

Maintenance, Repair & Overhaul

—a Sector in Upgrade Mode

Business aviation depends on **maintenance, repair, and overhaul (MRO)** providers for safe and reliable operations, and U.S. operators currently spend some \$10.9 billion annually on these services. Meanwhile, major MRO companies are undergoing large-scale upgrades, as they integrate new technologies and processes into their toolkits to meet shifting challenges. These include ADS-B and coming equipage mandates;

investing in infrastructure to meet changing demands; dealing with a declining pool of qualified technical talent; and ensuring that customers get fair value for their MRO spending.

We asked several leading MROs what they're doing to meet customers' evolving needs, and for their perspective on the industry's most dynamic developments. An edited version of their replies follows.

MRO Roundtable participants:



Stefan Benz—senior vice president and general manager, Jet Aviation, EMEA and Asia



Skip Madsen—senior vice president, Signature TECHNICAir



Stephen Maiden—president/CEO, Constant Aviation



Mike Minchow—vice president of service sales, Duncan Aviation



Greg Sahr—president, Elliott Aviation

What trends are you seeing among customers today? What's driving their MRO spending?



Constant Aviation—Stephen Maiden

Customers are retaining aircraft longer than they did in prior years. That's putting a greater focus on aftermarket upgrades and higher demand for non-essential add-ons such as interior refurbishments and avionics enhancements. Connectivity remains popular. The cost to equip aircraft is somewhat more competitive and technology is allowing systems to be installed in smaller classes of aircraft. Obsolescence is also driving required upgrades to cockpit systems, primarily displays, and cabin CMS systems.

Elliott Aviation—Greg Sahr

We are seeing a lot of movement in the used aircraft market. This includes wholly owned aircraft transactions and aircraft coming off of lease. This has led to an increase in pre-purchase inspections and modifications. We are also seeing a slower-than-expected demand for ADS-B installations as many customers are choosing to do them with their next major inspection. We're seeing an increase in demand for LED lighting to replace older fluorescent technology. We are also seeing an increase in larger-cabin interior customizations. Customers are looking for ways

to customize their aircraft to fit their company's brand or their own style.

Duncan Aviation—Mike Minchow

Connectivity is important to customers. We are also seeing a lot of activity with cabin-management systems. We're working closely with Gogo Business Aviation to develop STCs for its new 4G service and Wi-Fi equipment, for installations on Bombardier Challengers and Globals, Falcons, and Gulfstreams. We're also working with SmartSky as it develops and certifies its connectivity solution. Additionally, we recently became the exclusive U.S. distributor for Inairvation's Integrated Smart Cabin Upgrade for the Gulfstream G450 and G550, a modular solution featuring a Lufthansa Technik nice HD CMS package that replaces the out-of-production factory-installed CMS.

Jet Aviation—Stefan Benz

We've seen a general increase in the volume of heavy-maintenance projects, and strong demand for RMUs (refurbishment, modifications, and upgrades) and NextGen upgrades. As aircraft mature, we're also seeing an increase in demand

for local, more accessible services, particularly in Asia. We've seen more requests for in-flight-entertainment and cabin-management-system (IFE/CMS) upgrades for high definition (HD), as well as satcom systems for Swift Broadband and cabin router upgrades. That's particularly true for owners and operators of BBJ aircraft, who have a high interest in aircraft-to-ground connectivity. We've also noted a great increase in Ka-Band installations through all aircraft types. This trend will continue, despite the increasing complexity of such installations.

Signature TECHNICAir—Skip Madsen

Stubborn optimism continues to face the reality of a highly competitive market with mediocre demand. A post-election trend where conservative owners of aging light jets finally upgrade to larger, newer aircraft has presented opportunity for inspections, interior enhancements, and avionics installations, though spending trends are by no means extravagant. We expect used aircraft



acquisitions will offer growth opportunity through upgrades and refurbishments. Aging cabin-management systems are a growing concern in many legacy aircraft. Operators see that a complete replacement of technology will be required soon, but many operators of light to midsize aircraft are still limping along as new Wi-Fi-based solutions require significant investment.

How can customers know whether they're getting good value from their MRO? Should AOG support be part of that?

Signature TECHNICAir—Skip Madsen

The MRO company should be able to communicate clearly and immediately answer questions a customer may have about a proposal or invoice. Customers should be looking for responsiveness and proactive communication about the MRO's talent and resources. Customers should see evidence of the processes they follow and the depth of pre-planning they take to assure timely delivery of quality, service, and value. Transparency is apparent when different options are presented for consideration in resolving any discrepancy. Onsite maintenance (whether AOG or not) is a common consideration for operators. In the critical case of AOG repairs, response time is everything to the operator. The "first responders" on scene win the work, so the MRO's footprint is an important factor.

Duncan Aviation—Mike Minchow

In our experience, most aircraft operators care about three main things: quality, on-time delivery, and communication/project management.

These are the things we focus on and measure. Quality is pretty basic: aircraft need to be maintained at a high level to ensure safety and reliability. Operators must be confident in the quality of the provider they choose. On-time delivery is also important. Not only is it crucial that MROs provide turnaround times that work for the client, but the client should evaluate the facility's success in meeting those promised out-dates. Communication addresses a slew of other things, including planning, expertise, invoicing, and project updates. Mobile maintenance teams are important to customers, and AOG support is vital for the industry as a whole.

Constant Aviation—Stephen Maiden

Communication and pricing are fundamental when customers are evaluating transparency and fairness. Be sure that the service provider has a robust and effective approval process in place. The treatment of employees is the single greatest factor to consider. A culture that fosters individual growth and maximizes potential ensures better productivity and success.

Consider the footprint of an MRO. A national provider or MRO with multiple locations can more readily support smaller maintenance events that present themselves during an aircraft's life cycle. Mobile maintenance teams and onsite AOG service is an extension of a large infrastructure and speaks to the sophistication that customers desire when selecting a maintenance provider.

Jet Aviation—Stefan Benz

The depth and detail of the responses and the response times are significant tip-offs to the quality of work and the terms of delivery. When the time estimates for required work are accurate and schedules are kept, this shows reliability that you can trust. Similarly, if the pricing is transparent, this indicates high regard for the customer, as well as conviction in the services provided. A reputable MRO service provider will hold recognized approvals and authorizations. While AOG support can be more important in remote locations, dedicated customer support is always important. An MRO should be a reliable business partner that views the customer as a partner and is willing to go the extra mile.

Elliott Aviation—Greg Sahr

An MRO should present solutions to a customer, not just sell a product. For any given issue, a customer should be notified of what solutions are available, the cost for each decision, and a recommendation for the solution. An MRO should educate you on your options and allow you to make the decision that is right for you. Charges should be transparent and fair. If you are looking at a large work scope, choose an MRO that has full one-stop-shop capabilities; it can be incredibly expensive and inconvenient to move your aircraft to multiple facilities. AOG support isn't something our customers ask much about, as we typically deal with larger work scopes. We do provide it on an as-needed basis to support our customers' needs.



50
YEARS

Jet Aviation

One Jet Aviation

One Customer Experience

As president of Jet Aviation in our 50th anniversary year, I'd like to extend sincere thanks on behalf of the entire Jet Aviation team for your business and support over the years. To celebrate this milestone — which we would not be doing without your ongoing trust and loyalty — we launched our 'One Jet Aviation' initiative earlier this year. We are investing in One Jet Aviation to ensure consistent global standards and processes across our sites and portfolio of services for the next 50 years, and beyond. We look forward to seeing you soon!

Rob

Rob Smith | President, Jet Aviation

Many Advantages

Maintenance, Refurbishment, Completions, FBO, Aircraft Management, Flight Support, Charter, Staffing.



www.jetaviation.com

JET-~~AVIATION~~
A GENERAL DYNAMICS COMPANY

What is the level of demand for ADS-B and other NextGen upgrades, and how are you preparing for the expected crunch as compliance dates approach?



Jet Aviation—Stefan Benz

We are being asked to prepare more quotes related to ADS-B and FANS, but it's a bit premature for the NextGen upgrades, for which we're still awaiting CPDLC (controller-pilot datalink communications), RNP (required navigation performance for modern avionics), and other upgrades. To ensure we'll be prepared, we are working closely with the system specialists, including Honeywell, Rockwell Collins, and Garmin. We also track involvement of the authorities (FAA, EASA) to gauge the progress of such releases.

Elliott Aviation—Greg Sahr

Many customers are making their ADS-B upgrades during a major inspection or as part of a prepurchase. To keep up with demand, we have created ADS-B STCs for several airframes—including Hawker 800/900XP series, Premier 1/1A, and Beechjet 400A/Hawker 400XP—and we're working on a solution for the Citation Excel/XLS. We are also the industry-leading retrofitters for the Garmin G1000 in the King Air and the Garmin G5000 in the Beechjet, both of which are ADS-B compliant.

we have access to or hold 37 solutions for ADS-B, which allows us to perform upgrades on more than 100 aircraft models. We are authorized by Rockwell Collins to perform the ADS-B modifications on their line of TDR-94 and TDR-94D transponders. We also have access to FANS solutions for 17 aircraft models. We're being proactive for our customers regarding future scheduling for ADS-B; we have allotted two slots per month at each of our avionics satellite shops for ADS-B upgrades, and we allow operators to reserve the slots.



Constant Aviation—Stephen Maiden

We are seeing an uptick in upgrades to comply with the NextGen mandates, but at a slower pace than expected, given the number of aircraft that must meet the requirement by December 31, 2019. We're preparing now for the wave of requests by creating solutions for our niche aircraft. The organization has also identified a dedicated team to solely focus on NextGen upgrades. This will enable us to communicate all available slots from now until the deadline.

Signature TECHNICAir—Skip Madsen

The ADS-B mandate has operators exploring their options for both mandate compliance and NextGen-related features. ADS-B proposal activity over the last 12 months is up 300 percent over the prior 12 months, though installations still lag the rate needed for everyone to "ride the wave without drowning." Our sales teams are aggressively working with operators to advise and educate them about options specific to their aircraft. The threat of extensive new equipment lead times and modification turn times necessitate purchase of new inventory or exchange equipment pools to keep downtimes within reason.

Duncan Aviation—Mike Minchow

We've been working with all the major OEMs in the development of ADS-B solutions. Currently,



THE WORLD WIDE LEADER IN GARMIN G5000 RETROFITS

At Elliott Aviation, we have done more Garmin G5000 installations than all other dealers in the world, combined. The Garmin G5000 has many benefits including synthetic vision, electronic charts, WAAS/LPV, new autopilot, touchscreen controls and more! In addition to being the first dealer to install a G5000, our exclusive 400E interior can save up to 360 pounds in your aircraft. As an authorized service center for the 400A/400XP, we can handle your maintenance, paint, interior, accessories and more! At Elliott Aviation, you'll land a better experience... *because of our experience.*



GARMIN

ELLIOTT
AVIATION

MOLINE

DES MOINES

MINNEAPOLIS

800.447.6711

ElliottAviation.com

What new technologies are changing the MRO sector, and how is your company applying them?



Signature TECHNICAir—Skip Madsen

Cloud-based software solutions are providing a new level of collaboration and information sharing both inside and outside the company. We have made transitions from traditional on-premises software with customer-relationship management, marketing, and other sales-related software, and with operational-planning functions such as shop scheduling. The sole-source, real-time nature enhances awareness of key information and enables better decision-making. We're also very interested in aircraft performance and health data monitoring. This can reduce the frequency of traditional scheduled maintenance as the legacy aircraft population is overtaken by newer aircraft designed around maximum dispatch availability and lower cost of operation. We see the percentage of reactive maintenance increasing as preventive scheduled maintenance transitions to trend-based monitoring triggers, which are less predictable.

Elliott Aviation—Greg Sahr

We are applying many avionics technologies to allow not only new capabilities, but also weight savings as well. Our Garmin G1000 and G5000 retrofit program replaces all existing cockpit avionics and allows for a weight savings of 200 pounds or more. With the increase in demand for Wi-Fi, we are seeing less call for cabin-entertainment systems. This allows us to utilize cabin areas to provide more functionality, decrease weight, or both. LED lighting is also becoming increasingly popular, as it is much more reliable and contributes to aircraft weight savings. Lastly, the obsolescence issues with many avionics products and our retrofit programs have allowed us to create an aftermarket avionics department to support spares sales to customers that have not yet upgraded.

Constant Aviation—Stephen Maiden

Everyone is going digital. We're looking to further advance our digital buy-back and work-order systems. We take a unique approach with

real-time communication with customers, using our computer-based work-order system to keep them up to speed with all expected costs. This feature helps with transparency that was discussed earlier. We're also looking at electronically based diagnostic systems that allow for greater opportunities to record and analyze data. The review of the data can often show a degrading issue before a default occurs. This information allows the maintenance team to stay ahead of potential risks.

Jet Aviation—Stefan Benz

New advanced materials (e.g., carbon fiber) and IT technologies (e.g., process digitalization) are impacting the MRO sector. To be technically prepared for future aircraft generations (e.g., Airbus A350 XWB, Boeing 787, Boeing 747-8, Airbus A30X, Bombardier CRJ/C Series), we expend a lot of time and energy maintaining relationships with the OEMs and suppliers, to build up our resources and capabilities as early as possible. Our goal is to provide business aviation customers seamless maintenance services to the highest standards. For example, Jet Aviation was selected to engineer, manufacture, and install a VVIP cabin on the world's first private Boeing 787-9 Dreamliner, and since then, we've developed technologies and processes to support the completion of this new-generation aircraft.

Duncan Aviation—Mike Minchow

New technologies are driving a need for STC and other engineering services and capabilities. We recently launched a program that makes our engineering and certification services available for projects throughout the aerospace industry. Our engineering and certification professionals have always been available to assist other companies, but we're expanding this offering to include a team dedicated solely to supporting external requests. In the last four years, our engineering and certification team has completed 11 new and amended STCs for external customers, with two additional in progress, and more than a dozen proposals for STCs are in the initial stages.

You're never far away from **Signature MRO service.**

Each of our 18 Signature TECHNICAir maintenance centers are located next door to a Signature FBO. Each location is staffed by experienced, factory trained, certified professionals. We stand by our solid track record of quick response with expert craftsmanship and extreme attention to detail.

Book your maintenance and FBO stop together, and you can refuel and refresh in the comfort of some of our finest, friendliest support facilities.

www.technicair.com

Signature TECHNICAir Total Care. Keeping you mission ready.
One Call. Countless Solutions. +1 855 595 4192

Airframe, Engine and MRO Services | Avionics Installations, Modifications and Repairs | Interior Refurbishments | Aftermarket Enhancements



SIGNATURE
TECHNICAIR[®]

Aircraft Maintenance
A BBA Aviation company

The industry faces a shortage of maintenance technicians. How does your company attract and retain qualified technical personnel?



Elliott Aviation—Greg Sahr

In addition to hiring for skill sets, we have strict guidelines to hire based on our core values of unmatched quality, uncompromising integrity, and unbeatable customer service. This makes initial recruiting a bigger challenge but it leads to higher employee engagement levels and better retention rates. We recently created the position of vice president, talent and culture, as part of our effort to attract and retain technical talent. We've conducted employee engagement surveys, and we're also conducting "Stay" interviews: sitting down with employees and having a discussion to understand their perspectives and goals. We've also shifted to try to hire locally and train [technicians]. It's a longer path, but I believe the retention numbers long term will be much better.



Signature TECHNICAir—Skip Madsen

As part of the larger BBA Aviation Company, we have a fully staffed recruiting department. Our efforts include ad placements on top job boards such as Indeed, Careerbuilder, JS Firm, and AVjobs, and print ads in local newspapers, employment guides, and other publications specific to each area. We regularly participate in local events such as career fairs and expos. We're also building relationships with local community organizations, colleges, and workforce centers, and we're working with military/veterans and other diversity groups to find talent. We utilize social media—Facebook, Twitter, and LinkedIn—to an ever-increasing extent to highlight available positions and showcase the culture of the company.

Constant Aviation—Stephen Maiden

Providing fair wages, adequate training, and ensuring advancement opportunities are important factors in attracting and retaining employees. Our hiring is focused on preserving the culture that has driven our success. We offer benefits that are industry-leading and take a multi-tiered approach to attracting talent. We utilize the web and social media to publicize our open positions and partner with local trade schools. Over the last year,

we have hosted several career fairs as well. Lastly, we rely heavily on team-member referrals.

Duncan Aviation—Mike Minchow

We meet our staffing needs primarily through employee referrals and hiring entry-level technicians from A&P schools. The key is finding and selecting candidates who have the drive, interpersonal skills, and technical aptitude to be successful in our culture. We've also developed internship programs for some of our technical positions, giving high-potential students the opportunity to work at Duncan Aviation before they graduate. Additionally, we promote careers in aviation at local middle and high school career events and have partnered with technology programs at local high schools to have interns work in various areas for class credit.



Jet Aviation—Stefan Benz

The scope and scale of our business offers technical personnel the opportunity to work on different aircraft, with new materials, leading processes, and complex systems. This, coupled with our reputation for high standards and quality craftsmanship, makes us attractive to qualified and skilled employees. To help retain employees, Jet Aviation makes great effort to ensure career growth prospects, and we provide regular and advanced training opportunities. We've also implemented measures to empower employees to take responsibility, make decisions, and act accordingly.



**DUNCAN
AVIATION**

Productivity

ON-SITE, AT HOME
OR IN THE HANGAR



Duncan Aviation's myDuncan project management system lets customers be productive wherever they happen to be. Of the 2,343 aircraft projects delivered in 2016, more than half were managed off-site, allowing the aircraft representatives to stay current on project status, item approvals and budget while keeping up on things at work and at home.

Visit us at EBACE Stand #G88.

www.DuncanAviation.aero/myDuncan
Experience. Unlike any other.



constant

AVIATION

NATIONWIDE

Service Centers and AOG Mobile Teams



Service Centers

Cleveland, OH
Orlando, FL
Las Vegas, NV



AOG Mobile Teams

Birmingham, AL
Scottsdale, AZ
Los Angeles, CA
Oakland, CA
San Francisco, CA
Denver, CO
Rifle, CO
Naples, FL
Orlando, FL
West Palm Beach, FL
Atlanta, GA
Greensboro, NC
Las Vegas, NV
Cincinnati, OH
Cleveland, OH
Pittsburgh, PA
Greenville, SC
Nashville, TN
Dallas, TX
Seattle, WA

216.261.7119

info@constantaviation.com
www.constantaviation.com