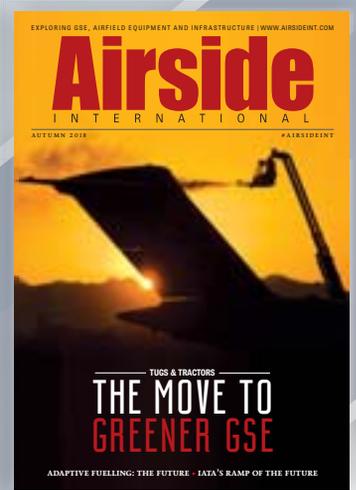
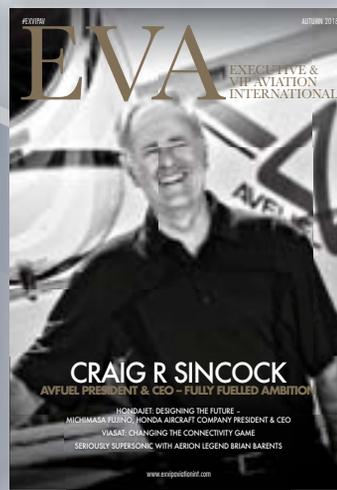
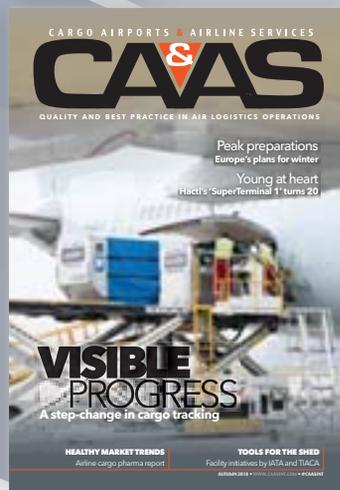
"These can be broken down into categories including regulatory requirements, safety aspects and operational efficiency, but ultimately, they must also be suitable to meet the requirements of the owner. Regulations tend to cover the basic requirements, although the relevance and interpretation of different regulations will be subjective and determined on a case-by-case basis, depending on factors such as whether the yacht is private or for commercial use; we recommend



A Starspeed's S-92 crewmember, Luc Sones models Luxaviation Helicopters' new helicopter crew uniform, designed by Group Client Service Officer Jana App-Sandering, who also designed Luxaviation's business jet flight attendant uniforms.

Andreas Wernheuer

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operators seek independent advice as early as possible. Compliance with the regulations, however, does not guarantee an operation will be safe or efficient; this is where the experience of a specialist maritime aviation company is really of benefit.

“Additional considerations when a helicopter is to remain embarked include refuelling, securing it to the deck, protecting it from the elements, and engineering requirements. If a helicopter is to remain embarked for long durations, extra space on board is likely to be required for additional support equipment.”

Pilot training

Luxaviation Helicopters flies its yacht operations under EASA regulations and CAA-approved procedures that allow it to operate commercial helicopter/yacht missions. “As such, our manuals outline the full training requirements for our crews,” Pedersen says, “and they’re followed strictly. We also operate our own ATO [approved training organisation] where all crews take specific offshore training courses, followed up with regular checks and recurrent training.

“We provide crews with weekly newsletters updating them on developments in helicopter safety. All operations are also conducted according to regulations regarding crew duty times, including when a helicopter is on board.”

Turner agrees that highly-trained, professional crews ought to be the only choice for superyacht helicopter operations even though, as he notes, today’s flying is usually conducted in fair weather conditions. However, with the increasing interest in aviation-capable, explorer-type vessels, he says: “There’s an increasing appetite for owners to visit areas of the world where the weather conditions may be less favourable. In addition, as the size of the vessels increases, so does the

number with commercial helidecks, which are designed to be capable of helicopter operations at night and in poor weather.

“Irrespective of the conditions or helideck type, there are best-practice procedures for the operation of helidecks or HLAs, and MAST recommends that every aviation-capable vessel has an iterative system in place for identifying the hazards pertinent to each helideck and for mitigating the associated risks, thereby making helicopter operations as safe as possible. Bespoke helideck operations manuals should be written for each vessel, including standard and emergency operating procedures – SOPs and EOPs – based on their facilities and operations.

“Helideck crews should be trained to an industry-recognised standard, such as the UK Maritime & Coastguard Agency [MCA] Large Yacht Helideck Safety Training Syllabus, and to use the vessel’s SOPs and EOPs. We deliver all four courses of the MCA’s syllabus, including training for helideck landing officers

vessel’s crew, regardless of whether they are directly responsible for the helicopter. Turner’s experience shows: “Any crew member has the potential to spot something during the course of their duties that may affect the safety of helicopter operations. That’s why MAST suggests all crew receive an aviation awareness course, including instruction on helicopter hazards and how having a helicopter on board may affect every crewmember. We’ve found that vessels taking this holistic approach to aviation safety benefit greatly. Depending on the role of additional personnel, they may also be trained as helideck assistants, to act as guest guides or as helicopter rescue firefighters.”

Integrated solution

Luxaviation specialises in VIP and VVIP operations, moving people expertly around the world as well as operating aircraft on their behalf. The scenario where a helicopter collects passengers off a private jet at an international airport and takes them directly to a yacht is not uncommon, but requires careful planning and a



Starspeed is Luxaviation Helicopter’s yacht specialist. Its fleet includes the AW139.
Ned Dawson

(HLOs), helideck assistants (HDAs), helideck firefighting – including live helicopter fires using our bespoke, mobile helicopter firefighting training unit – and helicopter refuelling, using our purpose-built, mobile helicopter refuel training unit.”

In fact, there is an important aviation safety role for every member of a

high degree of crew skill, as Pedersen explains: “It is a very complex operation to plan, but we have very experienced crews who are also trusted aviation managers capable of conducting all areas of the operation away from base, plus a fantastic team in our offices. The Starspeed team, our UK helicopter AOC, which manages



The five-seat cabin of Airbus ACH135 demonstrator D-HECB coordinates with its exterior...

Airbus Corporate Helicopters

our global yacht helicopters, has many years' experience of planning and coordinating every detail of jet, helicopter and yacht operations."

When a Luxaviation Helicopters-operated machine is embarked, the company's full management package ensures aircraft availability, including a crew ready and prepared to fly, whenever and wherever required. And if a client wants to embark their aircraft from a point far from base, Luxaviation Helicopters has the capability to dismantle, airfreight, reassemble and air test the machine ready to go on board.

Pedersen notes: "It's a scenario in which our Starspeed team excels, another complex operation requiring an extremely experienced team, especially since the 'jumping off' locations can be very remote. But helicopter transport is very addictive – once a client owns one, it's seldom far away from them – so moving an aircraft from one part of the world to another is rare."

Informed choices

Luxaviation Helicopters has the facility to work closely with customers when they are choosing or chartering a helicopter for yacht operations and Pedersen considers it perhaps the most important component in achieving efficient, safe operations. "With our many years of experience – Starspeed celebrated its 40th anniversary in September – we understand how important it is to choose the correct

helicopter for the client's mission. We ask questions and analyse which type would suit the client's needs best. When yacht operations are part of the equation we consider other factors too – for example, will the helicopter fit the helideck?

"Some helicopters suit offshore operations better than others, but there tends to be a degree of compromise. A wheeled undercarriage might provide for softer landings than skids on a moving deck, for example, but wheels may add to costs and maintenance requirements."

Lemos also has some thoughts on undercarriage and notes: "Our light helicopters, including the light-twin ACH135 and ACH145, are equipped with skids and special, bolt-on wheels for on-deck manoeuvrability. But the benefits of skids is their suitability for a variety of mission types. If a helicopter is expected to support a yacht's exploration capability and enable owners to reach remote, inaccessible locations, then skids are precisely what's needed. Our medium helicopters, including the ACH160 and ACH175, which are popular with owners of larger yachts and support vessels, have wheeled undercarriage."

"When it comes to powerplant," Pedersen continues, "I always recommend twin engines. It provides more power and gives higher performance, which is extremely reassuring when operating to and from a vessel and, besides, some regulators allow only twin-engined helicopters to operate

to yachts and offshore installations."

Airbus Corporate Helicopters works closely with its customers, optimising its aircraft to individual needs. "While the helicopter's mission defines the degree of customisation required," Lemos says, "we've delivered a number of modifications for yacht-based helicopters. This can range from anti-corrosion protection to folding blades for compatibility with small, at-sea hangars.

"It's important to note that in addition to the mission, modifications are influenced by the aircraft type and weight, which means we can customise an ACH175 for a life at sea more extensively than we can an ACH125. Also, HCareFirst, our comprehensive support and services portfolio, helps provide 24/7 global support services, enabling customers to anticipate and manage their yacht-based helicopter availability."

Another obvious possibility for customisation is paint scheme. Lemos confirms: "Many customers want to match their helicopter to the yacht. In one particularly eye-catching example, German artist Rita Weber created a distinctive blue-on-white, zig-zag livery for an older generation EC135, to complement the Nuvolari & Lenard-designed *Quattroelle*."

Pedersen says most modern helicopter avionics suites are more than adequate for yacht operations, but Lemos notes the particular advantages he sees in the Helionix system installed in all ACH's helicopters, from the light

twin-engined ACH135 to the largest helicopter in its portfolio, the ACH175. Nonetheless, he also notes continuing interest from yacht operators in the single-engined ACH125 and ACH130, for which he confirms there are digital cockpit upgrades in the pipeline.

Towards the opposite end of the size scale, Lemos reports: “For larger yachts there is strong interest in the ACH160, Airbus Helicopters’ latest offering, much of it coming from yacht owners currently operating AS365 or EC155 aircraft from the Dauphin family.”

Optimised vessels

There’s clearly more to helicopter/yacht operations than flying out and landing. The yacht needs a safe, obstruction-free area for the aircraft to touch down, with strict regulations determining how that area is configured depending on the type of operation planned. Then there are questions of emergency kit stowage and, if the aircraft will be embarked, decisions need to be made on how support equipment will be carried and even whether a small hangar is required.

...which neatly coordinates with this yacht, demonstrating the possibilities for design across vessels and helicopters.

Airbus Corporate Helicopters

The aviation complexities are best understood by the helicopter professionals and the best results for the vessel owner achieved when the shipbuilder and helicopter operator, OEM or other specialist work closely together early in the design process.

As a starting point, ACH has launched an interactive yacht app, available on iTunes and Google Play. Aimed at supporting yacht designers and shipbuilders, it provides key information on yacht design requirements for the full range of ACH helicopters. It’s a useful tool, but, Lemos admits: “Nothing can replace a direct, discrete conversation with the vessel designer. New yacht acquisition or rebuild projects are very expensive and if due care and consideration have not been paid to essential helicopter requirements, the owner may be denied some of the yacht’s best capabilities. The sooner the yacht-based helicopter support experts are consulted, the easier it will be to incorporate capabilities for helicopter operations.”

Pedersen says that alongside its other maritime aviation competencies, Luxaviation Helicopters also provides consultancy services regarding helideck design and considerations for helicopter operations. “It’s a complicated area subject to maritime and aviation regulations, controlled by different authorities; what’s acceptable to one, might need adjustment to satisfy the other.”

MAST also provides consultancy services, for the original design phase of a project, right through the build and into the operational phase. Turner confirms: “During the design phase, there are many considerations for safe helicopter operations, including regulatory requirements, which should be factored in as early as possible. In addition to the regulations, however, getting sound advice from an experienced maritime aviation operator that understands the operational requirements can help achieve helicopter operations that not only meet the regulations, but are as safe and efficient as possible and, crucially, meet the owner’s requirements.”

It’s true throughout aviation that the highest levels of safety and efficiency are achieved through attention to detail. That’s perhaps even more the case when a helicopter operates with a yacht, especially when those details are addressed early. Turner says: “Small details can make big differences if the correct advice is sought; they may also have financial benefits, since mistakes tend to cost time and money. For this reason, MAST prefers to join a project as early as possible and remain with it into the operational phase to ensure the greatest levels of optimisation and safety are achieved.” ■



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The Greatest Slow?

UK-based consultancy Design Q has been working with Hybrid Air Vehicles (HAV), manufacturer of the Airlander 10 hybrid aircraft, to create a new concept in luxury travel. Combining aerodynamic and buoyant lift with thrust vectoring, the Airlander 10 is unique. Currently operating out of the famous airship sheds at Cardington near Bedford, UK, the Airlander 10 is vast – it's the world's largest aircraft. It also has an extremely long endurance – up to five days. And that's good, because the Airlander 10 is very slow...

The aircraft has obvious potential applications in luxury experience travel, non-urgent freight transportation, survey, communications relay and other specialist missions, and it's also inherently developable. HAV has designed the Airlander 10 for a 10-tonne payload but says it could ultimately build an aircraft capable of lifting 1,000 tonnes. For now,



Design Q CEO, Howard Guy

though, slow, luxury travel, where the journey is a series of experiences and just as important as the destination, was the inspiration for Design Q to create what CEO Howard Guy terms a 'stateroom for the sky'.

In a previous era of air travel, the Airlander 10's cabin may have been termed a gondola. Nestling in the aircraft's belly, it appears narrow and awkward, but that's an illusion created by the Airlander 10's bulk. In fact, at 46m, it's longer than an Airbus A321, providing Design Q with an expansive canvas in which to create bespoke features including a Royal Suite, for the ultimate honeymoon, multiple Private Horizon Suites, an extensive Infinity Suite, offering unrivalled comfort, and the Altitude Bar. And thanks to its extensive glazing and the aircraft's slow speed, the horizon-to-horizon views on offer are unprecedented.

Before Airlander 10

Guy and his business partner began their design careers in the studios of automotive manufacturer Jaguar. He reckons: "We spent much of the last



Design Q has particular expertise in luxury product design and we applied it carefully to the Airlander 10 concept

20 years using our automotive skills to bring new concepts and levels of luxury to the jet world.

“Our breakthrough was designing Virgin Atlantic’s revolutionary Upper Class cabin back in 2003. Subsequent work with major carriers triggered a long and fruitful relationship with Bombardier, beginning with the design of their Global flight deck in 2005. That project set new standards for cockpit comfort as we integrated high-end industrial design. We went on to collaborate on the Challenger 350 in 2012. More recently, Aerion commissioned Design Q to work on its supersonic AS2.”

With its AS2 involvement, Design Q finds itself involved in defining not only the world’s fastest VIP aircraft, but also, potentially, its slowest, presenting an interesting and very different

set of challenges. “We love doing different things,” Guy says. “We have a fantastic team of young designers who never cease to surprise me with their ideas and creativity. They relish the opportunity to do something no one has done before, to imagine a new concept and then get into the detailed design of what a space will be.

“Design Q has particular expertise in luxury product design and we applied it carefully to the Airlander 10 concept. Luxury is about nurturing the senses, providing delight by thoughtful touches down to the tiniest detail. The high-end materials, colours and finishes convey excellence, while the real wood flooring and Tai Ping silk carpets lift the interior to a class of its own. The sofas, generous in proportion for total relaxation and with the unique ability to rotate, allow perfect outward

vision through the massive panoramic windows, or turn easily to face inwards for evening social events.”

Guy reckons a typical Airlander 10 customer will be “...a discerning private individual who has enjoyed their jet and private yacht for many years, but is looking for something new and different, something that will give them and their guests unique access to remote parts of the world and that enables truly amazing views of our planet. We envisage luxury travel companies will be equally keen to offer their distinguished clients this unique experience. And we believe Airlander 10’s modularity will offer the flexibility such bespoke travel companies need.”

The Airlander 10/Design Q concept debuted at this year’s Farnborough International Airshow. So, what’s next? A tight-lipped Guy reveals: “We’re working closely with the Airlander engineering team on finalising the production design. We anticipate having further exciting news in the next few months...” ■





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