MAY 2016

AMT AIRCRAFT MAINTENANCE TECHNOLOGY

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DREAM BIG

An Irishman came to the U.S., joined the Navy, and built his career in aircraft maintenance through hard work and education. And he's not done yet.
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By Benét Wilson

COVER: PETTY OFFICER 1st Class Nathaniel Stuart, aviation ordnance man, crew chief for the U.S. Navy flight demonstration squadron, the Blue Angels, waits for a signal from his pilot at the Guardians of Freedom Air Show in 2011.

U.S. NAVY PHOTO BY PETTY OFFICER 2ND CLASS JEN BLAKE

LEFT: MAKING LAST MINUTE preparations at the Communications Cart prior to an aerial demonstration in 2015.

DECLAN HARTNEY

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INDUSTRY TRADESHOWS

Careful planning will provide you with the greatest benefit from your tradeshow experience

It's Saturday morning, the sun is shining through the window and I'm thinking I really should be outside enjoying the Upper Midwest spring time weather. I'm leaving Monday morning for another aviation industry tradeshow so I need to finish up some work first. My calendar says I've already attended, well let's just say, numerous aviation tradeshows, industry conferences, and local aviation events. And, as I look at the months ahead I have many more planned throughout the year.

From the largest tradeshows with thousands of exhibitors and hundreds of thousands of attendees to local events hosted by area aviation groups, there's great benefit in attending any size industry event.

Small local events are great, and an easy way to stay connected to your local aviation community. Aviation organizations host many smaller events and these settings provide you time for casual conversation with old aviation friends as well as some one-on-one time to discuss business with local companies. I recently attended the Minnesota Business Aviation Association's April luncheon. After another Minnesota winter it was nice to see many colleagues and catch up with the happenings in my local aviation community.

Large industry tradeshows are a different experience. They provide attendees the ability to visit with any number of exhibitors, speak with suppliers, learn about new products and recent developments, attend technical, business and educational sessions, or you can take an up-close look at new aircraft parked in static display areas. Just back from the MRO Americas in Dallas, TX, the highlight for me was reconnecting with many former airline colleagues. But it wasn't all just visiting with old friends; the list of business meetings was long.

PLAN CAREFULLY

Depending on what you want from your tradeshow experience, you may want to consider developing a personal tradeshow plan. You or your company has recognized the investment benefit so make good use of your time while there.

Take note of the physical size of the area and exhibitor locations. Some tradeshows are huge and you may have to walk long distances from one exhibitor to another.

Review the event exhibitor list ahead of time. Choose carefully the exhibitors you want to actually have a meeting with vs. just stopping by to introduce yourself.

Contact exhibitors prior to the show and schedule a specific day and time for a meeting. Exhibitors at these events can be extremely busy.

Don't forget to look at the aircraft. Some tradeshows may have aircraft on display at a nearby airport requiring extra time for travel to and from the static display area.

Take note of the educational sessions available and attend those of interest to you.

Networking events are always valuable and provide great conversation and industry contacts.

Most importantly, take time to sit and rest your weary feet.

Enjoy your next tradeshow, Ron

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ADVANCEMENTS IN TURBINE ENGINE OILS

Paul Fridman, aviation marketing manager with Eastman Aviation Solutions, answers questions regarding oil chemistry and the effects on operation and maintenance

By Ronald Donner

Operators of the commercial airline industry's newest generation turbine engines are said to be placing greater emphasis on engine oil life as oil temperatures are increasing and oil consumption is decreasing. Turbine engines today primarily use two types of engine oils; Standard Performance Capable (SPC) and High Performance Capable (HPC) oils.

To discuss turbine engine oils, we contacted Paul Fridman, aviation marketing manager with Eastman Aviation Solutions, and asked a few questions regarding oil chemistry and the effects on operation and maintenance. Eastman acquired the aviation turbo oils business from BP in June 2014.

AMT: **Describe some of the typical turbine engine oils and their chemistry.**

PF: Standard Performance Capable (SPC) oils are used across many engines and accessories which don't require the high thermal properties that HPC oils offer. SPC oil has been used by airlines for many years. Many likely recall Exxon Turbo Oil 2380. This product line has since gone through two acquisitions to BP and then to Eastman.

High Performance Capable (HPC) oils are 5 cSt (Centistokes) oils that are used in both turbine engines and accessory equipment such as IDG's. HPC oils offer an enhanced performance benefit

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TURBINE ENGINE oils undergo rigorous chemistry testing to ensure they perform to today's demanding requirements.

through higher thermal stability These HPC oils have been designed to handle the requirements of newer more fuel-efficient engines that typically have higher operating temperatures.

APU oils are typically slightly thinner oils (3 cSt) so they offer better low temperature properties to support engine start/stops in colder environments because of the ability to function in cold temperatures which is essential for extended-range twin-engine operations (ETOPS) when a cold start is required by the APU.

Additionally, for the helicopter market there are 5 cSt oils offering enhanced load-carrying features supporting use in combined engine/gearbox lubrication systems.

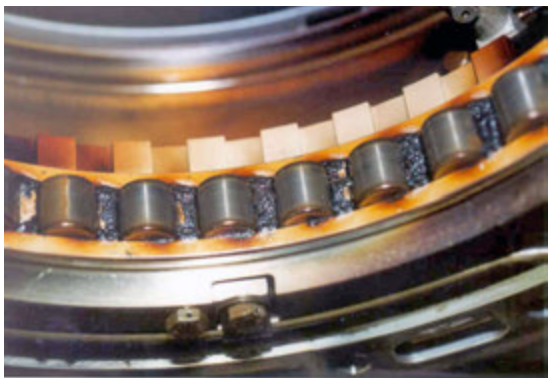
AMT: **What are some key indicators of a healthy oil system?**

PF: When a commercial aircraft engine consumes sufficient HPC oil through normal operation and subsequent top-off, regular oil testing is generally not necessary. Oil analysis is seldom employed in commercial airline operations. However, operators of turbine engine helicopter, business and general aviation aircraft will still perform regular testing as the original charge of oil may well be in the oil system for much longer periods without top-off. Modern engines also have on-board systems to detect metallic wear chips in the oil system as well as sensitive accelerometers to detect vibration due to bearing deterioration that will alert operators to an issue faster than any practical oil sampling interval.

Considering oil health over an extended time period, its quality and performance features are generally preserved through normal top-off frequency (typically 0.1 quarts per operating hour). This situation is different in lower utilization segments such as some helicopters and general aviation aircraft where the lubrication system has the opportunity to accumulate moisture during periods of inactivity as well as lesser opportunity for refreshing of the oil charge through top-off replenishment. Ultimately, this lack of aircraft utilization can accelerate the deterioration of the turbine oil.

AMT: **What benefits are operators likely to see when transitioning to the new HPC technology lubricants?**

PF: Various engine models require specific lubrication system component inspections and cleaning



LEFT: SUMP bearing operating on SPC.

RIGHT: NOTE the cleanliness of this sump bearing when using HPC oils.

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TURBINE ENGINE oil testing equipment in the Eastman laboratory.

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TOP: SCAVENGE tube using SPC oils.

BOTTOM: SCAVENGE tube using HPC oils.

EASTMAN AVIATION SOLUTIONS

tasks often mandated by OEMs through service bulletins due to deposits or deterioration of oil. In many cases, the time between cleaning or inspections can be extended or their associated work scope reduced when the operator is using an HPC oil. The deposit-reducing tendency of HPC oils provide for a cleaner operating engine and associated lower concerns over blockage of critical oil supply and scavenge tubes.

Eastman developed a Value Proven Tool that quantifies the potential maintenance savings an operator will enjoy for these affected engines should they utilize an HPC class oil such as ETO 2197.

AMT: **How does oil type affect inspection and/or maintenance activity?**

PF: HPC oil performance has allowed OEMs to revise traditional maintenance and inspection intervals in some cases. It also helps reduce time between maintenance intervals. Switching from standard to high performance oil can have a very beneficial effect on internal component wear. You can model examples of the positive effects of using High Performance Capable oil on the Eastman Value Proven Tool.

AMT: Has there been any studies linking operating hours to engine cleanliness?

PF: Eastman has completed a number of studies comparing component health using both Standard Performance Capable and High Performance Capable oils. These critical components include oil vent tubes, bearings, and oil supply tubes. Significant benefits are seen in using HPC oils versus SPC oils indicated by lower levels of carbon deposits and a reduction in tube blockage over extended time periods. With respect to bearing areas, cleanliness was also noted to be substantially improved with HPC class oils. All these benefits can be attributed directly to the higher thermal stability offered by HPC oils. ***AMT***

More information can be found at www.eastman.com/Brands/EAS/Pages/Home.aspx including the online resource Value Proven Tool. Paul Fridman can be reached at pfridman@eastman.com.

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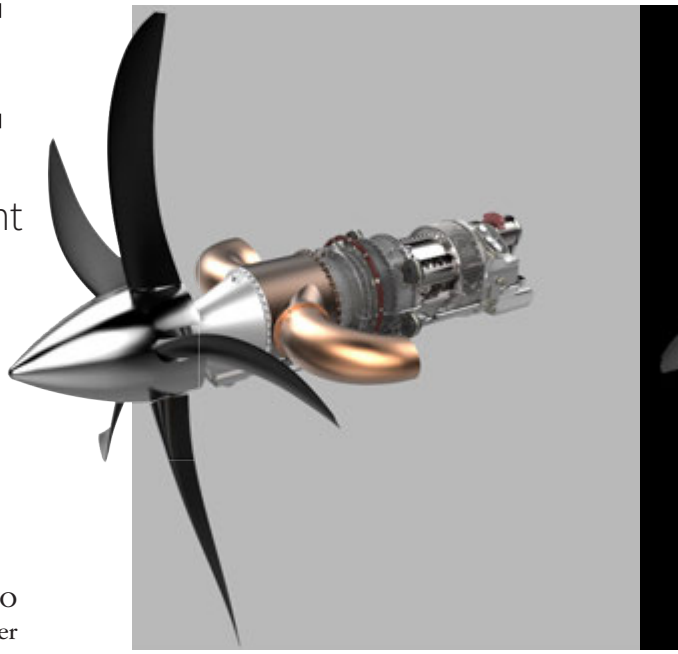
GE'S ADVANCED TURBOPROP IS THE SUM OF ITS PARTS — AND THEN SOME

The package may be new, but the constituent parts of that package are not. The ATP's aerodynamics borrow on more than 150 million hours of field use in commercial powerplants.

By Jerome Greer Chandler



WHEN YOU HARNESS A SINGLE POWERPLANT TO the nose of a brand-new airframe, that engine better be reliable. In this case the engine is GE Aviation's new advanced turboprop (ATP) and the airframe is Textron Aviation's new single-engine turboprop, or SETP.

The move marks GE's most ambitious foray yet into the business and general aviation arena. "ATP has a number of unique features that have never been seen before in this market segment," asserts Brad Mottier, vice president of GE Aviation's Business and General Aviation and Integrated Systems business.

GE Aviation says those features result in:

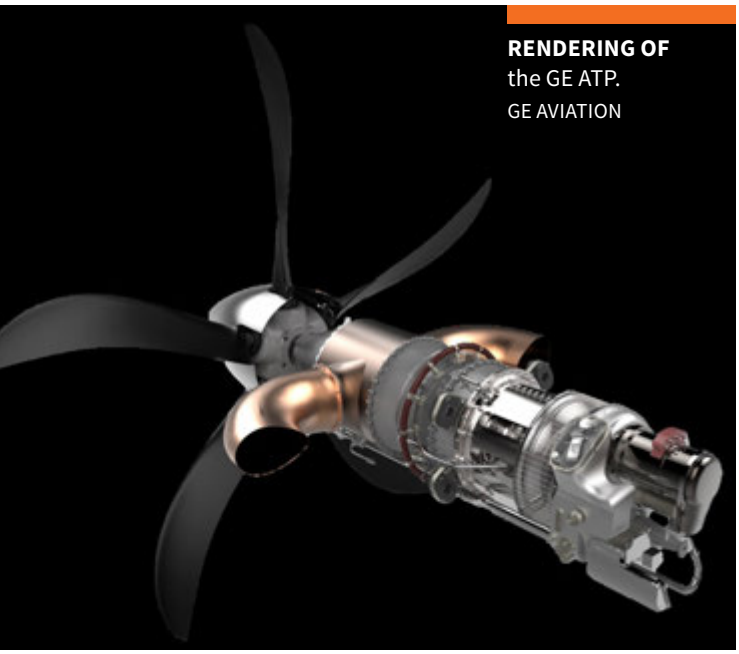
- a 16:1 overall pressure ratio;
- 20 percent lower fuel burn compared to the competition;

THE CURRENT GE facility in the Czech Republic that builds the H Series turboprop. A new facility will be built to produce the ATP.
GE AVIATION

- 10 percent more engine power at altitude;
- 850 to 1,650 shaft horsepower;
- 33 percent longer time between overhaul, compared to the competition;
- the highest power-to-weight ratio in its class.

The package may be new, but the constituent parts of that package are not. The ATP, says Mottier, "is taking technologies from different (GE) engines and architectures from other engines and putting them together in this new platform." GE Aviation's BGA engine chief contends, "We are doing this at very low risk." That's because the high-pressure ratio compressor, the stator vanes, and the cooled turbines have more than a billion flight hours on a multitude of GE commercial aircraft engines. The ATP's aerodynamics borrow on more than 150 million hours of field use in commercial powerplants.

The engine's modular architecture is based on the CT7 turboshaft, a family of engines that has managed to rack up more than 100 million flight hours — 5 million of them in hot and harsh environments. ATP gets its compressor from the CT7.



RENDERING OF the GE ATP.
GE AVIATION

ATP is a reverse flow affair, one in which air enters the engine near the back of the powerplant and flows out via exhaust stacks on the side. In that respect it's similar to GE Aviation's H Series of turboprops.

All this serves to reduce the risk that can be associated with new powerplants, and cut those unexpected revelations that can wreak havoc on a program.

BY THE NUMBERS

That bodacious 16:1 overall pressure ratio is really efficient, "a step-change," says Mottier. Cooled turbine blades and a multiple-stage low-pressure turbine contribute to the ratio. By way of reference, he says competitive engines have overall pressure ratios in the "9:1 to 10:1 range."

Twenty percent less fuel burn and 10 percent more power at altitude are accomplished via computer-control of the engine, coupled with a prop that's integrated into a propulsion control system. "That is a first," contends Mottier. "It's never been done in this [BGA] marketplace."

Propulsion control optimizes prop speed, prop pitch and the powerplant itself in a given flight regime — takeoff, descent, and cruise. The way things are right now in this particular BGA niche, "you have a propeller control lever and a throttle." The ATP is linked to a single lever, one that controls both the prop and the powerplant.

There's a fundamental difference between overhaul intervals in the BGA market compared to the commercial airline arena. Business and general avia-

tion aircraft fly fewer hours. At the same time, somewhat counterintuitively, the "engine overhaul cycle is much shorter." A commercial powerplant will stay on wing 20,000 hours, perhaps more. By contrast, BGA engines stay put in the 3,500- to 5,000-hour range. Fewer flight hours, more frequent overhauls. Mottier says, "ATP's time between overhauls will increase more than 30 percent, virtually a full third." With the ATP, Mottier says control logic prevents you from doing incremental damage to the engine, damage that mounts up and hurts long-term durability.

CZECHMATE

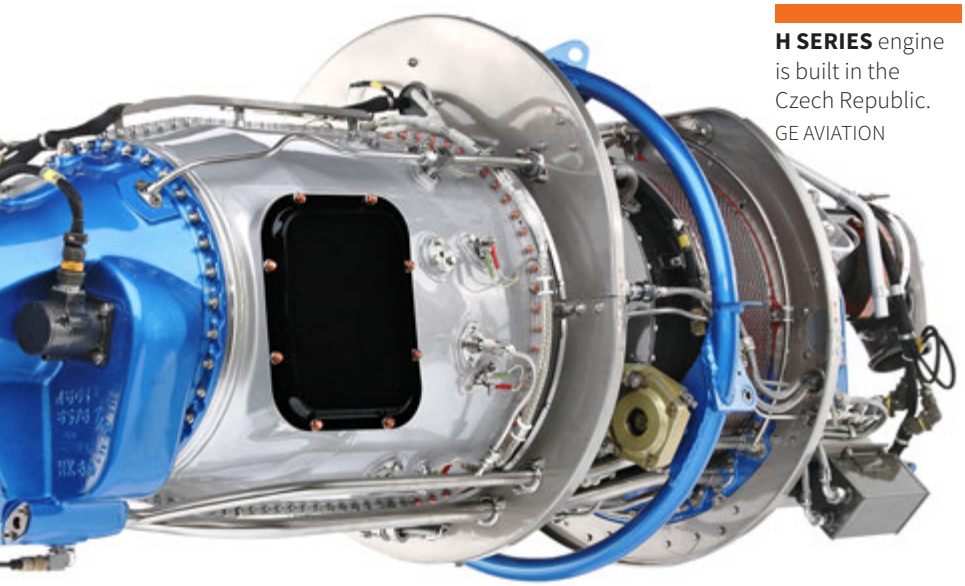
For the time being, ATP design and testing will be at GE Aviation's existing facilities. By 2020 the engine maker plans to start manufacturing ATPs in the Czech Republic at the GE Turboprop Center of Excellence (CoE), which is now under construction.

Why the Czech Republic? GE Aviation has been there since 2008, when it acquired Walter Engines. In 2012 GE's existing Czech facility began producing H Series turboprops, with power in the 750 to 850 shaft horsepower range.

GE Aviation leveraged the robust design elements of the Walter M601 engine, incorporating 3-D aerodynamic design techniques and advanced materials to create the H Series of turboprops. That's important. Mottier says, "With the new [Czech-based CoE] the ATP will join the H Series as the first engines designed, tested, and manufactured outside the United States, incorporating the best of our proven technologies into our newest family of turboprops powering next-gen aircraft, like Textron's SETP."

> By 2020 the engine maker plans to start manufacturing ATPs in the Czech Republic.

When people ask Mottier, 'How are things going in Europe?' the exec answers that there are some 12,000 GE Aviation employees there now, about 2,000 of them engineers. "Over the last decade," says Mottier, "we've established centers for



H SERIES engine is built in the Czech Republic. GE AVIATION

manufacturing and engineering in Europe that perform some of the design work for engines that are manufactured here in the United States." GE manufactures parts in Europe that are then assembled here in the U.S. As far as the advanced turboprop effort is concerned, engineering project management and systems engineering group will be European-based. He says they'll "use European resources to the maximum extent possible. This is a *global* [author's emphasis added] engine."

Heretofore GE Aviation has been building out its H80, a small horsepower turboprop that competes in the smaller power range precincts, from 750 to 850 horsepower. But the company wanted something with substantially more punch, a powerplant in the 1,300 to 1,650 horsepower range.

TEXTRON'S REQUEST FOR PROPOSAL

Mottier says Textron told GE Aviation the airframer would issue a request for proposal and see what other parties could come up with. The upshot: if such an engine would be produced at the right price it would be significant and Textron could develop a new, clean-sheet airframe, one built around the new powerplant's capabilities.

That was in December 2014, and the race was on. The field was narrowed to a trio of competitors and GE Aviation ended up on top. Mottier describes what lies ahead now for him and his team a "once-in-a-career opportunity," an opportunity potentially worth US$40 billion in revenue over the next 25 years. No less than GE Chairman and CEO Jeff Immelt highlighted ATP's possibilities in the company's most recent annual report.

According to Textron Aviation spokeswoman Lindsay Adrian, GE advanced turboprop will be the only engine the new SETP uses. "We're designing the aircraft to be powered," solely by the ATP. "Our single-engine turboprop will combine the best of both clean-sheet aircraft and new engine design," says Adrian. "Selecting GE as our engine partner reflects the best fit for the mission."

Textron is moving methodically, with consummate caution, in releasing details about SETP — declining just now to announce the name, maintenance advances, projected in-service date, or where the aircraft will be built. What is known is that it will have a range in excess of 1,500 nautical miles and a speed greater than 280 knots. Adrian says the single-engine craft will sport "best-in-class operating costs." **AMT**

EFFICIENT PROCESS AND RESOURCE MANAGEMENT ARE CRITICAL TO EFFECTIVE MRO

Transforming MRO and its associated supply chain into a more holistic approach, reducing maintenance costs by just 10 percent could double profits

By Kevin Deal

The world of civil aviation is changing, and organizations involved in maintenance repair and overhaul (MRO) and the supply chain need to ensure they aren't left at the departure gate when it comes to industry innovation. International Air Transport Association (IATA) figures show the global commercial aerospace sector sustained significant growth throughout 2014 with international passenger traffic rising more than 6 percent, underlined by extended record-setting production levels. Growth continued through 2015 caused by an accelerated replacement cycle (more fuel-efficient aircraft, e.g. Boeing's 787 Dreamliner and the Airbus A350XWB, linked to increased passenger travel demand — India, China, Middle East, and Asia-Pac). Annual revenue growth is also expected to continue in the region of 5 percent over the next 20 years — demand increased by 400 percent and passengers by 30 percent between 1981 to 2013.

Aircraft production is also showing dramatic rises — with Frost and Sullivan, the IATA, and the Official Airline Guide all predicting a 25 percent increase in aircraft production over the next 10 years. More

KEVIN DEAL is the vice president for aerospace & defense at IFS North America. IFS develops and delivers enterprise software for enterprise resource planning (ERP), enterprise asset management (EAM), and enterprise service management (ESM). IFS was founded in 1983 and currently has over 2,700 employees. For more information visit www.IFSWORLD.com.

planes are making more flights, with flight routes becoming busier and increasingly globalized. These new aircraft, complete with new technologies, must merge with a fleet containing planes at varying stages of their operational lifespan.

Aerospace MRO services/supply chains face significant challenges to meet the demand and will need to drive in transformational efficiencies.

WHY IS MRO IMPORTANT TO THE BOTTOM LINE?

Wall Street Journal research showed that in many cases, 99 percent of the revenue received per flight by many airlines is needed simply to break even on the high base costs incurred in operation. The largest cost to airlines is fuel, followed by salaries, taking 29 and 20 percent of revenue respectively. Hedging is a key play here for fuel but that is effectively a risk and airlines cannot directly influence the barrel price. Salaries are also difficult to reduce because of the global competition for qualified aircraft maintainers. As such, both fuel and people are costs that cannot be influenced easily or minimized to maximize profit.

The one area where an airline can help boost profits is that of maintenance (be it indigenous or contracted out), where costs typically make up 11 percent of revenue. By transforming MRO and its associated supply chain into a more holistic enterprise approach it is possible to achieve increased value. And, the sums indicate that if operators can reduce maintenance costs by just 10 percent, they could double their profits.

TRANSFORMING TO IMPACT THE BOTTOM LINE

For an MRO to be able to deliver on the bottom line the maintenance operation needs to transform and adapt. New technology such as new composite materials, the continual development of passenger services such as touch screen entertainment and Wi-Fi, as well as government initiatives such as 'Clean Sky', brings widely different MRO demands than ever before. Link this to an ever increasing regulatory compliance framework and this is only going to get more complex over time as new requirements continue to evolve.

Some key challenges IFS sees being fed back from the civil aviation sector include:

It's a dynamic market

The MRO market dynamics are transforming, and an organization needs process and information system (IS) solution agility to deal with them. Smaller MRO businesses are facing increased competition as more airlines bring MRO in-house coupled with the increasing dominance of original equipment manufacturers (OEMs) seeking to maintain and support their own products. New technologies, green engines, and composite materials are adding further pressure on aircraft maintenance where process efficiency, high resource utilization, and process innovation are key requirements in order to stay competitive.

It's a growing market

MRO services must adapt to cope with the resulting increase in demands. This requires continued investment in facilities, training, and modern IS.

It's hard to optimize scarce, skilled resources

With staff resources stretched, it becomes critical to manage those skills more effectively with greater flexibility. Operators also need a better understanding of cost structures and activities to facilitate adjustments.

It's challenging to drive in regulatory requirements

Increasing pressure is also coming in the form of environmental factors such as Clean Sky and the annual reporting rigours associated with eco-footprint.

It's a complex supply chain

The costs of aircraft parts are increasing — the logistics needs to be managed efficiently. At the same time there needs

to be a healthy mix of competition and managed stability in an organization's MRO supply chain. The supply chain needs to be secure and able to deal with the growing risks of counterfeiting.

With such challenges putting strain on maintenance operations, how do organizations remain flexible, agile, and informed? How do they optimize their assets and resources so that efficient and effective MRO is the key driver to maximizing profits?

ONE VIEW NEEDED TO MANAGE ASSETS ACROSS THE WHOLE ENTERPRISE

Businesses need to manage assets and resources across the whole enterprise. Effective asset management and MRO efficiency are, and will continue to be, critical factors in business performance and ultimately the bottom line.

Many operators currently and historically use solutions that have emerged from specific initiatives — for example one solution for managing aircraft fleet line maintenance, another for heavy maintenance, a further vendor solution for technical publications management, and yet another vendor solution for an end-to-end supply chain and the close contractual engagement with key suppliers. An organization may also have a mix of in-house and OEM-supplied solutions.

MRO is a complex process and needs industry standard, robust processes but it doesn't need to be serviced and supported through an equally complex user interface. The business should be treated as a business not a set of distinct organizations. How an engine is progressing through an MRO shop, where certain parts are in their lifecycle, how certain suppliers are performing, how HR manages the resource risks, are we meeting compliance reporting and audit obligations are all parts of the P&L success and all contribute to the enterprise.

The key therefore is IS support that combines both industry standard, robust processes with an enterprise wide operational information driven perspective.

WHAT DOES THIS MEAN?

This means being able to integrate data, metrics, and operational and business objectives. The value-add of an integrated approach to asset management and maintenance is a common user-interface (reducing the amount of training needed and encouraging cross-department collaboration). Agile line maintenance — civil aviation operators need a line maintenance solution that enables the optimization of resources, allocation against planned tasks, and capture of costs of work undertaken. Robust heavy maintenance, repair, and overhaul — MRO solutions need to provide an integrated, incremental solution to match the demands of engine and airframe MRO overhauls — on time, on budget, with safety and within regulation. Organizations need the ability to work smarter and adapt through the use of agile, modular enterprise solutions based upon standards that can provide the broader functionality needed. In addition, successful MRO providers realize that making operations smarter requires end-to-end strategic intelligent business operations. This requires solutions that provide a range of tools delivering visual insight, decision support, and action execution at the enterprise level, to accelerate business performance. To support a complex MRO operation, three key elements are required:

- **Map the Enterprise** — In order to reach the nirvana of well-informed decision making, the first step is to have a top-down corporate business management process that gives the leadership 'Visual Insight'. Most business intelligence solutions are limited by using a bottom-up approach, a legacy of patching in stovepiped functional systems without real interconnectivity.
- **Monitor Performance** — Management needs a system that monitors the performance of activities against business goals. For example, to be able to calculate the impact of raw material price or quality changes on the bottom line in real-time. In this way, each functional leader can direct their energies toward those tasks that matter the most to achieving the corporate strategic goals.
- **Manage the Business** — Managing the business isn't just about watching things happen, it is about doing things when necessary. Business leaders need the ability to execute decisions supported by real-time 'what-if' analysis that drives their specific business and gives them a competitive edge.

WHAT OTHER TRENDS WILL IMPACT CIVIL AVIATION MRO?

Consumer IT is having a drastic effect on the way we work. With the growth in popularity of smartphones and mobile devices has come an expectation for the same functionality in the workplace as in our personal lives. Civil aviation is not immune from the ripple effect of consumer trends. Support solutions are becoming less about IS infrastructure and more about open access and ease of use. Mobile devices are now commonplace in maintenance hangars, and wearable technology has recently been trialed to inspect aircraft on the ground. The next generation of logistics will see the

All of these names have one name in common.

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full integration of operations, maintenance and the supply chain, into the optimized logistics support enterprise.

We will also see airline maintenance teams equipped with mobile apps to access relevant information at the time of need, rather than the long walk to the office. The trend will be to create an environment to better enable the user to do their job, reducing solution overheads, for busy maintenance engineers. Information must be in a format optimized for specific equipment, easily customizable, and devoid of overhead.

The first glimpses of return on investment from additive manufacturing are anticipated. A&D is already a trendsetter in terms of adopting additive manufacturing, contributing 10.2 percent to the industry's $2.2 billion global revenue in 2012, and all indications are that this will continue to grow. Boeing and Airbus have been using the process to manufacture components for over two years. In MRO terms, the technology allows printing of replacement parts on demand for damaged equipment to support maintenance operations.

Additive manufacturing allows printing of **replacement parts on demand** for damaged equipment to support maintenance operations.

We are also seeing a real business need for wearable technology emerging. Airlines are now trialing Google Glass in the maintenance process. The glasses are worn by engineers working around the plane on the tarmac. Images of the aircraft are sent to maintenance specialists for assessment who then feed any issues they see back to the engineer on the ground. Maintenance is completed promptly, can be assessed in real time, and all information is recorded to assess further issues down the line. Wearable technology has the potential to reduce complexity, workload, and maximize deployment of scarce skill resources. Context-aware computing is also coming to the fore, IS solutions will automatically tailor their operation through recognition of the maintenance environment. The technology's key benefit is that it reduces the time taken to complete maintenance tasks in difficult environments — engineers can get the job done quickly, streamlining the maintenance process.

But as new technologies are implemented, MRO IT solutions must be able to adapt and integrate — and quickly. Traditional ERP solutions have had a track record of months or even years to install, let alone adapt to incorporate new technology and that can result in a dramatic effect on the bottom line. But, modern, modular, ERP applications have an inherent agility — reducing the time and pain required to modify processes and make it possible to deploy new technology quickly.

BUT THERE ARE SOME RISKS ...

Make it or fake it — with large fleets containing aircraft at various stages of lifespan, there is constant demand for parts, while cost and schedule pressures have created an environment which allows counterfeiting to flourish. The Federal Aviation Authority (FAA) estimates that 2 percent of the 26 million aircraft parts installed each year are counterfeit. This has the potential to severely impact the support chain assurance as well as airworthiness. To dramatically reduce the number of counterfeit parts requires agile IS solutions to introduce key audit checkpoints across both logistics, supply, and MRO processes.

Strict export control plays an important role in keeping the world safe. It's not just a defense issue and can cut across all sectors of the aerospace industry. Only by complying with stringent export control regulations, as implemented by various government agencies, is it possible to combat infringements of sanctions. It is absolutely critical that these businesses can demonstrate that they can comply with the most robust export control if they are to be recognized as bona fide suppliers.

AND BENEFITS

Efficient and effective MRO is one of the key areas that an airline can significantly influence in order to drive increased profits and USPs.

It requires advanced regulatory and safety compliance, ability to optimize workforce resources with a focus on efficiency, high utilization, and process innovation. It involves smarter procurement, better parts availability, better supplier management, and improved use of facility capacity and also better financial performance — by aligning contracts and resources to operational efficiency. But any supporting IS solution needs to underpin this with the inherent solution agility that can readily adapt to the changing aviation market and technological initiatives.

This will provide airlines with increased customer service, increased availability with minimized turnaround times, and a real business differentiator going forward — achieving that 10 percent reduction of maintenance costs that can result in a doubling of profit. **AMT**

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An Irishman came to the U.S., joined the Navy and built his career in aircraft maintenance through hard work and education. And he's not done yet.

By Benét Wilson

Dream Big

DECLAN HARTNEY on his way home to Pensacola, FL, after a great airshow weekend in Virginia Beach, VA, in September 2015.
DECLAN HARTNEY

THE U.S. Navy Flight Demonstration Squadron, the Blue Angels, maintenance and support team members perform a practice ground demonstration prior to the F/A-18 Hornets' launch.

U.S. NAVY PHOTO BY MASS COMMUNICATION SPECIALIST 2ND CLASS KATHRYN E. MACDONALD/RELEASED

This is a story about how the 1986 movie "Top Gun" transformed a young Irishman from being an aviation mechanic to becoming a highly educated Naval officer charged with overseeing maintenance for the world-famous Blue Angels Flight Demonstration Squadron.

Growing up in Ireland, Declan Hartney admits that he watched "Top Gun" one too many times. "I was always interested in U.S. military aviation. I was fascinated with the Navy, the aircraft it flew and the aircraft carriers. That really did it for me," he says.

Hartney began his aviation career working as a mechanic for De Beers at Shannon Airport in 1990. "Although I was interested in aviation, there wasn't a lot of opportunity for me in Ireland, since we had only one airline," he recalls. "But then Shannon Aerospace built a new facility, which allowed young people like me to enter the industry.

"Shannon Aerospace was looking for maintenance technicians, so I applied for its aviation structural technician program. They say I was very enthusiastic during my interview, and I was accepted into its two-year program in May 1992," says Hartney.

During the program, Hartney was trained in structural and composite repair on Boeing and Airbus aircraft. "It was a mix of classroom and hands-on training to do repairs on those aircraft," he says.

JOINED THE NAVY

After graduating in 1994, Hartney won the visa lottery to go to the United States. He immigrated, and two months later, joined the Navy as an aircraft maintenance technician.

Hartney's first job in the Navy was as an aviation maintenance technician for the Strike Fighter Squadron 131 in July 1995. "The squadron, known as the Wildcats, was based at Naval Air Station Cecil Field in Jacksonville, FL. It flew F18s, the same fighter flown by the Blue Angels," he says. "As I was doing my Naval training, we competed. Whoever finished top of the class got to pick the orders that were available. I was number two in a class of 35, so I got a wide choice of orders to choose from."

His original choice — the F14 Tomcat — wasn't available at the time. "So I took the next best thing, which was still a fighter jet," says Hartney.

That was an intimidating time for Hartney. "Not only did I find myself in a foreign military, but I was also trying to fit into a new country. I had only been in the states a year when I started that first job," he says. "I was still trying to figure things out. It was a fast work environment that encouraged a work hard, play hard mentality."

In Ireland Hartney says he was a hard worker, but felt that he was being held back. "After I joined the

Navy, the harder I worked, the more I was appreciated and rewarded. I felt like I fit in," he says.

BLUE ANGELS AND CLIMBING THE LADDER OF SUCCESS

In October 1999 Hartney took his next job, as an aviation maintenance technician for the Blue Angels, when he started taking public speaking classes. "One good thing about being in the military is that it gives you the opportunity to go to college for free. I wanted to be an officer so I had to go to college, and I had to take public speaking courses as part of that," he says. "It served me well with the Blue Angels when we traveled and visited schools and the public."

From there, Hartney became the material control manager/airframes and powerplants division officer for Strike Fighter Squadron 146 during Operation Enduring Freedom in Afghanistan in 2002.

DECLAN HARTNEY

THE BLUE Angels en route to Nashville, TN, in December 2014.

"As a material control officer, I had to balance the squadron's budget and watch over spending. One of the biggest challenges was paying for fuel. If we got it off our ships, it was fine," says Hartney. "But if we got it from Air Force or European tankers, it was a challenge. But the bottom line was we provided the squadron with mission-capable aircraft in Afghanistan."

Hartney says he was also responsible for providing leadership for between 40 and 50 sailors who served as aircraft technicians. "The sailors specialized in structure and composite repairs, similar to what I did at Shannon Aerospace," he states. "I wasn't just pushing paper. I could talk intelligently about the work they were doing. I understood what they did and could offer them advice and guidance."

Later in his career, Hartney was tapped to create a special aviation maintenance department for the Navy's Special Warfare Special Reconnaissance Team One in June 2010. "The team was operating a new aircraft platform that required a maintenance program in San Diego. My name came up as someone who could head this up," he says. "As it turned out, it was the best tour I ever had. When I walked in, I was the maintenance department."

Hartney built the department up, along with a program to support it logistically. "There was a lot of work that went into it and I enjoyed it. It was my baby for three years," he says.

TAKE ADVANTAGE OF EDUCATIONAL OPPORTUNITIES

During that time, Hartney also took full advantage of the military's free education program, getting his bachelor's degree at

U.S. SAILORS assigned to the U.S. Navy Flight Demonstration Squadron, the Blue Angels, maintenance team, practice a ground demonstration at Naval Air Station Pensacola, FL, May 9, 2013.

U.S. NAVY PHOTO BY MASS COMMUNICATION SPECIALIST 2ND CLASS KATHRYN E. MACDONALD/ RELEASED

Southern Illinois University, a dual master's degree in aviation safety and management from Embry-Riddle Aeronautical University, a master of arts in national security and strategic studies from the Naval War College, and a Ph.D. from Northcentral University.

"After I got my bachelor's degree, I decided I wanted to get my Ph.D. Again, I had big dreams. In order to get that, I had to get my master's and I did at Embry-Riddle. It was my intention to do my Ph.D. there too, but I got sidetracked to go to Naval War College," says Hartney. "Going to war college was not an opportunity that maintenance officers usually got. It was a two-year detour and I enjoyed it and learned a lot. But once that was completed, I went back to my goal to earn my doctorate."

The bachelor's degree was what was needed to further Hartney's career in the military. "Usually the military doesn't look beyond that. For my career path it wasn't advantageous, but it showed that I was ambitious and that I was a hard worker," he says. "It would also give my commanding officers a good feel about me because I was going above and beyond what I was required to do."

A career decision cut short Hartney's original tour with the Blue Angels. "I didn't regret the decision, but I always wanted to go back," he says. "It took me three times to apply and get the job again, which was not an easy thing to do. I started again in September 2013." His retirement from the Navy was official at the end of February.

RETIREMENT, NOT QUITE

Now that he's retired, Hartney says he wouldn't mind staying in aviation in some capacity. Among the things he's considering are program management with aerospace companies, unmanned aviation, airport management, and aviation management for an airline. "It's funny. As I'm going through this application process, companies like Amazon, Microsoft, and Starbucks are also interested because of my military experience and leadership qualities," he says.

Hartney says he can bring a lot of his military skills to the civilian world. "The most important of those skills is my attention to detail," he says. "I can also be prepared, giving any boss the comfort of knowing they will get the best product from me."

He's had a few interviews, but is still waiting to hear back from companies. "I want to stay in the San Diego area, since I relocated here after retiring," says Hartney.

Much can be learned from Hartney's amazing career. "Never give up and if you know what you want to do, go get it. No one will give it to you, so don't ever give up," he advises. "I don't have any regrets, and you need to live with the decisions you make."

His advice for young people starting their aviation careers? Continue to learn and research the industry, says Hartney.

"This is something I did in my career. I wanted to expand my knowledge of aviation industry beyond what I was learning at the time, whether that was at Shannon Aerospace or in the Navy. It has served me well," he says. "Get on industry websites and keep up with the news. Continuing to learn about your industry and getting to know it is key."

Hartney says he's always had big dreams. "When I talked to students and my teachers about moving to America and joining the Navy when I was in high school, they laughed at me," he recalls. "They're not laughing now. I pursued and carried out my dreams." **AMT**

BENÉT J. WILSON is founder and sole proprietor of Aviation Queen LLC, an aviation/travel freelance writing and consulting business. Currently, she is senior editor of sister publication *Airport Business.*

ON THE MARK
WITH ROB MARK

Presented by AVIATIONPROS.com

Why TSA Leadership Needs a Marketing 101 Class

Just as another busy travel season begins, comes word from the Transportation Security Administration that passengers will have one more item to groan about as they prepare for their next airline flight … long security lines at the airport.

The question of course is why?

Turns out TSA's experiencing a staffing problem brought on by the near failure of the agency's incredible passenger PreCheck security program that thousands have experienced as the way to speed through airport security lines. Despite the fact that PreCheckers loved the program, almost no one knew it even existed, primarily because the TSA just assumed folks would hear about it somehow and sign up in droves.

PreCheck might yet survive … and it should as one of the few truly great government-run travel benefits. But passengers will need to get busy with some Word of Mouth marketing that the government seems to have failed at miserably.

I'll tell listeners why we can't let this program die.

Watch *On the Mark*
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Made Possible by …

THE ROTAX® WORLD OF TRAINING

The 912 engine has become an industrial standard in experimental and light aviation and training ensures proper use and maintenance practices

By Marino Boric

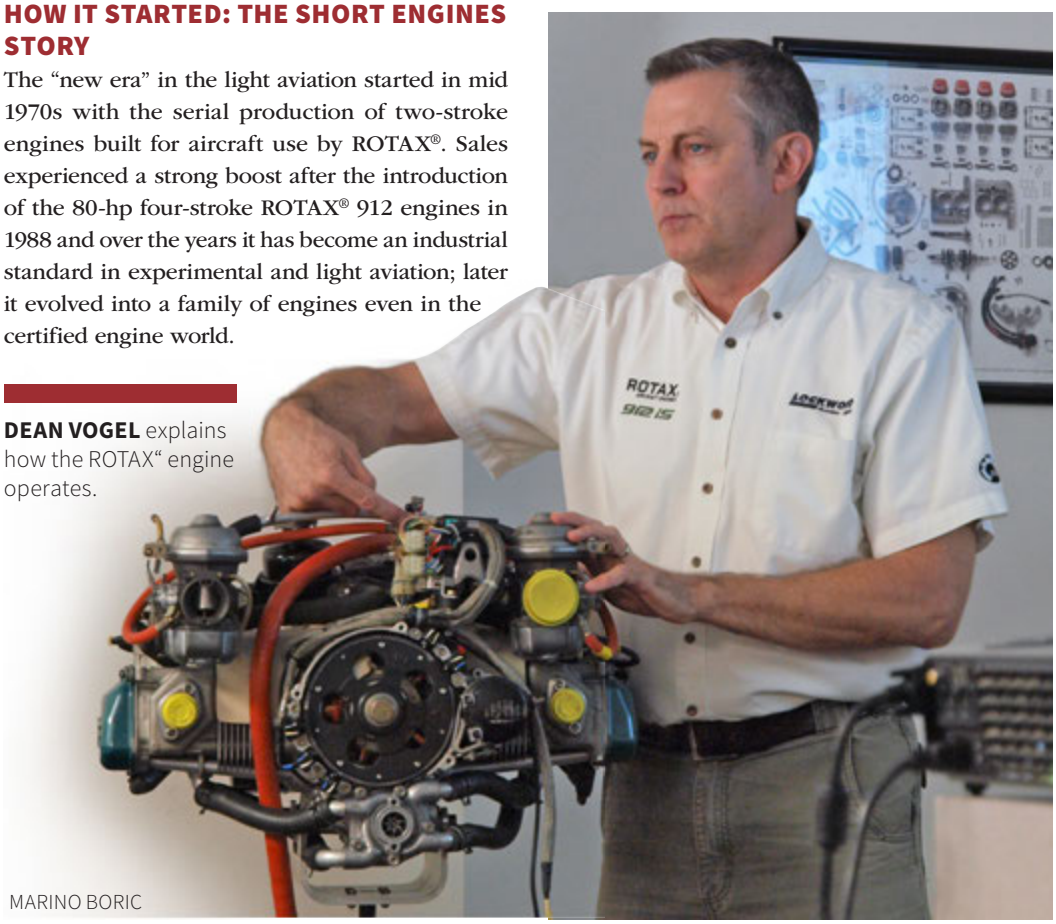
Some 41 years ago, in a remote 1975, the engine world of experimental aviation suddenly changed. What happened? Well, ROTAX® engines showed up and quickly became favorite power-plants in a grassroots aviation field. Engines sales grew rapidly and it was soon obvious that an appropriate training for user-owners, pilots, and servicing and maintenance personnel had to follow. Basically, what in the early 1980s was timidly initiated in single countries evolved into a complete world of training; not only in the U.S. but globally.

HOW IT STARTED: THE SHORT ENGINES STORY

The "new era" in the light aviation started in mid 1970s with the serial production of two-stroke engines built for aircraft use by ROTAX®. Sales experienced a strong boost after the introduction of the 80-hp four-stroke ROTAX® 912 engines in 1988 and over the years it has become an industrial standard in experimental and light aviation; later it evolved into a family of engines even in the certified engine world.

In the very beginning after the production start of the first two-stroke engines, ROTAX® 642 in 1975 and the ROTAX® 501/505 in 1978, which was made for motor gliders, it was difficult to predict the strong sales numbers experienced among the grassroots community.

The introduction of the first four-stroke ROTAX® 912/80-hp engine in 1989 was a milestone in small aviation, it has become the bestseller in the light aircraft. This engine — first ROTAX® engine developed specially for aviation — gave birth to a whole



DEAN VOGEL explains how the ROTAX" engine operates.

MARINO BORIC

MARINO BORIC graduated with a university degree as an aeronautic engineer, and acquired degrees in business development/trade and commerce and journalism. He is a civil and military pilot and has built experimental aircraft. As a journalist, he specializes in aviation and propulsion and travels worldwide, flight-testing UL, LSA, Experimental, and certified aircraft. He is writing for U.S., European, and Chinese media companies.

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Designed to create a softer, richer atmosphere within the aircraft cabin, JETFLEX® Elite from Sherwin-Williams Aerospace Coatings is a single stage coating, based on OEM qualified material that is ideal for commercial and private aircraft interiors.

Using an interior cabin coating like JETFLEX Elite is a cost effective way to improve the passenger experience in the economy or premium class sections of the aircraft.

It offers an extensive color palette from bright whites and neutrals to vibrant effects while providing outstanding stain, high abrasion and scratch resistance.

JETFLEX Elite is an interior cabin coating product designed to offer sophistication and mood enhancement to aircraft interiors. Using proprietary pigments that are more responsive to LED lighting, these coatings create a subtle glow with highlights and colored shadows not seen with current interior cabin coatings. Color tones have been derived and inspired from Sherwin-Williams' most popular interior architectural lines.

Sherwin-Williams JETFLEX® Elite is recommended for interior applications and applies easily to plastic, metal and composite surfaces. Based off Boeing Qualified technology (BMS 10-83), it meets the most stringent requirements for stain and abrasion resistance as well as the FAR / JAR 25.853 regulations for burn, smoke and heat release. Being a single stage coating, it does not need a clearcoat, yet provides extensive durability against scratches, stains and mars.

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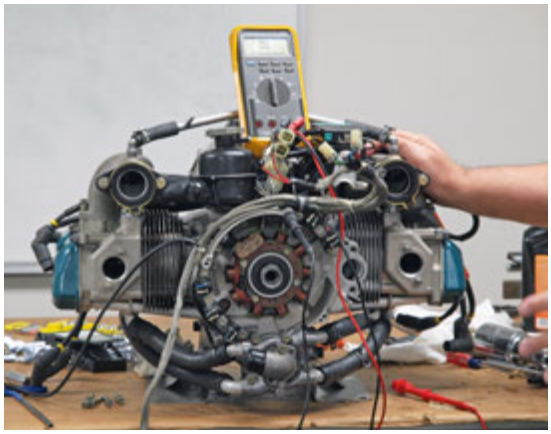
Sherwin-Williams Aerospace Coatings provides a variety of topcoat and primer cabin coatings systems designed to provide a smooth, textured or soft feel finish. It also offers a variety of aerospace primer products specifically designed for aircraft interiors. These primers complement Sherwin-Williams interior aircraft topcoats by assisting with substrate adhesion and hiding profile and surface imperfections.

Today's aviation coatings specifiers and painters ask Sherwin-Williams Aerospace Coatings to provide quality coating systems and technical support to the global commercial, military, general and business aviation markets. Sherwin-Williams is an industry leader in innovation and technology solutions with its certified products, top-rated service and knowledgeable team of field technicians.

For more information on qualified interior cabin coatings, go to www.swaerospace.com or call Sherwin-Williams Aerospace Coatings 1.888.888.5593 (North America), 1.316.733.7576 (international).

SHERWIN-WILLIAMS Aerospace Coatings

DURING CLASSES students assemble and disassemble engines and conduct testing to ensure operation. MARINO BORIC



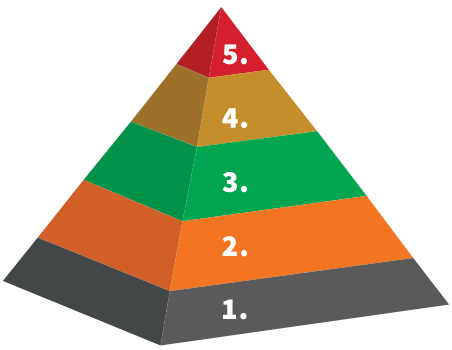
line of engines now in production. With the addition of a turbocharger in 1992 the 80-hp ROTAX® 912 became a ROTAX® 914 with 115 hp. Further, from the 80-hp ROTAX® 912 UL (1,211 cm³/73.91 cubic inch) was developed the 100-hp ROTAX® 912 ULS/S (1,352 cm³/82.6 cubic inch) with a bigger bore/higher compression version released in 1999. In 2012 the 912 iS engine was presented – the fuel-injected and deeply

ENGINE & MAINTENANCE TRAINING

RFSC has iTC, independent Training Centres located in the USA and Latin America. Additionally, one is located in UK and another in Korea. Other regions of the world have training done by the ROTAX® distributors in those countries. In case of the Americas, all training activities are done by RFSC (Rotax Flying and Safety Club).

Within the USA there are three service centers that have an iTC, Lockwood Aviation, Leading Edge Air Foils, and California Power Systems. There are also two others, SMLA, South Mississippi Light Aircraft and Rainbow Aviation. LAG Ultralight offers classes in Spanish in Mexico, Ecuador, and Colombia. For the Southern area, SRL Ultralight in Argentina also offers training in Spanish. In Brazil, CDS in Sao Paulo state offers training in Portuguese. All operate with the RFSC iRMT programs. For many of the Latin American countries, type-specific training is a requirement of the CAA and proof that the technician attended is required along with their CAA license to work on ROTAX® engines. Technicians should always comply with CAA regulations from the country they are working with.

The iRMT – independent ROTAX® Maintenance Training Pyramid is built on five main levels:



1. Familiarization Course A: First information on the ROTAX® aircraft engines, suitable for pilots, homebuilders, managers, owners, etc. Includes the history and range of engines, insight of data, documentation, and communication system.
2. Service Course: Most popular for most technicians' needs.
3. Maintenance Course: Flying schools, OEMs, and FBOs should have technicians at this level.
4. Heavy Maintenance Course: More specialized with required experience, tools, and facilities.
5. Overhaul Course: Heavily restricted to authorized facilities only.

RFSC – ROTAX® IRMT TRAINING OVERVIEW

RFC – ROTAX® Familiarization Course, 1 Star Skill, one-day course. ROTAX® Familiarization Course is an introduction to ROTAX® Aircraft engines and the company that makes them. This course has no prerequisites.

912IC – 912ULS Installation Course, 2 Star Skill, one-day course. This is aimed at home builders and small OEMs. The course covers the installation of carburetor equipped four-stroke ROTAX® aircraft engines. Available at select iTCs only. There are no prerequisites. There are no renewal requirements.

912ISI – 912iS Installation Course, 2 Star Skill, one-day course. This course is aimed at home builders and small OEMs. The course covers the installation of the ROTAX® 912iS fuel-injected aircraft engine. Available at select iTCs only. There are no prerequisites. There are no renewal requirements.

2SM – 2-Stroke Maintenance, 2 Star Skill, two-day course. The 2 Stroke Maintenance course is designed for technicians. It covers service, line maintenance, and heavy repair. Students must show prior experience or have LSA repairman or higher rating.

2SMR – 2-Stroke Maintenance Renewal, 2 Star Skill, one-day course*. Renewal course for working members with a 2-Stroke iRMT rating that is current.

9SS – 9 Series Service, 2 Star Skill, two-day course. As of Jan. 1, 2015, this course will replace the current 912 Service Course as it now includes the 912iS engine. This program is aimed at both owners and technicians. It covers service and inspection on

modernized version of the carburated 912UL with over 60 percent of new parts compared to its predecessor.

In 2015 at AirVenture/ Oshkosh the 135-hp 915 iS was presented. This is now the last evolution stage of the fuel-injected 912 iS engine, that, with an added turbo-charger and intercooler, is capable of full power output up to 15.000 feet. By the time you read this article the 915 iS should have completed its maiden flight.

FUEL TYPES: ROTAX® aircraft engines are approved for use with Ethanol 10, MOGAS, and avgas fuel types. The exact approvals can be found in the operational handbooks of the individual engines (http://docusearch.flyrotax.com/files/pdf/d06038.pdf).

ROTAX® ENGINE MAINTENANCE (HI)STORY

From the first two-stroke engines to the introduction of the successful 912/914 engine range series and today's fuel-injected 912 iS-915 iS engines, a lot has happened. This technological progress and the certified engine variants have put a different emphasis and requirements on the engine maintenance and training methods.

The first dedicated training in the Americas for ROTAX® aircraft engines started in early 1980s with Engine Tech in Canada and Ron Shettler as the first distributor for the Americas. He contracted Engine Tech — which later became ROTAX® Flying Club (RFC) — offering training also to all new OEMs. A few years later the RFC- ROTAX® Flying Club added safety to the name, to cover the accident investigation functions for RFSC-ROTAX® Flying and Safety Club. These early programs were based on training developed from the two-stroke, snowmobile programs, coupled with years of experience collected in maintenance training on aircraft engines.

the ROTAX® 9 Series engines to the 100-hour or annual level. There are no prerequisites. Note: Current 912 Service rating holders must complete the new program to be eligible for renewal.

9SSR – 9 Series Service Renewal, 2 Star Skill, one-day course*. This course is available to all current RFSC 912 Service rating holders.

9SM – 9 Series Maintenance, 3 Star Skill, two-day course. As of Jan. 1, 2015, the 9 Series Maintenance Course will replace the current 912 Maintenance Course at select independent Training Centres (iTC) that have a 912iS training engine. The 9 Series Maintenance course is a two-day program aimed at technicians. It covers the removal and replacement of components at the line maintenance level. A current 9 Series Service rating is required. Note: Current 912 Maintenance rating holders must complete the new program to be eligible for renewal.

912M – 912 Maintenance, 3 Star Skill, two-day course. 912 Maintenance course is for technicians. It covers the removal and replacement of components at the line maintenance level. A current 912 iRMT Service rating is required.

912MR – 912 Maintenance Renewal, 3 Star Skill, one-day course*. Renewal course for working members with a 912 Maintenance iRMT rating that is current.

9SMR – 9 Series Maintenance Renewal, 3 Star Skill, one-day course.

9 Series Maintenance Renewal – This is part of a one-day renewal program. Only for students that have taken the 9 Series Maintenance course. (Three-month window if student's current rating has expired.)

9SHM – 9 Series Heavy Maintenance, 4 Star Skill, three-day course. 9 Series Heavy Maintenance course is for technicians. It covers the repair of line item parts and advanced maintenance. A current 912 Service and Maintenance iRMT rating and two years experience are required.

9SO – 9 Series Overhaul, 5 Star Skill, four days, renewal two-day course. The 9 Series Overhaul course is available by invite only. Applicants must meet both facility and training requirements to be eligible.

RIT – Instructor Training, 6 Star Skill, four-day course. This course is by special invite only.

*NOTE all marked renewals done in same day, review of all manuals, all SB, SI, releases in the past 24 months

MY PERSONAL IMPRESSION

To be able to write this article I attended several iRMT courses at Lockwood Aviation in Florida and at ROTAX® Franz Aircraft engines in Germany (www.franz-aircraft.de). This was the only way to make my opinion and experience — this is my duty as a professional journalist. I have to admit that even being an aeronautical engineer and frequent flier of ROTAX® powered aircraft I have learned a lot in service and maintenance classes. For proper engine use I should have learned that way earlier! Talking to other attendees with different backgrounds, from prospective home builder, aircraft manufacturer to A&P technicians/mechanics they admitted that they have learned many new things, too. Surprisingly, after the courses, many of them expressed a wish to take renewal courses as new topics showed up in training, specially those associated to new generation of fuel-injected engines. I'm almost sure I will do the same. For a normal user without any experience with these engines I will suggest attending the one-day "installation" courses and for more ambitious persons the two-day service or line maintenance courses. Other courses, specially all "3 Star Courses" and above are for pros or for very ambitious persons.

FOR MORE INFORMATION

Visit www.brp.com, www.flyrotax.com, or www.rotaxflyingclub.com.

RFSC Training Facilities: www.ROTAXflyingclub.com/courses/centres or www.Rotaxflyingclub.com/courses/training.

To contact a local distributor: http://dealerlocator.flyrotax.com/.

Visit www.RotaxFlyingClub.com or www.RotaxiRMT.com for contact information of any independent training center.

TIMELINE

2015 Introduction of ROTAX® 135-hp, 915 iS turbo-intercooled aircraft engine

2014 Launch of ROTAX® 912 iS Sport aircraft engine

2013 BRP Inc. has become a public company

2012 Launch of ROTAX® 912 iS aircraft engine

2010 TBO of 2,000 hours achieved for 912/914 engine series

2006 ROTAX® 582 engine compliant to Light Sport Aircraft Norm ASTM

2005 ROTAX® 912/914 engine series compliant to Light Sport Aircraft Norm ASTM

2005 Production Organization Approval (POA) by EASA

2003 Design Organization Approval (DOA) by EASA, Bombardier Inc. sells its recreational division. A new company BRP – Bombardier Recreational Products Inc. is born.

1998 Launch and Type Certificate for ROTAX® 912 S Series engines, 100 hp

1996 Type Certificate for ROTAX® 914 F

1996 Launch of ROTAX® 914 Series of turbocharged, 115-hp engines

1994 Type Certificate for ROTAX® 912 F

1989 Type Certificate for ROTAX® 912 A

1989 Launch of ROTAX® 912, four-stroke engine, 80 hp

1984 Start of development of ROTAX® 912 engine

1978 Launch of ROTAX® 501 and 505 ultralight engines

1975 Certification of the first ROTAX® aircraft engine (ROTAX® 642)

1970 Bombardier acquires ROTAX®-Werk AG – and becomes Bombardier-ROTAX® GmbH

1947 Relocation to Gunskirchen (Wels), Austria

1920 Founding of ROTAX®-Werk AG in Dresden, Germany

Initially, experimental aircraft owners and kit builders in the U.S. were the target group which wanted and needed more knowledge on ROTAX® aircraft engine products. Over time, more and more certified technicians were interested to get type specific ratings for two- and four-stroke engines not only in the U.S. but worldwide.

ROTAX® certified the 912 under JAR standards (now EASA regulations) in Europe and only a few relevant requirements were imposed to complete the FAA's FAR Part 33 differences. This allowed them to be used in more than experimental aircraft. The reasons for ROTAX® type-specific training programs were self-evident from the beginning. Training on certified engines in Part 147 training schools was directed toward the legacy engines and systems.

Given that the existing "standard training" in technical schools was lacking coverage of the technical differences, such as gearbox, electronic ignitions, and dual carburetion, special type-specific training had to be developed.

A huge push for special training began when the certified 912A and F engines were first imported with European aircraft to the Americas. The Canadian distributor, Rotech Research Ltd, addressed the customer-related problems caused by lack of qualified maintenance providers and developed training for existing A&P and AME technicians for the Canadian and American aircraft. Their basic programs developed for the four-stroke engines became a best practice base for the current training systems.

LSA ON THE RISE

The introduction of the FAA new rules on Light Sport Aircraft (LSA) in 2004 was another milestone. With LSA aircraft the FAA was concerned that there would be no training materials for this category from industry. A request to all the stakeholders of the LSA category was for type-specific training for the various aircraft types and

AVIATION ENGINES FACTS & FIGURES

175,000 ROTAX® aircraft engines produced since 1975. More than 50,000 engines of the 912/914 engine series produced since 1989. Active ROTAX® aircraft engines fleet: more than 27,000 four-stroke and 13,000 two-stroke engines. Flying hours of the ROTAX® 912/914 engines fleet: approx. 45 million hours (February 2015) Yearly flying hours of ROTAX® 912/914 engines fleet: approx. 5 million hours.

HERE DEAN Vogel checks on the readings to make sure the engine is adjusted properly.
MARINO BORIC

STUDENTS GET hands-on training.

categories. This gave rise to the need for ROTAX® to have factory-approved programs on engines as they were ahead of the other producers.

Aircraft manufacturer OEMs realized that the engine training would ideally come from the engine manufacturer itself and did not want to develop training on the engines; so it was clear and required that any approvals had to come from the engine supplier/manufacturer itself for that requirement. In 2007 ROTAX® released training guidelines to all distributors based on RFSC and Rotech Research Canada suggestions. Therefore BRP-ROTAX® established in 2007 a globally standardized training guideline covering the different scope of work, target audiences, and educational levels that range from familiarization to overhauling of ROTAX® aircraft engines. All technical training courses are offered by ROTAX® authorized distributors and training organizations.

The ASTM Light Sport committee, F37, developed its ASTM F2339 engine standard to which all ROTAX® aircraft products were compliant with. As LSA class has become globally accepted with ROTAX® the dominant player in it, the training programs were embraced by the industry. Furthermore, a growing number of certified aircraft using ROTAX® engines and the shift to higher power engines makes training even more important for the future in both certified and noncertified applications. ***AMT***

THE LITTLE RED HEN AND TEAMWORK

When we miss our chance to participate fully in the customer experience, we are "robbed" of the opportunity of gaining satisfaction in a job well done.

By Bob Hobbi

TRADITIONAL CULTURAL LESSONS RING TRUE today. What could the story of "*The Little Red Hen*" possibly have to do with aviation? We all know hens don't fly! Read on and it will become clear ...

At the farm, the Little Red Hen is busy with growing, harvesting, and milling the wheat to bake some bread. Along the way, she runs across many farm "friends" that she relies on for help. But according to the story, they are all too busy and are not able to help her achieve the goal. However, once the beautiful bread is done baking and ready to eat, she finds many friends back at her door waiting to reap the benefits of her work!

ServiceElements has worked with thousands of business and general aviaiton professionals in many organizations throughout the industry — FBOs, charter management organizations, OEMs, MROs, flight departments, etc. No matter what type of organization we work with, the biggest challenge across the board (at least 90 percent of the time) is the internal customer culture (a fancy term for teamwork).

Whether the challenges come from "silos" (lack of communication/teamwork between departments or job functions) or "tunnel vision" (lack of empathy/vision for what others have to do), ServiceElements' facilitators find that most organizations struggle with the challenges of recognizing and being vigilant with their internal customer service (teamwork).

In our ORM (organizational resource management) programs, we discuss how none of us can do everything required from our jobs on our own every single day. All of us rely on our teammates at work to help us deliver the best service we possibly can deliver. We typically spend more time with coworkers than family members. So, conflicts and disagreements are expected. But the key is identifying out how to turn these conflicts and disagreements into opportunities to build strong teams (and hopefully infrequent) incidents rather than relationship issues. In addition, finding out how to be focused on our internal customers just as we are with our external customers.

Aviation professionals can be so focused on their own responsibilities and goals that **they miss the opportunity to provide service to team members to help achieve the ultimate goal** for the organization ... service, safe service.

Sometimes, internal customers can be like the Hen looking to coworkers for assistance. Other times, aviation professionals can be so focused on their own responsibilities and goals that they miss the opportunity to provide service to team members to help achieve the ultimate goal for the organization ... service, safe service. There have probably been times in each of our aviation careers where we attempted to participate in the success of another's work. But there have also inevitably been times when we were not an engaged part of our team and only focused on our own workload and not participating in the overall effort it takes to deliver on a business aircraft service goal.

BOB HOBBI is the founder, president, and CEO of ServiceElements International Inc. Bob has 30 plus years in aerospace and aviation leadership roles with FlightSafety International, Honeywell Aerospace's Aerospace Academy, and MedAire. ServiceElements is an organizational and people development company, now in the aerospace industry for almost 15 years. For more information visit www.ServiceElements.com.

Quite often, we don't even realize the effects of this unintended culture. Our lack of engaging in our "link in the chain" will eventually surface further down the road. That could mean disastrous results from our lack of awareness of internal customer needs because successful internal service has a direct correlation with successful external service. Today, more and more reports are focusing on drama as the key reason for loss of productivity. And drama is usually the result of an organizational culture which does not promote a service-minded, team-oriented entity. We are all familiar with this; we see and hear it every day. The occasions when coworkers point at others not doing enough. Or how so and so gets away with things and others don't and so on and so forth. We live in an era that people issues are the most predominant in our work.

That is why organizations like Maintenance Managers Conference (NBAA MMC held May 2 through May 5) are focusing on the people-oriented aspects of our industry. As an industry, we do have the obligation to be as technically proficient as we can be. This is a reality for our industry. However, more and more we are seeing the challenges in people interactions. It could be a simple situation like line maintenance becoming confused by simple inspection interpretation of how to document a job. Or a pilot simply not finding time to explain a squawk or even an eager to please boss doesn't hear his team about a maintenance issue in favor of looking good in front of the aircraft owner/user/customer. Or the shifts not passing on the important information to the next shift. These are all causes for drama which ultimately result in lack of confidence and job loss.

When we miss our chance to participate fully in the customer experience, we are "robbed" of the opportunity of gaining satisfaction in a job well done. This may affect coworkers' self-esteem, create drama, and possibly generate negative feelings within the workforce. It can also minimize the overall customer experience. Ultimately, the sooner we recognize that teamwork is a participatory sport, the sooner we control our own careers and destiny.

For more information about organizational cultures, or if you would like to schedule a service culture assessment, please contact us at ServiceElements, www.ServiceElements.com. **AMT**

NEW SMS CALLS FOR TRUSTED HUMAN FACTORS SOURCES

Proper SMS will quickly discover if there is a maintenance fatigue issue in an organization. By design, an SMS must identify such hazards, determine the corrective action, promote the action, and assess the impact.

By Dr. Bill Johnson

DR. WILLIAM B. JOHNSON is the FAA Chief Scientific and Technical Advisor for Human Factors in Aircraft Maintenance Systems. His comments are based on nearly 50 years of combined experience as a pilot/mechanic, an airline engineering and MRO consultant, a professor, and an FAA scientific executive.

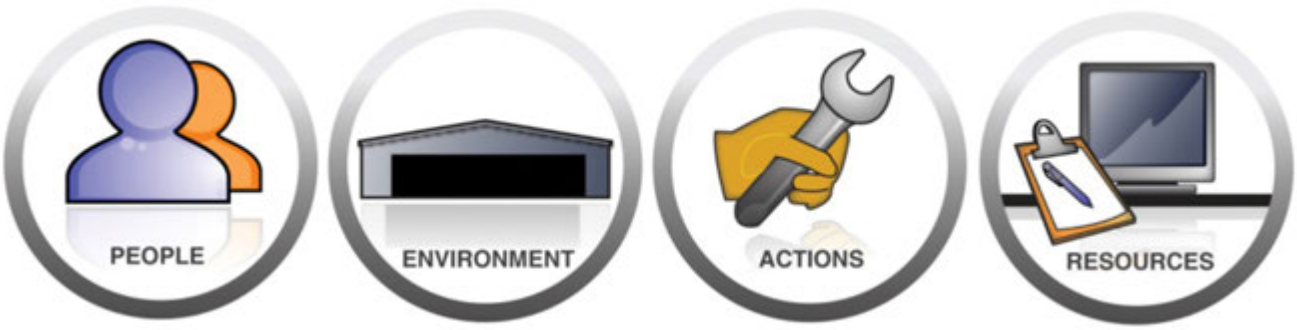
SAFETY MANAGEMENT SYSTEMS HAVE RAISED the awareness toward the human factors hazards in maintenance. Dr. Bill sees reports on the increased use of the trusted sources from FAA's Human Factors Website. He offers a few examples.

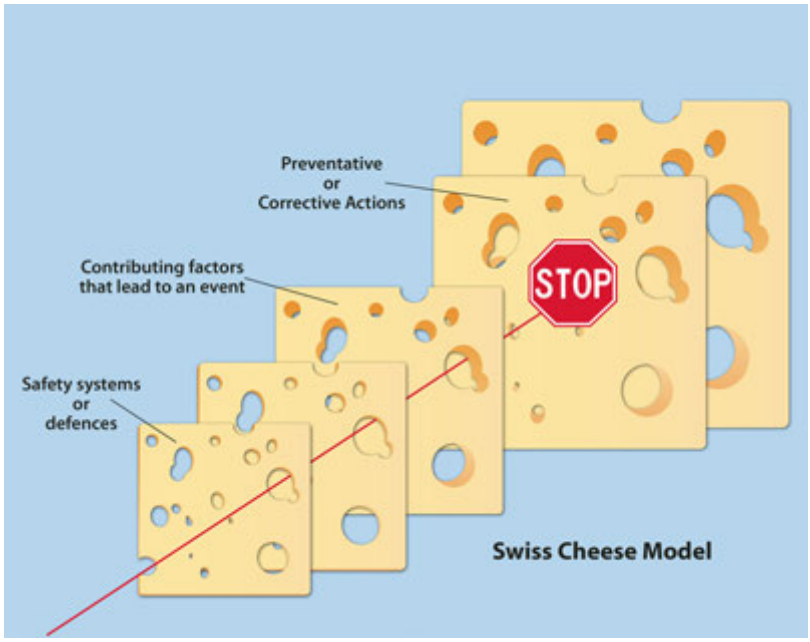
The regulations currently require that Part 121 operators have a safety management system well under way. That is clearly happening. The industry is embracing SMS for more reasons than mere regulatory compliance. I am noticing that the word "required" is hardly used when industry personnel talk about SMS. I see enthusiasm for the recognized value in a structured approach to spot trends and to recognize and address hazards before they cost money, injure a worker, or threaten the continuing safety of flight for airline operators.

The good news is that there is a large "trickle down" approach where Part 121 operators are asking their suppliers to establish and capitalize on a SMS. Of course, a supplier is not likely to have the same requirement for a large SMS that a 7/24/365 airline has. Each SMS is different and matched to organization needs. These organization-specific needs, in my opinion, have triggered a revised interest in maintenance human factors. I offer three examples here, which include how to categorize hazards, how to estimate return on investment, and best fatigue risk management methods and training. All of these topics are worth revisiting.

CATEGORIZING HUMAN FACTORS

Increased attention to safety management, data collection, voluntary reporting, and hazard management begs for organized categorization of hazards and errors. Over the years maintenance personnel have used the Swiss Cheese, SHELL, Bow Tie, and PEAR. Of course, I am partial to PEAR being the co-inventor and chief promoter of the concept for 20 plus years. PEAR, for review, stands for People, the Environment in which they work, the Actions workers perform, and the Resources necessary to perform the work. PEAR is the main human factors training paradigm for FAA inspector training as well as for CASA Australia HF training for engi-





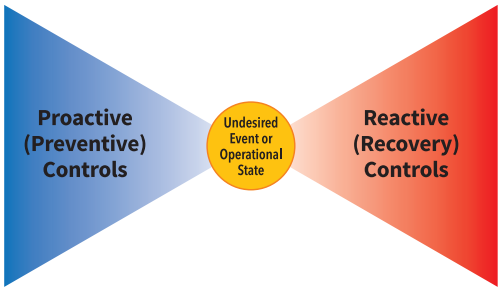


FIGURE 1. Four popular human factors models. FAA

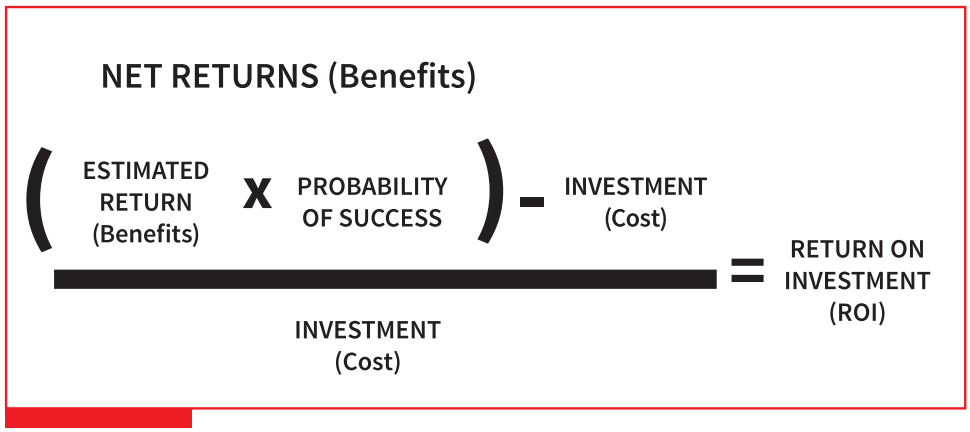


FIGURE 2. The FAA ROI Model. FAA

neers. Training support resources are available at www.humanfactorsinfo.com as well as at the CASA website. PEAR is significant because the categories can represent the holes of error in the cheese or the human resilience represented by the solid part of the cheese. PEAR overlaps with SHELL but is easier to understand. On the Bow Tie, PEAR is an ideal way to offer the proactive barriers that prevent the event of focus.

The purpose here is not to make you a PEAR expert but it is to insist that the concept is alive and well. If you want more detail then Google "Johnson PEAR Model."

JUSTIFYING YOUR HUMAN FACTORS INTERVENTIONS

Engineering/maintenance managers know where the most significant hazards are. Fostering the positive safety culture, using the technical publications, and ensuring fitness for duty are a few of the most common opportunities to address hazards. However, organizational-specific information, discovered by voluntary reports or SMS data will identify specific hazards, like aircraft ground movement, availability of specific tools/equipment, scheduling challenges, shift turnover communications, and more. Unlimited resources would permit organizations to address all hazards, but that's not the real world. For that reason organizations must apply risk assessment to look at the likelihood that the hazard may cause an error and what is the severity of such an outcome. But organizations must also determine the financial and safety impact of a hazard in order to prioritize which hazard reductions have the highest payoff. That's where the FAA Maintenance Human Factors Return on Investment tools can come in handy.

Figure 2 shows that one does not have to be an economic expert to calculate return on investment. In fact, it is more about understanding your hazards and the associated number of events (or potential events) that will result in an unmanaged hazard. SMS data can help assign costs if you are motivated to assign costs. The aviation maintenance expert will assign cost to the hazard intervention and predict the level of confidence in the estimation. The rest is multiplication and division. The tools and detailed directions are available in the tools section at www.humanfactorsinfo.com.

FATIGUE RISK ASSESSMENT

Many have seen me write or speak that SMS, regulated or not, is the best approach to fatigue management regulations in maintenance. Most authorities do not have strict rules for fatigue risk management. Even when there are national industrial fatigue rules they are usually trumped by a variety of stipulations that permit aviation maintenance personnel to work more consecutive days and longer hours than they should. Proper SMS will quickly discover if there is a maintenance fatigue issue in an organization. By design, an SMS must identify such hazards, determine the corrective action, promote the action, and assess the impact.

My recent experience suggests that industry is becoming increasingly aware of the hazards associated with worker fatigue. I believe that SMS programs have an impact on the awareness of worker fatigue hazards. The number of users on the two-hour FAA web-based training continues to grow (estimated at over 200k users in the past five years. (Course # ALC-258 available at www.faasafety.gov.) The video, titled "Grounded," is available as part of that training or accessible on YouTube.

DEMAND REMAINS HIGH FOR MAINTENANCE HUMAN FACTORS SUPPORT

Industry has stepped up to address the hazards associated with human factors challenges in maintenance. For the most part, they have done that without extensive regulations. The safety and business case speak louder than regulations. FAA intends to continue to support the maintenance human factors website and is open to all suggestions for additions to our website and associated resources. **AMT**

A BRONZE bust honoring the first aviation mechanic, Charles E. Taylor, is now on permanent display in the National Museum of the U.S. Air Force's Early Years Gallery.
U.S. AIR FORCE PHOTO BY KEN LAROCK

CHARLES E. TAYLOR: MY STORY

This article, written in 1948 while Taylor was living in retirement in California, was first published in *Collier's*, Dec. 25, 1948, and was reprinted in *Air Line Pilot*, December 1978. Taylor died Jan. 30, 1956, at the age of 88.

1911: CHARLES Taylor in the Wright workshop How many people work in their shop today in a bow tie? What a professional.

In celebration of AMT Day, May 24, the day Charles Taylor was born, we are providing an article of an interview Taylor had while living in retirement in California. We received the article from Charles Taylor II, his great grandson. You can find the article at www.aviationpros.com/12131479.

The story for aviation that began in Dayton, OH, continues today as David McCullough and Tom Hanks visit the locations that were important to the Wright brothers and the development of flight. McCullough's book "The Wright Brothers" is being made into a television miniseries that will be shown on HBO.

And in recognition of all mechanics that continue to provide safe flight we would like to say thank you. And would request that you send us brief descriptions and photos from your AMT Day celebrations. ***AMT***

THE VOICE OF AVIATION MAINTENANCE EDUCATION

The Aviation Technician Education Council (ATEC) hosted its 55th anniversary conference in Atlanta, GA, April 9-12

THE ATEC ANNUAL CONFERENCE is always a great place for educators to meet new people.

PHOTOS COURTESY OF RONALD DONNER

THE AVIATION TECHNICIAN EDUCATION COUNCIL (ATEC) recently hosted more than 150 aviation maintenance educators, vendors, and employers at its annual conference in Atlanta on April 9-12, 2016. Flying into the world's busiest airport made for the perfect setting given the culmination of a very busy year for ATEC.

The purpose of the ATEC annual conference is to provide professional development, networking, and strategizing opportunities for technician educators and industry, and to engage attendees on the big issues. Two themes resounded at this year's conference: workforce development and FAA rulemaking, namely the Part 147 notice of proposed rulemaking issued in October 2015.

As the lifeblood of our industry, it is important that technician educators are kept up to date on technological advances. The first two days of the ATEC annual conference therefore focused on professional development; invited speakers were experts in accident investigation, unmanned systems program development, avionics and electrical-bases systems, and certifications and solutions for in-flight connectivity.

▲ **CRYSTAL MAGUIRE,** ATEC's executive director and Ryan Goertzen, chief aviation and academic officer, Spartan College of Aeronautics and Technology, and current ATEC president, provide conference attendees with an update on the ATEC organization and initiatives.

◀ **EDUCATORS FROM** Tulsa Technology Center and Hallmark University catch up during a break between professional development sessions at the 2016 ATEC Conference.

Attendees were also treated to a tour of the Delta TechOps hangar where they got an up-close look at an airline technician's day-to-day, and engaged in frank conversation with training and hiring personnel. Year after year ATEC is the recipient of incredible industry support, Delta Air Lines in particular went above and beyond, sponsoring content throughout the program. We are certainly grateful to that organization and its contribution to this year's event.

Day three of the annual conference focused on more programmatic aspects including an update on council activities, briefings on FAA and Department of Education policy initiatives, and an overview of programs built to help narrow training gaps and better prepare students for careers in aviation maintenance.

A recurring theme throughout the day was the recent Part 147 notice of proposed rulemaking, the regulation governing aviation maintenance technician schools (AMTS). The new rule will be the biggest regulatory change AMTS have seen in 50 years. An FAA representative was therefore on hand to discuss the next steps in the rulemaking process and what industry might expect during implementation.

The conference concluded with insight from industry employers on efforts to hire and retain a highly skilled workforce. The challenge was clear: there are not enough qualified technicians available to satisfy industry demand. Representatives from Delta Air Lines, Lockheed Martin, and ExpressJet shared hiring plans and company strategies to meet growing demand. Several companies are facing

◂ **THE ATEC** Conference provides professional development sessions for aviation maintenance school instructors and administrators.

▲ **JOE MCDERMOTT** from Delta TechOps and Michael McDaniel from Express Jet Airlines discuss finding and retaining the maintenance talent needed in the airline industry.

daunting hiring needs; for example, Lockheed Martin is planning for 2,500 new employees over the next two years, and Express Jets mechanic recruits will increase 20 percent this year over last. These numbers illustrate the looming threat of a workforce shortage and encouraged dialogue on what we should all do individually to help create a steady stream of future personnel.

ATEC will do its part by ensuring aviation maintenance education provides the expertise needed to get the new Part 147 right. I am very proud of the work our regulatory team did to develop pragmatic comments to the proposed rule in February, and for efforts made to educate congressional leaders on the issue. To further that mission, this year ATEC will host its first industry-wide fly-in to sound the message: regulatory policy must support, not hinder, the aviation workforce. All are welcome, please consider joining us in Washington, D.C., on Sept. 8, 2016.

ATEC is extremely excited about what lies ahead. The annual conference is but one example of how the council furthers its service to the future aviation technician, and continued safety in flight. We hope you will join us next year, April 1-4, 2017 in Seattle. ***AMT***

RYAN GOERTZEN is the president of Spartan College of Aeronautics and Technology in Tulsa, OK. He was named president of the Aviation Technician Education Council in April 2014. To learn more about ATEC, visit www.atec-amt.org.

POWERING THE PISTON FLEET WITH A NEW KIND OF FUEL

The Piston Aviation Fuels Initiative (PAFI) is working to develop and deploy an unleaded fuel for piston airplanes to replace the 100 low-lead avgas currently used on 167,000 aircraft in the U.S. and a total of 230,000 aircraft around the world

IF ALL GOES ACCORDING TO PLAN, OPERATORS OF piston-engine aircraft will be putting a different kind of fuel in their tanks in the not-too-distant future.

That's because a joint industry-government effort — the Piston Aviation Fuels Initiative (PAFI) — is working to develop and deploy an unleaded fuel for piston airplanes to replace the 100 low-lead avgas currently used on 167,000 aircraft in the U.S. and a total of 230,000 aircraft around the world. GAMA serves on PAFI's Steering Group, along with the FAA, the Aircraft Owners and Pilots Association, the Experimental Aircraft Association, the National Air Transportation Association, and the National Business Aviation Association.

PETE BUNCE is president and CEO of the General Aviation Manufacturers Association (GAMA), which represents more than 85 of the world's leading manufacturers of general aviation airplanes and rotorcraft, engines, avionics, components, and related services. GAMA's members also operate repair stations, FBOs, pilot and maintenance training facilities and manage fleets of aircraft. For more info: www.gama.aero.

As a bit of background, avgas is currently the only form of transportation fuel that contains tetraethyl lead, which has historically been required to create the high-octane levels needed by high-performance aircraft engines. Piston-engine operations without adequate octane can result in engine failure. So as PAFI seeks to qualify the best fuels for use, it's evaluating the impact of a totally new unleaded fuel on the full scope of aircraft performance and systems capability — an impressive, and extensive, process.

In 2013, the FAA requested that fuel producers submit replacement fuel proposals for evaluation. Six companies responded with 17 fuel formulations, which the FAA then evaluated based on their impact on the existing fleet, their production and distribution infrastructure, their environmental and toxicological effects, and the anticipated cost of aircraft operations. After this careful review process, just four fuels were selected for further rigorous Phase I testing.

Shell and Swift Fuels have been chosen by the FAA to produce the new fuel..

The Phase I laboratory and rig testing looked at fuel properties and determined compatibility with aircraft materials and components. Following this testing, the FAA announced this March that it had winnowed the list further, from four to two fuels. Those two fuels, produced by Shell and Swift Fuels, will soon undergo full-scale Phase II testing in engines and aircraft, which is expected to wrap up in 2018. This testing will be critical in determining how to minimize the effect of a transition on all aspects of the existing fleet, including aircraft and operations.

If the testing goes well, the FAA will then issue a fleet-wide authorization for general aviation aircraft to use the fuels and support the development of an ASTM International Production Specification for commercialization of the avgas. This specification will allow the fuels to be accepted in the marketplace, which will determine the next steps in terms of when and where fuel is available.

While there are a lot of steps in the avgas transition, the FAA deserves our thanks for keeping the PAFI program on schedule. So does the U.S. Congress, especially the House and Senate Appropriations Committees, which all recognized the importance of this transition. Congress approved $7 million in funding in fiscal year (FY) 2016 for PAFI, and GAMA has made it a priority to request additional unleaded avgas funding for FY 2017.

As we make this important transition to unleaded avgas, GAMA and other members of the PAFI Steering Group will continue working hard to ensure the new unleaded avgas allows the existing fleet to operate safely and reduce general aviation's impact on the environment. **AMT**

WHAT IS A **BROKER OF RECORD** (BOR) LETTER?

The BOR letter suspends your current broker's ability to negotiate on your behalf with the insurance company and terminates the business relationship between you and your current agent/broker

INSURANCE COMPANIES RELY ON INSURANCE brokers to supply applications/clients for evaluation and quoting. Since there are a relatively small number of aviation insurance companies, each with limited staff, there is no time to quote the same account to numerous brokers. To maximize efficiency, each company will recognize only one broker per account — this is done on a first-come, first-serve basis.

The first broker to submit an application to the underwriter will become the broker of record. The underwriter will assume that the first broker to submit the application was the client's first choice. Any brokers who submit an application after that will not be able to obtain a quote. A client can select whichever broker they would like to work with the underwriters on their behalf. If one chooses to change brokers, they must execute a broker of record letter.

The broker of record letter is a serious document that accomplishes the following:

- Suspends the current broker's ability to negotiate on your behalf with the insurance company.
- Terminates the business relationship between you and your current agent/broker.
- Confirms the appointment of a new broker, giving that broker the sole ability to negotiate with the insurance underwriters for you.
- Provides access to any underwriting information, proposals, policy information, or other information related to your insurance account.

WHEN SHOULD I SIGN A BROKER OF RECORD LETTER?

- You are simply unhappy with the quality of service or performance of your current agent/broker.
- The new broker has more experience in your class of business, aviation knowledge and expertise, or a higher degree of technical insurance knowledge specific to your business.
- You would like to assign brokers specific underwriters to work with and obtain quotes.

WHAT HAPPENS WHEN I SIGN A BROKER OF RECORD LETTER?

- The "new" broker will send the signed BOR to the insurance companies.
- The insurance company will then notify your current broker by sending a copy of the signed BOR letter confirming the change.
- The insurance company will allow your current broker five days to obtain a reversing BOR letter. This is known as a "rescinding period."
- Your current broker may call you to discuss why you are making a broker change.

Many times the "fired" broker tells underwriters not to release any information, and will force the customer to wait the entire five days. They have no intention or ability to obtain a reversing BOR, but want to delay the process as long as they can. This "sour grapes" attitude is unprofessional, and only serves to punish the customer. A simple explanation to your previous broker clearly explaining the reasons for the change usually ensures a smooth and seamless change.

You should sign a BOR when you are unhappy with the **quality of service or performance of your current agent/broker.**

BUYER BEWARE!

Be certain you clearly understand the full effects of signing a broker of record letter. It is very important that you select a knowledgeable, competent aviation insurance broker who is contracted with 100 percent of the aviation insurance underwriters available, and provides you with a complete summary of all the quotes received. This level of service is what you should expect from any broker you select. Your CFO will thank you. **AMT**

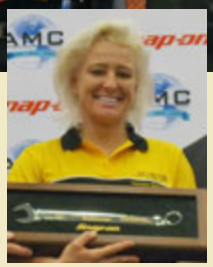
STEVE BRUSS is president of Wings Insurance, an independent aviation insurance broker headquartered in Minneapolis, MN. He has 22 years' experience in aviation insurance, and is also a licensed Commercial pilot and flight instructor. He can be reached at sbruss@wingsinsurance.com or by calling (952) 641-3140; www.wingsinsurance.aero.

2016 AEROSPACE MAINTENANCE COMPETITION

ALASKA AIRLINES' TEAM SEATTLE BESTED 50 OTHER TEAMS from around the globe to capture the prestigious Snap-on sponsored William F. "Bill" O'Brien Award for Excellence in Aircraft Maintenance, held during the Aerospace Maintenance Competition, April 5-6, at the MRO Americas Convention in Dallas.

The William O'Brien Award for Excellence in Aircraft Maintenance, presented by Snap-on, is the grand prize for the team with the overall winning score from the Aerospace Maintenance Competition. The 4-foot tall trophy will be on display at Alaska Airlines' maintenance facility for the next 12 months. The trophy, which features a bust of Charles E. Taylor, will return to the Aerospace Maintenance Competition next year at the MRO Americas Convention in Orlando and will be available for next year's winner.

ALASKA AIRLINES won the Bill O'Brien Award for Excellence in Aircraft Maintenance for 2016. L-R: Tom Murray, director, marketing and business development, Snap-on Industrial; Brandon Statfield, Alaska Airlines; Marvin Hitt, Alaska Airlines; Vishal Prasad, Alaska Airlines; Mike Flowers, Alaska Airlines; TJ Spring, Alaska Airlines; and John Goglia, president, Aerospace Maintenance Council.



CHARLES E. TAYLOR PROFESSIONAL AMT AWARD: Dallas McLeod/ Team Apache

PHOTOS COURTESY OF SNAP-ON INDUSTRIAL

CHARLES E. TAYLOR PROFESSIONAL AMT AWARD (STUDENT): Gina Gottfredson-Kelly, Salt Lake Community College

GENERAL AVIATION CATEGORY: 1st Place: Flight Options

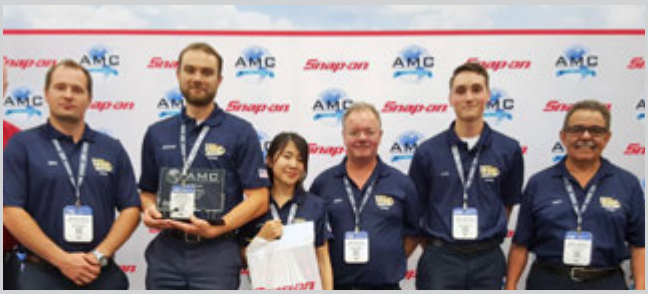
INTERNATIONAL COMMERCIAL AVIATION CATEGORY: 1st Place: China Southern Airlines (Pictured), 2nd Place Place: Embraer Team Legacy; 3rd Place: ALAEA (Australian Licensed Aircraft Engineers Association)

COMMERCIAL AVIATION CATEGORY: 1st Place: Alaska Airlines Team Seattle, 2nd Place: Southwest Airlines, 3rd Place: China Southern Airlines

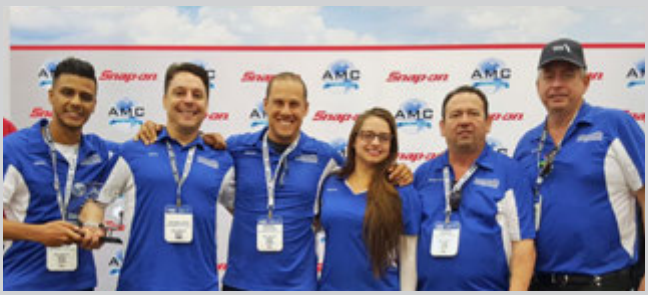
SPACE CATEGORY: 1st Place: Virgin Galactic

MILITARY CATEGORY: 1st Place: United States Air Force/ McChord Air Force Base

SCHOOL CATEGORY: 1st Place: Utah State University



SCHOOL CATEGORY: 2nd Place: West LA College



SCHOOL CATEGORY: 3rd Place: Broward College

MRO/OEM CATEGORY: 1st Place: FedEx Indianapolis

MRO/OEM CATEGORY: 2nd Place: FedEx LAX

MRO/OEM CATEGORY: 3rd Place: Embraer Team Legacy

The Aerospace Maintenance Competition gives teams of licensed AMTs, AMEs, international military personnel and qualified aviation maintenance students the chance to test their aviation maintenance skills against those of their peers. The competition included 24 challenges in areas such as avionics, safety wiring, fiber optics/flight control rigging, hydraulics, jet engine troubleshooting, workplace safety SMS and other tasks. Teams had 15 minutes to accurately complete each task; teams that finished their tasks in less than the allotted time received higher scores.

MILITARY CATEGORY: 2nd Place: United States Army

MILITARY CATEGORY: 3rd Place: United States Navy

WHITMAN RECEIVES MÉDAILLE DE L'AÉRONAUTIQUE

Bruce Whitman, FlightSafety International chairman, president, and CEO, has received the Médaille de l'Aéronautique from France. The medal was presented in April.

FlightSafety established the Center D'Instruction Falcon in 1975 as a joint venture with Avions, Marcel Dassault-Breguet Aviation, manufacturer of the Falcon Jet, and opened a Learning Center in Vélizy-Villacoublay, France, in 1976. The center was relocated to the Paris-Le Bourget airport in 1987 and now provides training to more than 2,500 pilots and maintenance technicians each year.

DELTA AND BOMBARDIER SIGN ORDER FOR 125 AIRCRAFT

Bombardier Commercial Aircraft and Delta Air Lines Inc. have executed an agreement for the sale and purchase of 75 CS100 aircraft with options for an additional 50 CS100 aircraft. Delta Air Lines may elect to convert a number of these aircraft into CS300 at a later date.

With this order, the largest in Bombardier Commercial Aircraft history, Delta becomes the C Series aircraft's largest customer. Deliveries are scheduled for spring 2018.

EMBRAER FORECASTS DEMAND FOR 240 NEW JETS IN AFRICA

Embraer forecasts that Africa will take delivery of 240 new jets in the 70- to 130-seat segment over the next 20 years. The 70- to 130-seat jet fleet in service is estimated to grow from the current 120 units to 260 by 2034. According to its study, there are still ample connectivity opportunities within the African region although traffic remains concentrated in the largest cities.

PHILLIPS 66 AVIATION EXPANDS PARTNERS-INTO-FUEL

Phillips 66 Aviation has expanded its contract fuel program, Partners-Into-Plane, to allow corporate and charter flight operators (Part 91 and 135) to participate. The program is in its 40th year offering contract fuel, making it the longest active contract fuel program offered by any U.S. refinery. The program doesn't require fuel releases or contract fuel cards for processing, which streamlines the process, allowing flights to be ready for takeoff faster.

AVIONICS PROGRAM OFFERED

Airline Ground Schools Div. of Flamingo Air unveils its avionics program. The program, which is fully accredited by NCATT and ASTM, is an online system that reduces the on-campus time necessary to earn the AET certificate. Using the Airline Ground Schools' program of distance learning, combined with traditional classroom training, an Aircraft Electronics Technician certificate can be earned in a matter of weeks, not semesters. For more information visit www.flamingoair.net.

AEA NAMES 2016 AWARD WINNERS

At the 59th annual Aircraft Electronics Association International Convention & Trade Show in Kissimmee (Orlando), FL, Jeanne Rau-Flattery of Millennium International, Lee's Summit, MO, was named the 2016 AEA Member of the Year, while Gogo Business Aviation was honored as the AEA Associate Member of the Year. Robert Duncan was presented with the AEA Lifetime Achievement Award.

TEXTRON AVIATION EXPANDS IN GERMANY

Textron Aviation opens a European line maintenance station in Bremen, Germany, further enhancing its service offerings for Citation, King Air, and Hawker operators in Germany and throughout Europe. With the addition of the Bremen site, Textron Aviation operates six line maintenance facilities across Europe.

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EDUCATION & TRAINING

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NEVER STOP LEARNING

No matter how talented a person is in mending what is broke, they cannot fulfill their responsibilities without understanding the regulations. The stakes are too high for ignorance.

EVERY YEAR I HAVE THE PLEASURE OF TEACHING inspector authorization renewal courses on regulatory compliance topics. This annual ritual has helped me establish some broad opinions about the aviation maintenance industry and the talented individuals supporting the wide variety of fantastic flying machines.

The United States does not show its appreciation for people with innate technical capability. "Blue-collar" businesses and jobs are undervalued except when an essential function is lacking and a replacement is immediately required. Most aviation technicians are not in their youth; many have labored their entire lives to ensure their children do not have to "work with their hands." The next generation is not being encouraged to follow their talent, they are expected to enter professions with higher monetary returns than aviation maintenance. Thus, native technical aptitude is being lost to other industries — many of which do not have as many opportunities to learn and grow.

The men and women I teach have instinctual talent for restoring or improving functionality in complex equipment and systems, they don't necessarily have an equal capacity for following rules. Heck, many technicians have learned about aviation safety requirements from a fellow worker not from actually reading the regulations and guidance material. Thus, many do not understand the extent of their power or responsibility. The tendency to "believe" that a regulation requires "thus and so" rather than to read the exact words is strong. Unfortunately, that inclination creates misconceptions and potential violations.

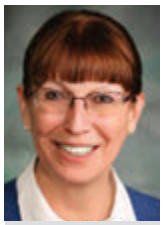
Regulations are written with two basic philosophies. The first is called performance-based: The language of such rules is written in broad terms that allow numerous methods of achieving a definable end. Compliance is judged in line with the old adage, "the proof of the pudding is in the eating." For example, the performance rules in section 43.13 require the work to be performed using methods, techniques, and practices that return an article to at least its original or properly altered condition. Read carefully, each sentence of the first two paragraphs of this rule requires a maintenance provider (including individual mechanics or technicians) to know what s/he is doing, the tools and equipment used in the accomplishment, and the result of the actions taken. That "freedom" carries responsibility — you can neither blindly follow a manual nor can you deviate from a manufacturer's instruction, without knowing the consequences.

Alternatively, prescriptive rules are written with specific compliance requirements, leaving little or no room for "doing it another way." An example is section 43.16, which requires a maintenance provider to follow the manufacturers' airworthiness limitation requirements (or the approved operations specifications of the operator). If someone wished to perform a mandated airworthiness inspection in another manner than delineated in the manufacturer's manual, an approval from the FAA would be required. No wiggle room (even if the manual is obviously incorrect).

You can **neither blindly follow a manual nor can you deviate** from a manufacturer's instruction, without knowing the consequences.

My talent is communicating the difference between and among the regulations and how business must be conducted — the ability to bridge the gap between regulation and reality. I have devoted so much time to regulatory compliance training because of my desire and need to impart information on aviation safety requirements to the individuals with innate and valuable talents in fixing fantastic flying machines. No matter how talented a person is in mending what is broke, they cannot fulfill their responsibilities without understanding the regulations. The stakes are too high for ignorance: Some violations can result in a permanent ban from working in aviation.

Every aviation technician — young or old, first day or nearing retirement — must spend at least eight hours a year in regulatory compliance training. It is the only method of ensuring a continuing career while (more importantly) protecting the safety of the flying public: read the rules, keep current on advisory materials — don't ever stop learning. **AMT**



SARAH MACLEOD is managing member of Obadal, Filler, MacLeod & Klein, P.L.C. and a founder and executive director of the Aeronautical Repair Station Association. She has advocated for individuals and companies on international aviation safety law, policy and compliance issues for 30 years.

"I recently worked with Elliott Aviation on a Citation interior project and had an excellent experience. I had heard they had an excellent maintenance shop but I was skeptical about their Challenger 300 experience. I took the time during my Citation work scope to get to know Greg Feuerbach and Andrew Nicewanner, who both have exceptional Challenger 300 experience. I awarded them my 96 month inspection and the planning, communication and quality of workmanship was excellent. The aircraft was delivered on time, squawk free and was one of the most painless major inspections I ever had on my aircraft."

MIKE VICTOR
DIRECTOR OF MAINTENANCE
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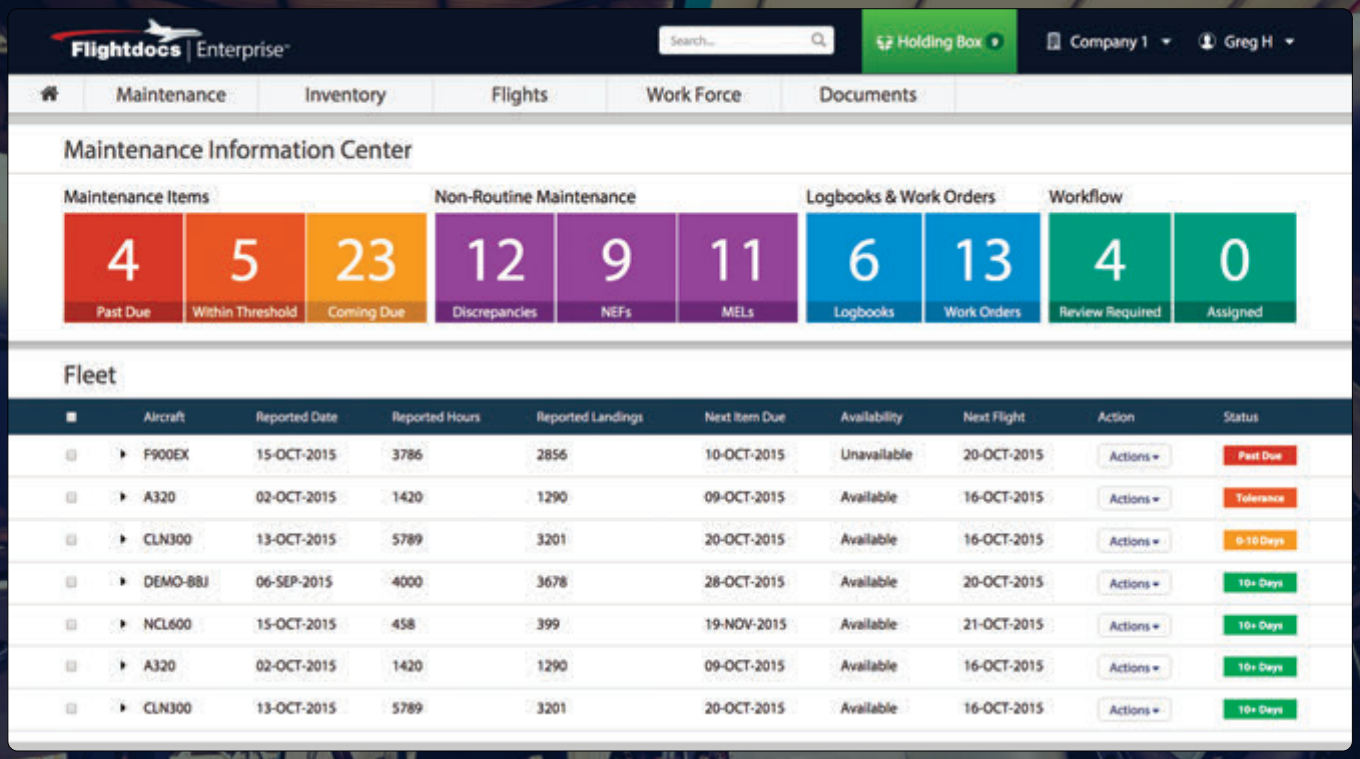

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