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OCTOBER 2017

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TEXTRON AVIATION

ABOVE: TEXTRON Aviation Düsseldorf Maintenance Manager Dirk Oberlander describes the maintenance organization to Ron Donner AMT Chief Editor.
MARINO BORIC

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BUSINESS AVIATION

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FAA FLIGHT STANDARDS SERVICE REALIGNMENT

Will the new functional structure really result in greater operational agility, efficiency, and effectiveness for the agency and its customers?

I just finished reading John Duncan's article on page 48 in this month's issue of *Aircraft Maintenance Technology* regarding the recent "Realignment" of the FAA Flight Standards organization. Duncan is the executive director of FAA Flight Standards Service. I, like many of you, might ask the same question; will this result in a *better* FAA experience for me?

Reading the article, as well as some of the information on www.faa.gov mentioned in the article, I paused to reflect on my personal experience with the FAA. I realize I have likely not had near the amount of interaction with FAA as many of our readers. However, I have had a fair amount over the past four decades in both my general aviation activities and airline career; 15 years of which were in a quality assurance and FAA liaison role with a major airline. As chief editor of *AMT* Magazine, I speak with FAA officials probably weekly.

I've worked with both new and senior inspectors during my career. I've been in meetings with local FAA office managers and Washington, D.C., headquarters managers. My experiences have been mainly good ones. Yes, there were those times we didn't agree on a particular issue but those were the exception.

Now, I'm sure there are many people that will differ with me on what I just said, and many people have probably experienced their share of controversy and maybe even felt unfairly treated. I won't deny that happens. There are always a few bad apples in any group and I believe those actions are not representative of the entire organization.

Now it's up to us in industry to understand this new functional organization, read the information provided and intended to make us more aware, talk to our local inspectors about any planned changes, and work with our regulators as best we can so we can continue on the path of having the safest aviation system in the world.

Will the realignment of Flight Standards result in a *better* FAA experience? I guess that's up to each one of us to answer.

Ron

AMT AIRCRAFT MAINTENANCE TECHNOLOGY

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RED WING AEROPLANE IS MORE THAN A SMALL TOWN TENANT

What began as a general aviation maintenance shop turned high-end jet charter operator, this family operated small town business looks to return to its roots and more.

By Ronald Donner

LOCATED ON THE BANKS OF THE MISSISSIPPI RIVER a short distance southeast of the Minneapolis/St. Paul metropolitan area is the Red Wing Regional Airport. Owned and operated by the city of Red Wing, MN, just across the river (Red Wing Airport is actually in Bay City, WI) one of the tenants of this small town airport is the thriving private jet charter company Red Wing Aeroplane.

RED WING Aeroplane's maintenance hangar with two of the company's Cessna Citations undergoing maintenance.
RONALD DONNER

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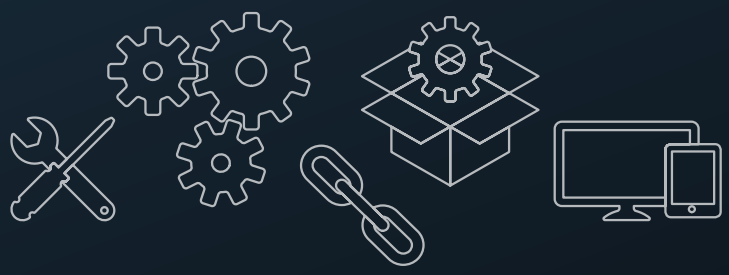

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OVER THE past three years a new set of buildings have been built capable of housing functions of the current operation as well as for growth.
RONALD DONNER

IN THE BEGINNING

The roots of this company were not providing high-end jet charter for the rich and famous. In July 1990 father and son team Bob and Wes Converse started the company as an FAA certified repair station providing a variety of maintenance services for general aviation customers. The early years were primarily focused toward maintenance on piston engine airplanes and related accessories. Bob had his start in airline maintenance and Wes in military aircraft maintenance then the airlines. Wes eventually went on to fly for a cargo airline for a while but maintained an active part of the company.

In 2004 the company entered into the Part 135 jet charter business with one Cessna Citation. Now the Vice President of Flight Operations Wes Converse says, "As the company grew into a robust charter operation, the maintenance activity shifted away from supporting general aviation maintenance customers in order for us to support our growing fleet of Cessna Citations."

TODAY'S OPERATION

Today, Red Wing Aeroplanes operates 13 Cessna Citations throughout North America, South America, the Caribbean, and the Bahamas. The company has 80 employees with 20 pilot bases; half of these 80 employees are in the Red Wing area – a really nice economic contributor to any small Midwest town.

Chris Converse, the company CFO and son of Wes, says, "The charter model we use is a *floating fleet model* rather than an *out and back* operation. Airplanes are not based in Red Wing or really any specific location but operate wherever they are needed. We pick up trips point to point." The first half of 2017 the Red Wing Aeroplane fleet has flown approximately 2,532 flights which included charter, ferry, and dead-head legs, and over 5,000 hours. The charter operation is also ARG/US Gold and Wyvern PASS Ready.

Due to the expansion, over the past three years they have built a new set of buildings capable of housing functions of the current operation as well as planned future growth.

Interestingly, they have done very little charter flights from Red Wing since the beginning and some limited flights out of the nearby Twin Cities.

THE MAINTENANCE ORGANIZATION

Todd Newton, director of maintenance, says, "All of the aircraft are scheduled back into Red Wing about once per month for routine maintenance and they come back to Red Wing for all phase checks and any in-depth maintenance requirements. The only maintenance we don't do ourselves is primarily the engine overhauls and of course some of the unscheduled items that surface while aircraft are out in the system flying."

Newton goes on to talk about the company growth and says, "When I started with the company there were five technicians and now we have 15 and

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LEFT TO right is Tim Gilmore, stock room manager, and Todd Newton, director of maintenance.
RONALD DONNER

everyone works a schedule of four 10-hour days for seven-day-per-week coverage. As you can imagine the maintenance organization keeps very busy.

Newton says the technicians appreciate the variety and describes how the crew can build up wheels and brakes, do an RVSM check, work on a phase inspection, engine change, or compass swing. The majority of the work is scheduled and there are not many distractions that come with drop-in work.

Both Newton and Converse feel fortunate they don't experience some of the same employee recruitment and retention challenges felt by many in the industry these days, owing to its location, and from what I observed a really nice working environment.

TOMORROW'S ORGANIZATION

Wes says, "Now we are kind of going back to our roots with maintenance. After a decade of performing Cessna Citation maintenance on our fleet, we have a high level of experience on this series of aircraft. We have accumulated a large amount of tooling and specialized equipment, parts and materials, and most importantly knowledge on the Citation."

Wes was clear they are not giving up on the light-jet charter and shared that they built their brand on reliability and customer service and now want to expand that back into general aviation maintenance customers like they did in the beginning.

Newton says of doing more outside customer maintenance, "We've got the manpower, we've got the tooling, we've got the experience, so now we are in a position to utilize this knowledge and support other Citation owners not just our own fleet. In the past two years we have done several Citation phase inspections for outside customers and we intend to do more."

In May of 2016, Red Wing Aeroplane became an authorized Mooney Aircraft Service Center. They feel that Mooney maintenance is small but growing and a nice fit for them. They have about 20 Mooney customers already.

They also have a wide assortment of tooling for the typical general aviation aircraft and are able to offer aircraft weighing, dynamic prop balancing, pitot-static transponder checks, and they are an authorized installation center for Ice-Shield pneumatic deice boots.

They concluded the work is there and the time is right so they just need to go back out into the market and tell owners and operators.

Another new piece of business is a Citation simulator. The company has purchased a full flight Level D simulator and plans to bring all pilot training in-house. Part of the facility expansion will be a dedicated simulator area and the installation will begin soon. Eventually, they plan to become Part 142 certificated and offer simulator training to other operators.

Most of the maintenance training is done right at the company. They rely heavily on good old on-the-job-training, are in the process of developing a new internal Citation maintenance training program, and plan to use the new simulator for run-up, taxi, and systems training for the technicians. Newton wants to start an internship program with one of the area's Part 147 maintenance schools.

When asked what accomplishments they are most proud of, Wes commented, "It's a good place to work and we get a lot of work done." When asked about the future he concluded they are looking at larger aircraft.

Wes still rolls up his sleeves and helps in the shop whenever needed. He commented that he's held all but one position in the company and started as an A&P on the floor.

I should note that all but one person in the immediate Converse family works at Red Wing Aeroplane. Bob officially retired recently at the age of 87 but we all know you can't always keep old aviators away from what they love. ***AMT***

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BOEING GLOBAL SERVICES CASTS WIDE NET

By Jerome Greer Chandler

BOEING GLOBAL Services employees Michael Gutierrez (left) and Robert Zoricic perform maintenance, repair, and overhaul to ensure the global C-17 Globemaster III fleet is always ready and evolving through continuous technology upgrades, including using data analytics to optimize predictive maintenance capabilities and minimize unscheduled maintenance. Boeing is the original equipment manufacturer for the C-17, and has provided sustainment to the fleet since delivery of the first aircraft in 1993.
THE BOEING COMPANY

NEWLY MINTED BOEING GLOBAL SERVICES (BGS) is casting a wide net in quest of US$50 billion in annual revenues. The issues for the aerospace industry are the reach of that net, and just how finely woven it is.

Stan Deal, BGS's president and CEO, has some answers. First off he contends this is much more than a counter-cyclical play by Boeing, to cushion the impact of future slow times in its commercial and defense aircraft manufacture.

"There's an element of that," accedes Deal. But he asserts the underlying rationale for launch of BGS is that the services arena overall has been largely underserved by Boeing.

Consider, "We produce a little over half of the commercial aircraft around the world, yet we're only about 7 percent commercially in [the] services market segment," says Deal. "On the defense side, we roughly produce about half the Free World's defense products," yet Boeing provides a scant 9 percent of the services attendant to that key sector.

Looking ahead to the second century of its existence, Boeing sought to see where it could position itself for growth. Services seemed "like a big opportunity," says Deal. Indeed, $50 billion in yearly revenues from assorted services is a very big deal indeed.

"We've done our homework," he says. "Certainly it's a doable aspiration … I'm driving the team inside Boeing to [work] more towards the five- than the 10-year" timeframe to hit the US$50 billion target. Boeing estimates the aggregate commercial and services market over the next 10 years at $US2.6 trillion

Evidence of BGS's new stature is that it's now categorized within the company as Boeing's "third major business unit" according to a prepared release, "operating alongside Commercial

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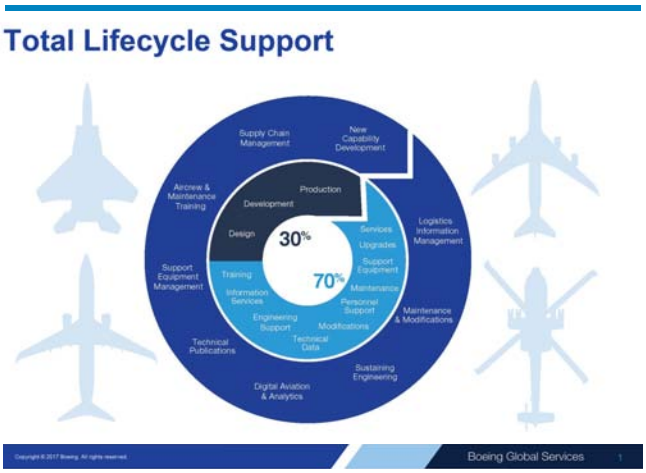


Airplanes as well as Defense, Space & Security."

Headquartered in suburban Dallas, this new business unit will focus on four broad areas:

- Supply chain;
- Engineering, modifications, and maintenance;
- Digital aviation and analytics;
- Training & professional services.

Growth will come organically and acquisitionally. Innovation will be the key, says Deal. "First, we're going to look at organic growth as our No. 1 priority. Our focus has been ramping up innovation … around services."

Even before BGS was officially launched as a co-equal business unit it got a bit of a head start on revving up innovation initiatives. "Last year we produced 17 new innovative services to take to market," says Deal, "all centered on trying to bring value to an airline or government."

He says the aim is to scale up incubation of new services so as to produce some 100 of them per year. Despite the disparate nature of those services, Deal says they all have a couple of things in common: "increasing utilization of the airplane, or lowering the cost to operate the airplane. That's where we think the added value is … But I will continue to look at niche plays that continue to expand organically. Those aren't off the table."

Case-in-point: the 2015 purchase of Peters Software GmbH, a provider of European Aviation Safety Agency (EASA) based content for ab-initio pilot training. Boeing's own Pilot and Technician Outlook says airlines are going to require some 558,000 new pilots over the next 20 years.

Peters Software is part of Boeing's "track record of making acquisitions," says Deal, especially where the cockpit is concerned. In 2000 it bought Jeppesen, which recently introduced FlightDeck Pro 3.0/9.0. "The third generation of software" brought navigation, manuals, weather updates trip planning and maintenance management records into "a more integrated format." Deal believes the resultant Electronic Flight Bag (EFB) "takes that integration to a supercharged level."

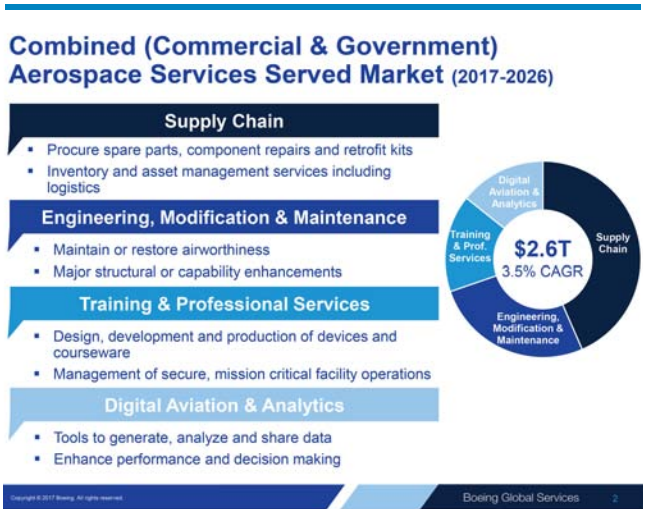
Understanding where BGS is going to derive that hoped-for US$50 billion per year means understanding the term 'services' takes in a lot of territory.

BGS is into crew scheduling too, specifically via a crew disruption management application. Deal says it tackles the challenge of "how you get the crew schedule re-optimized to re-start fast, safe and compliant with FAA rules and work rules negotiated with the labor force within an airline."

It's the sort of app whose reason-for-being is ripped right from the headlines of recent air carrier history.

MRO INITIATIVES

More in keeping with traditional definition of 'services' is Boeing's announcement that it's partnering with China's Taikoo (Shandong) Aircraft Engineering Co. Ltd. in an ambitious Boeing 737-800 passenger-to-freighter conversion program. STAECO joins Boeing Shanghai Aviation Services in the effort.



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BOEING SHANGHAI Aviation Services inducted its first 737-800 Boeing Converted Freighter in June 2017. THE BOEING COMPANY

"It's a large set of capabilities that we have out there," says Deal. "Our innovations continue to repurpose our airplanes and other people's airplanes … to extend their life."

BGS is moving "off platform," not confining itself solely to Boeing products. "We've modified C-130s. We've modified A-10s and re-winged them."

In yet another niche, Boeing and Taiwan-based China Airlines have inked a memorandum of understanding to "explore the development of the airline's capabilities to serve the growing maintenance, repair, and overhaul market in Asia." Boeing says it intends to work closely with the carrier to qualify it as an approved Boeing supplier. That will allow China Airlines to bid for work on Boeing products.

In the increasingly important logistics arena BGS is the United States Air Force's performance-based logistics provider. In taking care of the company product Deal says BGS "does total life-cycle planning for that asset."

BGS's ever-widening net also includes taking care of Airbus aircraft — at least to a degree. "We're distributing parts today around the world," says Deal. Bombardier and Embraer parts too, all of this through its Aviall subsidiary. One of the latest initiatives is a distribution agreement with GE Aviation to supply spare parts to support F110-100 and F110-129 engines which power the F-16 fighter.

Deal says he sees even more opportunities, specifically in parts maintenance programs, "where we provide fixed-fee per flight hour [on] rotable components … not only on Boeing, but Airbus airplanes." One reason for the Airbus connection, he says, is that "Airlines are running an integrated fleet. They prefer to [work with] one [company] vs. two, three, or four."

CAVEAT

The sweep of Boeing Global Services' mandate is just short of breathtaking, with few aerospace precincts left unaffected. "This is where it gets tricky," contends Jonathan Berger, managing director of Alton Aviation Consultancy. For example, if growth comes from parts, the component OEMs, which supply Boeing could become Boeing competitors. "That's always the dynamic of this," says Berger. "You're now in the business of competing with your customers, your suppliers. And that's a very tricky dance."

Tricky, perhaps. But also downright "exhilarating," says Deal. "This has largely been a market that is very fragmented, underserved."

Data from Alton Aviation Consultancy shows aircraft OEMs rely heavily on manufacturing revenue, deriving 90 percent of their revenue from building airplanes, and only 10 percent from aftermarket MRO services. By contrast, component OEMs get 60 percent of their revenue from manufacturing and 40 percent from aftermarket MRO services. The engine OEMs get a surprising 45 percent of their revenue from building powerplants and a fulsome 55 percent from aftermarket MRO activities.

Looked at that way you can understand why Deal says services — at least from airframers — is underserved.

Boeing Global Services presents a chance, as he sees it, to bring better consistency, and value to Boeing's customers — commercial or defense.

"That's the excitement of this job," says Stan Deal. **AMT**

AIRCRAFT MAINTENANCE ISN'T JUST OLD SCHOOL

Traditional policies and practices are a must for aircraft technicians but so are sharing knowledge, using sophisticated diagnostic equipment, analytic thought processes, and common sense coupled with trust in our colleagues

By Jim Sparks

Having entered the aviation maintenance profession in the 1970s my upbringing was mostly in the hands of members of the "Greatest Generation" whose capabilities, knowledge, and wisdom enabled, empowered, and motivated newcomers in the field to carry on their mission. As I recall back then regulations were written in a way that a reasonable person could interpret the intent without a coven of lawyers. The "Aircraft Mechanic's Creed" was written in 1941 by Jerome Lederer and was initially published by the Flight Safety Foundation in May 1953. In spite of technological evolution it is a timeless creation. I was exposed to this document early in my career and have kept it near ever since (pdf version available at FAASafety.gov).

One of the many lessons learned not only in the aviation profession but in life in general is that change is certain and nothing stays the same for long. Change is not necessarily a bad thing as long as the implementation is for understandable reasons. Many employed in the aviation technical field possess an analytical thought process which lends itself to the ability to solve complex problems quickly by adapting a methodical approach to exploring all the associated elements. Unfortunately, if there is no perceived problem, changing a process or procedure can create disruptions both in productivity as well as work force moral.

SOLID CAREER PATH

Globally aviation is on an up-swing with industry forecasts from both Airbus and Boeing predicting the worldwide fleet of aircraft will close to double by the year 2030 and the need for qualified technicians will increase exponentially. Many of us have experienced cycles in our business over the years where effects associated with merger, acquisition, outsourcing, downsizing, and rapid uncontrolled growth have all taken their toll or in some cases provided significant reward to those capable of adapting or resilient enough to withstand the change. Many industry outsiders often perceive that our profession may not provide a stable and secure career path.

Having had the opportunity to deliver "Career Day" presentations I was alarmed to learn many high school guidance counselors consider aviation maintenance a declining career field and seldom recommend it to their students. I am pleased to say

There will always be a need for those with a keen eye and ability to pay attention to detail along with the craftsmen capable of implementing complex repairs ...

that after the last such presentation all the students in attendance were allowed to get in line in front of the four presenters including: accountant, doctor, health care professional, and myself to ask one or two questions, my line was over two times longer than anyone else's. This may be attributed to the fact I included a picture of Taylor Swift's aircraft. The guidance counselors also cornered me once the program concluded and were amazed at how our occupation has evolved and the new opportunities that have been created.

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Just what has prompted the renaissance in our profession? It has been known for many years that regulations globally dictating the "Need to Know" of aviation technicians were at best antiquated. Yes, in the U.S. Federal Aviation Regulations (FAR) Part 43 and Part 65 had seen some revisions and the FAA realizes the need for additional amendments. The European Aviation Safety Agency (EASA) recognized and adopted Part 66 in an attempt to cover those tasked with ensuring airworthiness were up to the task. In part this requires demonstrating knowledge on type specific aircraft with separate certifications for mechanical and electrical/electronic areas.

CORE COMPETENCIES

An initiative started back in the late 1980s by a business aviation technician named Brad Townsend called "Project Bootstrap" eventually evolved into formation of an industry-driven global standard under the ASTM (astm.org) committee F46 banner addressing qualifications of aerospace personnel. This dedicated group includes representatives of all aspects of aviation-related businesses, professional organizations, educational institutions, regulatory agencies, and dedicated individuals. Accomplishments so far include formulation of standards addressing core competencies and aircraft electronics technicians (AET). There are other opportunities as well dealing with advanced composites, design, and manufacturing concepts and support roles. Everyone needs to get involved!

There is no cost to join and each person has a unique perspective on what our industry needs. There will always be a need for those with a keen eye and ability to pay attention to detail along with the craftsmen capable of implementing complex repairs under other than ideal circumstances.

With forecasts indicating the rapid deployment of new technology aircraft and the fleet doubling within many of our lifetimes we cannot forget how to support older equipment as they too will continue to occupy the skies with the same emphasis on airworthy. Millennials borne in the information age have an acquired knowledge of use of electronic devices and built-in diagnostic capabilities but are often unprepared to contend with problems associated with analog devices. It appears the ability to troubleshoot using multi-meters and other yesteryear diagnostic tools are becoming "tribal knowledge" and the tribe is rapidly dwindling.

IMPORTANCE OF SOFT SKILLS

Included in core competency are numerous soft skills. In the past participation in our industry was focused on technical capabilities and/or skills. The ability to communicate, negotiate, and lead others was never truly nurtured and only in recent years has the realization materialized and educational programs have been introduced to meet the need. Another misconception is that a good manager automatically makes a good leader and it was often assumed that the best technicians would make the best managers. In my career I can honestly say I have been associated with several of the very best leaders in the industry plus a few of the very worst and have thankfully learned from all of them including consideration of ego and degree of maturity.

A common opinion among the aviation community is military protocol recognized pilots as officers and leaders while mechanics are the enlisted personnel with limited advancement possibilities. This concept has impacted many aspects of the aviation industry throughout the years. Yes, many of us have persevered to relate to pilots. After all, if it weren't for them, most of us would be unemployed! The best aviation organizations most often operate on a team concept where all members interrelate to achieve a common goal. Unfortunately individual rank within an organization does not prove the ability to effectively lead nor does an assortment of college degrees, age, or even family heritage.

Many of the best leaders I have been privileged to work with come from humble beginnings and most share the belief that those that they lead are in fact the most important assets. A positive outlook, thorough understanding of the organization's goals and objectives coupled with a sincere concern for others are essential parts of being effective in a leadership role. Aviation interpersonal skill development programs are worthwhile in creating the basics and honing dexterity. Knowledge is only part of the career enhancement equation. There are many under-employed yet knowledgeable people in our industry. Wisdom is the key to knowledge utilization and is a quality built around acquired pertinent understanding, experience, and good judgment. Of course good judgment is based on experience and a lot of that comes from previous bad judgment!

TODAY'S TECHNICIAN

One of the criteria for being considered "Old School" is the adherence to traditional policies and practices. Yes, we are "mechanics" even though by today's criteria "technician" may be better suited to our role. A "mechanic" is defined as "one who fixes things" and that is exactly what we do, by sharing knowledge, using sophisticated diagnostic equipment, analytic thought processes, or just common sense coupled with trust in our colleagues. As the "Keepers of Airworthy" we all share a grave responsibility to exercise good judgment and to strive toward the advancement of aviation and to the dignity of our profession. This is one thing that I hope never changes. ***AMT***

JIM SPARKS has been maintaining aircraft for almost 40 years with the majority of the time involving Business Aviation activities. Jim's endeavors have placed him on six of the seven continents contending with numerous situations from routine flight dispatch to critical AOGs. His career includes maintainer, avionics/electrician, educator, tech rep, and director of aircraft maintenance. In addition to other activities he is engaged with ASTM assisting in the global development of criteria defining the Next Tech for NEXTGEN. You can reach him at sparks-jim@sbcglobal.net.

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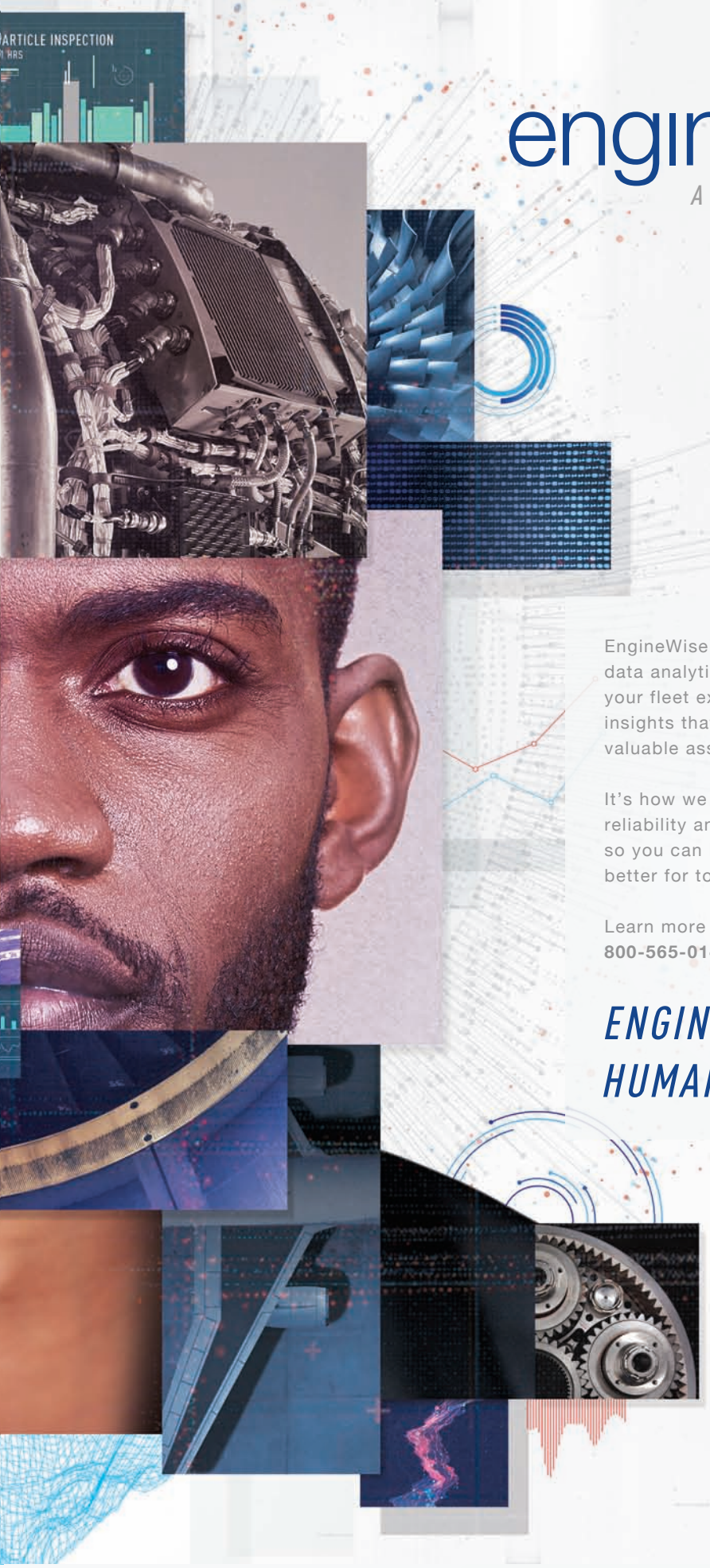

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WHY TEXTRON DÜSSELDORF IS A GEM IN THE TEXTRON AVIATION FAMILY

AMT visits the Textron Aviation Düsseldorf facility in Germany

By Marino Boric

In June of 2017, *AMT* Chief Editor Ronald Donner and *AMT* International Correspondent Marino Boric visited the Textron Aviation Düsseldorf facility in Germany. What, prior the trip, seemed to be "just another MRO facility visit," turned out to be an unexpected surprise. The Düsseldorf Textron Aviation facility provides a unique OEM experience, with maintenance, parts, and field service, adding a proprietary personnel education component.

THE EUROPEAN NETWORK

In 2012, Textron Aviation, then Cessna Aircraft Company, acquired Jet Aviation's Düsseldorf, Germany, and Zurich, Switzerland, maintenance, repair and overhaul (MRO) operations. In just five years since that acquisition, Textron Aviation has transformed the factory-direct service experience for Citation, King Air, and Hawker customers operating throughout Europe.

NOTE THE beautiful wooden ceiling structures inside the Textron Aviation facility in Düsseldorf, Germany.
TEXTRON AVIATION

Today Textron Aviation provides a host of complete maintenance and support solutions to a European fleet of more than 1,600 Citation, King Air, and Hawker aircraft. The European team counts more than 400 employees — over 140 of them are in Düsseldorf — comprised of engineers, service technicians, field service representatives, and sales representatives, so the customers in the region now have local access to factory-direct expertise in a number of ways.

"Over the last five years, we have established a robust factory-direct service offering for Citation, King Air, and Hawker operating throughout Europe," says Kriya Shortt, senior vice president, Customer Service, Textron Aviation. "Driven by customer feedback, we have strategically invested in our company-owned footprint to bring an unrivaled service experience to our customers operating throughout the region."

In addition, each of Textron Aviation's company-owned service centers in Europe have been integrated to serve customers across the Citation, King Air, and Hawker platforms. The company operates six service centers throughout the European region in Doncaster, United Kingdom; Düsseldorf, Germany; Paris, France; Prague, Czech Republic; Valencia, Spain; and Zürich, Switzerland. Additionally, the company has established line maintenance facilities and mobile support vehicles to offer additional flexibility to its customers operating throughout the region.

WHAT MAKES TEXTRON AVIATION DÜSSELDORF STAND OUT?

From the very beginning of our Düsseldorf visit we knew this visit would be "different." We were greeted by the kind and friendly Stephanie Kietzmann, the facility's general manager in Düsseldorf. Kietzmann described the organization in this statement: "We are the only facility in Germany delivering a unique OEM experience; offering sales, maintenance, parts, and field service in one location."

The Düsseldorf facility is Textron Aviation's largest European facility which is seeing notable growth, and is serving customers primarily from Europe and some from the Middle East.

THE FACILITY TOUR

Our tour was guided by Maintenance Manager Dirk Oberlender, who started in aviation on the parts side of the business in 2003. He worked in avionics, customer service, maintenance control center, as center/production manager.

Early during our tour we noticed how much Oberlender loves his work. This is easily understandable seeing the beautiful wooden structures of the hangars which are originating from the 1970s and are developed among the CASH program — Clean And Structured Hangar — the

facility is exceptionally clean and luminous.

Oberlender states, "One hangar is primarily dedicated to larger aircraft, such as the Citation X, Sovereign, and XLS, while the other hangar houses Hawkers and smaller Citations. We also work on King Airs, and are pursuing approval for the Caravan."

Beside the routine maintenance, Oberlender describes how their location does larger sheet-metal repair, larger interior refurbishment, avionics modifications, and different upgrades. They utilize a mobile paint-booth where tail-sections, fuselages, and wing sections can be painted. By the end of this year Düsseldorf also plans to establish a wheel and brake shop.

Five customer service representatives work in the Düsseldorf planning center. Each CSR supports customers before, during, and after their maintenance visits, ensuring each customer receives an outstanding service experience.

DÜSSELDORF IS TEXTRON AVIATION'S PARTS WAREHOUSE

As part of its continued investment within Europe, Textron Aviation recently established a centralized parts distribution center in Düsseldorf with increased inventory levels to serve the European customer base. The warehouse we visited is located just a few driving minutes from the Düsseldorf international airport, and houses more than 225,000 parts for all aircraft models. The inventory is cleared through customs into the European Union, resulting in faster delivery and fewer fees for customers.

ADDITIONAL SUPPORT FOR EUROPEAN OPERATORS

"Textron Aviation in Düsseldorf is able to assist European Citation, King Air, and Hawker operators with operational challenges related to European Aviation Safety Agency (EASA) regulations," says Oberlender. The company offers a cost-competitive solution to guide operators through the compliance process related to the Part-NCC EASA rule change. Part-NCC requires any non-commercial operator registered within the 32 EASA member states or operating in an EASA state to adapt a safety framework similar to commercial operators.

Textron Aviation also can serve as an operator's continued airworthiness management organization (CAMO), allowing the company to issue and extend Airworthiness Review Certificates to customers.

INSIDE THE Textron Aviation Düsseldorf warehouse.
MARINO BORIC

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STEPHANIE KIETZMANN, GENERAL MANAGER, SERVICE CENTER DÜSSELDORF

Stephanie Kietzmann is responsible for the Service Center in Düsseldorf with line maintenance facilities located in Egelsbach, Bremen, and Stuttgart. For the past three years she has lead a talented team of experts dedicated to enhancing aircraft performance and the resale value. In her previous role within the company Kietzmann was director of human resources.

One of her main goals as general manager is to establish a working environment that allows the employees of the service center to dedicate their passion and energy to the customer.

Kietzmann studied law in Würzburg, Lausanne, and Münster and holds a 2nd state exam from the state of North-Rhine Westfalia and she is also a licensed attorney.

INSIDE THE Apprentice Training Center.
MARINO BORIC

THE TRAINING ACADEMY

A key initiative for Textron Düsseldorf and a personal project for Kietzmann is the Apprentice Training Center. According to Kietzmann she sees talent development as a challenge for the industry as a whole saying: "There are so many opportunities in the business aviation industry, particularly in Europe, and yet there is a real lack of information for young people regarding opportunities within the industry. The perception is that a career in aviation is all about working for the major airlines, with little awareness of business aviation. We are currently working on becoming more visible in order to let the next generation know about how rewarding a career in business aviation can be."

Bruno Tolksdorf, manager of the Apprentice Training Center, toured the facility with us where 21 students, in a first year of training, were learning basic aviation and technician skills like sheet-metal work and electronics maintenance.

The complete training lasts just over three years and is based on the singular German dual educational system. This dual vocational education and training system is well established in Germany, has evolved over time, and was considerably influenced by the economic framework conditions and the German historical development process. In this case, as in other state-owned schools, the students go through a combination of theoretical, in-class training sessions, and later, practical training in industrial environment. Young students come from public schools after the 10th grade, at age 16 to 19, and in the first year are trained in basic skills, at the Textron Aviation training center and in a state school in Mönchengladbach, and over time learn and work in increasing amounts of time at Textron facility at the Düsseldorf airport. After passing the final exam (performed by the local Chamber of Commerce), the student is becoming a qualified aircraft technician and if the final exam note is above 75 percent, Textron offers them a job. 24 Textron employees in Düsseldorf have this background.

Kietzmann says, "This program has proven to be an excellent system giving the employer the chance to meet the future employee very early in their career, we see them growing, and the students learn the ropes on his or her future work site."

FINAL COMMENT

We could literally breathe the "aviation spirit" and commitment of the personnel in Düsseldorf. Touring the Textron Aviation facility we soon noticed something all employers dream of: The passion and the total dedication of the personnel toward perfection of their work. As Dirk Oberlender said several times to us: "I'm married to my work."

In Stephanie Kietzmann's words, "I am most proud of the team. I am fortunate to have a very collaborative team all working toward a common goal of delivering exceptional service and support to each customer. And that collaborative, customer-centric spirit extends across the entire network and between facilities to ensure we are meeting the needs of our customers." ***AMT***

MARINO BORIC graduated with a university degree as an aeronautic engineer, and acquired degrees in business development/trade and commerce and in 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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ONE OF the airplane camping areas at AirVenture Oshkosh 2017.
PHOTOS BY MARINO BORIC

WHAT WAS UP AT **AIRVENTURE 2017?**

The 2017 edition was blessed by the weather, by the record-breaking attendance of 590,000 visitors, by more than 10,000 aircraft, and by 1,050 forum and workshop sessions attended by more than 75,000 people

By Marino Boric

The *AMT* crew regularly attends relevant trade fairs like BACE, EBACE, Paris Air Show, Heli-Expo and many others. Such events offer different kinds of technical solutions and industry perspectives. *AMT* was at AirVenture 2017 in Oshkosh, WI, which took place from July 26 to Aug. 2. In that week Oshkosh is the world capital of aviation not only by numbers of aircraft and attendees but by a priceless ingredient called: FUN. In Oshkosh you could find almost everything from a "motorized broom" to supersonic jet and even a rocket. In this context Oshkosh means FunKosh.

This 2017 edition was blessed by the weather, by the record-breaking attendance of 590,000 visitors, and by more than 10,000 aircraft that arrived at Wittman Regional Airport in Oshkosh and other airports in east-central Wisconsin. Somewhere else this might be a burden but at Wittman airport, this is a part of airmen's dreams with 17,223 aircraft operations in the 10-day period from July 21-30. Can you imagine what that means with an average of approximately 123 takeoffs/landings per hour? For Oshkosh visitors this is simply aviation heaven.

All numbers have risen compared with an already successful year in 2016: The total number of show planes climbed by 5 percent to 2,991, and by 12 percent to 1,162 for the number of vintage airplanes. EAA counted 1,107 homebuilt aircraft, 351 warbirds, 168 ultralights and light-sport aircraft, 79 seaplanes, 54 rotorcraft, 60 aerobatic aircraft, and 10 hot air balloons.

Parking and camping spots were filled to capacity for five days starting on Sunday prior to the show opening, with extra parking and camping prepared and opened in the middle of the week to accommodate the increased attendance. The "good old" Oshkosh feeling was back! More than 11,600 sites in aircraft and drive-in camping accounted for an estimated 40,000 visitors throughout the week.

Beside this "traditional" AirVenture customers, the commercial exhibitors numbers climbed to 881 filling completely the four hangars and the main aircraft display;

THE BLUE ANGELS.

but possibly the most important numbers are 1,050 sessions attended by more than 75,000 people in forums and workshops adding great educational value.

We all will remember the Apollo gathering at the Theater in the Woods, Stan Lee's visit, and the Blue Angels performance. To have the Blue Angels performing at EAA meant having to evacuate several houses and the factories near the airport had to shut down their operation for several hours. Events showcased the 50th anniversary of the Apollo program and the 75th anniversary of the Doolittle Raid. Plenty of folks (together with EAA Chairman Jack Pelton) talked at any possible opportunity about the big issue of the day, the ATC privatization. A delegation of aviation representatives traveled from Oshkosh to Washington for a day to speak out against the proposed ATC privatization.

This year, the crowds were huge and EAA managed to stuff so much into the programs that I had trouble to follow everything that was available. The core around which all this was built was the static display in Boeing plaza and the daily airshow. That main square was dominated by big military and civil birds like A10, B-1, B-29, B52, and just a stone throw away the Blue Origin rocket, New Shepard, a reusable rocket developed by Jeff Bezos' space company. The restored B-29, Doc, left a deep impression on all visitors.

AirVenture has transformed over time from a pure fly-in to a commercially important venue for showing new products and technologies giving to big and small names in the industry almost the perfect stage. Despite all, anyone who is serious about putting a foot in aviation business uses AirVenture just to show they're players in that sandpit.

Final, subjective comment: I have not missed many AirVenture editions of last two decades but if I would have missed this 2017 edition that would have been my biggest mistake as an airman.

Next AirVenture in Oshkosh will be held July 23-29, 2018.

WHAT WAS NEW AT AIRVENTURE?

This year we could see many novelties and improvements from all fields of aviation, none of them real breakthroughs or something we haven't seen yet or somewhere else, but it is important to see that the trends which popped-up years ago — like electric alternatives — are still around and are growing well. We could see new engines, avionics, unusual designs, multicopters and some airframes which might be of relevance in years to come.

Blue Origin

The New Shepard rocket developed by commercial space company Blue Origin was exhibited. On Nov. 23, 2015, New

Shepard became the first rocket to ascend to 62 miles above the Earth's outer space and successfully return to Earth making a vertical landing. The booster repeated the feat five more times the following year, demonstrating the re-use of a rocket for the first time. In addition, the company exhibited a 1:1 scale mockup of its astronaut crew capsule developed for use with the New Shepard.

Lancair - Mako/Legacy

Lancair International was taken over few months ago by Mark and Conrad Huffstutler who transferred the production from Oregon to its new home in Texas. The new manufacturer is bringing back the four-place, fixed-gear Mako. Powered by a Lycoming IO-540 engine, the cruise speed is expected to reach about 205 knots; the turbocharged version should reach 256 knots. The Mako on display has impressive load-carrying capabilities, boasting a useful load of 1,300 pounds. The four-seater retracts pretty unusually only the front wheel, having the main gear fixed.

Conrad Huffstutler said to us that Lancair will offer a quick-build program for the Mako, which is expected to run about four weeks. The company started taking deposits for the Mako in Oshkosh, and expects to having the first airplane airborne by end of 2017.

Stratos VLJ

The Stratos 714 VLJ (Very Light Jet) made its public debut at AirVenture 2017, after it has been more than 10 years in the making. The Stratos team, visibly proudly, presented the freshly painted aircraft at Boeing Plaza. Stratos CEO Michael Lemaire addressed the crowd with a smile as he detailed the 714's long journey. The 714 is designed to carry six people up to 1,200 NM at 400 knots. The company is working on a 714 prototype, powered by a Pratt & Whitney JT15B-5 engine. So far, the prototype has accumulated about 60

STRATOS VLJ

hours of flight testing. The ultimate goal for the 714 is the certification with a Pratt & Whitney 535E, the same engine that powers the Phenom 300. Stratos is not yet taking orders for the 714 as there is still much testing ahead; however, the team hopes to achieve relevant flight progress by the end of 2017.

Aero Electric Aircraft Corp., Sun Flyer

AEAC announced plans to build a four-seat version of its two-seat, all-electric airplane. The Sun Flyer 4 will have a payload of 800 pounds for pilot and passengers, and should fly by the year end said George Bye, CEO of AEAC. The $19-per-hour operating cost can be broken down to $5 for electric energy and the remaining $14 to build a battery-replacement reserve and cover the electric motor inspections and consumables. The four-seater will have four hours of flying time. Spartan College, which has already placed 25 deposits for the two-seat Sun Flyer 2, also made the first deposit for a Sun Flyer 4. Spartan plans to develop a complete training system based on the Sun Flyer aircraft, AEAC said, including a course for airframe and powerplant technicians that will go through a specialized training for the all-electric systems.

AEAC brought a proof-of-concept prototype of its two-seat Sun Flyer to Oshkosh which is planed to be certified under FAR Part 23. Sun Flyer will soon begin power-on tests. AEAC projects the energy cost for Sun Flyer 2 will be only about $1 of electricity for each hour of flight, compared to $25 to $65 per hour for leaded avgas.

The company started to accept deposits for the four-seat Sun Flyer at an introductory price of $349,000 while the two-seat version will cost $249,000.

Kitty Hawk

At AirVenture, a California start-up called Kitty Hawk debuted a unique new multi-rotor aircraft that's similar to a large drone and can carry a single person. Kitty Hawk could be manufactured under ultralight standards and has daily flown over water for approximately four minutes.

THE SUN FLYER.

Workhorse

The American Electric-drive truck manufacturer Workhorse showcased a hybrid-electric vertical-takeoff-and-landing (eVTOL) aircraft called SureFly in the Innovations Center. The octocopter, the eight-rotor SureFly, builds on Workhorse's development of the HorseFly delivery drone and has four arms with two electric motors on their end which can fold down for ease of storage.

The design is reminiscent of the Chinese Ehang 184 drone and is powered by a nondisclosed 200-hp turbocharged combustion engine which drives a generator, and which is backed up by a dual-battery system.

Samson

Samson Motors brought its pre-production prototype of the Switchblade flying-car design, which is still under construction, to AirVenture. The vehicle, in development for eight years, features the patented wing-swing mechanism, previously called "scissor wing." The design will carry two persons, will fly at 200 mph, the company says, with a 190-hp turbocharged V4 engine, and have a range of 400 miles. First flight is expected by the end of this year. The vehicle will be sold as an experimental aircraft, and owners will be able to complete the aircraft at the company's builder-assist center in as little as three weeks. On the ground, it can be operated with a license for either automobiles or motorcycles.

Detroit Flying Car

The Detroit Flying Car was exhibited at the Innovations pavilion at AirVenture and is another, highly unusual proposal for a flying car. This proposal is and looks different than other — recently abandoned — projects. The secret juice of this flying car are its wings. They don't fold, they are built of many wing panels that retract into each other and then into the wide fuselage. For further compacting the design, the wings — the forward and rear wings — are not symmetrically located in a same pane but above each other. That means that the left and right wing are approximately a foot above each other — abandoning the usual symmetry. Propulsion on ground should be assured by electric motors and in the air by a combustion engine/electric generator.

GAMA PRESIDENT Pete Bunce in one of the electric aircraft at the GAMA exhibit.

Zenith Aircraft

Zenith Aircraft Company introduced a new aircraft design at AirVenture. The STOL CH 750 "Super Duty" is the latest model in the Zenith high-wing line developed by aeronautical engineer Chris Heintz. The STOL CH 750 "Super Duty" (SD) looks like the popular two-seat STOL CH 750 light-sport aircraft, but was redesigned to offer much increased load, the addition of a "jump seat" in the large rear cabin area, and powered by 205-hp IO-375 Aero Sport Power engine. The traditional instrument panel has been completely replaced with a single, extra-large, free-standing and freely positionable 17-inch glass display built by Avilution and called Unpanel. By removing the traditional instrument panel the forward half of the cabin feels more like a helicopter.

GAMA Electric exhibition

The General Aviation Manufacturers Association (GAMA) highlighted hybrid and electric propulsion technology during AirVenture 2017. On display were the eSpirit, an all-electric aeroplane designed and built by the Embry-Riddle Flight Research Center; a Pipistrel Alpha Electro, the world's first all-electric production training airplane; a mock-up of the eViation all-electric airplane that was unveiled at the Paris Airshow; as well as a two-blade Bantam ultra-lightweight propeller and an electric airplane battery. GAMA tent visitors had the chance to experience an electric flight through a Siemens Aviation interactive feature and information about its Electric Propulsion and Innovation Committee, its new global standards developed to facilitate this technology.

"It's an exciting time in general aviation, with hybrid and electric propulsion coupled with increased automation," said GAMA President and CEO Pete Bunce. "The new degrees of freedom these technologies enable when combined with the nimble design certification environment now becoming a reality, we can truly invigorate our industry."

Pipistrel

The FAA administrator visited the Pipistrel exhibition and showed great interest in electric aircraft technologies. The FAA administrator was according to Pipistrel personnel not aware of the fact that Pipistrel had made such strong advances and was surprised to see an LSA certified electric aircraft already in serial production.

Vulcanair

The Italian company Vulcanair debuted in the U.S. its new 1.0 trainer aircraft. Priced at $259,000, with a Garmin G500 IR suite on board, it is powered by a Lycoming 180-hp IO-360 engine equipped with a constant speed prop. MTOW is 2,446 pounds with a useful load of 882 pounds. The 1.0 is already EASA certified in Europe and is expected to receive U.S. validation by the end of 2017.

Mooney

At the press conference Mooney said through Lance Phillips that Chino,

CA-based design center, which did much of the work on the emerging M10 line, will move its operations to the Kerrville, TX, factory headquarters — all as a part "of consolidating efforts." Phillips said the company's primary investors are still committed to the aircraft and that more information would be forthcoming in a few months.

Remos & Stemme

Remos, an established UL and LSA manufacturer, and Stemme, the builder of sophisticated motorgliders, have announced by the years end the beginning of their merger. This AirVenture was for the two German companies the first international event under the same roof.

Piper

This year Piper celebrated the 80th anniversary of the iconic Piper J-3 Cub, which was one of the most successful designs ever. A celebration was held during AirVenture, along with displays of many new Piper models. Simon Caldecott CEO was really optimistic about Piper's future; the business is going well not only in the U.S. but also in Europe.

ICON

A little more than a year after it announced plans to slow production and realign its manufacturing flow and supply chain in 2016, ICON Aircraft has resumed customer deliveries of the amphibious light-sport A5 and is working on an upgraded version for its model year 2018. ICON recently handed over the first six A5s, the first deliveries since announcing the production delay

LYCOMING'S NEW TEO-540-C1A.

in spring 2016. "We've had a challenging year for sure, but the A5 is now ready. In fact, it's more than ready," said ICON CEO and founder Kirk Hawkins adding, "We're now ramping-up production and delivering aircraft."

Textron Aviation

From Beechcraft Barons to King Airs, from Caravans to Citations, and several airplanes in-between, the Textron Aviation exhibit was huge and offered something for anyone looking to purchase a new aircraft.

ENGINES

This AirVenture was a successful engine year. Why, you ask? The engine field is a very delicate one; there are not many manufacturers around and those few seldom bring new engines to market ripeness. This behavior is influenced by a low number of sold piston aircraft, high development costs, liability issues, and so on. Despite all this we have seen many engines this year that in several weeks or months will

A NEW Mooney.

receive the FAA certification/validation. Rotax is just about to gain the certification of the turbocharged 915iS engine and CMG surprised us with two new diesel engines, while Lycoming is increasing a pace on electronic engine control. There are many other interesting engines of automotive origin like Adept Airmotive and Viking engines but those are addressing only the noncertified market.

Lycoming

Lycoming Engines had on display its TEO-540-C1A which will power the new Tecnam P2012. The Integrated Electronic Engines (iE2) is the company's flagship technology. The iE2 system features a continuously optimizing multi-port fuel injection system for optimum power and fuel consumption performance, and it has the ability of the engine control unit to continuously monitor and report engine performance.

EPS

Wisconsin-based Engineered Power System (EPS) stated that the V-8 diesel (108-degree), liquid-cooled, geared engine just initiated certification and durability testing of the engine. EPS returned to AirVenture after a short absence and was showing the latest version of its V-8 diesel engine called Graflight. According to Michael Fuchs, EPS co-founder, the engine reached several thousand hours of test cell testing. He said that the company is working into the integration of the engine into the SR 22 and the GA8 airframe. According to Fuchs, the engine's horsepower is scaled up to 450 hp and the weight is expected to be about 50 pounds heavier than comparable gasoline engines.

Rotax

During AirVenture 2017, the Rotax Flying and Safety Club (RFSC) and BRP-Rotax offered multiple, daily information sessions on Rotax 9xx iS engines and on the capacities of the engine ECU and logged data, conducted by experienced RFSC instructors free of charge at the mobile classroom at the Rotax booth.

Marc Becker of Rotax informed the press about the progress of the 915iS engine. The new 135-hp turbocharged and fuel-injected engine is well on the certification path and its EASA certification, as well as the FAA validation, are expected before the end of 2017. Becker told us that more than 30 OEMs have completed the design-in 915iS process and that the wet installation weight is 84 kg or 185 pounds; field tests have shown full power delivery

A B-1 Bomber made an appearance.

up to 15,000 feet and a typical 6-8 gallon/hour fuel burn. This power delivery at altitude is for some airframe OEMs of strong interest.

RS Aerotech, the Single Lever Revolution

RS Aerotech Ltd. exhibited the Searey Advanced Technology Demonstrator with the new Rotax 915 iS engine at the Rotax booth during AirVenture 2017. This installation is likely to set a new milestone in LSA and lower GA field with the introduction of the Single Lever for small aircraft engines. The amphibious demonstrator, Searey S-LSA aircraft has been equipped with a single lever constant speed propeller control system (SLC), and a CAN aerospace-based flight data acquisition and recording system. This engine and flight data could be transmitted worldwide through any 2G/3G/4G network. RS Aerotech is flight testing the Rotax 9xx iS engines fitted with MT propellers and future-oriented electronic aircraft systems. Now all 912 and 915 iS engines could install this option for the Single Lever Throttle which automatically controls/adjusts the propeller pitch according to the pilot's throttle input. This could even be used on LSA aircraft where variable pitch prop is currently not allowed by the LSA rules as an exception.

CMG

Continental introduced two new engines ai Oshkosh 2017: the certified 300+ hp, six "V" layout, CD-300 engine series, and the flat, four-cylinder CD-265. See CMG article in the July/August issue of *AMT*.

AVIONICS TRENDS

Dynon and Garmin are growing and showing new products at an almost frightening rate. Both companies are going strong — coming from different directions — but have initiated a revolution from "below" offering new, sophisticated, and price wise interesting products in different categories.

Dynon's announcement of entering the certified market with further developed Skyview series may be a manufacturer's milestone and the most significant of all the avionics developments till today. Dynon which has served the experimental amateur-built market since its founding in 2000, is expanding into the Part

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23 certified avionics market with the imminent FAA certification of its SkyView HDX, touchscreen, glass cockpit system. The first approvals will be in the Cessna 172 and Beech B58 Baron, and others will follow.

The SkyView HDX is a full flight deck, with all the functionality of systems costing far more, including autopilot with limited envelope protection. System prices are the same as the company's experimental or light sport aircraft version.

Included in the SkyView HDX system are the touchscreen primary flight display with angle-of-attack and synthetic vision, engine monitor with lean assist and fuel computer, autopilot, mode-S transponder with 2020-compliant ADS-B Out, ADS-B In (traffic and weather), moving map with flight planning, a Dynon EFIS-D10A for backup instrumentation, and battery backup.

The SkyView HDX will be fully IFR capable, and it will also integrate with navigators such as the Avidyne IFD series and Garmin GTN/GNS series.

Garmin

Garmin brought many, almost too many new products to Oshkosh. Garmin debuted two new retrofit autopilots GFC 600 and GFC 500 with solid-state attitude-based (AHRS-derived) autopilots that feature brushless DC motor servos. Both with Garmin's electronic stability and protection (ESP) and a level mode. The autopilots also feature underspeed and overspeed protection.

In addition to the autopilots there were two portable weather receivers, GDL51/52, and new low-cost ADS-B Out solution for the market's lower end.

The GDL51 specifically receives SiriusXM data, while the $1,149 GDL52 is an all-in-one device that receives both ADS-B and SiriusXM data. The portable systems can wirelessly connect with two devices simultaneously, including the aera660 and aera 795/796 portables and Apple and Android tablets and smartphones. The permanent-mount "R" remote-mount versions can be wired to the panel displays in Garmin's G3X Touch experimental avionics suite.

Garmin announced the GDL82 UAT device for mandate-compliant ADS-B Out option for aircraft that fly below 18,000 feet. The budget-priced GDL82 is a small two-piece (remote box and GPS antenna) Universal Access Transceiver (UAT) with built-in GPS. ***AMT***

AMT CHIEF editor Ron Donner (left) is provided an explanation of the RS Aerotech system.

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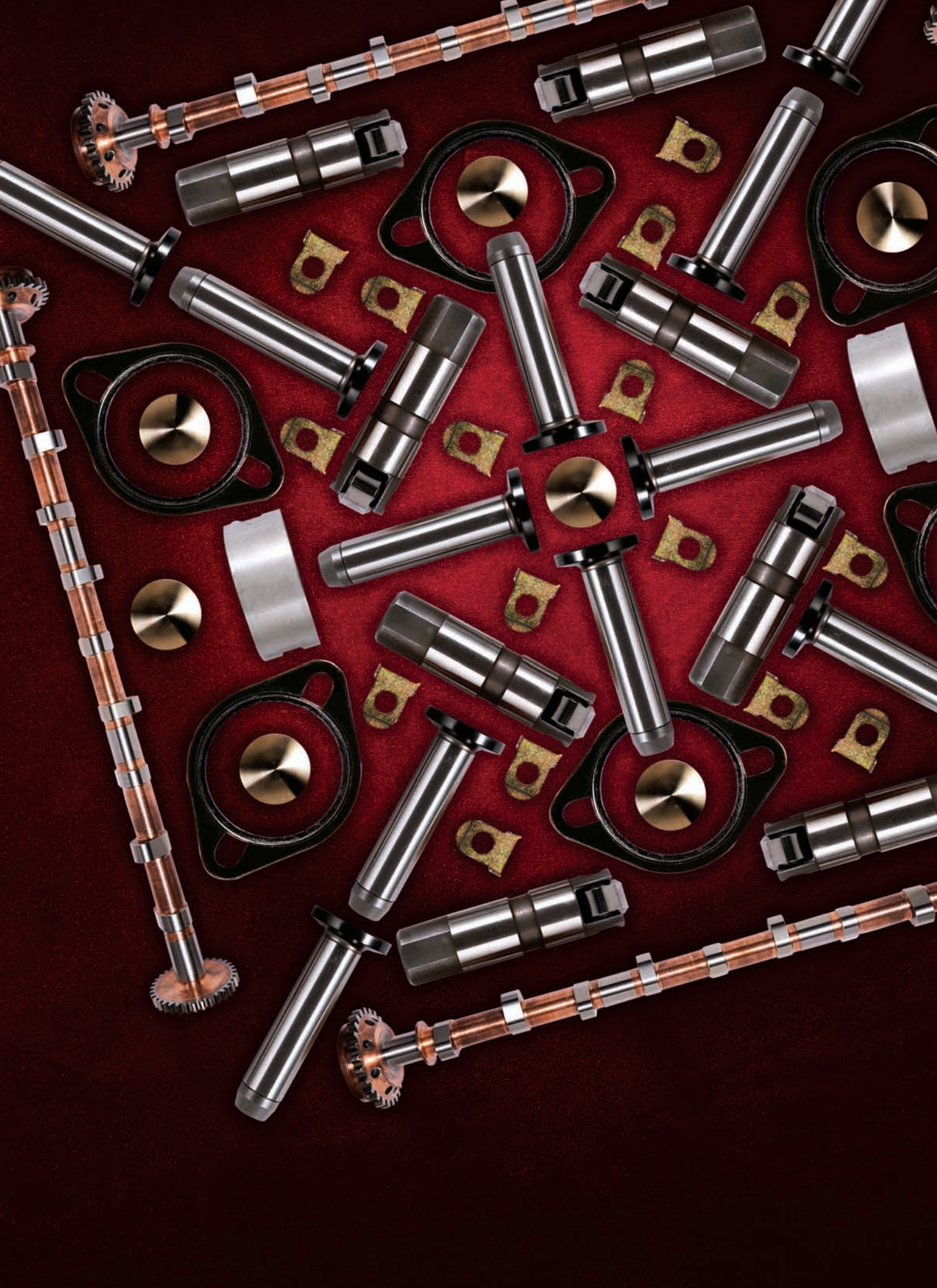

U.S. Navy photo by Mass Communication Specialist 3rd Class Adam Henderson/Released

THE ROLE OF HUMS

With health usage and management systems, maintainers have real-time, precise feedback on the health of a fixed or rotor wing aircraft

By Kevin Hawko

PHOTO PROVIDED BY UTC AEROSPACE SYSTEMS COURTESY OF THE U.S. NAVY.

UTC AEROSPACE SYSTEMS' LEGACY GOODRICH business was among the companies that pioneered health usage and management systems (HUMS) for military helicopters in the late 1990s and early 2000s, automating parametric sensor data collection and using this data to diagnose the health of mechanical drive train components. These systems integrated vibration sensor arrays with the aircraft avionics to allow the system to automatically recognize different aircraft states and flight regimes and capture data in each regime.

In 1999, the safety benefits derived from vehicle health management (VHM) systems and their ability to provide early identification of issues that result in catastrophic component failures prompted the UK's Civil Aviation Authority's (CAA) Safety Regulation Group to issue Additional Airworthiness Directives (AAD) regulatory compliance guidelines (CAP 693) mandating the use of VHM for civil transport helicopters operating in the North Sea. The AAD and certification guidelines were updated in 2006 when CAP 753 was released to address certification of VHM system design and operation.

HUMS today now provide automated power assurance checks, in-flight crew alerts when thresholds are exceeded, package data for evaluation by ground-based applications that feature automated rotor and shaft balance solutions, drivetrain and engine health assessments, and automate logbook entries for maintenance records. Fleet analytics tools are used to trend the health and usage of an aircraft and can compare this aircraft with others in the fleet for trend analysis. The UTC Aerospace Systems (UTAS) Vehicle Health Management System (IVHMS) has been credited by the U.S. Army with a 27 percent higher sortie rate compared with non-IVHMS equipped aircraft, a 52 percent reduction in unscheduled maintenance, and a 17 percent reduction in total maintenance for the UH-60L Blackhawk.

HUMS as an enabler to more efficient operations and lower sustainment costs — Compared with fixed-wing aircraft, helicopters have higher mechanical failure rates and operating costs. These factors, coupled with a requirement for improved safety of passenger-carrying helicopters, drove the requirements for mechanical diagnostics and the early adoption of HUMS in military helicopters. The benefits of vehicle health management systems are now being considered for commercial and business fixed wing aircraft to reduce unplanned maintenance and to improve dispatch reliability. For years, commercial aircraft have been linking engine usage and aircraft parametric data to ground bases for analysis, so how would vehicle health management systems be required?

KEVIN HAWKO Is the HUMS Business Development Manager at UTC Aerospace Systems. He joined his first Navy helicopter squadron in 1993 was a Naval Aviator until 2000 and was qualified as a maintenance check pilot.

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PULSE™ HEALTH Monitor – weighs 1 pound.
UTC AEROSPACE SYSTEMS

Consider for a moment, an automotive tire pressure monitoring system. The system is fully contained within the vehicle, to include a tire pressure warning light to alert the driver if he needs to stop and check his tires. This system also has pressure thresholds established to optimize fuel economy and the additional indirect benefit of preventing excessive tire wear caused by under-inflation. These features help save the motorist operating and maintenance costs. Translate that to an aircraft subsystem monitor; knowing that a key system is degrading or has failed can help aircrews make the decision to abort, divert, or even request an emergency landing. But the true efficiencies are gained when flight crews, ground operations, and maintenance centers can each view aircraft health data, presented in a manner that facilitates decisions:

Flight crews — on indication, crews can query system health in operation and make real-time decisions for events that could impact safety, performance, or passenger comfort.

Ground crews — can use mobile devices to query an aircraft and get a quick dashboard status on subsystems as the aircraft taxis to the gate or prior to the start of the day's operations. Troubleshooting guides can be linked to mobile applications to expedite any required maintenance steps required.

Green systems — fully functional

Yellow systems — degraded below threshold but acceptable for operation

Red systems — failed and require maintenance

Maintenance centers — can trend system performance by tail number or across the fleet to incorporate degrading systems into the next planned maintenance window. Deeper analysis of developing indications can be correlated to usage, events, or rate of the failure progression.

Advancements in sensor and processing technologies are now enabling providers like UTC Aerospace Systems to field more efficient, lighter health management solutions that can be tailored to a specific aircraft subsystem. Beyond the traditional HUMS solutions for engine and drivetrain components, today's vehicle health systems monitor targeted applications like pumps, generators, electro-mechanical actuators, and fans and compressors.

Applying health monitoring to a single subsystem or scaling to multiple systems requires a flexible, distributed architecture like UTC Aerospace Systems' new Pulse™ Health Monitoring System, or PHMS, that can integrate large arrays of digital sensors and combine multiple sensor types to achieve a best-fit solution for each operator. In many cases, chronic maintenance issues have resulted in soft-life limits for entire fleets, where parts are replaced prior to failure based on hours accumulated, often replacing units that are still functioning normally. Through the use of a Pulse Health Monitoring System, maintenance action could be deferred until degradation of the unit is observed. Analytics from the system health monitor can also help display trends and identify causal factors for certain equipment failing prematurely due to regional usage or environmental factors. In such cases, the maintenance actions can be planned to accommodate these regional variations, scheduling spare parts and maintenance intervals appropriately.

Sensing and diagnostics needs may increase over the life of the aircraft, so expandability and scalability are critical to recognizing full potential of a vehicle health monitoring system. The Pulse Health Monitoring System is a lightweight, distributed-architecture system that can take advantage of information from the aircraft digital data bus and integrate those parametric data points with arrays of analog and digital sensors. It is designed to be

modular and scalable for efficient tailoring to a customer's need.

The UTC Aerospace Systems PHMS provides traditional sensing of vibration, speed, strain, temperature, pressure, position, and current, making it ideal for monitoring aircraft subsystems and drive trains, accessing existing sensor data. Alternatively, new, lightweight digital sensors can be added to monitor the targeted system. Miniaturization and current manufacturing advances allow these products to be offered at a fraction of the price and footprint of previous generation HUMS products, making them an affordable, easily installed option for small fleet operators. The PHMS is designed to perform the same onboard data analytics as traditional, larger health monitoring systems. Wireless data concentrators also offer the convenience of connecting modular sensor arrays to the onboard processor without the need to route additional harnesses, helping to save cost and weight for these systems.

PULSE™ STRUCTURAL Health – Sample of cargo bay floor panel status.
UTC AEROSPACE SYSTEMS

Additionally, the PHMS offers the option for structural health monitoring by adding arrays of the UTC Aerospace Systems MD7-PRO™, an advanced structural health monitoring (SHM) sensing system, to automate and provide highly repeatable inspection of aircraft structures or skins. The SHM system adds capability to identify or trend fatigue and impact damage, monitor for corrosion cracking, identify loose fasteners, or composite bond line delamination. By permanently installing a lightweight, digital sensing array to directly metallic or composite structures, significant reductions in labor-intensive visual or other nondestructive inspections can be realized. This is a significant benefit for hard to access or concealed areas of an aircraft. The PHMS can add a modular SHM function to offer both aircraft subsystems as well as structural monitoring. These tools offer ground crews the ability to efficiently query an aircraft on the ramp to determine if damage has occurred following a suspected hard landing or through contact with ground support/servicing equipment. This capability allows for quick response and minimizes dispatch delays related to troubleshooting or inspections.

The UTC Aerospace Systems PHMS offers state-of-the-art data download capability, with multiple transmission capabilities built into the unit. The data download can be requested using a variety of different criteria. This capability enables near-wing maintenance status review and cloud-based fleet management.

REALIZING THE BENEFITS

The culmination of prognostics and structural health monitoring systems comes through fusion of the data across all aspects of an aircraft lifecycle. Maintenance organizations receive actionable alerts while an aircraft is still in flight and are prepared with corrective actions when the aircraft arrives at an airport. User-friendly visual displays on mobile devices aid in assessing health and status of the aircraft and in aiding in the remediation process. Integrating tracking databases with maintenance information systems help operators track component time in service and document part history.

Ground operations staffs have real-time, precise feedback on the health of the entire aircraft, with links to troubleshooting and repair guides and service limits. These mobile applications are linked to central maintenance systems to help automate just-in-time ordering of parts to align with scheduled maintenance periods at designated locations. This allows operators to optimize parts inventories and maximize the utilization of equipment and resources. Trending the condition of equipment results in early detection of issues and timely remediation, reducing more expensive, often unscheduled repairs. ***AMT***

FAA REALIGNS FLIGHT STANDARDS SERVICE

The new functional structure aligns our leadership in four areas: air carrier safety assurance, general aviation safety assurance, safety standards, and foundational business

By John Duncan

ON AUG. 20, FLIGHT STANDARDS transitioned its management structure from the traditional geography-based regional structure to a functional structure. The new functional structure aligns our leadership in four areas: air carrier safety assurance, general aviation safety assurance, safety standards, and foundational business.

This structural realignment should be completely transparent to you. We have "erased" the geographic boundaries and aligned our reporting and management practices according to function, but you will not see any structural change to the local FAA offices who serve you today.

What you *should* see, though, is continuing improvement in how those offices operate. As I have said many times to our employees, our structural changes are important, and they are the most visible part of our Future of Flight Standards transition. But structural change won't do much for us without the essential cultural changes at both the individual and organizational levels. For several years now, we have been stressing the importance of interdependence, critical thinking, and consistency in our workforce, and these behavioral attributes and competencies are now embedded in each Flight Standards Service employee's work requirements. At the organizational level, the ongoing culture change includes training managers in the competencies of change management, and the "coach approach" to leadership, which is about helping employees by expanding awareness and sharing experience.

With our less-tangible but absolutely critical culture changes well underway, we were finally in a position to benefit from the structural realignment. The organizational intent of the shift to functional organization is to increase efficiency, eliminate multiple interfaces, and integrate surveillance activities, and to improve our performance in several areas:

FOR MORE INFORMATION

THE REALIGNMENT TOOLKIT:

The Realignment Toolkit is designed to provide a one-stop shopping point for information on realignment. Our intent is to provide as much information as possible to everyone. External Toolkit Link: www.faa.gov/about/office_org/headquarters_offices/avs/offices/afx/realignment_info/.

NEW FLIGHT STANDARDS SERVICE

Websites: The Flight Standards Service websites have been updated to provide additional information. We offer both internal and external versions that provide links to the functional area offices. External Flight Standards Website Link: www.faa.gov/about/office_org/headquarters_offices/avs/offices/afx/.

RAPID RESPONSE TEAM:

The Rapid Response Team (RRT) responds quickly to any issues that arise from realignment. These could include: information technology access issues, routing/coordination, roles and responsibilities, work stoppages, applicant issues, etc. To contact the RRT, you have the following options:

Email: FlightStandardsRRT@faa.gov

Telephone number (external stakeholders): (888) 283-8944.

Note: All modes of communication with the RRT are monitored 8:00 a.m. - 8:00 p.m. Eastern time zone.

InFO 17010, Federal Aviation Administration's (FAA) Flight Standards Service Reorganization: www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/media/2017/InFO17010.pdf

Accountability to Flying Public, Stakeholders

- Meet the needs of a constantly and rapidly changing industry
- Fix/prevent issues with consistency and standardization in regulatory interpretation

Budget Constraints

- Balance allocation of resources
- Increase efficient use of personnel and travel funds
- Reduce redundancy in regions

Change Readiness to Meet Constant Stream of New Challenges

- Operational agility, efficiency, and effectiveness
- Consistent service and performance

Decision-Making — e.g., Risk-Based Decision-Making Strategic Initiative

- Culture and structure that facilitate effective implementation of risk-based decision-making, including Compliance Philosophy

You can probably see how our cultural and structural changes are mutually reinforcing, and how both aspects of the transition contribute to a Flight Standards Service with greater accountability, better use of resources, and change readiness. So the change we *do* want you to notice is what we have already been hearing from some of our industry stakeholders. From my vantage point, the conversation with industry has changed for the better. Our stakeholders are noticing that we are responding in a different way, with a greater amount of service, and with better care and quality. I hope and expect that your experiences with Flight Standards will be similar.

I also hope and expect that you will also see us continue to improve. You've probably heard it said that "the future is now." What that means to me — and for the FAA Flight Standards Service as a healthy organization — is that the future is the result of what we do right now. So I want to see us get better still at practicing our new cultural norms, and creating a Flight Standards Service that is truly agile, efficient, and consistent in our service to you. We owe you that, we are ready to deliver. **AMT**

JOHN DUNCAN is the Executive Director of the FAA Flight Standards Service.

UNDERSTANDING NDT FOR AIRCRAFT MROS

Fatigue cracks and corrosion will continue to be threats to aircraft reliability and uptime. High-quality inspection and NDT testing serves as the first line of defense.

By Daniel Richard

DANIEL RICHARD is technology manager at Zetec Inc., a global leader in nondestructive testing technology for aerospace, oil and gas, power generation, and other industries. Zetec is based in Snoqualmie, WA.

WHEN THE FEDERAL AVIATION ADMINISTRATION enacted rules on widespread fatigue damage (WFD) and the commercial use of older airplanes, it gave MRO managers insight into the structural performance testing that takes place before components ever see a flight line.

By and large, OEMs conduct these tests in controlled environments — big spaces where individual pieces and joints are methodically subjected to both nondestructive testing (NDT) and teardown over an extended period of time.

It's a different situation for MRO applications. An inspection for surface and sub-surface cracks, corrosion, impact damage, and other irregularities on in-service aircraft has to be fast and accurate without having to dismantle components or increase downtime.

NDT has been an important tool in aircraft MRO going back decades, but it's a broad category of inspection techniques. For operations that contract NDT services or perform their own tests, it's critical to understand the different NDT techniques typically used for aircraft MRO.

PENETRANT TESTING

Liquid penetrant testing (PT) remains one of the most common nondestructive methods to identify surface-breaking defects and discontinuities in metal and other nonporous materials. PT involves applying a colored liquid and allowing it to be drawn into minute surface openings by capillary action. Defects become visible under UV light or by the contrasting color of the dye being used.

Magnetic particle testing (MT) uses magnetic fields to locate surface and near-surface discontinuities in ferromagnetic materials. Very fine ferromagnetic particles are applied to the metal and are drawn into discontinuities on the surface, which indicate the presence of defects to the technician.

PT and MT are generally considered affordable and effective NDT techniques but each has its limitations.

EDDY CURRENT INSTRUMENTS: WHAT TO LOOK FOR

For aircraft MRO operations, a handheld eddy-current instrument and the right probe will produce fast, accurate inspections and provide results in a digital format so you can record and analyze them. Here's what to look for:

- **Dimensions:** A small, lightweight, and ergonomically designed instrument will be more portable, comfortable to handle, and easier to use in tight spaces. Look for an instrument where the center of mass is close to your hold point in order to avoid arm fatigue.
- **Display:** Look for a display with at least a 5-inch diagonal screen that can handle a range of modes — for example, two signals side by side, or a reference signal and a live test signal simultaneously. A touch screen provides added functionality and convenience.
- **Connectivity:** Look for an instrument with USB, Wi-Fi, and/or Bluetooth connectivity and multiple EC channels to support different probe types.
- **Power:** A minimum eight-hour battery life can power the instrument during an entire shift without recharging.
- **Memory:** The ability to store different test configurations will reduce inspection setup times.
- **Software:** The software should support single and dual frequency eddy current, rotating scanners, and conductivity with the viewing tools of Lissajous, Waterfall, C-Scan, and bar charts. Fast access to filters and the ability to manipulate signals and views for each application are also important capabilities. The ability to perform eddy current surface array inspections is a key differentiator for inspection time savings.
- **Comfort:** A sunlight-readable display with a wide viewing angle, buttons, and controls you can use with gloved hands, an ergonomic form factor, a strap, and/or other accessories for ease of handling — these "comfort" features can make the inspector's job easier.

CONNECTED TO an NDT instrument, a surface array probe can conform to a variety of surface variations including curvatures and weld beads, and can help generate a digital record of pitting, cracks, and other defects.
ZETEC

PT testing can only detect surface cracks and requires the purchase, handling, and disposal of chemicals. MT testing is effective only on ferromagnetic materials. Both techniques — including surface prep and cleanup — are time consuming and test results can vary depending on the skill and patience of the inspector, especially when the work environment is hazardous, uncomfortable, or hard to reach.

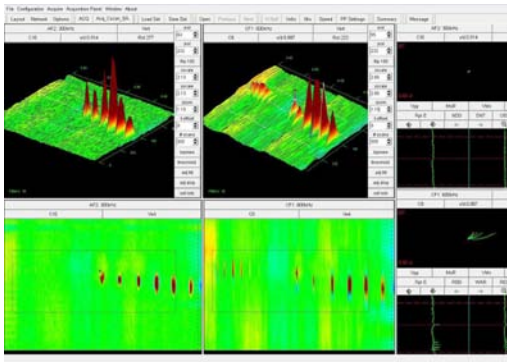
EDDY CURRENT TESTING

Eddy current testing (ECT) is a nondestructive technique that's capable of detecting surface and sub-surface defects including cracks, corrosion, and heat damage in conductive materials with a high degree of precision while at the same time producing a digital record of the results. In aviation, ECT is used to inspect skins, stringers, frames, rivet holes, tubing, and many other ferrous and nonferrous components. A good example of this technique is the inspection of a fuselage lap splice.

In simple terms, a probe or coil applies an electromagnetic field to metal which swirls through the material in loops, like eddies in a river. Any cracks or changes in thickness or metallurgical structure will distort the flow; these distortions are captured and analyzed by an instrument and displayed for the technician to review.

Factors other than flaws can affect the response from a probe, including the conductivity and permeability of the metal and the geometry (edges and curves) of the piece being inspected.

Under comparable conditions and with a skilled technician, single-coil eddy current testing and PT will produce comparable pass/fail-type results. However, a handheld eddy current tool with a C-scan display can present a digital "big picture" and help inspectors find more defects in less time.



NDT ANALYSIS software graphically depicts disruptions in the flow of eddy currents through material. Changes in current flow can indicate cracking and other defects that are otherwise not visible to the naked eye.
ZETEC

The NDT industry's more advanced instruments can conduct dual-frequency testing, digital conductivity testing, and nonconductive coating thickness measurement, and can also generate digital records for advanced analysis and reporting.

The choice of probe is also important. There are eddy current probes for specific aircraft applications like rivets, lap splices, and welds. For example, a dedicated bead seat probe lets users inspect the bead seat on a wheel with only one pass.

MULTI-COIL ARRAYS

Multi-coil arrays take eddy current technology many steps further.

Array probes have multiple coils in the same probe assembly, positioned at longitudinal, transverse, or off-axis orientations and firing at coordinated times. With an array probe, users can capture more information in a single pass, and dramatically increase the speed, accuracy, and repeatability of nondestructive tests, especially on large inspection areas. The inspection changes from a manual process that lasts several minutes to a more automated one that takes seconds.

Today the market is shifting toward multi-coil probes that can be used in a range of applications, which makes them feasible for anyone who wants faster, more accurate inspections.

Take, for example, a simple weld. If the average PT inspection on a 1-foot section of weld takes 30 minutes not including cleanup, the same inspection with a single-coil eddy current probe would take less time but still require the technician to scan the weld multiple times with a probe in order to complete the job.

With an advanced handheld multi-coil

probe and an NDT instrument, the technician could scan the body of the weld, toes, and heat-affected zone all in one pass. The entire scan might take less than three minutes, with a higher probability of detection.

COMPOSITES

Defects in carbon fibre-reinforced plastics (CFRP) and other composite materials tend to be more complex than those in metal.

With composites, cracks can occur on the surface or beneath the surface — and in different layers or plies — with no predictable orientation. De-lamination defects can occur and propagate quickly especially in components where a laminate is loaded through the thickness, like at spar or stringer runouts. Furthermore, failure can be sudden and catastrophic with no warning or obvious signs of fatigue.

Adding to the challenge, composite components tend to be large pieces with complex shapes and varying thicknesses.

Phased-array ultrasonic testing (UT) is the preferred NDT inspection method for composite materials. A phased-array UT instrument generates pulses of high-voltage electricity which are converted to high-frequency ultrasonic energy by a transducer. The transducer emits pulsed sound waves into the material at precise intervals and set angles. When these ultrasonic waves encounter a defect or discontinuity, some of that energy is reflected back from the flaw surface like an echo.

A dedicated probe configuration, a high-performance phased-array UT instrument, and advanced software can deliver accurate, detailed results about the depth and size of flaws in composite materials quickly without special skills or robotics.

Because some sort of coupling agent (typically water or a gel) is required between the probe and surface of the part to guarantee a high-quality reading, phased-array UT is more common for OEM applications. However, given the increasing use of composites and the effectiveness of phased-array UT on these materials, MRO managers and NDT technicians should become familiar with this technique. Its aircraft maintenance and repair applications are bound to grow.

Although materials and components evolve, fatigue cracks and corrosion will continue to be threats to aircraft reliability and uptime. High-quality inspection and NDT testing serves as the first line of defense to identify problems so users can make informed decisions and timely repairs in the maintenance bay. **AMT**

USING BLOCKCHAIN TO REINFORCE AVIATION ASSET MANAGEMENT

BAS DE VOS is director of IFS Labs; he is responsible for positioning and communicating the company's innovation projects to illustrate the future of enterprise software. Bas and his team research and develop ideas that derive from concepts and technologies beyond the context of traditional enterprise IT. For more information visit www.ifsworld.com.

A modern airliner consists of roughly 2 to 3 million parts. It is crucial to know the provenance of these parts in order to ensure they have the right specification and that they are not counterfeit.

By Bas de Vos

BLOCKCHAIN IS ONE OF THE most discussed and intriguing technologies out there today. I will not go too deeply into the specifics of how it works since that has been covered by many other sources. Suffice to say that it is a huge, global distributed ledger or database running on many devices and open to anyone within the blockchain. In the blockchain, information, or anything of value can be stored. Its purpose is to ensure a 100 percent secure, verifiable, and traceable database protocol.

So far, most use cases have been focused on the financial sector, including transaction management where costs are reduced by keeping property ownership and records or using it to track high-value goods, such as diamonds. There is, however, a huge untapped market in asset management — specifically in the commercial aviation industry.

AVIATION – A HIGHLY REGULATED MARKET WITH COMPLEX SUPPLY CHAINS

A modern airliner consists of roughly 2 to 3 million parts. It is crucial to know the provenance of these parts, i.e. original manufacturer and exact product model and version, in order to ensure they have the right specification and that they are not counterfeit. In addition, many of these parts are so-called "tracked items." Not only their provenance, but the entire maintenance history of these parts needs to be transparent.

Today, the many participants in an asset's lifecycle — from manufacturers to transporters, maintainers, and operators — each have their own disparate systems for managing assets. Consequently, it's quite difficult to establish and maintain a single version of the truth when looking at that asset's entire lifecycle. Often, these records can be incomplete or nondigitized, where communication between the different participants is often conducted on paper or even verbally. Lack of standardization leads to limited traceability and the cost for noncompliance can be high.

But what if all of these participants submitted a transcript of the transactions into a purpose-specific, distributed ledger — like

blockchain — which only authorized participants would have access to?

The manufacturer would initially start the blockchain for the asset and each participant would add the relevant blocks to it. The distributor would let the chain's participants know that the asset was transported from point A to point B, while the operator would register the number of flight hours that the asset has undergone.

Using blockchain for this asset management scenario would give you a 100 percent verifiable, traceable, and trustworthy history of the asset's lifecycle in real-time. Each individual participant in the chain still has the features and benefits of their own business applications to run their business.

POTENTIAL BENEFITS FOR THE BLOCKCHAIN PARTICIPANTS:

- Improved data quality through minimized need for manual data entry by the various participants
- A single, traceable record of serial numbers
- Complete and more accurate maintenance history
- Increased trust between service providers, suppliers and operators
- Reduced cost for compliance
- More flight hours for the aircraft due to improved reliability of parts

INTEGRATION IS KEY

So how can we achieve these benefits? There are several players that need to work together to make this happen: the technology providers must work together with the regulating authorities, such as the FAA, and the airlines and their partners, as well as with software vendors. We all need to work together and be willing to share information to integrate with the blockchain.

We're not there yet, as there are still several challenges to overcome. Things like technical performance need to be considered, as latency of transactions and computing power could stand in the way for achieving consensus within a chain. Data ownership, privacy, and security must also be addressed.

There are certainly a few things to consider before blockchain succeeds in asset management, but there is huge potential and a possible competitive edge for those who are willing to get in on the ground floor. **AMT**

S.A.F.E Structure Designs has been awarded the contract to design, engineer, and manufacture custom maintenance platforms for the United States Coast Guard's (USCG's) fleet of MH-65's in Elizabeth City, NC.

JLG Industries Inc. opens a new service center in Rock Hill, SC. The 13,800-square-foot, seven-bay facility will inspect, maintain, and repair all brands of lift and access equipment at the JLG facility or on location at a customer's jobsite.

SHOP EQUIPMENT

Mobile Work Platform

Spika Design & Manufacturing Inc.

No stairs, no electricity, no hydraulics, no problem with Spika's mobile Terra Series work platform. Step onto the deck from ground level, and remain on deck while it raises to working level. Raise the deck manually or with the use of a cordless hand drill. Four telescopic legs at each corner provide unmatched stability during any stage of extension. Customize the deck with Spika's Thinline extensions for even more flexibility and freedom.

For more information call (888) 915-5678 or visit www.spikamfg.com.

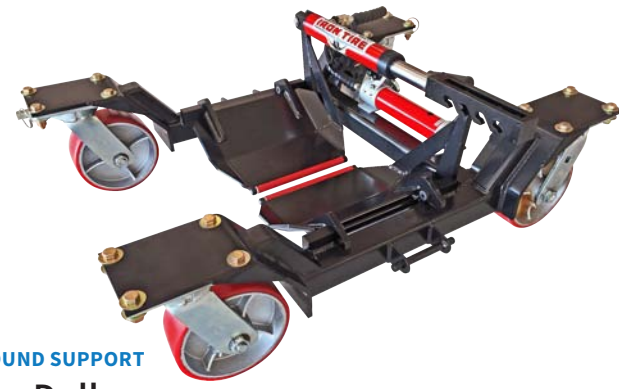
TOOLS

H-60 Bridge Tool Kits

Varley USA Inc.

The H-60 Bridge Tool Kit contains specially designed tools for the removal and installation of "5-Pack" (gearbox, two engine input and two accessory drive modules) components that include forward and aft bridges, bellcranks, tie rods, eccentric bushings, and longitudinal support assemblies on the H-60 helicopter. The H-60 platform includes all models of the Blackhawk (USA), Seahawk/Knighthawk (USN), Pave Hawk (USAF), Jayhawk (USCG) and the White Hawk (USMC, Marine One).

For more information on the H-60 Bridge Tool Kit visit: www.varleygroup.us/products/mro-tools.



GROUND SUPPORT

Tire Dolly

AERO Specialties

The AERO Specialties Iron Tire aircraft flat tire dolly is specifically designed to be used on airplanes with a flat tire, making it quick and easy for any one-person to recover a disabled aircraft from the flight line. This ability to easily move disabled aircraft ensures that your runway remains open for air traffic.

For more information visit www.aerospecialties.com or call (208) 378-9888.

SHOP EQUIPMENT

Custom Aircraft Maintenance Platforms

Liftsafe Fall Protection Inc.

Liftsafe Fall Protection specializes in engineering custom aircraft maintenance platforms, which are designed to allow access to aircraft nose, engine, wing, fuselage, walkways, tail and vertical stab areas by technicians. The aircraft maintenance stands are designed as rugged long-lasting solutions, which will not compromise aircraft airworthiness. In addition all units are built in accordance with applicable health and safety standards, ensuring the safety and comfort of maintenance workers.

For more information call (800) 977-2005 or visit www.fallsafetysolutions.com/gse.

INSPECTION & TESTING

High-Speed Camera

Fastec Imaging

Fastec Imaging's TS5 handheld high-speed camera enables you to record any gears, motors, engines, or other rotating equipment moving at high-speed and susceptible to vibration problems, as well as any other high-speed events for aerospace component testing, performance analysis or troubleshooting using slow motion replay, so you can see what you have been missing with normal speed video. This handheld, portable, battery-operated camera with a large built-in LCD touch screen and an intuitive on-screen menu system puts the power of both a traditional high-speed camera and long-record system into the palm of your hand.

For more information call (858) 592-2342 or visit www.fastecimaging.com.

"HOUSTON, WE HAVE A PROBLEM:"

3 STEPS TOWARD ACHIEVING ACCOUNTABILITY

It is essential for leaders to clearly communicate goals and objectives over and over. The result will be improved accountability.

By Christine Hill

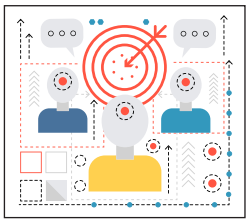
Imagine if the engineers who were responsible for Apollo 13 just stood around waiting for someone else to do something when they heard those immortal words, "Houston, we have a problem"? No way! Everyone was scrambling to find a way to bring our astronauts home safely. It was not someone else's problem. It was everyone's problem and they all took ownership of finding a solution.

Imagine if everyone took ownership of problems and obstacles that occur each and every day in aviation workplaces! How do we create an environment where team members collectively step up to achieve results and engage others in doing the same?

In today's complex work environment, it is very easy to feel that we have no control over situations. So we blame it on the economy, the government, the boss, the front line, the tools or the computer, etc. Some of the common symptoms that an individual or organization is not accountable for their results:

- Blaming others and pointing fingers
- Blaming policies or work equipment
- Discussions of problems focus more on what *cannot* be done rather than on what *can* be done
- Feeling that you have been treated unfairly and thinking you cannot do anything about it
- Spending a lot of time talking about things that cannot be changed
- Citing confusion as a reason for not taking action
- Saying things like: "It's not my job;" "There's nothing I can do about it;" "All we can do is wait and see;" or "Just tell me what you want me to do"
- Spending valuable time crafting a compelling story detailing why you were not at fault

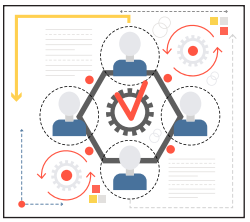
It is very easy to see and feel the above symptoms within our environments, but it is not as easy to find ways to overcome these symptoms. Here are three steps toward building a more accountable team:



STEP 1: SET, MANAGE, AND SHARE EXPECTATIONS

In a dynamic and constantly moving and shifting "service world," the key focus for accountability must be complete "service delivery" by setting, managing, and sharing expectations (with both internal and external customers). Without completely understanding, defining, and communicating expectations, it will be difficult to maintain reasonable, credible, and fair accountability standards. Accountability requires definition by leadership. It is not easy and it needs constant vigilance and nurturing. Assumptions are accountability's worst enemy. It is essential for leaders to clearly communicate goals and objectives over and over. The result will be improved accountability. Please do not fall prey to the idea that only the people at the top with big titles are leaders. Anyone can be a leader in his/her workplace environment.

CHRISTINE HILL, executive vice president and co-founder of ServiceElements, has been in teaching, facilitating, and coaching for 30+ years. She has a Master's in psychology/education from Northern Arizona University and is passionate about helping organizations, teams, and individuals with development of human interaction skills.

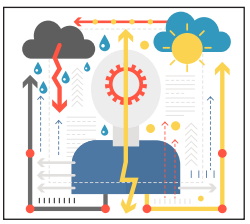


STEP 2: DRIVE SERVICE & SAFETY ACCOUNTABILITY THROUGH PEER PRESSURE

Those teams and organizations that are most successful have a service and safety culture driven by the entire organization, not just management. Accountability is not just the responsibility of leadership/management. Focus on the expectation that *all* are responsible for safety, service, and the organization/team's success. Potential problems should be identified and dealt with quickly by questioning one another's approach without hesitation. Everyone is on the same page understanding that no one will accept an individual who is not carrying his/her weight.

Trust and respect is required among all team members for this step to be successful. If there is trust and respect, then team members will not be easily offended. Everyone understands that it is not personal, but an effort to hold the culture to the highest standard (for the good of all).

Remember that positive peer pressure is almost always more powerful than negative feedback from leaders.



STEP 3: DO NOT TOLERATE BAD ATTITUDES

Having a bad attitude is the art of looking for trouble and finding it everywhere. Once a bad attitude is tolerated, it can begin to infect a culture. It is then difficult to keep it from spreading. Attitude makes the difference between a good team member and a bad team member. It can create resentment among team members who have different standards of performance.

Once again, leadership/management cannot be the only ones weeding out those with a bad attitude. It is important to hire for attitude. However, there are some "bad 'tudes" that can interview well and slip through the hiring process. There are also team members that can develop bad attitudes after years on the job. In successful service and safety oriented organizational cultures, each team member is held to the same high standards (by everyone on the team).

One of the elements that can have the biggest impact on accountability, is the willingness of everyone — team members and leadership — to look into a mirror and answer the questions, "Am I accepting mediocrity from myself?" "Am I accepting mediocrity from my team mates?"

The next time you hear "(Houston … insert your name here) we have a problem," try not to get defensive and think "it wasn't me!" or "it's not my problem!" But instead ask yourself what you can do to help find the solution. ***AMT***

OPS CHECKING IT

Are we sacrificing effective instruction – true, personal, 'lead by example' type instruction – because it is more cost effective not to?

By Stephen Carbone

I read a coffee cup today; it said: Aircraft Mechanics — In God We Trust. Everything Else, We Ops Check. Yes, it's an amusing maxim. However, I've been talking to my students about how improper operations checks in accidents I investigated led to two separate major accidents. So, now it becomes sound advice. How many other problems could we have averted if only an effective operations check was performed? Would better procedures have worked better?

Speaking of ops checking, I'm looking for a job teaching as an A&P instructor — wait for it, I'll tie the points together. One place I asked at only does certain A&P classes through computer internet education (CIE), even if the student is in the same town; distance learning, by another name. No classrooms, no face-to-face, just click and type.

In my day job, I've been easing middle-aged students into the digital technology world as carefully and effectively as I can, e.g. 'writing' on Adobe files, sending lessons to the 'Cloud'; simple concepts all, yet my generation used hard-cover textbooks and carried reams of paperwork home from school. Reading and researching was time-consuming, but words and examples were tangible. More to the point, classes were challenging because if fellow student, Bob, asked a question, it sparked debate in, e.g. Aviation Law. That's the real learning: back and forth between instructor and students.

Now … I'll tie my points together. At what stage do we Ops Check the quality of the A&P students' CIE-type instruction? The likely response: "If they pass the A&P certifications, the CIE was good enough." And there's the rub: technical or trade schools' education should never be 'good enough'. The two accidents I spoke of earlier? The work performed was 'good enough'. The Ops Checks accomplished were — technically — 'good enough'. They did the operations checks right, but there was a breakdown in their communications: Right Tests, Wrong Challenge Replies.

CIE instruction is here to stay; I'm not suggesting otherwise. It's less expensive: no classroom leasing; no automobile travel expenses, e.g. gas, wear-and-tear. Textbooks are easier to obtain when uploaded as opposed to shipping. The school can even cut back on personnel with less facilities to man or maintain.

There are many other benefits, e.g. when I attended school for my Masters, I took a few CIE classes. Fellow students could be anywhere; one guy was on the USS John F Kennedy (CV-67) operating in the Mediterranean; CIE made his Masters education possible. In a 1999 graduate study class, that type of education worked well.

However, my wife is taking graduate studies CIE courses 18 years later; her challenges are different than mine were. CIE procedures have gone through strange evolutions. Instructors respond only through digital communications — no phone calls, even during office hours — and only then at their convenience. If the system goes down, technical support isn't always available; answers to class discussion(s) aren't timely; and if you have a problem with your instructor, the dean or student counselors are only available Monday through Friday, 9 to 5, Eastern Standard Time, right in the middle of my wife's workday.

But that still doesn't answer my original question about Ops Checking CIE instruction … or does it? Every form of education and training has its pros and cons: on the job training (OJT), stand-up instruction, simulator. While humans are involved, nothing will be perfect. That's how it answers my question: these other forms have been proven successful. Why?

With OJT, an instructor gives the benefit of experience to the learner(s) in a straight forward manner. If I (as the learner) had loosened the wrong hydraulic line, my instructor slapped my hand, pointed me to the correct line. He/she never left me to my own devices — that's training on the most personal level.

STEPHEN CARBONE is an avid writer of aviation fiction; his first novel *Jet Blast* has appealed to mechanics, pilots, air traffic controllers, etc. by giving accurate depictions of the accident investigation process. A former airline mechanic, he has been involved in many aspects of commercial aviation and went on to investigate major aviation accidents for the NTSB. A member of ISASI, Stephen holds a Masters degree in Systems Safety from ERAU. His weekly Blog can be found at: https://danieltenace.com.

Stand-up instruction is different, yet not so much. In my classes I try to incorporate accident investigation risk analysis and apply it to surveillance and inspection; I use 'war stories' to reverse the order of events that led to the accident, employ the 'Five Whys' and show my students that things aren't always what they seem. Lessons lead to questions, questions lead to discussions, discussions lead to answers, all within a controlled environment that is conducive to debate. Again, this is training on a personal level.

Simulators of all kinds: full-motion, static and even situational, are a form of OJT mixed with stand-up instruction. Full-motion simulation's advantage: the instructor controls the circumstances; he/she allows the student(s) to apply what they've learned to real scenarios, e.g. navigating a major airport on a rainy night for run/taxi instruction. As the student crosses a runway, a landing 737 comes out of the clouds. After the disaster, discuss the missed options afterward, in safety.

In my experience, static simulation is used with computer-based instruction; it can reproduce a hot start or compressor stall without the real damage or cost of an engine.

Situational simulations give scenarios that force students to use their wits to overcome social, business, or regulatory problems. Then the students analyze, argue, and defend their reactions. All three simulation types: full-motion, static, and situational, are training on a personal level.

My opinion? That is CIE's Achilles' Heel; it's too easy; it joins the rest of the world in being impersonal. Don't want to speak to your date? Go on Facebook or Twitter. Don't want to talk to your employee? Send him a text or email. Don't want to troubleshoot an aileron problem? Ask the aircraft computer. Don't want the expense and trouble of teaching face-to-face? Only offer CIE classes.

Are we sacrificing effective instruction — true, personal, 'lead by example' type instruction — because it is more cost effective not to? If so, it will be years in the future before we see the effects of instructing only through CIE. By then, OJT might mean less. Why? Because we won't have the social skills to make it work right again. In that case, Ops Checking will be the least of our problems. **AMT**

GLOBAL AEROSPACE LAUNCHES AVIATION PROFESSIONAL SERVICES LIABILITY INSURANCE

Global Aerospace now offers aviation professional services liability insurance for the aerospace industry. The coverage will be available to aerospace contractors, aircraft maintenance providers, auditors and engineers, among others.

The liability policy will provide the industry with coverage for financial loss and defense costs arising from acts, errors or omissions in performing aviation professional services. Financial loss arising from these activities is a primary exposure for aviation specialists. For more information visit www.global-aero.com.

OKANAGAN COLLEGE EXPANDS AIRCRAFT MAINTENANCE PROGRAM

A large expansion in the local aircraft industry and national unmet staffing demands has fueled Okanagan College to offer an additional intake of its aircraft maintenance engineering structures program this fall.

Starting on Nov. 14, the program will see up to 12 students step into KF Aerospace's shop space at the Kelowna International Airport to begin training for one of the region's most in-demand careers. Thanks to an accelerated 37-week program, students will be ready to enter the workforce by August. Conditional upon graduating, students will be interviewed and offered jobs in July 2018, a month before the program is even finished. For more information visit visit www.okanagan.bc.ca/ame.

AMERICAN TO BUILD MRO FACILITY IN BRAZIL

Brazil has confirmed a plan by American Airlines Group Inc. to build a maintenance center at Sao Paulo's airport. $100 millon (US)investments will support the U.S. carrier's South American operations.

The deal allows American to use land at the airport for more than 40 years.

PRATT & WHITNEY ADDS FAN BLADE FACILITY IN MICHIGAN

Pratt & Whitney has recently commissioned a new fan blade manufacturing facility at its AutoAir plant in Lansing, MI.

The new 93,000-square-foot facility adds to an already existing GTF fan blade production line in Lansing and is one of 30 dedicated manufacturing, production, or assembly locations across the globe performing work on various parts and components of the GTF engine program.

PITTSBURGH INSTITUTE OF AERONAUTICS COMPLETES $1.3M EXPANSION

PIA invested $1.3M in the construction of a new two-story teaching facility at its Hangar 3 site. This facility includes electrical and welding classrooms, an aeronautics lab, a conference facility, administrative offices, and a student resource center with a computer lab. The adjacent hangar features specialized shop areas for aircraft propulsion systems, electricity, sheet metal, hydraulics, instruments and controls, composite materials, nondestructive testing, welding, and painting.

Since 2006, PIA's Youngstown Branch campus has been training certified and work-ready aviation maintenance technicians with a 16-month diploma program in aviation maintenance technology. For more information visit pia.edu/campuses/youngstown.

NBAA NAMES TRAXXALL PRESIDENT TO MAINTENANCE COMMITTEE

TRAXXALL Technologies, provider of aircraft maintenance tracking and inventory management systems, announces that company President Mark Steinbeck has been named to the National Business Aviation Association (NBAA) Maintenance Committee.

The committee is currently focused on several forward-looking initiatives, including: 'NextTech for NextGen', an initiative that helps the aviation maintenance profession manage the rapid modernization of aircraft navigation, communications and surveil-

lance systems; and the 'ASTM International Standards Initiative', which develops new standards for the training and certification of aviation maintenance professionals.

MACHIDA TO HOST LIVE ENGINE DISPLAYS AT NBAA

Experience the Machida live engine display at this year's NBAA Central Hall, Booth C12811. It will be hosting the Pratt & Whitney PT6, the Allison 350, and TurboMeca engines.

It will also be showcasing its Pratt & Whitney approved PWC34910-109 3mm video borescope, and its borescope from the CTE Kit, perfect for your GE engine inspections, the 4mm VSC-4-140-NLT with removable 90-degree FOD resistant adapter.

CAREERS IN BUSINESS AVIATION DAY AT NBAA

The National Business Aviation Association (NBAA) will host its popular annual Careers in Business Aviation Day on Thursday, Oct. 12 during the NBAA Business Aviation Convention & Exhibition (NBAA-BACE) in Las Vegas, NV. Career Day, a free event for all registered students, faculty and chaperones, kicks off at 9 a.m., and will feature a special keynote presentation, followed by the College/University Roundtable session, as well as opportunities for students to visit the NBAA-BACE exhibit hall and static display of aircraft.

DUNCAN BREAKS GROUND ON UTAH MAINTENANCE FACILITY

Duncan Aviation has begun construction on a new business aircraft maintenance, modifications, and paint complex at its Provo, UT, location.

Building on nearly 45 acres of land at the Provo Municipal Airport, Duncan Aviation will add nearly 275,000 square feet of buildings with a 222,000-square-foot maintenance and modifications center and a 53,000-square-foot paint facility. The facility, which will cost over $70 million, is expected to be completed by the end of 2019.

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Terri Petitt, Director, Audience Development — September 15, 2017

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EDUCATION & TRAINING

DUTY BOUND: IMPORTING AIRCRAFT PARTS INTO THE US

Under the Agreement on Trade in Civil Aircraft (CAA), many civil aviation products and parts are exempt from import duties

CHRISTIAN A. KLEIN is the managing member of Obadal, Filler, MacLeod & Klein, P.L.C. overseeing the firm's policy advocacy practice. He represents trade associations as a registered federal lobbyist and provides strategic communications and legal counsel services to clients. He is executive vice president of the Aeronautical Repair Station Association and represents the American Concrete Pressure Pipe Association.

THE UNITED STATES HAS A POSITIVE BALANCE OF trade in aviation maintenance services. That means a lot of aviation products and articles come into the country from abroad for repair. The good news is that under the Agreement on Trade in Civil Aircraft (CAA), many civil aviation products and parts are exempt from import duties. The bad news is that confusion about the rules has forced maintenance providers to devote considerable resources to navigating Customs regulations and dealing with conflicting views of exporters, importers, and government agents.

One major question has been whether the part being imported for maintenance must be airworthy at the time to qualify for duty-free treatment. ARSA's view is that under the CAA and applicable U.S. rules, airworthiness isn't a criterion. To understand why, you need to know a little bit about the legal landscape in this area.

FIRST A TREATY, THEN A REGULATION

The CAA is part of the Tokyo Round of international trade negotiations; it entered into force on Jan. 1, 1980. The signatory countries (including the United States) agreed to eliminate customs duties on articles used in civil aircraft and aircraft manufacture, repair, maintenance, rebuilding, modification, or conversion. The agreement also eliminated duties on civil aircraft maintenance activities.

The CAA covers civil aviation products and articles. The term "civil aircraft" is defined in the agreement by negation, that is, to mean all aircraft other than military aircraft.

The Harmonized Tariff Schedule of the United States (HTSUS) is maintained by the U.S. International Trade Commission (ITC). It is the primary resource for determining the proper tariff (customs duty) classification for imported goods. General Note 6 prescribes what must be done to enter products duty-free under the CAA and defines the term "civil aircraft" for purposes of the tariff schedule.

The primary applicable Customs regulation is 19 CFR §10.183, which explains, among other things, what qualifies for the exemption, how to claim duty-free treatment, and the required certifications and documentation that must be maintained. The rule applies to aircraft, aircraft engines, and ground flight simulators, including related parts, components, and subassemblies, that qualify as civil aircraft under General Note 6(b) of the HTSUS.

To qualify for duty-free treatment the item must be used as original or replacement equipment in the design, development, testing, evaluation, manufacture, repair, maintenance, rebuilding, modification, or conversion of aircraft. The article must also be:

(1) Manufactured or operated pursuant to a certificate issued by the FAA under 49 U.S.C. §44704 ; or

(2) Covered by an application for such a certificate, submitted to and accepted by the FAA, filed by an existing type and production certificate holder pursuant to 49 U.S.C. §44702 and FAA regulations; or

(3) Covered by an application for such approval or certificate which will be submitted in the future by an existing type and production certificate holder, pending the completion of design or other technical requirements stipulated by the FAA .

AIRWORTHY OR NOT?

There is no requirement in the regulation or HTSUS that the part be airworthy and Customs rulings support that position. For example, in 2005 Customs examined the tariff exemption for parts removed from a foreign aircraft sent to the United States for repair. The government concluded: "if the parts at issue are either FAA certified or approved for use on a civil aircraft and are imported for repair to be used in the same manner, then the importation of the parts would qualify for duty-free entry under the Civil Aircraft Agreement."

DOCUMENTING AND PAPERWORK

19 CFR §10.183 provides details on how to claim, certify, and document duty-free admissions under the CAA. The rules also require that a claim for duty-free treatment be supported by documentation. The documentation must be maintained in accordance with the HTSUS and Customs recordkeeping requirements (found at 19 CFR Part 163).

RESOURCES FOR INDUSTRY

Confusion about the rules means wasted time and money. That's why ARSA is working with government and industry stakeholders to resolve questions and developing guidance to encourage consistent compliance and enforcement. Keep checking www.arsa.org/regulatory/customs for more information. **AMT**

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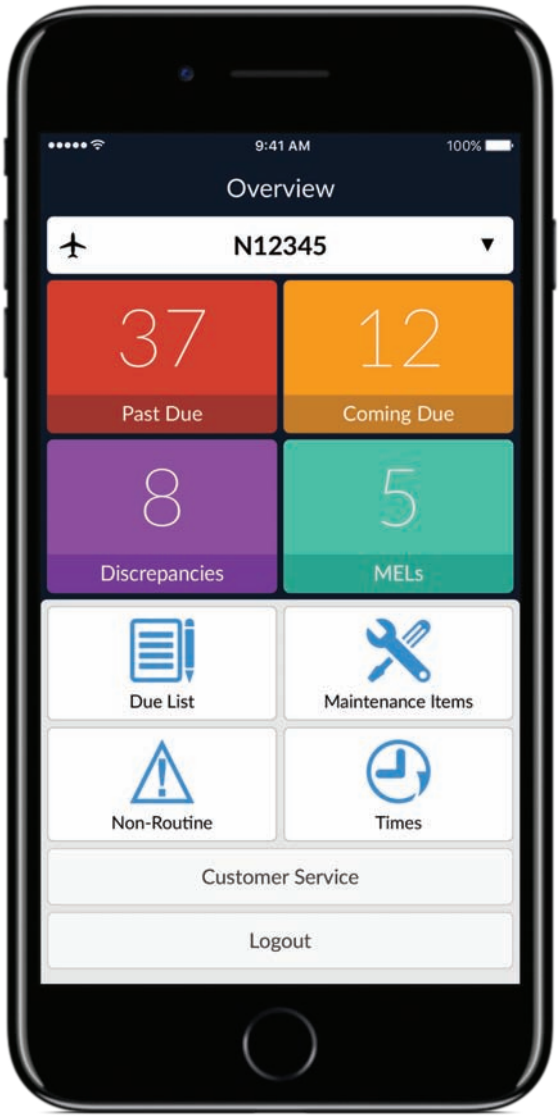

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