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Informing the Maintenance Professional

COMMERCIAL MRO

Heavy Maintenance

Tracking the Trends

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Operations at TIMCO in Greensboro, NC. The HAECO/TIMCO merger will offer additional maintenance synergies to customers.

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MRO Trends in the Transport Category

As airline consolidation continues will MRO consolidation follow?

Returning from the HAI Heli-Expo 2014 aboard a US Airways flight recently, I couldn't help but speculate the eventual impact on airline maintainers and maintenance providers as the flight attendant mentioned, "thank you for flying US Airways, now part of the new American Airlines." As the airline industry continues down the flight-path of consolidation how will the air transport segment of the MRO industry respond; or has it already responded?

Hong Kong-based HAECO's recently announced its intention to acquire U.S.-based TIMCO. HAECO's widebody capabilities and TIMCO's narrowbody capabilities combined will create one of the world's largest MRO airframe providers. Will we see more mega MRO mergers?



For questions, news tips, email comments, email ron.donner@AviationPros.com

Whether a result of business changes due to airline consolidation, or simply the need to expand their capacity, Aviation Technical Services (ATS) headquartered in Everett, WA, in late December announced an agreement to lease a portion of the KCI Maintenance, Repair and Overhaul Base at Kansas City International Airport. ATS plans to create more than 500 new jobs over the next three to five years with potential for double this number.

In this issue of *Aircraft Maintenance Technology*, Jerome Chandler discusses some of the trends we are seeing in the large aircraft MRO segment with interviews from key industry leaders. Eugene Gerden also explores the Russian MRO industry and describes how companies around the world are looking to gain a presence in this emerging market.

Of course where new aircraft maintenance technicians will come from to meet the demands of the industry is the subject for another time. But John Goglia asserts in his column this month, "*the next 20 years and beyond look like good years to be an aircraft mechanic.*"

The other recent announcement having an impact on the MRO industry you can read more about in this issue is the long-awaited TSA repair station security rule.

This month's *25 Years: Then and Now* feature looks at the avionics and electronics industry and the shift from straight-forward equipment installations to full integration of operating systems in today's modern aircraft. As described in the article, the last 25 years has brought about the introduction of digital cockpits, digital cabins, and fully integrated aircraft systems. Advancements to avionics and electronics have been downright revolutionary.

Enjoy, Ron

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Leaders Lead

Seriously, aviation!

I have had an opportunity to work in some pretty cool industries over the span of a 25-year magazine/media career. I rode the rails in the railroad/intermodal industry then hit the water while working on boating magazines in the '80s and '90s. In the 1990s, I launched my own publishing business in Southern California before moving to the coatings industry. I was then approached by an association to build a new magazine and in this role I created and ran a magazine, handled trade show sales, and operated a live summit event. After this incredible ride, I now get to take to

their organizations' success. What I found refreshing at my first aviation event, the Airport Planning, Design and Construction Symposium put on by Airport Consultants Council (ACC) and American Association of Airport Executives (AAAE) in Denver, is while airport leaders were the ones in attendance describing their airport projects, these leaders used words like teamwork and collaborative effort in their presentations. Time after time, we heard they couldn't have done these projects without their teams.

Over my career, I have learned that the most successful leaders in any

to yourself. Praise your team and give them recognition for the work that they do.

The Cygnus Aviation Group has at its core an incredible team; a team ready to help you lead your teams to an incredible future. *Aircraft Maintenance Technology* is part of this group and we plan to use the benefits of our incredible multimedia capabilities to help you lead your teams to successful outcomes. Our staple of aviation magazines, which also includes *Ground Support Worldwide* and *Airport Business*, offer in-depth insight into the aviation market while our website, www.AviationPros.com, is accessed by more than 200,000 visitors a month! If you are one of the few not using this incredible resource, visit www.AviationPros.com today and see what you are missing (make sure to sign up for the daily eNewsletters). Our industry-leading magazines and digital properties can help you lead your team.

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I welcome your feedback on what you would like to see within the pages of *Aircraft Maintenance Technology* or any of the Cygnus Aviation properties listed at the bottom of this page. Let us help you lead your team to success!

Com'on Aboard!



Brett Ryden

Brett@AviationPros.com

Publisher, AviationPros Group



The Cygnus Aviation Group has at its core an incredible team; a team ready to help you lead your teams to an incredible future.

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Leadership is the one commonality I've found within all the industries I've been a part of. At the core of every successful organization be it a publishing company, a railroad, a boating manufacturer, an airport or an aviation MRO — is strong leadership that propels the operation toward a common goal.

The phrase "leaders lead" knows no boundaries. But while it's true that good leaders step up and take charge, great leaders look closely at their teams and rely on each and every member for

industry typically have a strong support structure in place and utilize every member of their teams to their fullest potential. How do you do this?

- **Serve as an inspiration.** Paint a vision for the future that others want to be a part of.
- **Support your team.** Promote a safe environment for them to speak up, take risks, and make decisions.
- **Engage team members in all that you do.** Offer challenges and seek out their ideas and contributions.
- **Recognize team members for a job well done.** Don't keep the accolades

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LYCOMING



Sikorsky HH-60J.

PHOTO COURTESY OF THE U.S. COAST GUARD

SIKORSKY AIRCRAFT AND U.S. COAST GUARD:

70 Years of Lifesaving Missions

The durability of the helicopter, coupled with USCG's maintenance program, and Sikorsky's integrated support have been instrumental

By Alicia Hutchins

Embodiment of founder Igor Sikorsky's vision of the helicopter as a life-saving instrument, Sikorsky Aircraft celebrated 70 years of lifesaving partnership with the U.S. Coast Guard in November 2013.

The U.S. Coast Guard has eight domestic locations, and its aircraft fleet includes 42 Sikorsky MH-60 SEAHAWK variants known as JAYHAWK helicopters. Since the mid-1990s, the fleet has accrued more than 514,000 flight hours.

Engineering and aftermarket support

The longevity of this relationship serves as testimony in part to Sikorsky's innovative engineering, offering some of the best search and rescue (SAR) and MEDEVAC helicopters in the industry. Yet, the best aircraft in the world is only as good as the crew that flies it and the support services that enable its full capabilities. Sikorsky's aftermarket

support offers integrated and comprehensive solutions tailored to customers' fleet and mission requirements.

The Coast Guard has a five-year renewal maintenance contract that includes made-to-order spares, and overhaul and repair of dynamic components such as blades, transmissions, and rotors. The traditional sustainment contract offers a dedicated engineer, program manager, and field service and logistics support representatives.

"Our expertise in supply chain management is built on an extensive network of more than 1,600 suppliers. The key to aircraft support is based on parts availability, and we provide the exper-

tise and material support foundational to mission readiness," says David Adler, vice president of strategic partnerships.

The durability of Sikorsky's JAYHAWK helicopter, coupled with the Coast Guard's meticulous maintenance program and Sikorsky's integrated support, have been instrumental in lifesaving missions the past seven decades.

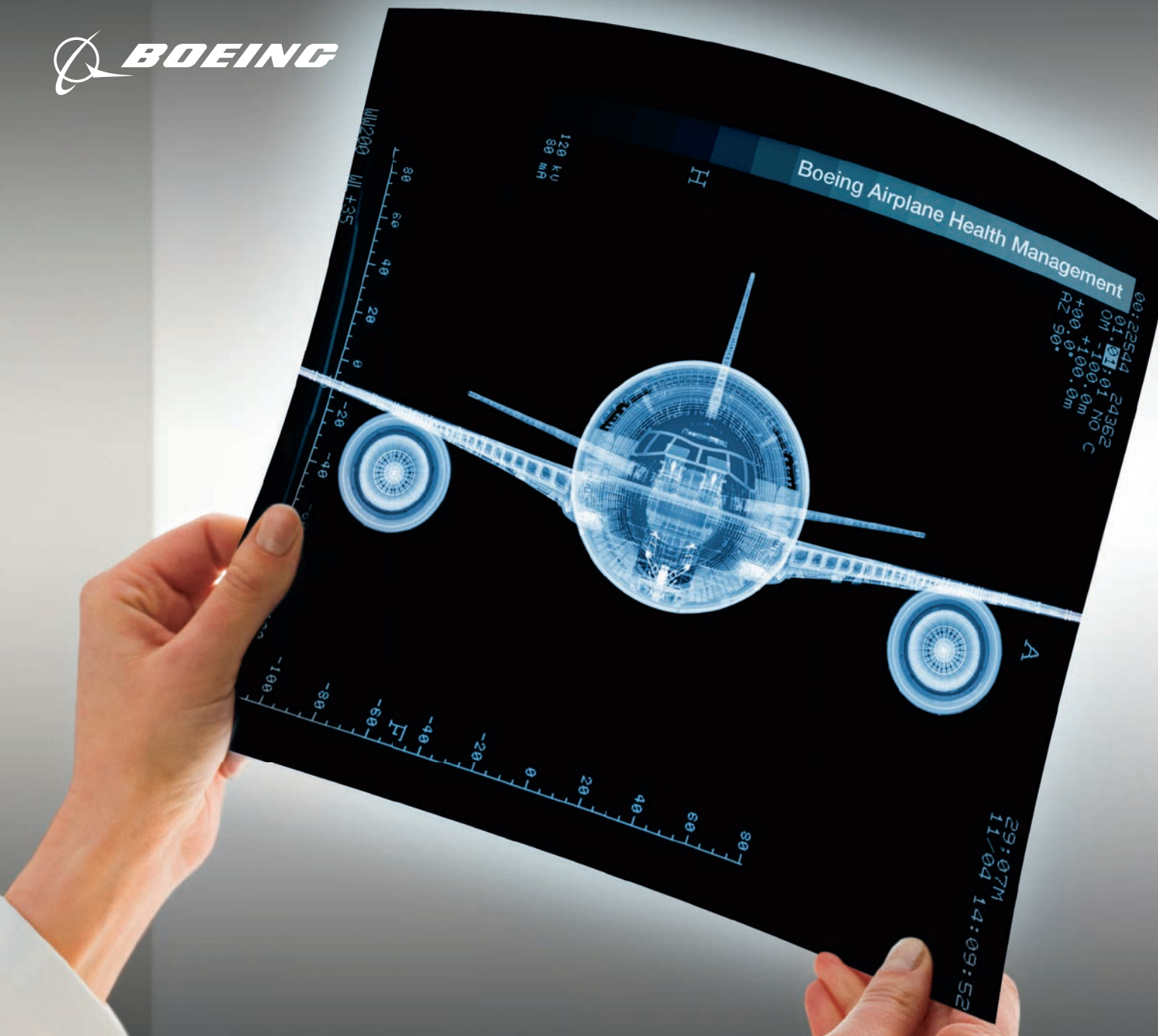
Analyze fleet data

Supporting Sikorsky's military and commercial customers, the company's Fleet Management and Operation Centers analyze fleet data, observing specific trends that help identify components with degraded performance.

This data mining enables timely and accurate maintenance recommendations. The data is also used to inform engineering and enhance aftermarket supply chain management processes. The goal is to provide an aircraft operator the opportunity to perform necessary maintenance before unplanned component failures disrupt flight operations.



ALICIA HUTCHINS is senior marketing/communications specialist for Sikorsky Aircraft. For more information visit www.sikorsky.com.



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Sikorsky S-76 medical helicopter.

"We want to turn unplanned maintenance into planned maintenance," says Adler. "To date, our efforts have contributed to a variety of benefits: predictive health monitoring, focused troubleshooting, new condition indicators, and component overhaul interval extensions."

While the U.S. Coast Guard's civil support role focuses on coastal SAR missions, and the U.S. Air Force on its crash rescue missions, the U.S. Army employs Sikorsky BLACK HAWK HH-60L/M medically equipped air ambulance helicopters to transport wounded military

Sikorsky S-76 helicopter with LifePort's advanced life support system (ALS). Sikorsky acquired LifePort in 2010.



personnel, and to perform civilian rescues supported by the National Guard.

In the field resources

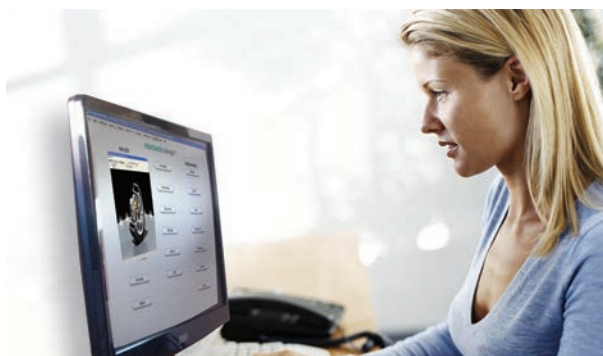
The Sikorsky HH-60L/M helicopters are supported by various contracts that provide for spares, overhaul and repairs, technical and logistics field support, and manuals — including the latest updates. Deployed aircraft are supported by joint Integrated Program Teams that bring together engineering, field, and logistic

support expertise to provide a single, dedicated resource for issues in the field.

"Most daily aircraft maintenance is done as planned maintenance," notes Adler. "By using our advanced Health Usage Monitoring System (HUMS) and other data sources, we also perform preventive maintenance. Operators are able to maximize aircraft usage while allowing maintenance to be performed proactively as a lower cost planned event.



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“Operators are able to make fact-based decisions about maintenance, aircraft utilization, and fleet performance using these tools.”

Life support and patient safety

In 2010, Sikorsky expanded its product and service portfolio by acquiring LifePort Inc., based in Woodland, WA. Offering high-quality turnkey solutions for military and commercial customers worldwide, LifePort features an extensive and proven history as a premier OEM for aftermarket mission equipment for both fixed and rotary wing aircraft.

Among its many products, LifePort offers high-quality state-of-the-art solutions for improving patient safety and survivability in medical transport missions. LifePort's Patient Loading Utility System (PLUS) is viewed as the standard by which all multi-mission medical systems are judged.

LifePort's products include rotating stretchers and integrated medical systems for rotary and large fixed-wing aircraft.

The Stanchion Litter System (SLS) is LifePort's newest generation medical product, used to transport patients on a variety of military air cargo aircraft such as the C-130®, KC-135, C-17 and C-5. A secured five-year, fixed price, indefinite quantity contract with the Defense Logistics Agency facilitates SLS availability for broad purchase by the U.S. government and international military customers.

Of particular note is the version of the SLS that was designed for the BLACK HAWK, which is the lightest,

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Fixed wing aircraft with stacking litter systems and stretcher interface module (SIM) units.

most advanced three patient litter system. Its modular design offers a simple five-minute install or removal without requiring any structural modifications to the aircraft.

LifePort also provides some of the market's most extensive Advance Life Support (ALS) systems. These low-maintenance systems range from replaceable components to full multi-mission medical units. LifePort systems are designed to specific customer requirements and support mass-casualty, accident scene response, and a multitude of other MEDEVAC missions.

International locations and support

“During the course of the last six years, Sikorsky has expanded its aftermarket management expertise to international

locations, advancing customers' in-country capabilities,” says Adler. “Earlier this year, we announced plans to perform the first post-delivery SAR modifications to Brunei Shell's Sikorsky S-92 helicopter.”

Originally configured for offshore oil missions, the aircraft is currently undergoing a comprehensive conversion to a SAR configuration. The SAR equipped aircraft will provide services to customers in Brunei and the surrounding Southeast Asia region. The modification program is being executed at Sikorsky Helitech, which is the company's facility in Brisbane, Australia.

The aircraft modifications include a new automatic flight control system customized for performing SAR missions; forward looking infrared (FLIR); a dual auxiliary fuel tank system; dual rescue hoist; Triple Patient Litter System

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(TPLS); SAR seats; and a side sliding door large enough to accommodate standard patient litters with unrestricted rescue hoist access.

“The common denominator across all aircraft platforms is increased readiness and lower operational costs,” says Adler, “and Sikorsky offers customized aftermarket programs for our commercial and military customers worldwide.”

OEM-approved parts and maintenance programs for fixed budgets

The Total Assurance (TAP) and Powertrain Assurance (PAP) programs have been specifically developed in response to customers’ requirements to operate their fleets within a fixed, known budget, reducing the risks of extraordinary unplanned costs. Sikorsky’s TAP program covers up to 98 percent of the cost of parts replacement including airframe, dynamic components, avionics, and consumable parts. The program covers corrective and preventative maintenance, including overhaul and repair components.

Contributing to improved aircraft performance as well as enhanced resale value, TAP provides customers with OEM approved parts manufactured to the latest drawings — backed by Sikorsky’s stringent quality system and worldwide distribution network. The program includes manual revision services, supply of parts required to comply with mandatory service bulletins, and access to a parts management tool — Rotorlink. Optional services include: (1) Sikorsky’s HELOTRAC 2X — a maintenance management program that records, manages, and reports essential information for enhanced fleet management operations; (2) transportation costs for both inbound and outbound parts shipment; and (3) spare parts consignment — allowing customers to store parts at their own facilities.

Similar to TAP, the PAP is geared toward operators who wish to take advantage of a fixed cost per flight-hour program but choose to limit the coverage to the major drive train components. PAP covers the repair overhaul of main, intermediate, and tail gear boxes.

The Sikorsky Helitech team in Brisbane, Australia, is working on Brunei Shell’s Sikorsky S-92 helicopter search and rescue (SAR) conversion.

Factors such as aircraft location, mission, utilization, and contract period have an important role in determining the price-per-flight hour of TAP and PAP. By using a rigorous method of calculating the hourly rate and working closely with each operator to define unique needs and requirements, Sikorsky helps each customer make the best decision on securing the optimal support and service solution.

Adler sums up by stating, “Both TAP and PAP, in conjunction with our Fleet Management Operations Center technology, have demonstrated the capability of simplifying the management of material logistics by avoiding uncertainty associated with unpredicted and unbudgeted material costs.”

Regardless of mission — SAR, MEDEVAC, troop transport, surveillance and crowd control, VIP, etc., — maximizing aircraft availability while lowering operational costs remains the common goal.

Sikorsky continues to lead the way in advancing innovative support technology for commercial and military fixed and rotary wing aircraft worldwide. **AMT**



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NATA President
Tom Hendricks

Set the Standard

NATA President Tom Hendricks shares his thoughts on what it will take for the United States to continue to set the gold standard for aviation. Commitment, education, improvements, and funding, he says, all play a role in U.S. aviation's continued success.

By Ronnie Garrett

Tom Hendricks remembers his first solo flight like it was yesterday. "It was in a Cherokee 140 in Hamilton, OH," he says. "And it was completely unexpected."

He explains he had a crusty old flight instructor who didn't shy away from pointing out his flaws, and he had convinced himself he would never please him enough to fly solo. But on that day, his instructor stepped off the plane and told him to "keep it running."

"The flight was fabulous and a huge confidence builder," he says. And, that early flight filled him with a passion for aviation that never left.

Hendricks followed his heart and made aviation his career. The retired Air Force Reserve colonel and career fighter pilot also served on active duty as a U.S. Navy officer on the USS Midway (CV-

41) and as an instructor pilot at the U.S. Navy Fighter Weapons School. He oversaw day-to-day flight operations at Delta Air Lines as director of line operations then moved to a position with Airlines for America (A4A). Today he spends his time as the president of the National Air Transportation Association (NATA), a position he's held since 2012.

He says, "I'm in a great place right now. I love what I'm doing and I'm able to really take advantage of my experience in aviation and help make it better."

But he adds, if he accomplishes anything in his current role, he hopes it is to instill a passion for aviation in young people today. "I view that as a very important responsibility of someone like myself; to make sure we reach out to young people and try to attract them to the industry," he says.

AMT's sister publication Airport

Business sat down with Hendricks at NBAA and discussed NATA's efforts to propel the aviation industry into the future.

What do you believe are the largest issues facing the industry?

Economic uncertainties continue to be the biggest drag on NATA's members. There is a general reluctance to make large capital investments until we have a better understanding of what the future looks like from the overall U.S. global and economic perspective. I think uncertainty continues to dampen large capital investments, which in turn drive business growth and job creation. People are very much in a wait-and-see mode.

As the federal government looks for ways to address its budgetary issues, there are those who predict general and business aviation will be targeted. What can be done to show decision-makers the importance of these segments of aviation?

The federal government is going through a rough period. The FAA gets about \$16 billion from the federal government. The infrastructure is aging. That includes airports, navigational aids, runways and taxiways, and airplanes. We've got to keep reinvesting in this industry that creates so much value, not only for just aviation but for all businesses.

One of the challenges we have is educating Congress and the general public about the importance of all segments of the aviation economy. There is no place like the U.S. in terms of our ability to transport goods and services, the job creation, the freedom we have to fly ... no other place on the planet can bring these sorts of capabilities to bear. We need to continually remind Congress and the public that we have to be careful about taking aviation for granted because it's become ubiquitous.

What is NATA doing to tell the aviation story so everyone fully understands its importance?

We are very coordinated with other aviation associations including AAAE, NBAA, AOPA, GAMA, HAI, EAA; all



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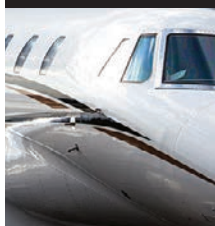
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groups that have a slightly different constituency than us. We take advantage of every chance we have to raise the profile of aviation in any venue we're offered. It is our duty that the public and lawmakers know the importance of aviation to the economy. One example, I routinely use is from my prior life, as the director of line

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National Air Transportation Association (NATA) President Tom Hendricks will be speaking at the Welcome Town Hall Session at AviationPROS Live on Tuesday, March 25.

NATA is also sponsoring the event's two-day FBO Success Seminar, slated to begin the day before the show opens, on Monday, March 24.

AviationPROS Live, slated for March 25-26 at the Sands Expo Convention Center in Las Vegas, is an event designed for aviation professionals. Visitors can learn how to improve safety, boost efficiency and develop their skills through cutting-edge solutions from exhibitors, high-impact education sessions, and invaluable networking opportunities.

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you want to see what the world looks like without a vibrant aviation system go to Africa. You'll see businesses and general aviation aircraft in larger cities but they are largely devoid elsewhere. It's a real economic constraint. People can't move goods and services efficiently. They don't have the means we have here in the U.S. to grow their businesses, because the infrastructure is just not there. I try to draw that contrast to show that what we have in America is a fully developed mature transportation system and we can't take that for granted. We've got to continue to invest in it.

In November, Congress gave final approval to a bill that requires the FAA to streamline the certification methods for smaller general aviation aircraft, advancing an initiative that should reduce the cost of upgrading existing aircraft and bringing new aircraft to market.

Can you discuss why this move was critical to general aviation's future?

We have the safest most comprehensive air transportation system in the world and we've all played a role in that — industry, government, labor, regulators, Congress. But technology is

evolving so rapidly that we were missing opportunities to improve safety performance because our certification processes remained in a legacy mindset. We needed to break free from that ... so we don't have this very bureaucratic process preventing us from bringing new safety enhancing technologies to bear. We don't want the U.S. to lose its competitive edge. We don't want to lose our position as the gold standard throughout the world of aviation.

Do you have any concerns about the industry supply of qualified personnel?

Yes, I do have concerns about the supply of pilots and people in all trades of aviation from air traffic controllers and mechanics to people working on the ramp. We've got to make sure we don't lose sight of the fact that these positions enable commerce throughout the world.

We've got to attract young people to this profession so that it continues to grow and prosper throughout the future.

The FAA rule on pilot flight time causes me great concern. I think a rule that assigns an arbitrary number of flight hours to pilot qualification is flawed. In my 40 years of flying, my experience has been that the quality of the training is the most important factor in whether someone is qualified to fly in a commercial environment. The FAA missed the mark on the rule by assigning an arbitrary number of hours. We should focus more, like other parts of the world are, on the type, structure, and quality of the training pilots are provided, rather than an arbitrary number.

I think we are going to have to come back and revisit that FAA rule in the future because we're going to see a big challenge to fill the flight decks of commercial aircraft. That's going to transfer

down into other segments of aviation as pilots try to work their way up. I've got concerns about other segments as well. We're seeing companies have a difficult time attracting aircraft maintenance technicians. We've got to be very thoughtful when we propose legislation that drives regulation like this.

What can be done to attract people to the industry?

We've got to ensure people are attracted to the industry and that we have an environment where they can get involved in learning to fly, learning to work on aircraft, learning to qualify themselves for air traffic control responsibilities, and so on. It's a solemn responsibility for those of us who've been in the industry for a long time. At the same time, we've got to continually take opportunities to push back on regulations and legislation that work against that goal. **AMT**

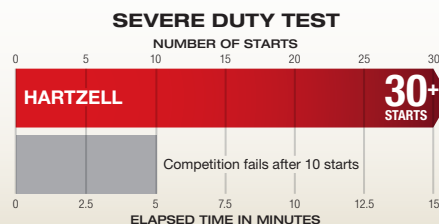


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The MRO at Vnukovo aircraft repair plant, one of Russia's largest aircraft repair plants. Sky Express, Russia's first low-cost airline, was established in March 2006 and merged with Kuban Airlines in 2011.

Russian MRO Industry on Verge of Big Changes

AAR and SR Technics are planning MRO expansions in Russia

By Eugene Gerden

The Russian MRO industry is on the verge of big changes, amid the ever growing demand for MRO services in the local market, as well as scheduled implementation of a series of large-scale investment projects.

For example, the U.S. AAR company has officially started the implementation of an ambitious project, which involves the construction of Russia's largest MRO center, which is expected to be located in the Ulyanovsk-East special economic zone in the city of Ulyanovsk.

The new center is expected to be commissioned at the beginning of 2015 and

will specialize in the provision of MRO services mainly to such aircraft as Boeing 777, Boeing 747, and Airbus 340.

It will be located on the area of 20,000 square meters, and will be able to provide MRO services simultaneously to eight narrow-bodied or two wide-bodied aircraft.

In addition to Boeing and Airbus aircraft, the new AAR center will also specialize in the provision of MRO services to such Russian aircraft as Sukhoi Superjet, as well as MS-21 mainline aircraft.

The AAR project is just the first in the list of large-scale investment projects,

announced for implementation in the Russian MRO market.

Potential for future growth

In recent years the Russian MRO market has significantly grown and has big potential for further development.

Since the collapse of the USSR, the market has gone through several stages of development. In 1992, the first Western-made aircraft — Airbus A310 was launched on Russian airlines. In 1996 Russian MRO providers for the first time received permission to perform MRO in accordance with the EASA Part 145 regulation.

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Maintenance and repair operations on a Russian An-148 aircraft. The aircraft is manufactured by the Ukrainian Kiev AVIANT plant (now Antonov Serial Production Plant) and Russia's Voronezh Aircraft Production Association (VASO). Although numerous companies are involved in the project, at least 70 percent of the aircraft's hardware is made by Russian manufacturers.

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In 2004, the first MRO C-check on the Airbus A320 aircraft was completed in the country, while in 2006, Russia's first center for training of MRO specialists in accordance with the EASA Part 147 regulation was certified.

Finally, in 2011 the government abolished customs duty on the supply of components and spare parts for foreign aircraft.

According to predictions of Jonathan Berger, vice president of ICF SH&E, one of the world's leading analyst agencies in the field of aviation and MRO services, currently the Russian market of MRO services is estimated at USD \$2.6 billion, while by 2025 it is expected to reach USD \$5.6 billion.

Currently the Russian market of MRO services remains at the stage of rapid development, while the majority of local airlines still prefer to receive MRO services for their aircrafts abroad. However, in recent years this situation has changed, which is reflected by the fact that the share of MRO services, provided by domestic companies in total volume of MRO services last year has reached 40 percent and continues to grow.

Russian MRO service providers

At present among the major Russian MRO service providers are such companies as Aeroflot ATC, Volga-Dnepr Technician, Transaero Technician, ATB Oreneyr, Ural Airlines, AK Yamal, AK Saha, AK Russia, NordTech, FL Technics, and Vostok Technical Services. At the same time German Lufthansa Technik remains the leading foreign player in the market.

As a rule, a significant part of Russia's leading airlines, which conduct their MRO within the country, have their own MRO centers. And, among Russia's leading independent MRO providers are such companies as FL Technics and Vostok Technical Services.

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Mikhail Somov, general director of Sibir Technik, one of Russia's largest MRO providers, comments, "At present the Russian market of MRO services is considered as very promising. The share of Boeing and Airbus aircraft in the fleet of the majority of Russian airlines is steadily growing and this trend

will continue to be observed during the next several years. This stimulates the growth of the domestic MRO market. At the same time high percentage of used aircrafts remains one of the features of the local market."

Somov's statement is confirmed by statistics, in accordance to which, the

share of Boeing and Airbus aircraft in total Russian aviation fleet in 2012 reached 83 percent. This is the highest figure in the history of Russian aviation. The market is dominated by narrow-bodied Boeing 737 and Airbus A320 aircraft, which form the basis of the Russian MRO market.

In the meantime, the majority of local analysts believe that the current situation in the market and lack of strong local players provides a good opportunity to the world's leading MRO providers to start an expansion of the Russian market. However, there is also a need to pay attention to its major features, which could prevent its rapid expansion.

Russia's market

Among the main features of the Russian MRO market are seasonality, as the largest number of orders for MRO services is registered during the period from mid-winter to mid-spring. In addition, the average age of local fleet can be considered another market feature. Aircraft, aged at 15 years and more, account for more than half of the total Russian fleet. The share of new aircraft, aged under five years, is still small and accounts for no more than 10 to 15 percent.

Many of Russia's leading MRO service providers are affiliated with the airports, which negatively affects the level of competition, as well as significantly reduces the number of potential customers.

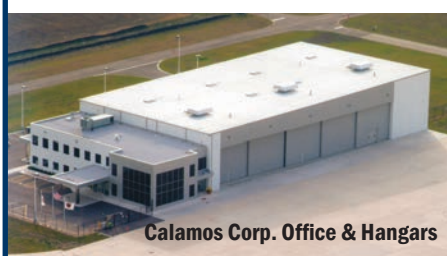
In the cost structure, up to 40 percent of costs account for MRO of engines. Line maintenance and repair of components accounts for 25 percent of costs each, followed by overhaul (10 percent) and modernization (about 5 percent).

The Russian government has made significant efforts for the improvement of the national legislation in the field of MRO and abolished customs duties on the imports of spare parts and equipment for MRO services. Due to traditional bureaucracy, its supplies may still be associated with big delays, which take up to five to 14 days, compared to the EU's 72 hours. In this regard, many airlines prefer to complete their MRO abroad.

Another obstacle that prevents the provision of MRO services to foreign

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aircraft in Russia is the right of a local customs service to require cash collateral for the period of temporary import of the aircraft, which is equal to its customs value.

Government reaction

In the meantime, the Russian government is aware of the current problems in the industry, and is considering how to solve them. As part of this, some steps have already been taken. In addition to customs duties, the government has recently abolished compulsory licensing on the imports of high-frequency radio equipment and devices to the country.

According to analysts of the Russian Association of Airlines, the government should continue to implement its efforts, aimed at developing the domestic MRO industry. In particular, it should improve conditions for the establishment of MRO bases throughout the territory

of the country, as well as stimulation of domestic airlines to service their aircraft within Russia.

MRO investments

The implementation of measures should contribute to the launch of other investment projects in the sector. In the latter case, in addition to AAR's project, there is a possibility that another large MRO center may soon be launched by FL Technics, which is part of the Lithuanian aviation group Avia Solutions Group, which has recently announced the start of construction of a MRO center in Ulyanovsk.

The new center is expected to be comprised of two hangars with the area of 8,000 square meters each and will specialize in the provision of MRO services to narrow- and wide-body aircraft such as Airbus A320, Boeing 737 Classic, Boeing 737NG, Boeing 777, Boeing 78, Bombardier CRJ 200, Sukhoi Superjet

100 as well as the Boeing 747, and Airbus A380 aircraft.

At the same time another large industry project is expected to be implemented soon by Russia's flagship airline Aeroflot and which will take place in cooperation with Russian Technologies Corporation and SR Technics, one of the world's leading providers of MRO services. According to the agreement, the new joint company will specialize in the provision of MRO services in Russia as well as repair of aircraft components and assemblies.

It will be established on a parity basis, where the stake of each partner will be 33 percent. **AMT**

EUGENE GERDEN is an international freelance writer, specializing in covering global aviation and the aircraft maintenance technology industry. He can be reached at gerden.eug@gmail.com.



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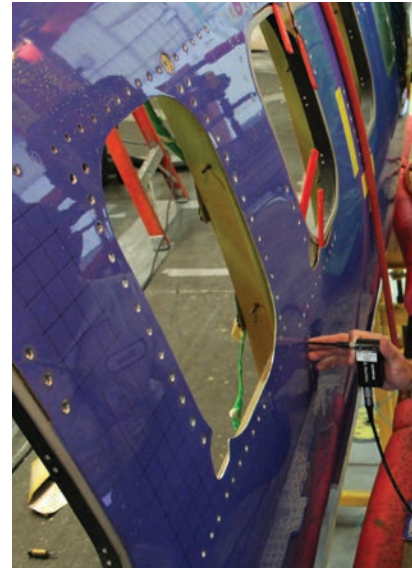
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Heavy Maintenance: Tracking the Trends

Today's mergers are more complementary, designed to fill in gaps in product offerings, not merely expand market share. While the focus is on profitability, it also has to include improved compensation for technicians to attract the needed work force.

By Jerome Greer Chandler





One of the motives for the HAECO/TIMCO merger could be the shortage of skilled labor. HAECO has sought government support to import qualified engineers and mechanics to ease the constraints concerning skilled workers.

TIMCO AVIATION SERVICES

in product offerings, not merely expand market share.

Case-in-point: HAECO/TIMCO. The marriage forges the planet's "second-largest MRO airframe provider, behind ST Aerospace," calculates Jonathan Berger, vice president of ICF's MRO Practice. TIMCO is an industry leader in interiors and seats, an increasingly profitable arena in which HAECO wants to grow.

Here too consolidation exerts an inexorable pull, *airline* consolidation. The American/US Airways and Southwest/AirTran mergers could boost interiors and seating work, as will Delta's purchase of 88 former AirTran 717-200s. As for the United/Continental combination,

The two share common customers. TIMCO could benefit from HAECO's widebody expertise and start accommodating more widebody work in the continental United States. "There are possible synergies we may be able to offer," says Kazmerski.

Certainly, other players are betting more U.S. carrier widebody work will be repatriated from Asia/Pacific. Chris Spafford asserts over the last half of this decade maintenance capacity is going to tighten significantly in the region — in China in particular and among widebodies specifically. "Part of that is due to the rapid growth — the hyper-growth — of the domestic Chinese ... market."

Labor rates and U.S. expansion

As Chinese aircraft occupy more bays, Spafford says, that pushes up prices overseas, prompting North American carriers to re-consider the once-powerful Asia/

A handful of far-reaching trends define heavy maintenance, repair, and overhaul today. Even as the MRO industry continues to consolidate, it's expanding into new markets. At the same time it's disciplining pricing to boost profits, it's impelled to improve compensation to attract ever-scarcer technicians. Such are the realities, and the imperatives, of this ever-evolving industry.

Effect of airline consolidation

Heralded by Hong Kong-headquartered HAECO's \$388.8-million agreement to acquire Greensboro, NC-based TIMCO, we're witnessing a new breed of merger these days, asserts Christopher Spafford, a partner in the consulting firm Oliver Wyman. "There's a real difference [between today's acquisitions] and three to five years ago when the U.S. airframe industry was just teetering on profitability." Today, healthy companies are merging with similarly robust firms; the resultant mergers are more complementary, designed to fill in gaps

HAECO maintains, repairs, and overhauls 747s, A330s, and the like, while TIMCO specializes in narrowbody A320s and 737NGs. Their marriage offers additional maintenance synergies for customers.

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10 to 20 percent of the maintenance performed in Asia/Pacific will migrate back to the continental United States over the next three to five years.

— Christopher Spafford, Oliver Wyman Consulting Firm

United spokeswoman Jennifer Dohm says, "We are not making all the cabins [of its 693 mainline aircraft] uniform, since each subsidiary operated different aircraft types." UA will, however, be installing Economy Plus seating across the board, as well as fitting its entire mainline fleet with Wi-Fi.

Widebody and narrowbody

Then there's heavy iron. HAECO maintains, repairs, and overhauls 747s, A330s, and the like, while TIMCO specializes in narrowbody A320s and 737NG's, says Leonard Kazmerski, TIMCO Aviation Services' vice president for marketing and business development. He contends the merger will enable the combined company (TIMCO keeps its name) to offer more maintenance slot availabilities to customers. Consider, TIMCO has 16 hangars and 33 bays; HAECO 15 hangars and 47 bays.

Pacific value proposition. He says 10 to 20 percent of the maintenance performed in Asia/Pacific will migrate back to the continental United States over the next three to five years. "We're seeing a mild shift" in the repatriation of widebody work.

"Definitely," agrees Chris Jessup, AAR's senior vice president of airframe and engineering. "[That's] one of the main reasons we expanded to our sixth airframe location." He asserts some hourly touch labor rates in Asia/Pacific are "equivalent, if not higher" than those in North America.

In making the move, AAR takes over 550,000 square feet of space formerly occupied by Aeroframe Services at Chennault International Airport in Lake Charles, LA. An 118,000-square-foot expansion is underway that will allow AAR to accommodate aircraft as large as the A380.

According to the Baton Rouge-based newspaper *The Advocate*, AAR will create 500 jobs with an annual average salary of more than \$46,000, plus benefits.

It could take at least that level of compensation to combat a persistently troubling trend that threatens to undermine the best-laid plans of MROs and airlines alike: a dearth of talented maintainers.

Shortage of mechanics

"There really is a shortage of skilled technicians," says Spafford. Consider natural attrition vs. the number of new technicians entering the industry and the shortfall is "probably ... 15 to 17 percent," he asserts. Here's the kicker: that figure "assumes there's very little repatriation of widebody work." He says the crunch is especially acute in the North American market, and will be so "over the next four to five years."

Labor availability may well be one of the motives behind the HAECO/TIMCO merger. Hong Kong Aircraft Engineering Company is "having issues hiring enough labor," says ICF's Berger. That shortage of skilled technicians "drove down [HAECO's] net profit by 21 percent on year in the first half" of 2013 says the *South China Morning Post*. The paper quotes Chairman Christopher

Pratt as saying HAECO was "seeking government support to import qualified engineers and mechanics to ease constraints on the supply of skilled workers."

"We like to feel we're ... very proactive ... as we recruit technicians we pay [for them to] get additional education."

— Chris Jessup, AAR Corp.

Globally, Boeing's 2013 *Pilot & Technician Outlook* forecasts the need for some 556,000 new technicians "to ... maintain the new airplanes entering the fleet over the next 20 years."

Training and recruitment programs

Aeronautical Repair Station Association Executive Vice President Christian Klein released the sobering results of a survey not long ago showing "very few" of its responding members are taking actions needed to lure, train, and retain employees. For example, just 25 percent hire student interns, and a mere 25.8 percent do on-campus recruiting.

An exemplar of how to recruit and keep technicians might just be AAR. "We like to feel we're ... very proactive," says Chris Jessup. The company has an active apprentice as well as an internship program and, "as we recruit technicians we pay [for them to] get additional education."

Other labor pools might lie south of the border. Spafford foresees others taking a cue from Grupo Aeroméxico and Delta and expanding technical opportunities in Latin America — this in the wake of their construction of an MRO center at Querétaro. Delta says it will be able to service seven aircraft simultaneously. In a prepared release, Delta president Ed Bastian says the move to Querétaro from former facilities at Guadalajara International Airport "will usher in lower maintenance costs without compromising the very high quality work that Aeroméxico provides Delta." Both Delta and Aeroméxico are members of the SkyTeam alliance. Delta purchased a 4.17 percent stake in Grupo

Aeroméxico in June 2012.

Spafford expects Querétaro to become something of a template for U.S. carriers, "outside of Aeroman, it's the first really major, high-quality maintenance facility in Latin America that's been established in the last five to seven years."

Spafford believes Latin America is rife with technical talent. "Regulatory issues aside, the [region] is primed to be the next area of explosive growth."

Those issues, of course, center on the U.S. Transportation Security Administration's issuance of a long-overdue repair station rule. Ten years ago, Congress told TSA to adopt new



TIMCO provides airframe MRO services from four locations in the United States: Greensboro, NC; Macon, GA; Lake City, FL; and Cincinnati, OH.

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security regulations. The FAA can't certify any new foreign repair stations until that happens. The TSA released a final rule on Jan. 13, 2014.

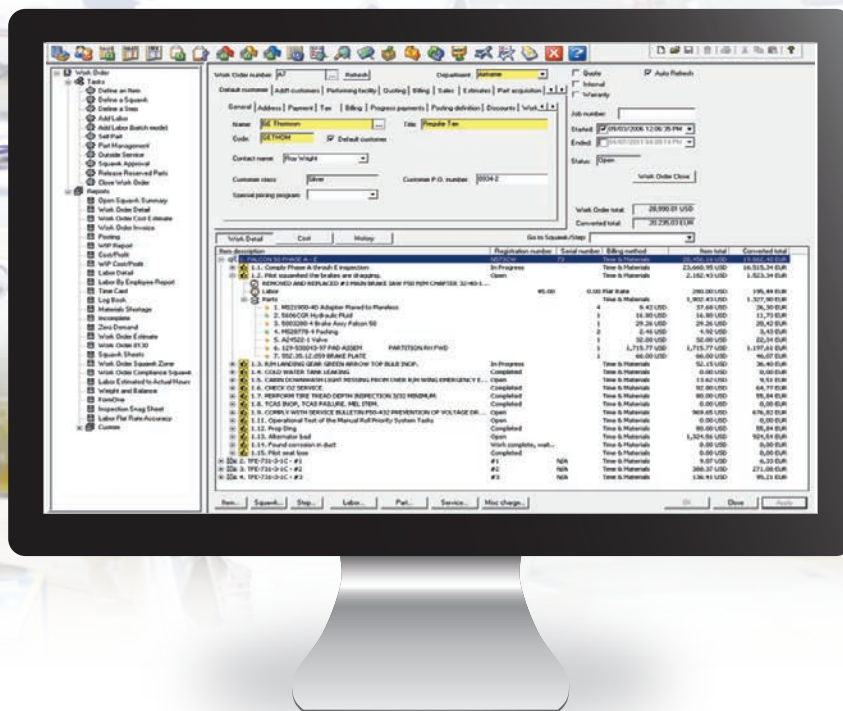
If there's a single *mega*-trend imbedded in all this it's the increasing permeability of international borders to the movement of heavy maintenance. Airlines and MROs are working to further break down those borders, even as they consolidate and seek out new maintainers for the task ahead. **AMT**



TIMCO could benefit from HAECO's widebody experience and start doing more widebody work in the continental United States.

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Systems Integration Drives Last 25 Years of Avionics

A switch from fixing one unit to an "integrated maintenance contract," a power-by-the-hour arrangement to ensure the whole system is always working

By Jerome Greer Chandler

Say so-long to specialization. If the arc of avionics has taught us anything in the past quarter century it's that. Systems integration rules today — a sometimes-frustrating frontier the industry has yet to fully figure out.

When you look at radios 25 years ago, installation was comparatively straightforward. It was a matter of, "basic integration, not a lot of digital interface," says Ric Peri, vice president of government and industry affairs for the Aircraft Electronics Association. "Fast-forward [to] today, where you're talking about a fully integrated cockpit with software controls. That skill-set is just

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fundamentally different." While digitally intermeshed systems can be elegant to behold, "when you get into integration it's much more complicated," he says.

In circa-1989 avionics technicians would specialize in the repair and installation of analog radios, radar, or navigation systems. "Today we're going to ask the same technician ... to be able to repair multiple products," says

Thierry Tosi, vice president and general manager of Rockwell Collins Service Solutions business.

Interwoven in that maintenance and installation must be an intimate understanding of how it all fits together.

AD 2014 technicians "have to deal with no-fault-found far more than before," asserts Tosi. That's because of the interconnectedness of it all. The entire integrated system may fail, when "it's only one component that needs to be repaired. [That's where] no-fault-found will come up. You remove the unit from the aircraft and go test it."



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If the suspect box doesn't squawk, you keep searching until you unravel the root cause.

And here lies the irony of digital integration. Tosi and others believe that while it's harder these days to quickly troubleshoot the problem,

"It's easier [once you've isolated the specific sub-system] to repair ... You have an automatic test bench that tells you what to do."

Often, visits to today's automated benches are less frequent than to their forefathers. Reliability is just better.

Many of 1989's components remained rooted in "round-dial" mechanics. "They were mechanical, single-functional systems," says Jim Rymarczuk, Honeywell Aerospace's vice president of strategic marketing. "From the maintenance side, they had many more demands ... They were very fragmented separate instruments."

"What you see is a fundamental shift," says AEA's Peri. "The reliability of the equipment is much greater than what it used to be." It's his contention aircraft electronics lag consumer electronics by about a decade in terms of adoption. Consumer electronics introduced today "would take roughly five



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While it's harder these days to quickly troubleshoot the problem, "it's easier to repair ... you have an automatic test bench that tells you what to do."

— Thierry Tosi, Rockwell Collins

years" to find their way into cockpits, "to go through the testing, the evaluation, the laboratory work ... required." Aside from the fewer moving parts entailed in digital systems compared to their analog ancestors, the robustness of today's avionics is rooted in regulatory rigor.

AEA President Paula Derks says the switch from "essentially printed circuit board technology, and relatively simple systems, to more complex digital systems" means — for the most part — "these new boxes are sent back to the manufacturer" for fixes. The result is a reduction in actual "hands-on maintaining and repairing by the avionics technician or the A&P."

Peri prefers the glass half-full perspective. "What [the OEM shift] does is create opportunities," especially in-shop software updating. On your home computer you get software updates from Microsoft via Wi-Fi. "In an aircraft [shop], we're not connected [via Wi-Fi] to the OEM," he says. "All that has to be done by a shop. So it's a shifting of technical skills."

The devil is very much in the details. It's no mere matter of plug-n'-play. Absent an in-depth knowledge of how components fit together Peri says, "You can do a simple software update and [bring down] other systems, or ... affect the reliability of other systems."

That's the integration piece of the puzzle. As opposed to their 1989 counterpart, Peri says today's avionics technician "has got to understand integration mapping and [have] the ability to validate the integration."

Integration doesn't end at the hangar door. Twenty-five years ago Tosi says the OEM performed 'time and material' repairs, in which a customer sent in a unit, asked them how much it would cost to fix and how much time it would take. Now, it's a matter of inking an

"integrated maintenance contract," a power-by-the-hour arrangement meant to ensure the aircraft operator "always ... [has] a working unit on his aircraft."

Repair management integrates spares and logistics, leveraging increased component reliability to keep operator parts stores sufficiently stocked.

The last quarter of a century *has* wrought real change. While airframe and engine evolution have been measured — arithmetic and measured — the introduction of digital cockpits rendered avionics change *geometric* and downright revolutionary.

There's no way to fight it. All you can do — body and soul — is buy into the maintainer's mantra of '*education, training, qualification*' to make it through the next quarter century. Hope to see you on the other side. **AMT**



JEROME GREER CHANDLER

is a two-time winner in the Aerospace Journalist of the Year' competition's Best

Maintenance Submission

category; he won in 2000 and 2008. His best-seller 'Fire and Rain' chronicles the wind shear crash of Delta Flight 191 at DFW. Chandler's passion for aviation safety is more than professional. It's personal. Two of his relatives have perished on commercial airliners, one of them in the infamous Braniff Electra crash of 1959.

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New Repair Station Security Regulations

Random observations of 49 CFR Part 1554

By Stephen P. Prentice

It has taken the Transportation Security Administration (TSA) more than 10 years to come up with its final rule regarding security against terrorist incursions into certified repair stations. Is this urgent or not? If you wonder why another layer of so-called security had to be created you need only refer to the Vision 100-Century of Aviation Reauthorization Act of 2003; it mandated the creation of additional rules to *improve security at certain repair sta-*

tions. Blame your Congress. In addition, a whole new cadre of government workers to inspect and manage the new security programs is also created. Remember, TSA are the people who inspect your baggage at the airport.

stations argued that the stations already have adequate security or are already well regulated. They have quality controls, employee background checks, access controls, and general safety procedures already approved by the Federal Aviation Administration (FAA). Add to that drug and alcohol and DEA surveillance, and it begins to get repetitive. Why do we need more administration by another separate government organization?

TSA's simple answer to these concerns is that *its* new rules will reduce

the likelihood that a terrorist could commandeer a large aircraft capable of flight and use it as a weapon as in 9/11. It somehow fears that the terrorist will jump into a large passenger aircraft under repair at a MRO facility, manage to taxi

to a runway and take off and fly it into a building. This of course requires that the repair station is on or within taxi range of an airport runway, an essential item in this case. This may seem farfetched to many of us, but they think it is possible. Anything of course is possible. Nothing like this has happened in the 10 years since this TSA security was authorized without TSA during all this time and previously. I doubt that it will ever happen, the terrorists have too many easier targets, without serious risk already. They don't need anymore.

And yes, the new rules only apply to repair stations that work on transport aircraft ... those over 12,500 pounds. Repair stations that deal with smaller aircraft are exempt from the rule, on the theory that they are not big enough to be effective *weapons*. However, if a station supplies parts or other equipment to the large repair station they could be subject to the rule as well. TSA will decide. Air carrier owned and operated repair and overhaul facilities that conduct maintenance under their 121 or 135 air carrier certificate are likewise exempt from the rule. Again, the simple answer to this is the new rule only applies to Part 145 repair stations, not Part 121 or 135 airline shops. Canadian repair facilities do not operate with a U.S. Part 145 certificate, thus they are also exempt from the rule. Canada has a separate operating authority to work on U.S. aircraft under Part 43.

The rule only applies to foreign repair facilities that have Part 145 repair station authority issued to them by our FAA. Facilities located on military bases both foreign and domestic, however, are also exempt from the rule. The military have their own security regulations and a lot of guns available, so they don't need anymore.

Drug and alcohol testing

Regarding drug and alcohol random testing. It was hoped TSA would mandate that foreign repair stations would enact random drug and alcohol testing so that they would do what we do here in the United States. After all, our people are subject to random testing so why not the foreign repair stations? TSA has dismissed this opportunity simply by repeating what the foreign stations say ...



The need?

Many of the people commenting on the need for security regulation at repair

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"this is a matter for the local police to handle and we don't get involved." Apparently TSA failed big time, to use this opportunity to require the U.S. certified foreign stations to do random drug and alcohol testing like we do. They therefore reap the benefits and income from working on U.S. transport aircraft without the costs of drug and alcohol testing. Think about it, terrorists could find no better way to control possible subversive elements who work at these facilities than to facilitate their access to drugs. Meanwhile, our facilities and employees continue with the need for random testing.

The regulation authorizing the security regulation by TSA says clearly the need to *"strengthen oversight of domestic and foreign repair stations and to ensure that foreign repair stations that are certified by the Administrator under Part 145 ... are subject to an equivalent level of safety, oversight, and quality control as those located in the United States."* We have urged that this means that drug and alcohol testing for U.S. certified foreign repair stations should have been included in the regulation, after all, *equivalent* means *equal to* ... alas, in the end, our people backed down on this requirement.

Punitive powers

TSA will have the authority to suspend or revoke the operating certificate of errant repair stations. Commentators have urged that this is the domain of the FAA only. Some have said that if the TSA now has this authority in addition to the FAA it will give incentive to them to reduce their surveillance activities and the FAA would lose its oversight of repair stations and just let TSA do it. The FAA would no longer conduct mandatory inspections and thus safety and security would be compromised. TSA says its activity would not duplicate the FAA's and that its work would supplement not substitute for FAA surveillance. The TSA *security* measures would be designed to ensure that *unattended* large aircraft capable of flight, cannot be commandeered and used as a weapon. Many think this is the FAA's job.

TSA also says that it will not suspend or revoke a certificate. The FAA will do

the suspending or revoking on notification by TSA. What's the difference? TSA still decides whether or not a certificate holder is not maintaining and carrying out effective security measures in accord with its TSA rules. Is it possible that someday we will see the FAA merged into TSA? There is no difference really between *safety and security*, one clearly involves elements of the other.

TSA says its activity would not duplicate the FAA's and that its work would supplement not substitute for FAA surveillance.

TSA says that since certificate action against a repair station initiated by TSA will involve compliance with TSA's security regulations the basis of the action must remain with TSA and not the FAA or the NTSB. TSA also has specific authority to enforce security — and related regulations and requirements. TSA goes on to say that it will use a *progressive enforcement process* whereby instances of noncompliance can be resolved with noncertificate action, including counseling, administrative actions, and civil penalties. Sounds familiar ...

Give back the certificate?

In order to avoid both FAA and TSA oversight and security regulation, the repair station could of course simply turn in its Part 145 operating certificate and work with licensed A&P technicians without the necessity of a repair station certificate. After all, there is no need for a repair station certificate in order to work on and maintain aircraft. Of course the repair station can get by with lower paid repairmen since licensed A&Ps would require higher pay scales.

In order to respond to this position, TSA says the operator would not be permitted to perform maintenance

work on passenger aircraft unless hired by an aircraft operator, in which case the work would be subject to the safety requirements of Part 121 or 135 regulations. One must keep in mind also that foreign repair stations covet the Part 145 certificate issued by our FAA, this is their authority to work on U.S. aircraft and thus opens up a large income source they would not otherwise have ... eg. Jet-Blue and Southwest as well as other U.S. air carriers use or have used foreign MRO facilities on a regular basis. This can be a major source of income for these companies.

It is difficult to disagree with safety and security regulations ... like motherhood and apple pie ... but there comes a time when people say enough is enough. TSA will now, for example, conduct security reviews and audits of repair stations located outside the United States ... for sure they will be *paper* audits of all the 707 repair stations that will come under the rules, while the 451 repair stations in the United States will similarly be affected but also subject to unannounced on-site inspections. Foreign stations will get ample notice in advance and prior permission will be required beforehand.

For the most part the new regulation is narrowly directed at a relatively small group of repair stations. Many others, are as noted, exempt from regulation, the mom and pop shops and similar small repair station operations, but we must always wonder for how long? We all know how government grows ... some call it ... make work.

There are many more details spelled out in the new regulation and the expanded responses to the many comments filed in response to the NPRM. You can review them all at federalregister.gov/a/2014-00415. **AMT**



STEPHEN P. PRENTICE is an attorney with an Airframe and Powerplant certificate, is an ATP rated pilot, and is a USAF veteran. Send comments to aerolaw@att.net.



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FAA-Industry Workshop Ponders Event Reports for Maintenance SMS

Challenges and solutions associated with voluntarily reported event data

Dr. Bill Johnson

A recent government-industry workshop identified the challenges associated with collecting, analyzing, and using information from voluntary reporting systems. The proceedings show that one size does not fit all but that effective use of data is good for organizations of all sizes.

The annual workshop

For four consecutive years, the FAA's Office of Aviation Safety (AVS) Chief Scientific and Technical Advisory (CSTA) program, and the Human Factors Division of the Civil Aerospace Medical Institute (CAMI) conducted an annual workshop dedicated to maintenance human factors. The 2013 workshop addressed the challenges and solutions associated with the collection, analysis, use, and effectiveness evaluation of voluntarily reported event data.

Twenty-three invited attendees came from government, research and development, manufacturing, airlines, and maintenance, repair, and overhaul organizations. They worked together to show success stories on use of data. There are many organizational and process-oriented factors that affect collection, analyses, and implementation. The organization's management, the col-

lective labor force, the individual worker, and the FAA share the responsibility for success. The group identified the top 10 challenges and solutions (details in 60-page final report, Avers and Johnson, 2013, www.hfskyway.faa.gov). Here are three selected examples:

1. Corporate and individual resistance
2. Data, data, data — Consistency in data analysis
3. Scaling data systems to any size organization

Let's look at these three categories.

Corporate and individual resistance

Generally speaking, most segments of the aviation maintenance industry are a bit reluctant to collect data. That situation has a number of contributing factors ranging from:

- corporate lawyers who are not comfortable about documenting error,
- mid-level managers who are pressed more by delivery schedules than by data collection,
- individual mechanics who are fearful of reprisal from the employer or FAA and from ridicule from co-workers.

The transition from hiding negative events to reporting and learning from errors requires time and corporate commitment. Some organizations are

making the necessary cultural change faster than others. Most of the workshop delegates were from organizations that are making the necessary safety culture transition and were seeing the high value of this change. They are the early adopters of best application of voluntarily reported data. All reported success stories as well as growing pains. For example:

- AAR Corp. mentioned that it used maintenance and the FAA Return on Investment procedure to show how fatigue training reduced damage and employee injury.
- Delta Airlines said that the data helps the company learn what it does not know because of employee reports.
- Southwest Airlines used its data to see how errors increased as hours on duty increased.

The primary message is that the organization needs demonstrated senior commitment and support for optimal collection and use of event data.

Of course, one might say that evolving requirements for safety management systems (SMS) will ensure data collection. However, there is usually a difference between meeting a regulatory requirement and fully capitalizing on the "spirit" of the regulation. This article is about the "spirit" and the process more than about regulatory compliance.

The workshop delegates made suggestions on how to overcome corporate and individual reluctance to collecting and using data. First, all parties must see "What's in it for me?" For the individual they may see that organizational changes, like new procedures or equipment, are a result of voluntary reporting systems. Management may see that voluntary reporting reduces injuries, delays, and rework. Everyone wins!



DR. BILL JOHNSON is the FAA Chief Scientific and Technical Advisor for Human Factors in Aircraft Maintenance Systems. Johnson is a member of the Human Factors Advisory Group to the European Aviation Safety Agency (EASA).

The delegates said that successful organizations are using voluntary reports to communicate an awareness of hazards and hazard reporting before they contribute to unacceptable risk to the organization. Some commented that such communications can also include information about how small safety investments have large financial return and impact on flight and worker safety.

Data, data, data

Challenges associated with data are inseparable from the cultural issues described above. Without universal commitment to data collection, analysis and application are unlikely to succeed. At the same time, poor implementation of a safety data system can affect the commitment of both management and labor.

Many challenges were discussed: format, inefficiency, experience with analysis/interpretation, logical implementation, and automated report generation tools. None of these issues are trivial but there are solutions. Once the senior corporate commitment is demonstrated (i.e. sufficient funding allocated) the work can commence/continue. Delegates warned that selecting the data team is critical. A group of bright mechanics and managers will fail. Likewise a group of experienced data analysts will fail. Someone must understand the technical content and another person must understand the analytic process. It takes multi disciplines to ensure success.

There must be some method to the madness of data collection. For example, different departments must coordinate their efforts. An avionics shop has different issues than an engine assembly shop. However, there are likely more similarities than differences. Shared data reporting formats will ensure that analytic procedures can also be shared. SMS, based on data, is a corporate goal rather than a host of organizational stovepipes doing their own thing.

Start small and you are more likely to succeed. More than 20 years ago I was teaching a human factors course for an MRO in Hong Kong. I distinctly recall asking the safety manager if he knew where the "problems" (called hazards

today) were. He leaned forward, and said "yes we do." He pulled a file from the cabinet behind him and showed Excel charts with problem categories and counts. He asked me to address these issues in the five-day HF class.

In those days it was not a requirement for HF training much less a requirement for SMS. Instead, they had a corporate goal to reduce human error which would decrease cost and decrease heavy maintenance time. He was using voluntary reports based on Boeing's Maintenance Error Decision Aid (MEDA) process, and MEDA was identified as the basis for the maintenance data systems for most of the workshop delegates.

Learn from others. Safety data collection is hardly a trade secret. Pick up any magazine, like *AMT*. In October the Flight Safety Foundation AeroSafety World dedicated two articles to the topic. Dr. Bob Baron covers a number

of issues, including "Garbage in, garbage out." FAA's Advisory Circular on the Aviation Safety Action Program (AC 120-66B) is another source.

Find ways to demonstrate that your data collection efforts are not in vain. Measure your success not by the amount of data collected but rather by the amount for positive safety impact.

Scaling data systems to any size organization

The industry representation was from the larger carriers including Delta, American, Southwest, and United. AAR Corp. represented the MRO viewpoint. But, they don't have a monopoly on common sense, on safety culture, or on the ability to collect and use data. The end game is the same for everyone. Understanding and managing your hazards has the promise on the inseparable trio of aircraft/flight safety, worker safety, and profit. **AMT**



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The Aircraft Repair Station Security Rule: The Down and Dirty

So, as an aviation mechanic, what do you need to know about the new rule?

The Transportation Security Administration (TSA) finalized its aircraft repair station security rules on Jan. 13.

The regulation's purpose is "to reduce the likelihood that terrorists would be able to use large aircraft [over 12,500 pounds] as a weapon." Nonetheless, the final regulation applies to all repair stations certificated by the Federal Aviation Administration (FAA) under 14 CFR Part 145 (domestic and foreign), except those located on U.S. or foreign government military bases. (Canadian repair stations are not covered because they are not issued a repair station certificate by the FAA.)

Those repair stations located on or adjacent to an airport (if there is an access point between the repair station and the airport large enough to move a large (12,500 pounds) aircraft) must implement new security measures, including:

1. Designating a point(s) of contact to carry out specified responsibilities;
2. Preventing the unauthorized operation of large aircraft capable of flight that are left unattended; and
3. Verifying background information of those individuals who are designated as the TSA point(s) of contact and those who have access to the measure(s) used to prevent the unauthorized operation of unattended, large aircraft capable of flight.

So, as an aviation mechanic, what do you need to know about the new rule? Regardless of where your Part 145 repair station is located, TSA can

issue Security Directives and conduct unannounced security inspections. Don't be surprised if TSA is knocking at your door!

Point of contact

However, if you're located on or adjacent to an airport, more changes could be afoot at your facility. Every repair station is mandated to designate point(s) of contact (POCs) for TSA available 24 hours, seven days a week. POCs have several responsibilities, including:

- Accountability for compliance with the regulation;
- Serving as the primary person(s) for security-related activities and communications with TSA;
- Maintaining records of all employees responsible for controlling keys (or other approved means) used to gain access to the aircraft; and
- Retaining records associated with the background of all individuals designated as POCs and those who have access to any keys or other means used to prevent the operation of large aircraft.

Not just any employee can be a POC; you must hold a valid airman (mechanic or repairman) certificate issued by the FAA, acquire a security threat assessment (by holding a SIDA badge, for example), or a background check must be completed for the most recent five-year period or the time since the employee's 18th birthday, whichever is shorter. A gap in employment of six months or longer without a satisfactory explanation is unacceptable.

Whether you are designated a POC by your repair station or not, you could still be chosen to prevent unauthorized operation of unattended, large aircraft. TSA lists several approved means for rendering an airplane incapable of flight, including blocking the path of the aircraft to thwart movement (such as using a vehicle), parking the aircraft in a locked hangar, and moving the stairs away from the aircraft (and locking all doors, if possible). Other means can be approved by TSA in writing (as of publication, the agency hasn't clarified how to get acceptance of the "other means").

Regardless of what approach your repair station implements, a crucial component of all methods is maintaining control of the keys; they must only be available to authorized individuals having undergone proper background checks. For example, if a vehicle is used to block the aircraft to prevent movement, only authorized employees may have access to the car/truck keys. Similarly, if the aircraft is locked in a hangar, only approved personnel should be able to unlock it.

TSA believes the rule is clear and straightforward. However, when a diverse industry is implementing government mandates, questions and unintended consequences need to be addressed. ARSA is working with TSA to ensure it appreciates the complexities of the industry and repair stations understand compliance with the new regulations. **AMT**



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Maintenance and Fatigue: A Way of Life

Studies reveal sleep deprivation is a cultural norm in aviation maintenance, although mechanics as a group aren't cognizant that they don't get enough rest

By DeborahAnn Cavalcante

We in maintenance would be wise not to take fatigue in our workplace too lightly. Can you imagine calling your supervisor and saying, "I won't be coming to work today, I am too tired?" Don't be surprised if you hear, "Right, and don't you be surprised if your paycheck looks a little tired."

The list of human factors that can affect aviation maintenance is broad, and is certainly not limited to fatigue. It encompasses a wide range of challenges that influence people very differently; maintenance professionals do not all share equal capabilities, strengths, weaknesses, or limitations. Unfortunately, in the sequence of events leading up to an airplane taking off for flight, aviation maintenance is one of the first places where the human errors can begin.

Aviation maintenance technicians often work long hours under pressure, including working through the night. This often results in not just extreme fatigue but errors, some of which may potentially be life threatening to pilots and passengers as well as to the AMT.

It is no secret that fatigue can come in different forms: physical, mental, and emotional. Physical fatigue can bring about muscle soreness, oxygen debt, or extreme tiredness caused by sleep deprivation, illness, or poor nutrition. Emotional fatigue resulting from performing undesirable tasks, sometimes under challenging conditions such as lack of proper tools, inadequate lighting, and meeting completion deadlines in terms of time, may affect the degree

of high levels of focus and concentration associated with complex tasks and create mental fatigue. The mental fatigue combined with the physical or emotional, leads to increased errors and risks in safety sensitive arenas.

Fatigue-related accidents

There are countless documented errors and accidents attributed to tiredness and fatigue in the maintenance workplace. Studies have shown that fatigue can have consequential effects on a person's cognitive ability. Cognition refers to mental processes such as awareness, perception, reasoning, and judgment. Fatigue has drawn parallels to the effects of alcohol. In 2000, Williamson, Feyer, Friswell, and Finlay-Brown conducted a study on driver fatigue and found that after 17 to 19 hours without sleep, performance on some tests was equivalent or worse than that at 0.05 percent blood alcohol content. Response speeds were up to 50 percent slower for some tests and accuracy measures were significantly

poorer at this level of alcohol. After longer periods without sleep, performance reached levels equivalent to the maximum alcohol dose given to participants (0.1 percent blood alcohol content). The findings reinforced that sleep deprivation is likely to compromise decision-making ability and accuracy needed for safety on the road and in other industrial settings. (Abstract, Physical, Emotional and Mental Fatigue in the Aviation Environment, www.ukessays.com.)

Further FAA studies and self-reporting by AMTs indicate the average sleep is routinely five to six hours per night, two to three hours short of the required eight hours. Additional studies reveal that sleep deprivation is a cultural norm in the aviation maintenance workplace, although mechanics as a group aren't cognizant that they don't get enough rest.

Aviation accidents

One of the most notable aviation maintenance fatigue-related accidents occurred in 1990 when British Airways Flight 5390 experienced a windscreen blow-out shortly after departure. The left windscreen, which had been replaced prior to the flight, was blown out under the effects of the cabin pressure when it overcame the retention of the securing bolts. While the official accident report cited numerous contributing factors that led up to this incident, one of the most insidious was the effect of fatigue on the aircraft mechanic who conducted the task. The work was conducted very early in the morning at a time when the human body experiences a natural low, also known as circadian effect. This,



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combined with lack of sleep before his shift, may have contributed significantly to the mechanic's perceptual judgmental error in selecting the wrong size bolts for the job and then justifying that decision by believing that the countersink was too big rather than the bolt was too small.

Air Midwest Flight 5481 crashed on take-off killing 21 people. The NTSB concluded that the aircraft was tail heavy and the pilot was unable to keep the nose down because elevator travel was restricted due to improperly rigged flight control cables. The NTSB reported the maintenance work to the aircraft's elevator system was performed on the mid-night shift in the early morning hours. Compounding the fatigue issues was the lengthy commute the employees made getting to the repair facility and long shifts that were routine. Interviews with the mechanics indicated a number of shortcomings with maintenance procedures including lack of proper training, insufficient resources, and the possibility that fatigue affected the quality of the work performed.

How to enhance safety?

Education and training alone are most likely not enough to deter mechanics from working while fatigued when many organizations push 14- to 16-hour days. A combination of pressures including

customer satisfaction, management pressure, time pressures, along with interruption of revenue associated with the loss of use of an aircraft, seem to win out and over-ride common sense as well as documented safety policy and procedures.

So how do you cope with this problem but also further enhance safety?

- Be aware of and eliminate foods and snacks that provide quick energy. Eat a balanced diet.
- Avoid caffeine before bed and try not to go to bed too hungry or too full, as this interrupts and prevents deep solid rest.
- Exercise regularly, but not before bedtime as it increases energy levels.
- Coordinate your rest environment at home with family members to allow undisturbed sleep.

Healthy lifestyles do indeed make a positive difference but may not be enough. The cultural norm in the maintenance world, as well as aviation in general, is that no workday is too long. We intellectually realize that a lack of required rest periods is detrimental to safety, but as employers are we willing to consider other factors like staffing levels, the availability of break periods, promises to customers, and the value of a dollar to increase safety margins in maintenance?

Effective fatigue risk management requires a partnership between the

employer and the employee. Although unrealistic to aim for "zero fatigue" in all cases, an appropriate objective for fatigue risk management is to ensure that risks are as low as reasonably practical (Stewart & Holmes, 2008).

Opportunities exist in the maintenance environment to modify methods of task performance. Secondary inspections or operational and functional checks could provide the opportunity to "catch" and correct errors before they become a potential incident or accident. Schedule the most safety-critical tasks, or those most susceptible to fatigue, at times when fatigue will have the least impact.

It would be foolish to think we can avoid the reduced mental functioning brought about by fatigue, but by bringing awareness to it we can at least mitigate it. Senior management should establish a clear policy on fatigue, which includes how issues will be dealt with. Middle management should implement those policies, day to day. Ultimately, the quality of work rests with the individual maintenance technician. It is their responsibility and obligation to gain an understanding of fatigue and commit to employ any and all remedies to assure they remain well rested and able to perform tasks in a safe and effective manner. **AMT**

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AMTSociety Implements New Management Structure

The Executive Board will be the new leadership group. Industry Advisors will provide input on current aviation issues and suggest new initiatives.

To better serve its members and industry partners, AMTSociety has implemented a new management structure. This new structure will have two equally important groups: an Executive Board and a group of Industry Advisors.

Ronald Donner, AMTSociety Executive Director and Business Manager, says, "From time to time it's important for progressive organizations to look inward and ask itself if their structure is still aligned with the needs of the industry and members it serves. At the same time organizations must also look outside its group and ask others within the industry the same important questions. This new structure will provide a better means to seek input from members and industry aimed toward enhancing the overall mission of AMTSociety."

The new Executive Board is comprised of five positions and will be the new leadership group for AMTSociety. All five individuals of the new Executive Board were part of the previous AMTSociety Board of Directors. Members of the new Executive Board are Mark Collins, Gloria Cosby, Ronald Donner, Gary Goodpaster, and Jim Sparks. The primary role of the Executive Board is to provide overall direction and collective decision making on current and future activities, member offerings, and industry involvement.

In addition, AMTSociety will have a group of Industry Advisors. The primary role of the Industry Advisor is to provide input to the Executive Board on current aviation issues and to suggest new initiatives that enhance the overall mission of AMTSociety. The number of Industry Advisors may be adjusted



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depending on the input and expertise needed to successfully manage activities and implement initiatives at any given time.

Every attempt will be made to maintain a blend of talent and experience from all segments of aviation in both the Executive Board members and Industry Advisors. New Industry Advisors having relevant aviation, aircraft maintenance, or business expertise, can be suggested by anyone, or an individual can request to be part of this group.

Additional details on the new Executive Board members and Industry Advisors will be provided in future updates and on the [AMTSociety](http://AMTSociety.org) website.

AMTSociety Corporate Members

B&S Aircraft, an AMETEK Company, is the latest new [AMTSociety](http://AMTSociety.org) corporate member. Located in Wichita, KS, B&S is an FAA approved repair

B&S AIRCRAFT

and overhaul facility with expertise in starter generators, fuel systems, boost pumps, and much more. It maintains a large inventory of component parts ready for immediate shipment. B&S Aircraft Parts & Accessories opened its doors for business in 1965 and provides repair services and replacement parts for general and business aviation, air carriers, military, rotorcraft, as well as experimental category aircraft.

Ronald Donner, Executive Director, says, "It's great to have B&S as a new corporate member of [AMTSociety](http://AMTSociety.org) and help support our overall mission to promote the maintenance profession and industry." For more information on B&S Aircraft visit www.bsaircraft.com.

Continuum Applied Technology, CORRIDOR Aviation Service Software, is an enterprise application developed to

streamline all aspects of aviation maintenance and service. CORRIDOR is proven to improve efficiency, reduce errors, increase control and visibility, reduce costs, and elevate customer service levels. Its modular design provides tailored solutions for each organization. It is backed by professional,



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AviationPros LIVE begins March 25 at the Sands Convention Center, and the schedule has been designed to inform and entertain. You can see the latest in aviation products and services during exhibit hours from 10 a.m. to 5 p.m. each day and attend networking events each night.

A Town Hall Session on the first day will feature Tom Hendricks, president of National Air Transport Association, and Rosemary A. Vassiliadis, Director of Aviation, Clark County Department of Aviation, who oversees operations at McCarran International Airport.

The Maintenance Compe-



Aaron Tippin

tion hosted by Aerospace Maintenance Association (AMA) in conjunction with AMTSociety gives teams of licensed AMTs, AMEs, students enrolled in FAA, EASA, CASA or equivalently authorized schools as well

as personnel of any country's Armed Forces involved in the aircraft maintenance field the opportunity to test their combined abilities against those of their peers. A record number of teams have registered for

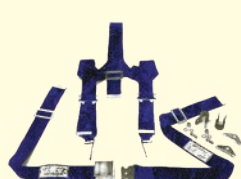
AVIATION PROSLIVE

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the event, be sure to see how the students compare to the professionals. Awards will be announced Thursday morning.

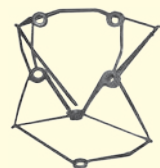
AMTSociety will hold its Roadshow Consortium Maintenance Education/IA Refresher over two days, from 12:30 to 4:30 p.m. on Tuesday and Wednesday, March 25 and 26. Sarah MacLeod from Aeronautical Repair Station Association will lead several sessions on Civil Aviation Regulations, Finishing the

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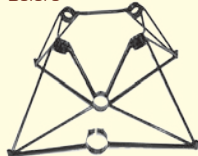


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Job — Paperwork, and Major Minor Primer. Other sessions include Maintenance Human Factors with DeborahAnn Cavalcante, Thrust Reverser Inspection and Maintenance Best Practices with Lane Perry from NORDAM, Practical Tips for Aviation Maintainers with David Burch from Bell Helicopter, and Safety Management with Jim Hein from the FAA.

Networking events will be held after exhibit hours on Tuesday and Wednesday nights. Ralph Hood will entertain with a keynote on Tuesday evening. Wednesday evening will bring the return of the chili cook-off to the show along with guest star Aaron Tippin. He has aviation ties as he is a certi-

fied A&P technician and an instrument rated commercial pilot with single and multi-engine ratings.

Aviation Technician Education Council 2014 Conference

The Aviation Technician Education Council (ATEC) Conference will be held April 5 – 8, 2014 in San Antonio, TX. ATEC has planned many professional development sessions and industry speakers. Interested in getting your 2014/2015 IA refresher training done early? On Saturday, April 5 in conjunction with this conference, AMT-Society is planning one of our Education/IA Refresher training days. To register for the AMTSociety training on April 5, visit www.amtsociety.org.

ATEC members may email membership@amtsociety.org or call (800) 547-7377 Ext. 2104. For more information on the ATEC conference visit www.atec-amt.org.

Bombardier adds customer response team aircraft

Bombardier has added a Learjet 45 dedicated to providing resolution of aircraft on ground (AOG)/unscheduled maintenance events in the continental United States. The aircraft will operate 24/7 and will be based at Chicago Executive Airport (PWK) in Palwaukee, IL, which is in close proximity to the Bombardier Parts Hub and Chicago-based Customer Response Team

truck. For more information visit www.bombardier.com.

New partnership: Rockford Airport and Rock Valley College

In a move designed to promote economic development and position a more strongly aligned workforce, the Greater Rockford Airport Authority (GRAA) and Rock Valley College (RVC) have combined efforts to create an expanded Aviation Maintenance Technology program.

As a part of the proposed lease, GRAA will lease land to RVC to build a state-of-the-art 40,000-square-foot Aviation Maintenance Training facility on airport grounds to house the RVC educational course of study

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for aeronautical maintenance and repair. The program is certified to provide approved instruction leading to FAA Airframe and Powerplant certificate examinations. Three new certificates will be added to the program offerings: Avionics, Nondestructive Testing, and Composites.

Rolls-Royce adds RR300 support

Premier Turbines and H+S Aviation, BBA Aviation companies, have been selected by Rolls-Royce Corp. as authorized maintenance repair and overhaul centers for the RR300 engine. The agreement runs through 2021 and provides RR300 operators with a responsive global maintenance service network with major repair and overhaul facilities in North America and the UK.

PAG expands in Australia

Atlanta-based Precision Aviation Group (PAG) has recently expanded its operations in Brisbane, Australia with an additional 5,000 square feet. The expansion will house the Repair Station - Precision Accessories and Instruments - Australia (PAI-AU). The expansion doubles the size of PAG's footprint in Australia. PAG opened Precision Heliparts - Australia (PHP-AU), serving the rotary-wing market in January 2013. The new facility will include sales, warehouse, and shop areas.

ExxonMobil Aviation gains new approvals for Mobil Jet Oil 387

ExxonMobil Aviation announces that its Mobil Jet Oil 387, a synthetic High Performance Capability (HPC) turbine engine oil, is now fully approved for use in a range of GE Aviation aircraft engines including its GE CF34-10 regional jet and GENx next generation turbofan. It meets industry specifications, SAE AS5780 High Performance Capability (HPC) and U.S. Military Specification MIL-PRF-23699-HTS.

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Maintenance Trends, Mechanic Job Prospects

What kind of mechanic do you want to be? Boeing's study predicts a global need for 556,000 new maintenance technicians over the next 20 years



The next 20 years and beyond look like good years to be an aircraft mechanic. First and foremost, is the global increase in air travel that is driving an increase in aircraft purchasing. Of course, more aircraft mean more mechanics to maintain them. This is true, according to the 2013 *Boeing Pilot & Technician Outlook*, even though new aircraft are more reliable and maintenance check intervals will lengthen. Boeing's study predicts a global need for 556,000 new maintenance technicians over the next 20 years, with 97,900 new technical personnel required in North America.

Avionics and retrofitting

The introduction of new aircraft means changes in maintenance programs and changes in technical training for mechanics. Not only are there new avionics in the cockpits of these new aircraft but there is a growing need

to retrofit the avionics in many of our older aircraft. Even five- or six-year-old aircraft — which are young by some standards — will need to be retrofitted because of the rapid changes in technology. In addition, electronics are rapidly changing the interior of our aircraft — both new and old. Some of those changes are obvious to passengers — such as individual screens on the backs of every seat, on-board Wi-Fi, and the advent of electronically controlled, lie-flat seats.

Composites

At the same time as these changes in aircraft avionics and electronics, changes in aircraft materials are changing the maintenance requirements of these new and retrofitted aircraft. In addition to changes in composites used to make structural components of the aircraft, composites are being used more and more within the airplane itself. Floors and floor beams, for example, are now

made of high-strength composite material. Working with these composites requires new maintenance skills and therefore new maintenance training.

Training and advancement

All these technological changes provide opportunities for mechanics who want to add to their skill base and increase their opportunities for employment and advancement. Students in Part 147 schools that do not offer courses in these advanced technologies should look for additional outside sources for training. Current mechanics, interested in working in these new areas, should do the same.

One low-cost option is to look at IA renewal training, even if you are not an IA. Often these renewal sessions offer no-cost or low-cost introductory training on emerging technologies provided by aircraft manufacturers. At a minimum, mechanics can check out these courses and see if they are interested in working in these areas.

Retirement trend

But what if you like the job you are currently doing and don't want to learn the skills necessary to work on these new aircraft systems? The future looks bright for you, as well. While new aircraft are coming on line and many are being retrofitted, thanks to anticipated mechanic retirements over the next 10 to 20 years, there will still be a growing need for mechanics who understand the current generation of aircraft.

So the choice is really yours whether you choose to continue to work on legacy aircraft or decide to learn the skills necessary to work on the new generation. And it's nice for mechanics to be in that position. **AMT**



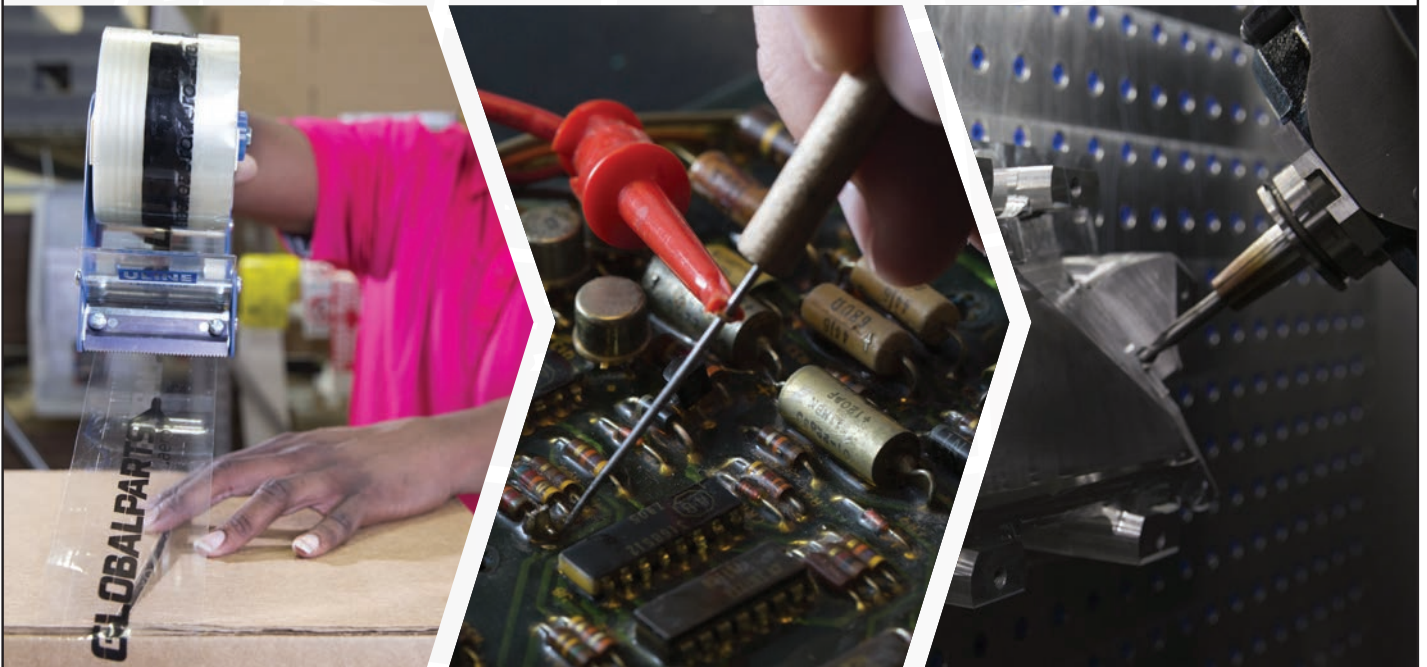
JOHN GOGLIA has 40+ years experience in the aviation industry. He was the first NTSB member to hold an FAA aircraft mechanic's certificate. He can be reached at gogliaj@yahoo.com.



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