

MAINTENANCE

Manufacturers' market

Jet aircraft-maker Gulfstream has focused on greater integration of manufacturing and maintenance. The 3D modeling used to design the G650 is an integral part of servicing the aircraft and is used in the air-to-ground aircraft monitoring. The company's latest datalink – PlaneConnect HTM (Health and Trend Monitoring), which is used on the G650 and G650ER – provides near real-time recording of up to 10,000 parameters on the aircraft. The system transmits information such as fuel consumption, pressure readings, temperatures and engine health data to aircraft operators and Gulfstream's Technical Operations for diagnosis, analysis and parts ordering. The data results in faster turnaround times for maintenance and produces valuable insights into the aircraft fleet.

Derek Zimmerman, president of product support at Gulfstream, says, "We also use flight operational quality assurance, or flight data monitoring, to enhance overall safety. We encourage operators to incorporate data analysis, constructive dialog and continuous improvement in aircraft operations."

Darius Saluga, CEO of Jet Maintenance Solutions, agrees that the introduction of advanced notification's about maintenance issues enables MROs to improve customer support. "There's more effective troubleshooting and usage information available to operators," he says. "It also enables interaction with fleet systems for advanced decision making and parts management. The added value is that we are able to take action before a component fails, which improves the reliability of the aircraft and dramatically reduces costs."

Florida-based Signature Flight Support says a recent incident on a Gulfstream V flying into Mexico clearly highlights how the greater availability of data can help reduce costs. The operator received a message from the crew that the flaps were not deploying correctly and cockpit indications were that the flaps were out of alignment.

Patrick Sniffen, vice-president of marketing at Signature Flight Support, says, "Reviewing the quick access recorders determined that there was a faulty indicator in the cockpit. Live data from the recorder monitoring the flap assemblies proved that all stops and full travel of the flaps were true and



African gateway for aircraft parts

ExecuJet Africa boasts a VIP lounge and 24-hour support capabilities



ExecuJet Africa's FBO in Nigeria throws a spotlight on some of the challenges of maintaining fleets of business jets in developing parts of the world. Part of the Luxaviation Group, ExecuJet Africa opened at Lagos's Murtala Muhammed International Airport in 2010. The FBO provides 24-hour maintenance support and full Continuing Airworthiness Management Organization (CAMO) services in the region.

With its 5,000m² hangar facility and a 25,000m² apron, the FBO had nearly 3,000 movements in 2016, with around 12% growth being reported so far in 2017 compared with 2016.

ExecuJet's parts and logistics capability, which is run from the FBO, represents a key part of the operation. The facility sends parts and components to airports throughout the area, acting as a gateway for these parts to and from Europe's major aviation hubs – Brussels, Frankfurt, London and Paris. The parts are used to keep business aircraft in service.

Paul Ludick, CEO of ExecuJet Nigeria, says, "We supply parts and consumables to third-party owners and operators who have urgent requirements in Africa. From tires, o-rings, lights and bulbs to hardware for routine and scheduled maintenance,



Above: Gulfstream's Luton Service Center serves as the OEM's European maintenance hub

Left: Line maintenance on a Dassault Falcon 900LX

correct. This alleviated the need to send another aircraft, crew and maintenance support to fix the aircraft."

Inventory investment

Maintenance providers have to invest in their facilities, tooling, IT systems and training to achieve this type of predictive maintenance. Last year Gulfstream opened a 406,000ft² (38,000m²) product support distribution center with automated inventory and workforce management systems. The inventory is stored and retrieved based on calculations about the size and frequency of order requirements to optimize operations.

"Instead of taking minutes to pull parts off shelves, it takes seconds," says Gulfstream's Zimmerman. "Ultimately our customers get the right parts they need, faster than ever, via the global parcel networks."

In terms of payback, Jet Maintenance Solutions estimates that new technologies could result in a 50% reduction in the time spent carrying out routine airframe heavy maintenance. Saluga from Jet Maintenance Solutions says, "For business jet operators it means increased revenue generation, better asset use and more flying days."

However, a major consideration of the enhanced level of connectivity and abundance of data being produced is cybersecurity. The latest generation of aircraft can produce up to 120TB of data every year. There are potential conflicts of interest in terms of who will control and profit from the data, as well as who will manage and ensure the security of commercial information. Gulfstream, which introduced Plane Connect in 2007, is looking at how to improve the connectivity of the information displays and instrumentation in the cockpit: "A lot of people have been talking about the connected aircraft for decades, but the use case hasn't been figured out yet – especially in the context of cybersecurity," says Zimmerman. "Currently the only way to get information into an aircraft is by the pilot typing it into the avionics."

Sniffen from Signature Flight Support says that today's connected technologies have two fundamental security system designs that preclude most threats. He says, "Cabin connectivity is an independent solution that does not interface with the cockpit except for input data to drive maps and non-essential information streams. Secondly, secure channels to interface with the cockpit such as navigation database updates, FMS flight plans or flight plan deviations cannot be conducted without pilot interaction."

"We are able to take action before a component fails, which improves the reliability of the aircraft and dramatically reduces costs"

Darius Saluga, CEO, Jet Maintenance Solutions



Left: Execujet Africa specializes in servicing airframe, avionics and engines

everything is held in our dedicated storage areas."

The company carries out its own quality checks on parts. If the inspection is passed, the part is positioned for immediate use or stored. However, unserviceable parts are transferred to quarantine for repair or exchange. Ludick says that this can cause friction with aircraft owners and operators, who have challenged them on the serviceability of parts on numerous occasions, especially

when its engineers are providing technical support for grounded aircraft in remote areas. Travel visas for staff to get to these remote areas can also take time to obtain.

Ludick says, "We recently had two aircraft-on-the-ground incidents. A Challenger 604 with a broken passenger door cable and a Global Express XRS with an emergency power shortage. Despite the challenges, we were able to service both aircraft ready for our clients quickly because of our stock and tool availability."



Dent mapping system set to support FBOs

Aircraft regularly suffer damage from bird strikes, hail storms, collisions with ground equipment or have post-corrosion repair issues. Traditionally, assessing aircraft damage is a time-consuming process. Prone to subjectivity and human error, mapping and measuring dents to regulatory standards can cause delay to aircraft that are otherwise ready for use.

Colorado-based 8Tree is addressing the problem with its dentCHECK surface inspection tools. The handheld device can be set up in less than a minute, scans the affected area and displays the measurement results in real time by projecting them onto the aircraft, colored in red, green or blue to display what's in and out of tolerance.

The 3D scanner also records the measurement data for reporting purposes with a single click and integrates easily with software to produce all of the necessary documentation.

The company, which launched in 2013, says that dentCHECK enables users to make decisions about aircraft serviceability faster than with traditional methods. The technology, which has approval from Airbus and is already gaining traction in the airline sector, looks set to be used in the business jet sector.

8Tree founder and CEO, Arun Chhabra, says, "The larger MROs using the product are getting payback in a matter of months. The feedback has been very positive with 90% time savings being achieved. Executive aircraft OEMs are showing strong interest. Following the completion of successful trials, we hope to announce soon that one of the global brands is adopting dentCHECK."



Customer customization

The business aviation sector remains very competitive and fast-moving for MROs. According to Jet Maintenance Solutions there is a growing demand for modifications for business jets, driven by customers looking for exclusiveness or cabin design originality.

Lori Johnson, marketing manager at Duncan Aviation, the world's largest privately owned business jet support facility, says, "Connectivity is no longer a luxury. Passengers expect it aboard their aircraft. And if systems become unserviceable it is often considered an aircraft-on-the-ground situation."

Duncan Aviation has developed customer-facing apps and website management systems to enhance customer service. First introduced in 2006, its myDuncan app is available to any customer with an aircraft undergoing an airframe, avionics or engine project at one of its sites. It also manages 'send-in' repairs with component status tracking. Customers use their computers and mobile devices to manage projects whether they stay with the aircraft or not. "Our customers receive email alerts, status reports and updates with hour and cost estimates," says Ryan DeVall, IT project manager, Duncan Aviation. "We want to make the customer's job easier and relevant data more accessible. We continue to add functionality to make myDuncan even more useful."

Technology roll-out

There is a notable people factor attached to rolling out new technologies, which includes empowering engineers to diagnose and repair more expediently. Saluga says, "Engineers and planning staff need more professionalism and knowledge. It's a different maintenance philosophy. As needs arise around the world, there's often a shortage of qualified engineers that can act quickly and effectively. New technologies help engineers to be more productive, having augmented their skills with 'expertise on demand' provided remotely to locations where they are not physically present."

Signature Flight Support's Sniffen agrees, "With a little understanding of the avionics suite and maintenance interface capabilities, engineers can connect a laptop, download the faults, ATA codes, troubleshooting methods and repair/replace procedures."

Saluga predicts that aircraft manufacturers will increase their share of the aftermarket support for business jets in

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Lori Johnson, marketing manager,
Duncan Aviation

the future. This will squeeze the independent private charter MRO market share, if new capabilities are not consolidated and strategies aligned with technology trends. "For us it is not enough to do only traditional maintenance such as heavy airframe checks, which are lower margin and subject to hangar space being available," he says.

Jet Maintenance Solutions is also looking to the growing demand for modifications, cabin reconfiguration, in-flight entertainment, avionics upgrades and wi-fi connectivity. "These trends are driven by passenger experience, but it's also vital we maintain our competitive advantage in heavy airframe maintenance. We are introducing automated inspection and data collection tools to make the process faster and more efficient."

Sniffen says that operators and MROs need to partner more closely to enable more real-time diagnosis, coordinating with maintenance teams for quick solutions and continued flight operations. "MROs that stay on top or ahead of the technology curve will be at the forefront to provide operators with unparalleled support. Slowly but surely things are moving in the right direction. This, like everything else aviation related, will have a slow adoption rate." ○

Above left: 8Tree's wireless handheld inspection tool maps out three-dimensional dents

Above right: The tool is set up to scan aircraft surfaces in less than a minute