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AMT

Aircraft Maintenance Technology

Written by aircraft maintenance professionals for the professional maintenance team

Official publication for AMTSociety

January 2012

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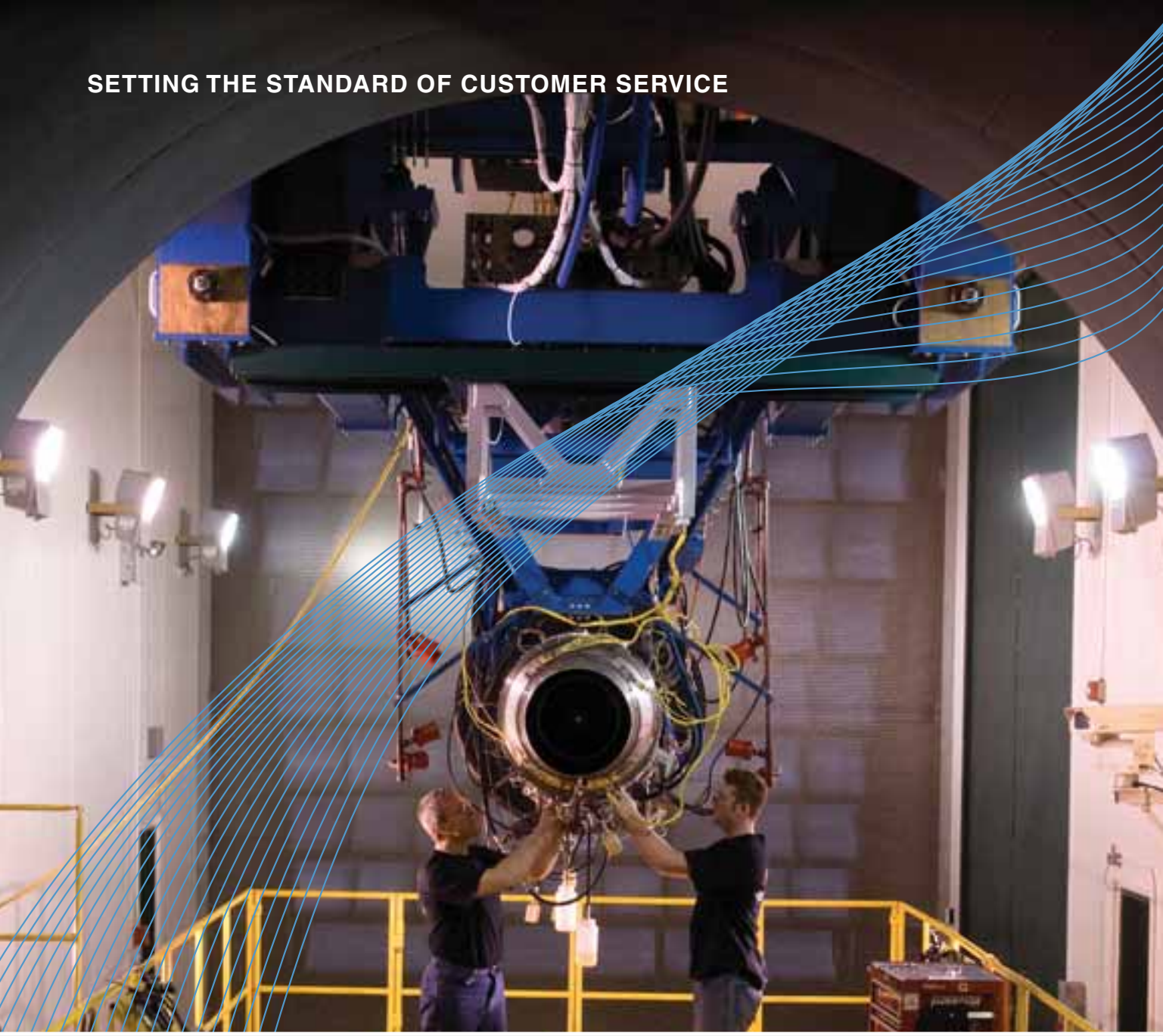

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AMT EXCLUSIVES:

2012 IA Recurrency Exam

Use AMT as a resource to further your training requirements. The exam is based on the previous year's articles. See page 29.

Free AMT Webinar

Join us on February 7 at 1 p.m. CST for our newest webinar: AMTSociety — Sharing Resources and Benefits. What it offers the members and the industry.

Check out AMTSociety webinar

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Begin The Year By ...

The FAASTeam is one organization you can join

Ron Donner, Editor

I began the New Year by attending a gathering of FAA Safety Team (FAASTeam) representatives in my area at the Minneapolis Flight Standards District Office. FAASTeam program managers Jim Niehoff and Alan Hoffert hosted this event where most of the 35 representatives in attendance received recognition for their participation last year. This was my first such event since becoming a FAASTeam representative myself.

From the FAASTeam web site, www.faasafety.gov, the mission statement of the FAASTeam is: *To improve the Nation's aviation safety record by conveying safety principles and practices through training, outreach, and education. At the same time, FAASTeam managers and program managers will establish meaningful aviation industry alliances and encourage continual growth of a positive safety culture within the aviation community.*

FAASTeam representatives are volunteers who work closely with local managers to actively promote safety through a variety of activities.

Promote safety

FAASTeam representatives are volunteers who work closely with local program managers to actively promote safety through a variety of activities. Representatives assist the local FAASTeam program managers with safety seminars, while others organize and present educational and safety sessions themselves to their local aviation community or back at their company, all in an effort to promote greater aviation safety awareness.

The majority of the representatives at the meeting I attended were pilots, flight instructors, General Aviation FBO managers or owners, air traffic controllers, flight school operators, and a few Designated Pilot Examiners, a very few mentioning being involved directly with maintenance; another reminder that many aircraft maintenance people don't seem to be joiners. There are approximately 3,250 representatives nationwide.

Why don't we see an equal interest by maintenance professionals to participate in some of the many organizations aviation has to offer, such as the FAASTeam, *AMTSociety*, or others?

See the value

I realize the day-to-day grind of life gets busy, sometimes overwhelming and for many doesn't leave time or energy for another meeting or a volunteer activity. But one does wonder, do aircraft maintenance professionals not see the same value that involvement in industry organizations can offer: education and continuous learning, sharing best practices, promoting safety, and of course the ability to be associated with their peers? Some do but I offer not enough.

Recently I had the opportunity to meet Steve Davis, chief inspector for Timken Aftermarket Solutions located in Mesa, AZ, and a FAASTeam representative. In this issue of *AMT* you can read more about my visit to this helicopter MRO, and how Davis uses his participation as a FAASTeam representative.

In addition to our regular features, this helicopter focus issue provides you with valuable information from Tanis Aircraft Products on how electric preheat systems can help with your cold climate operations, and Tim Kern describes a new engine test cell at the Rolls-Royce facility in Indianapolis, IN.

AMT will once again be exhibiting at the Heli-Expo so please stop by our booth, 9333, and say hello to the *AMT* staff. *Ron*

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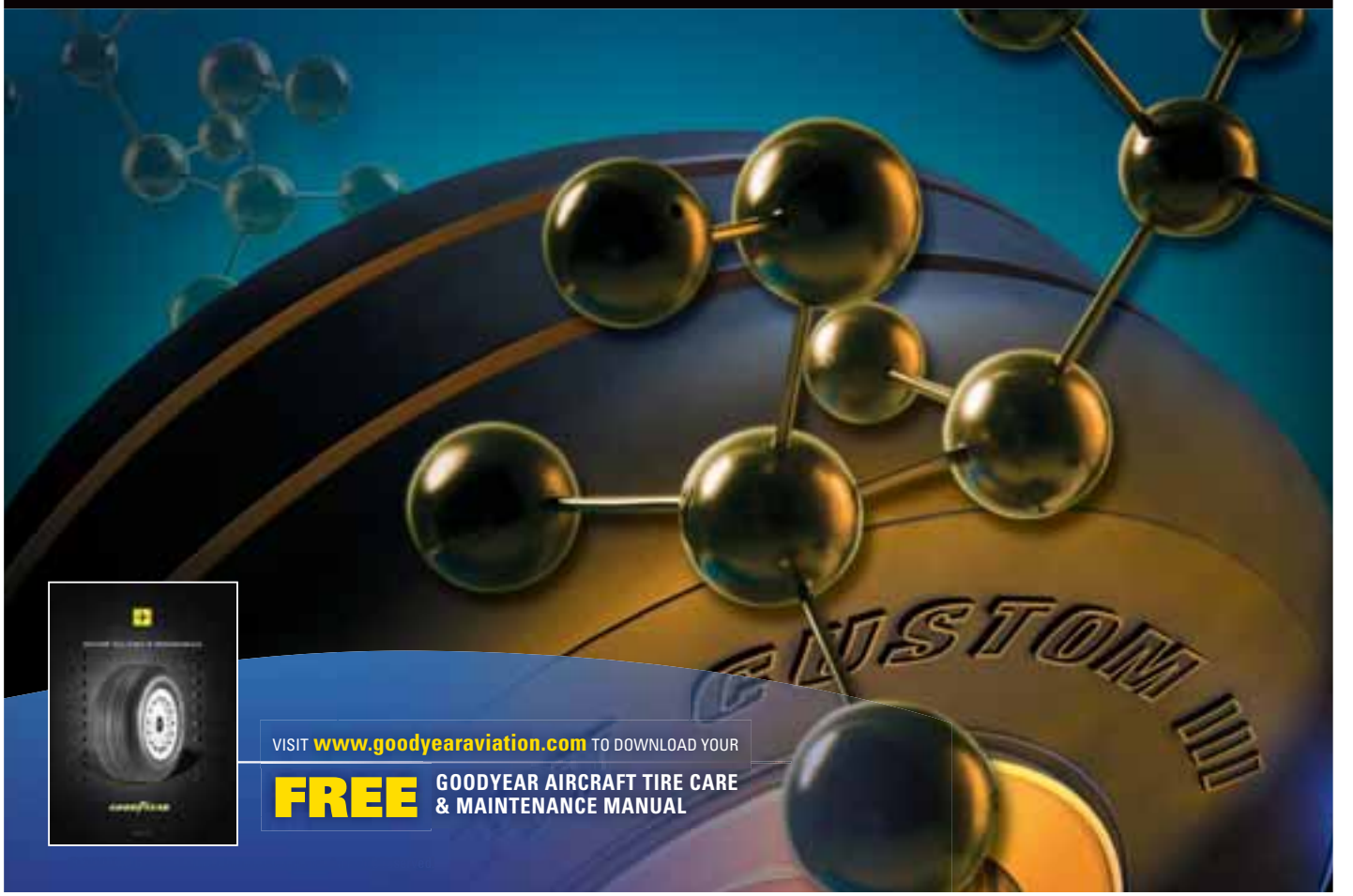

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The Small Turbine Engine Test Cell

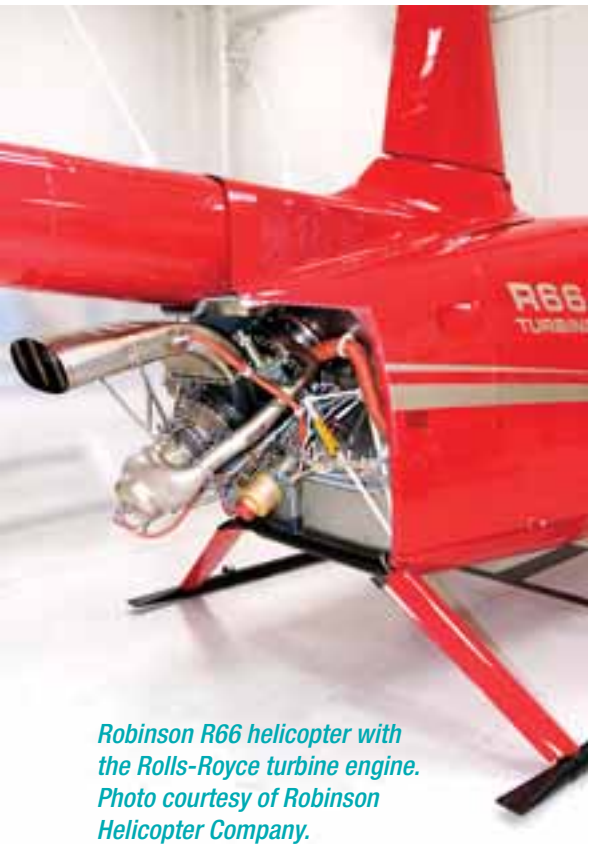
Rolls-Royce's tiny dynos do it all

By Tim Kern

Rolls-Royce has a couple new test cells, the result of the determination of such a need in 2007. By 2009, the first had been delivered; both are now on-line and in daily use. The test cells don't house your standard dynamometers. They're unusual in several respects, all of them good.

The demand for its small (Rolls-Royce M250 core) engines, many used in helicopter applications, was growing, and Rolls-Royce needed additional new dynos (its legacy equipment is still fully functional and is used regularly) to speed testing and throughput.

The company wanted to cover several bases with the new dynos: disaster recovery was one such consideration; being as "green" as possible was another; and of course the functionality of the test cells was paramount: quick turnaround, minimal maintenance, state-of-the-art telemetry and data logging, engine-configuration flexibility, and accessibility were all important.



Robinson R66 helicopter with the Rolls-Royce turbine engine. Photo courtesy of Robinson Helicopter Company.

Modular construction

Taking these into consideration, Rolls-Royce became the first customer for a new dyno system from a Texas company, Atec. That company's release (in February 2007) said, "This project marks the launch of Atec's Phoenix Series modular test facilities, a containerized test cell enclosure which can be fully equipped with all engine support systems — load absorption, fuel, air, oil and fire suppression … Atec has developed an innovative dynamometer system using an electric regenerative dynamometer. This dynamometer is a cleaner alternative than traditional systems, and it offers full range power absorption without the need of a gearbox, in most applications." The system, says Atec, provided "… all the functionality of a traditional engine test cell with the benefits of [modular construction]."

The system was tailored for use in the Rolls-Royce Indianapolis, IN, facility. Being of modular construction, the Rolls-Royce test cell sits on its own platform, the backbone of which is made up of 24-inch I-beams. This offers some insulation from rare possibilities — earthquakes and most imaginable floods — and maintains the module's independence — should a need arise to reposition it, the entire building can be moved with relative ease. "We have no plans to do that," says Paul Bushue, manufacturing and test engineer. "But we have the capability if we ever need it. These modules enhance our manufacturing campus by being lean and flexible."

Eco-friendly

As for being "green," well, running turbine engines at high loads for sometimes days on end doesn't seem all that eco-friendly, even though no one disputes the necessity of running these engines for certification, testing, and routine quality assurance. Standard dynamometers use a water or air brake, where the medium absorbs (*and wastes*) the power generated by the engine. The new Rolls-Royce

dynos use a pair of Schorch 500-hp-rated electric motor/generators controlled by a Parker SSD drive system to provide a precisely measurable load, and the electricity generated by the tests is fed back to the power grid, through an arrangement with the local utility. Rolls-Royce estimates it saves about a thousand dollars a month by selling its generated power back to the utility; and as throughput rises, of course the savings will follow.

Test cell operations

Interesting and important as those qualities are, the daily operational function of the cells is the paramount priority. Accuracy, safety, and throughput are the keywords in production-engine testing, and the new Atec dynos deliver.

Using a Rolls-Royce proprietary data collection system (internally called UMACS — universal monitor and control system), much of the test cycling is automated,

Atec Test Cell at Rolls-Royce

In a product as sophisticated as a test cell, there are no off-the-shelf units. The basic design is planned to be as useful and adaptable as possible; then the individual customer's requirements are added, and the result is a tailored unit that exactly meets the customer's needs.

Howard Lederer, the chairman and CEO of Atec, notes that, "You're dealing with many different departments, programs, and people. It's sometimes difficult to get a consensus. Everyone is not simultaneously available to discuss every question — and some questions never do get answered in the planning, or even the initial design stages. But finally, as you build it, someone fills in the remaining blanks." Of course, "As new requirements roll in and the design changes, costs go up. That can get a little tough for customers, but professionals understand the process. We learn from every customer; that eventually makes it easier for everyone."

Atec's small test cells are making a splash across industry, but it also makes big ones. "Currently, we're working on a cell to accommodate JT9s and CF6s," Lederer continues. "We have a design and a process that we're pretty proud of; it costs about half what a traditional cell of that size would cost." Perhaps we'll see more on that, later. Visit: http://www.atec.com/

although the cells are currently manned; repeatability is assured, and data are more robust. Both hydromechanical control and full authority digital engine control (FADEC) system engines are accommodated on either test cell, and the data collection covers the usual operational parameters — engine and gearbox oil temps and pressures, ambient air temp, inlet and exhaust temperatures — and development and engineering parameters, as well. (For example, various vibration points are monitored, through a highly configurable set of additional sensors.)

Four different engine test cycles that simulate typical light helicopter missions can run automatically: executive transport, standard training, autorotation training, and chase/police/news. Additionally, production/overhaul acceptance certification test cycles can run automatically, all the way to 24/7 "continuous life" tests, with stops for only those maintenance items called for in the manuals.

"The goal is to be able to run all the standard test cycles automatically," says Nathan Heidegger, assistant chief project engineer. "It's just that much more repeatable, test to test. Plus, when you're running extended endurance tests, you really don't want to tie up an engineer and test stand operator to just sit here and watch the engine run all day." The data collection is real-time, in the cell's control room. It is also remotely viewable at engineers' stations.

Rolls-Royce RR300 turbine engine mounted in the test cell ready for engine run. Photo courtesy of Tim Kern.

Both hydromechanical control and full authority digital engine control (FADEC) system engines are accommodated on either test cell, and the data collection covers the usual operational parameters.

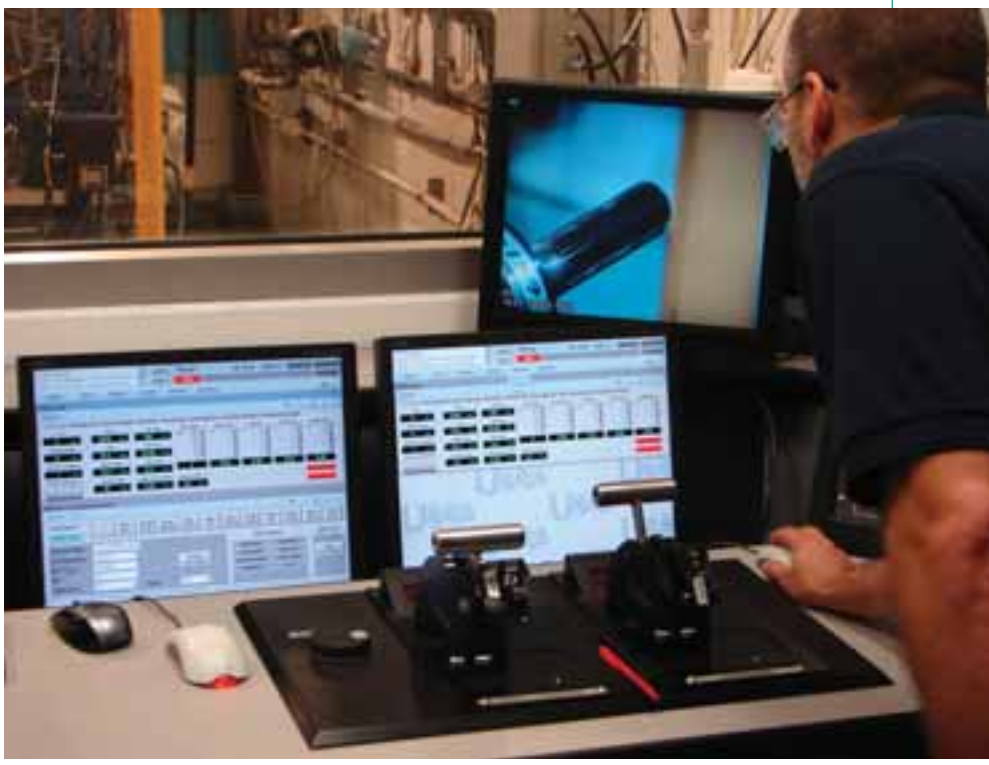
Still, the engineer on call can get … a call from the system. When the systems spot an anomaly in an operating parameter, any of several events take place: a minor deviation may simply trigger an alert on screen; a larger deviation may command a reduction in power; or a calamitous event may signal immediate shutdown. (The actual parameters are Rolls-Royce proprietary, but you get the idea.)

Three gimbal-mounted, variable focal length (zoomable)

cameras record the operations: two are in the dyno room itself, providing a good look at the overall operation and a close look at the power coupling indoors; the third camera keeps an eye on the exhaust stack outside. Any or all camera views are seen and controlled by the test crew.

Test cell throughput enhancements come from several improvements: the cell itself is easily configurable to fit any of the small R-R engines — M250 and RR300 (and, eventually RR500); turboprop or turboshaft; exhaust up or exhaust down. The test operating rpm range extends from 2,000 to 10,000, covering the small-engine line quite well. Different mounts switch quickly, and most hookups are generic. Additional sensors get added when they're called for.

Throughput is greatly enhanced by the two-cell setup. With their doors literally across the hall from each other, test mechanics can easily move between cells; tools are common and available. Subject engines roll up a ramp (the cells are elevated, remember?) and are fitted with sensor-equipped intakes and exhausts, plus other goodies that may be required for their particular tests. Then, as soon as a cell opens up, the new engine is wheeled in, picked up by a wall-mounted crane, and positioned in its bed, where the fuel lines, controls, and sensors are attached. Then the exhaust duct is lowered into place by an electric hoist. Push the button, and … power!



The test cell control panel in the Indianapolis Rolls-Royce facility. Photo courtesy of Tim Kern.

Paul Bushue says that the existing stands, in service for decades in the main building, still get plenty of work, but that the new stands, with all their improvements in capacity, precision, real-time reporting, datalogging, and automation "have taught me more about how our engines run. This actually helps me better translate information from the older stands." In other words, learning from one machine makes the other machines' data more relevant — a free improvement in old equipment! **AMT**

Tim Kern is an aviation writer, aircraft builder, and private pilot. He is based in Anderson, IN, and can be reached at info@timkern.com.

Aftermarket Solutions

Timken also offers gearbox and engine overhaul

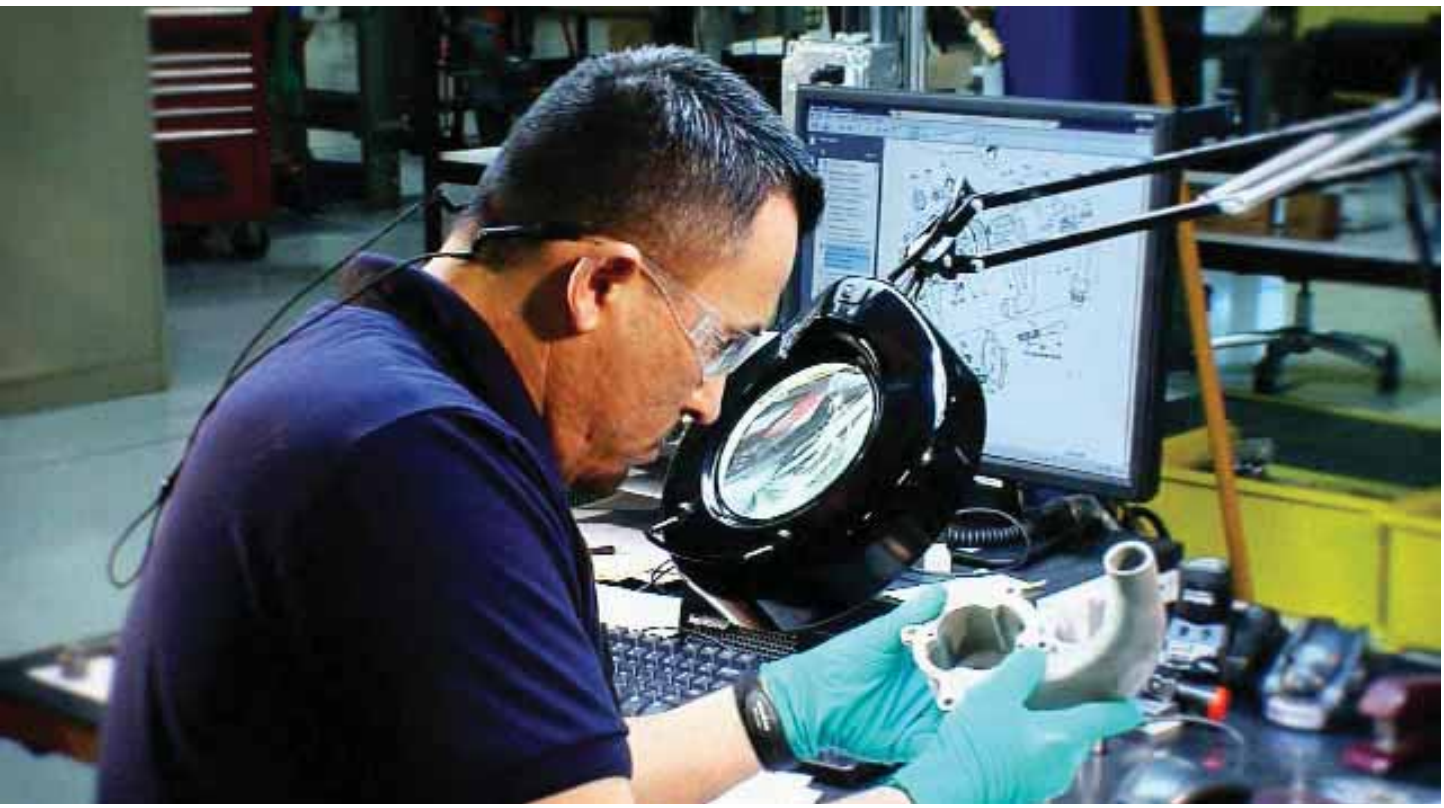
By Ronald Donner

Major maintenance on helicopter drivetrain components having specific overhaul times, life-limited parts, and other unique requirements is generally reserved for the maintenance repair overhaul (MRO) organization having dedicated facilities, specialized equipment and tooling, inspection and repair processes, and technicians having specialized skills and training. These facilities will have machining equipment, cleaning and nondestructive testing lines, welding sections, test or flow benches, paint booths, and are more similar to a specialized machine shop than the typical aircraft maintenance facility. Many times these specialized facilities provide MRO services for both civilian and military customers.

I recently had the opportunity to visit such an MRO facility; Timken Aerospace Aftermarket Solutions in Mesa, AZ, where a steady volume of repair and overhaul takes place on Pratt & Whitney Canada PT6A and PT6T TwinPac engines, Honeywell T-53 engines, Bell Helicopter drive train components, and Rolls-Royce 250 component repair. Some of the more complex units repaired and overhauled there are the Bell 212 and 412 transmissions, Bell 412 main rotor heads, and the Honeywell T-53 fuel control units.

Corroded transmission oil pump rotor a common shop rejection during overhaul. Photo provided by Ronald Donner.

Inspection of individual piece parts during the overhaul process is a critical step. Photo provided by Timken Aftermarket Solutions.



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"ACTIVELY ENGAGED": WHAT DOES FAA'S RECENT CLARIFICATION MEAN FOR IA RENEWALS?

FAA recently clarified its guidance to field inspectors on "actively engaged" for Inspection Authorization holders seeking their IA renewal. We'll cover what this all means for aircraft maintenance personnel and how they can facilitate their reapplication.

UNMANNED AIRCRAFT SYSTEMS: AN EMERGING INDUSTRY

Special session on unmanned aircraft systems (UAS), an emerging industry that is moving into the civilian sector of aviation. This session will explain the outlook and projections, focus on the need for trained technicians in the industry, how to get training, and the employment outlook.

FBO/MRO ROUNDTABLE: CHALLENGES FACING MULTI-FACETED SERVICE BUSINESSES

This roundtable will consist of representatives from Fixed Base Operators and Maintenance/ Repair/Overhaul organizations from the business and corporate aircraft segment. Topics that will be covered include challenges, lessons learned, and best practices when managing multiple locations/ facilities, consistent application of policy, procedures, and quality for the maintenance organization, ramp operations, on safety/SMS, human factors/ human error management, including implementing technological advances, and how to compete with other industries for good technical people.

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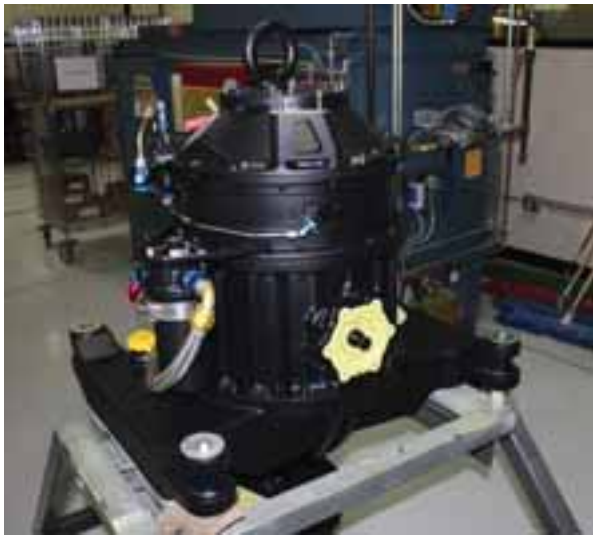
More than just bearings

I, like many other people, naturally associate the name Timken with bearings — and rightfully so as it has been manufacturing bearings of all sizes, shapes, and applications for decades. But that's certainly not all it does. Erik Paulhardt, vice president of Timken's Aerospace and Defense segment, explains, "The Aerospace and Defense group is an original equipment manufacturer (OEM) for rotorcraft transmission assemblies, and a variety of complex parts for gearbox and engine applications including bearings. We also produce a host of engine, gearbox, and other piece parts, including bearings, under parts manufacturing approval (PMA). The rest of the Bearings and Power Transmissions Group focuses on the manufacture and repair of roller bearings, ball bearings, gear and chain products for use in numerous OEM and aftermarket industrial market segments."



Bell 204 series helicopter main transmission overhaul nearing completion. Photo provided by Ronald Donner.

Larry Shiembob, director of aerospace aftermarket, says, "We really have the helicopter industry covered as a supplier providing new OEM bearings to helicopter manufacturers as well as replacement parts and numerous MRO services. Our MRO services include working on transmissions, gearboxes, main rotor components, gears, housings, certain turbine engines, and of course bearings. These capabilities place us in the unique position of being able to provide MRO for drivetrain components,

Operator preparing an overhauled engine for test in the new Timken test cell. Photo provided by Timken Aftermarket Solutions.

repair for piece parts and bearings, provide OEM and/or PMA replacement parts, and provide engine overhaul for certain turbine engine models for light to medium size helicopters." All bearing repair work is accomplished at the Timken facility in Los Alamitos, CA.

Shiembob concludes, "We work with the customer to make sure they understand what options are available and to help them determine which option to choose."

The Mesa facility employs approximately 80 people and about 90 percent of the shop technicians are FAA certificated either with an Airframe and Powerplant or a Repairman certificate. In the shop are experienced A&Ps, new A&Ps, and former military technicians having helicopter maintenance experience. Technicians receive a blend of ongoing training depending on what their role is including factory training, in-house classroom, and on the job training. Staff may be cross-trained as Timken views this as an advantage, making technicians flexible and allowing better support for the customer base.

Transmission overhaul

In the shop, I spoke with Brandon Clausen, mechanic – component repair, on the transmission overhaul line. He was nearing completion of a main transmission overhaul from a Bell 204 series helicopter. We spoke about common problems found during overhaul on this type of unit. He replied, "Internal corrosion is one

of the common problems that we experience in the overhaul process. The time that the aircraft sits idle can be more detrimental to certain piece parts of the assemblies. The overhaul time for this unit is 1,100 hours, but depending on the type of operation it could take up to eight years or more, and often times will include periods of extended down-time. Depending on the environment and storage conditions, moisture will collect and sit in low lying areas and create problems."

Clausen showed me a transmission oil pump gear rotor assembly or G-rotor and explained, "This badly corroded rotor for the oil pump of the transmission assembly is a common shop rejection. Most rotors are rejected for excessive wear of the polished surfaces. This one was so badly corroded it would not come apart; a common issue for units that sit idle for prolonged periods of time." He went on to say, "When an operator sends in a unit, we provide a quote for the overhaul, and due to unknown problems like this one, the overhaul cost can be more than they expected. Often times the customer may question the inspection and findings because of a low time since overhaul (TSO) on their component." Again he repeats that the time the aircraft sits idle can be more damaging than high use in some cases.

Engine test cell

John Hoban, facilities site leader, proudly showed the recently completed turbine engine test cell. Designed and built by Test Logic located in Middletown, CT, the cell has two bays with separate control panels allowing two engines to be run simultaneously. The test cell appeared similar to other state-of-the-art test cells of its size, with one interesting exception. The air inlet system has coolers inside that introduce moisture, reducing the temperatures at the engine by as much as 20 F. I was quickly reminded we were in the Arizona desert where summertime temperatures can easily reach well above the acceptable range for engine and test cell operation.

Hoban explains, "Each air inlet system was designed to contain a device that we here in the Southwest call a "swamp-cooler." Without this feature, there would be times when operating the test cell would be restricted due to the high temperature, potentially adding delays to the overhaul turn-times."

Specialized services and aircraft maintenance

I had an interesting discussion with Larry Shiembob regarding

a facility providing specialized MRO services that is separated in location from aircraft, an airport, and doesn't have the typical flying machines inside the typical hangar to look at, work on, or touch and see every day. We discussed how to maintain the sense of "aircraft maintenance" among the staff when on the surface a company providing specialized services is more similar in some ways to other industrial machine shop environments, rather than a traditional aircraft maintenance facility.

Shiembob quickly responds, "That's not an issue here. We're fortunate that our technicians have a lot of interface with our customers and helicopter operators. They are routinely asked to assist in the field with a variety of tasks from troubleshooting to rigging an engine. We maintain a very high sense of aircraft maintenance and aviation in our shop. Ask the guys in the shop and see for yourself," he concludes.

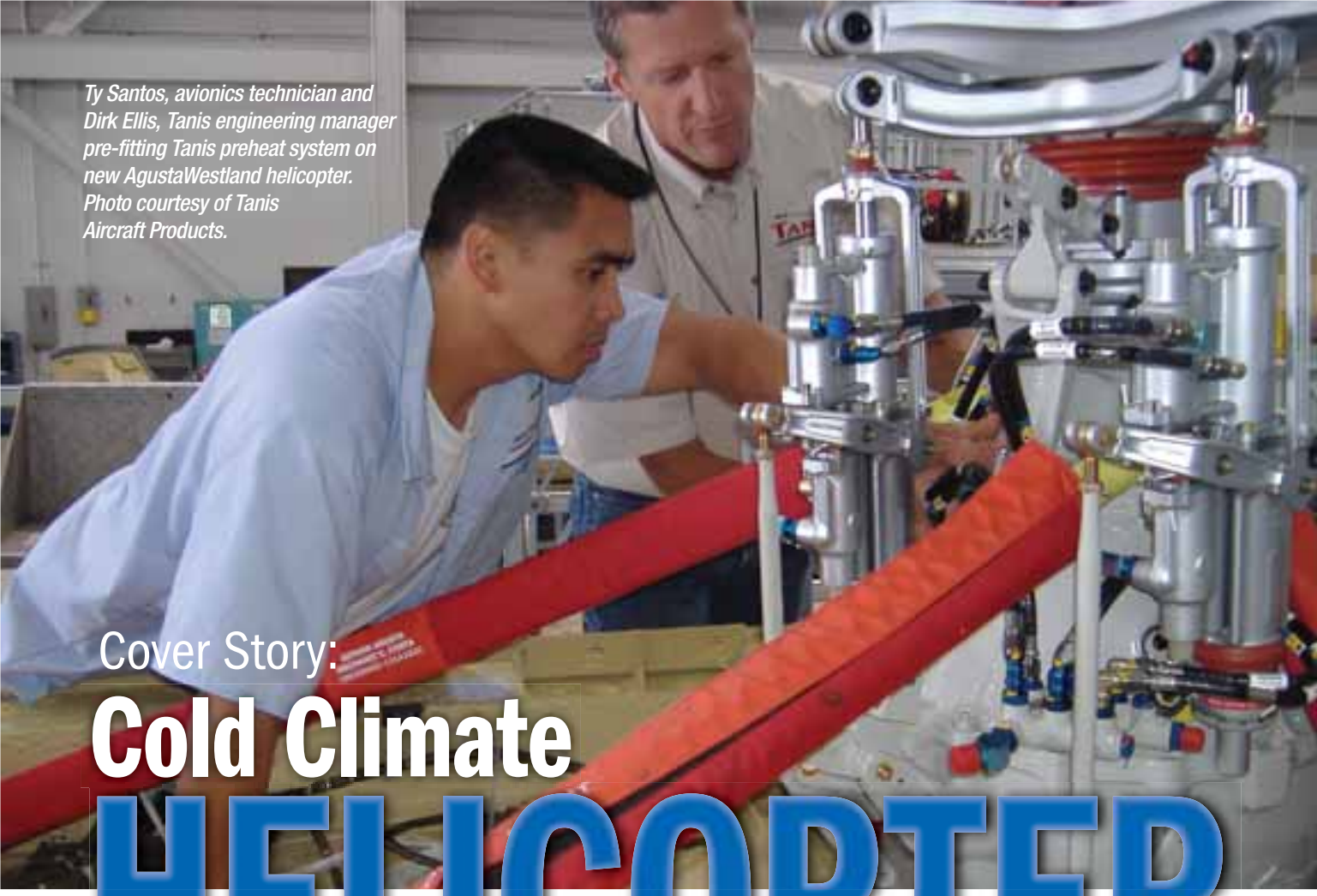
Promoting safety

In the shop I passed by a number of work benches, storage cabinets, and desks displaying the FAA Personal Minimums Checklist. I was introduced to Steve Davis, chief inspector, who explains, "I have been an FAA Safety Team (FAASTeam) representative for five years. This provides me the ability to keep the sense of aircraft maintenance and aviation safety in front of everyone here." He goes on to explain how he communicates FAASTeam information by posting written communications throughout the shop and presenting related FAASTeam information to all technicians during monthly quality meetings. Shiembob was right.

When asked what advice could be provided to maintainers in the field regarding drivetrain components Shiembob says, "By following the preventative maintenance and inspection guidelines, time in service increases and repair costs decrease. One of the common things we see is when customers take equipment off-line for an extended period of time. They should look into the storage and preservation process. Taking these extra steps extends the life of the engine and components."

So yes, bearings are what the name Timken is historically associated with, but its capabilities are much greater, including specialized MRO services for light to medium helicopters. **AMT**

For more information visit: www.timken.com/en-us/solutions/aerospace/aftermarket.



Ty Santos, avionics technician and Dirk Ellis, Tanis engineering manager pre-fitting Tanis preheat system on new AgustaWestland helicopter. Photo courtesy of Tanis Aircraft Products.

Cover Story:

Cold Climate HELICOPTER Operations

Electric preheating of driveline components helps cold climate starts.

By Ronald Donner

Any aircraft mechanic that has watched a turbine engine slowly spool up on a cold winter day has likely experienced anxiety relating to possible engine temperatures exceeding published limits during start. Exceeding the published limits can result in damage to the combustion chamber or hot section of a turbine engine caused by extended spool up times — a real concern to those operating in cold climates. The combination of cold thick oil being asked to lubricate driveline components and gearboxes, and the effect of low temperatures on battery efficiency is a formula for achieving a temporary spike in engine start temperature or, worst case, a hot start.

Aircraft mechanics and pilots both know that the best solution is a heated hangar, but this is not always possible. In the case of a helicopter, preheating of specific components such as gearboxes, transmissions, and other complex components can eliminate these potentially damaging conditions by lowering the viscosity of cold soaked fluids. One method of preheating is to install an electric preheat system.

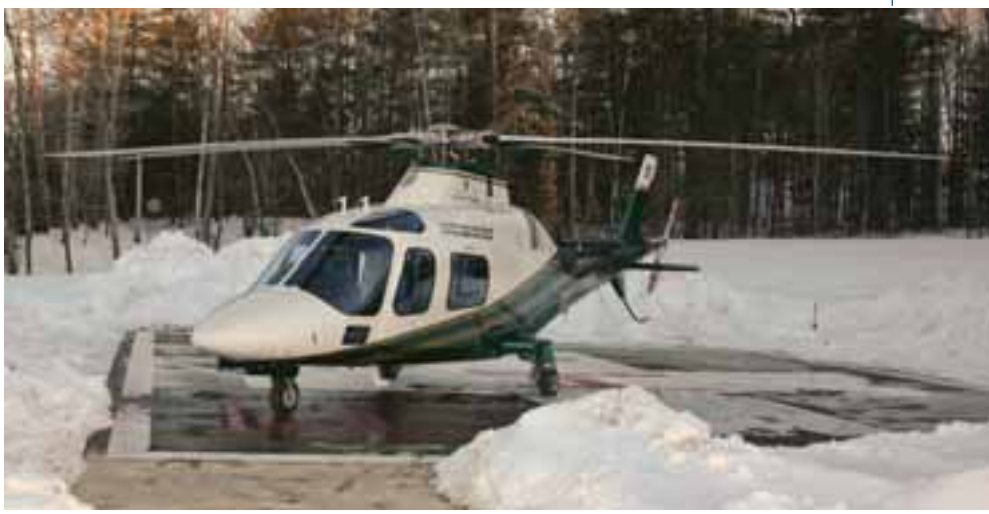
The electric preheat system

To learn more about electric preheat systems, *AMT* turned to Tanis Aircraft Products in Glenwood, MN. Tanis electrical preheat products have been used in reciprocating aircraft engines for decades. Much of the same technology is currently used on helicopters to transfer heat from an electric

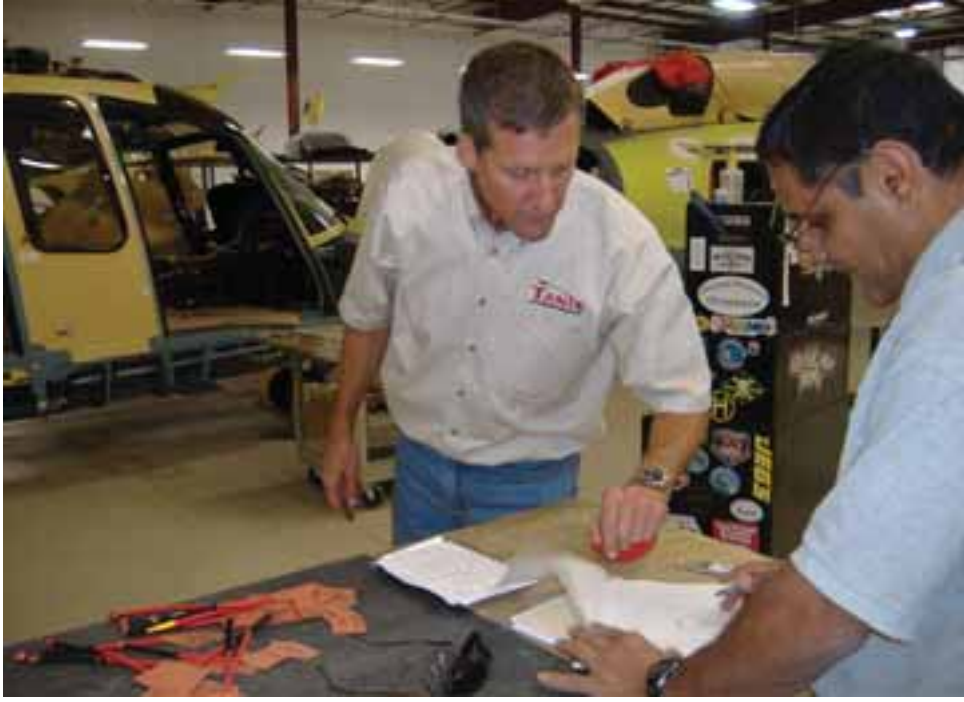
heat pad into an engine's oil, oil sump, hydraulic reservoir, reduction gearbox, accessory case, fuel control unit, tail rotor gearbox, or most any complex component.

Jim Conn, business development manager for Tanis, says, "The preheat technique is quite simple to explain in words: that is to raise the temperature of all helicopter critical fluids and components to a warm steady state. Over time, the temperature will stabilize similar to the internal temperature of a nominally heated hangar."

Conn goes on explain, "Electric preheat systems are shoreline (hangar or ground outlet) powered by 115v or 230v AC and designed to draw between 5-13 amps per helicopter. Because the system operates on shoreline power and is not operated in flight, the installation does not require Supplemental Type Certificate (STC) approval but is regarded rather as a minor alteration, even though we maintain a current Parts Manufacturing Approval (PMA) from the FAA. Additionally, battery heaters can be installed into the main cabling for the component heat pads which will improve the efficiency of cold batteries during engine start."



Operational readiness of this Agusta 109E is enhanced with electric preheat systems. Photo courtesy of LifeFlight of Maine.



Dirk Ellis and Jay Sundrum, avionics supervisor, discuss and record the cable routing. Photo courtesy of Tanis Aircraft Products.

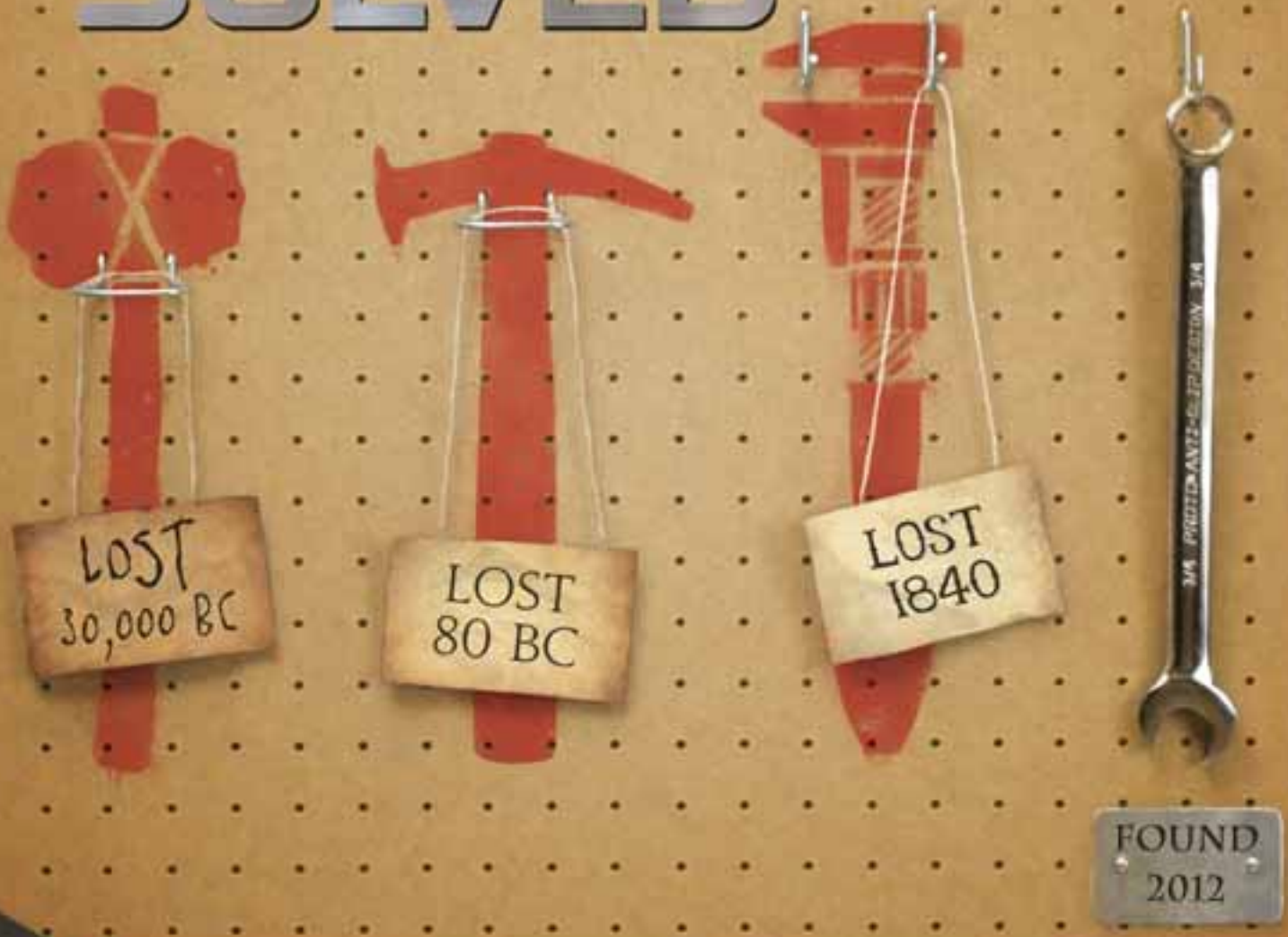
Thomas Judge, executive director for LifeFlight of Maine, says, "We work in an extremely cold climate and have the heaters installed on the main rotor gearbox, tail rotor gearbox, both engines, hydraulic oil tanks, and battery on our Agusta fleet. The electric preheat system increases our operational readiness and shortens take off times."

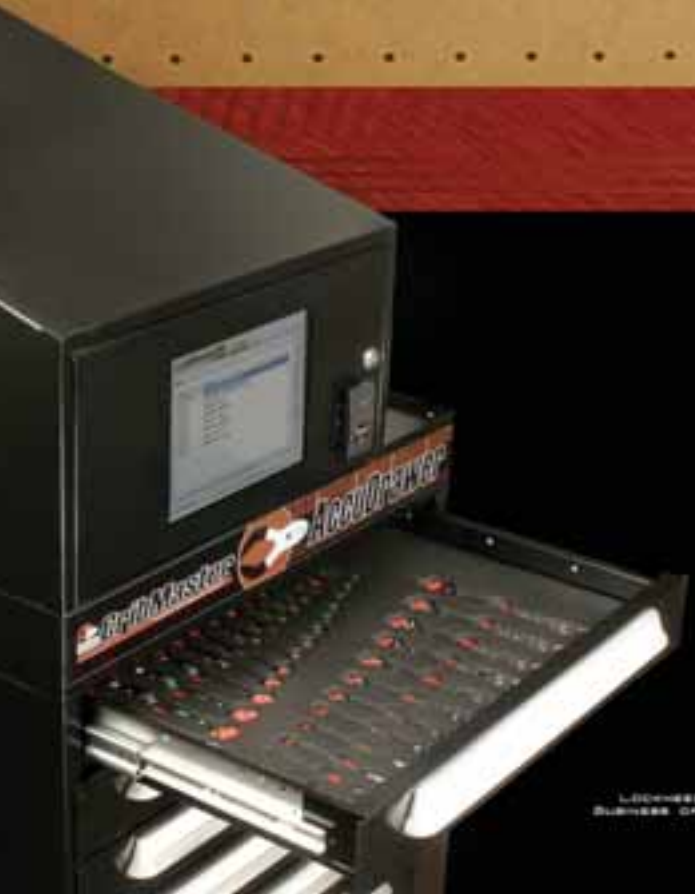
Design, maintenance, and inspection

Conn says, "The heat pads contain resistance elements which are sandwiched and vulcanized between two sections of flexible heat conducting pads. These pads are affixed with a cold cure bonding agent to specific heat conducting locations on fluid reservoirs and components that if preheated will enhance the starting process."

Conn explains the older style harnesses used high-temp silicone insulated wiring and spade type connectors. Feedback from aircraft mechanics in the field indicated that technicians were not always satisfied with the original spade type connectors. As a result of this type of feedback, they upgraded the design to use Mil-Spec Teflon insulated

AGE OLD PROBLEM SOLVED





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cable, the connectors are environmentally sealed and include a self-locking feature, and a quick disconnect feature was included using MIL-C-39029 connector technology. The latest SWAMP (severe wind and moisture problem areas) design parameters are used to develop and manufacture all helicopter systems.

A full set of installation instructions are shipped with each system, which makes for easy installation by any technician experienced on that model helicopter. Ongoing maintenance and inspection instructions are specifically called out in the Instructions for Continued Airworthiness (ICA)

Determining proper placement and correct size of heat pads on this new AgustaWestland main rotor gearbox. Photo courtesy of Tanis Aircraft Products.

that accompanies each Tanis electric preheat system. These ICAs should be made part of the aircraft's maintenance program. General maintenance and inspection practices for 100-hour or annual inspections include such tasks as:

- Examine the cabling system for abnormal wear and integrity at attachment points and bulkhead penetrations, and the shoreline power plug and each individual cable lead for continuity to its respective heat pad element.
- Heat pad elements should be visually checked for cable lead integrity and security of the bonded pad to its heated component. If any portion of a pad heat element comes loose, it may be re-bonded using only factory specified bonding compound. The use of standard tool crib adhesive is not acceptable for use as a bonding material as it will interfere with heat transfer properties of the heat pad element.
- If a pad heat element exhibits a gray discolored area, it is likely due to an air bubble under a poorly bonded element and will require replacement.
- Once the visual inspection is satisfied, verify with an ohmmeter proper heat pad element resistances as published in the installation handbook.

Wendell Stadig, ERA Helicopter lead maintenance technician for LifeFlight of Maine's two Agusta 109E helicopters, says, "The electric preheat systems are really trouble free and require very little attention. The only trouble I ever had was trying to remove heat pads from engines or transmissions being removed from the helicopter for overhaul. The pads do not come off very easily! Now I just leave them on and install new pads on the replacement component."

A few safety tips worth passing on regarding the handling of heat pads are, never apply electrical power to heat pads until they have been properly installed to the designated aircraft component. Applying power prematurely can potentially destroy a pad element before it is installed. Also, resist the temptation to touch a heat pad with your bare hand to see if it is working. Heat pad elements performing properly will radiate noticeable heat, so with electrical power applied touch the component adjacent to the pad to determine that it is working correctly.

Helicopter operations in severe winter conditions can create a special set of mechanical stresses on critical driveline components and engine starts. One method of overcoming these stresses is through the use of electric preheating systems. Stadig concludes, "The best part is that we just plug them in shortly after the last flight while the oils are still warm. It's easier to keep the components warm than to get them warm."

Information for this article provided by the following:

Jim Conn, business development manager for Tanis Aircraft Products. Jim holds a commercial pilot certificate and has been a user of Tanis products since the 1980s. He has established and managed aviation departments for small businesses, and in 1995 was cited "Wisconsin Aviation Person of the Year." Jim can be reached at jim@tanisaircraft.com or (320) 634-5149.

Dirk Ellis, engineering manager for Tanis Aircraft Products. Dirk has been part of the Tanis team for 20 years and he holds an Airframe and Powerplant certificate. Dirk can be reached at dirk@tanisaircraft.com or (320) 224-4425.

For more information: http://www.youtube.com/watch?v=vPwI_A7yUE0&feature=youtu.be **AMT**

Peter G. Tanis

Peter G. Tanis, now deceased, is recognized far and wide as the iconic name in aircraft preheat systems. Born in Kalamazoo, MI, he learned to fly when he was 16 years old and soon earned his aircraft mechanic's license, graduating from high school in Iowa in 1954.

He attended the Moody Bible Institute in 1959 to join the Missionary Aviation Program. Tanis taught aviation maintenance at the Watertown Vocational Technical College in Iowa from 1968 to 1971 and began testing his ideas for an engine heater. Using specialized heating elements to heat the entire airplane engine, from cylinder heads to the case and the oil, he patented his idea before selling his first preheating system. Tanis' heaters became an industry standard.

In 1977, Tanis moved to Glenwood, MN, where he also operated a maintenance shop, an avionics shop, and gave flight instruction at the Glenwood Airport. He published many technical papers and became known as the guru of aircraft preheating and cold weather flying. In 2011, Peter G. Tanis was inducted into the Minnesota Aviation Hall of Fame for his contributions to aviation.

The Tanis Aircraft Products manufacturing facility is still located in Glenwood, MN, with corporate offices in Eden Prairie, MN. For more information visit www.TanisPreheat.com or call at (800) 443-2136.

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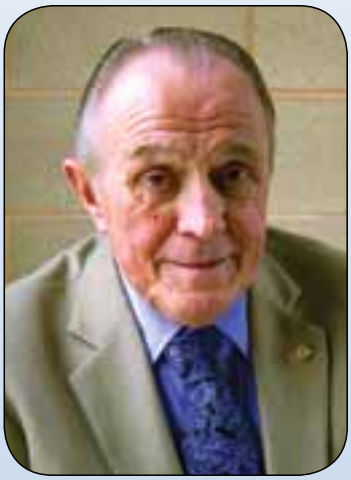

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Portable Electronic Devices

Sophisticated electronics as a means of problem solving

By Jim Sparks

This is not a story about performance enhancing drugs nor is it about the newest animated character coming from the house of the mouse even though the topic contains names like Bluetooth and WiFi joined by a cast of celebrities including, iPod, iPad, and even iPaq. So just what is a PED and how does it impact life in our world?

The portable electronic device (PED) has evolved from a noteworthy event in 1948. Bell Laboratories publicly announced the creation of a gadget known as the "Transistor." The intent was to enable amplification thus making bulky and fragile vacuum tubes obsolete. What followed in the next six years impacted how we listen to music and communicate through the airwaves. The "Transistor Radio" was arguably the first PED with a worldwide distribution. To those not "in tune" it was every bit as annoying in public as the modern cell phone.

Electronic flight bags (EFB), (both installed and portable), and high-speed data transfer units are two of the more recent and increasingly common devices available.

Sophisticated electronics have become a reality for today's aircraft technician. Even our tools have evolved. I find myself as dependent on the ability to connect a laptop to an aircraft as being able to figure out where best to plug in my multimeter. Understanding how to obtain and combine analog and digital information provides an effective means of solving difficult problems.

The use of a PED like most everything else found on an aircraft is regulated. In the United States, Federal Aviation Regulation (FAR) 91.21 provides guidance and lists approved equipment. It stipulates: no person may operate any portable electronic device on a civil aircraft when operated by an air carrier or any time the aircraft is operated under instrument flight rules (IFR). There are certain exceptions which include: portable voice recorders, hearing aids, heart pacemakers, electric shavers along with any other portable electronic device that the operator of the aircraft has determined will not cause interference with the navigation or communication systems.

Incident and accident reports

Recent incident and accident reports have revealed flight crews using PEDs, including laptop computers and mobile telephones, for activities unrelated to the duties and responsibilities required for a flight. In one widely publicized instance, two airline pilots were using their laptop computers during cruise and lost situational awareness, leading to a 150-mile fly-by of the destination. In another case a pilot was texting after the aircraft pushed back from the gate and missed relevant ground control communications. During an FAA check ride a crewmember's mobile phone was overheard ringing during the takeoff roll.

It is a pilot's responsibility to guard against distractions on the flight deck. Technology continues to advance and provides our industry with new tools to assist crews in accomplishing their jobs. For instance, electronic flight bags (EFB) (both installed and portable) and high-speed data transfer units are two of the more recent and increasingly common devices available. For the traveling public, PEDs are an established fact of life particularly in the highly mobile air transportation industry. While PEDs

can be valuable tools in aviation operations, crewmembers cannot permit the potential distractions and should continue focusing on duties and responsibilities related to the flight. Regulations regarding sterile flight decks prohibit crewmembers from participating in activities not related to the safe operation of the aircraft.

Flight departments should create a safety culture that clearly establishes guidance, expectations, and requirements to control cockpit distractions, including use of PEDs.

Stay connected

The ability to stay connected while flying has created numerous challenges for those of us involved in keeping the systems functioning. Information specialists find it challenging enough maintaining the data stream to a group of computers in an office environment. Couple these challenges to those found in modern high-speed aircraft and most information technicians throw up their hands as the traditional multi-conductor data cable is not an option in this environment.

Radio waves originating from either space based or ground stations must be in range of the aircraft transceivers for a connection to be initiated and once completed the traditional monthly bill from the phone company won't come close to covering the connection costs.

An aircraft cabin is a rather fragile environment and a majority of WiFi routers operating here are reduced wattage from those found in the home or office. This can, in fact, be limited by the airworthiness documentation approving the system.

Many factors can impact the successful use of PEDs in a wireless aircraft. The signal is based on a standard WiFi protocol known as the 802.11 standard and uses 2.4 gigahertz as the operating frequency. Not all WiFi compliant devices have the same sensitivity which means some types of PED demand more of the signal than others to function and can reduce the signal for other consumers. Also, the more users streaming data will cause a slow down of the network as the data stream flow can be compared to a pipe and once capacity is reached the stream backs up.

Bluetooth equipment has been confirmed to raise havoc on 802.11 networks as it shares the 2.4 gigahertz airwaves. As Bluetooth utilizes a different data protocol the signal can confuse the 802.11 system bringing data flow to a crawl or even cause a shutdown of equipment. Crews using remote Bluetooth GPS antennas with an IPad have been suspect in terminating cabin Internet activities.

It may be hard to perceive a microwave oven as a portable electronic device but in some instances they do find their way onto aircraft. Microwave energy can be another killer of WiFi and any installation should be tested to ensure an acceptable coexistence.

Interference and the FCC

Cell phones (and other intentional transmitters) differ from most PEDs in that they send signals strong enough to be received at a far distance. Since 1991, the Federal Communications Commission (FCC) has banned the inflight use of 800 MHz cell phones. This is primarily a result of potential interference with ground networks.

The ban requires that in addition to the FAA testing proving no interference with aircraft systems, an operator would also need to apply for an exemption to the FCC before it could allow cell phone use inflight. Even if the FCC ever rescinds its ban, FAA regulations would still apply, and any installed equipment would be subject to FAA certification. The air carrier would have to show that the use of a particular model phone won't interfere with the navigation and communications systems of the particular type of aircraft on which it will be used.

Airlines often let passengers use newer-model cell phones in what's called "airplane mode," disabling the transmit function. This capability allows users to take advantage of other functions. FAA guidance does permit airline passengers to make cell phone calls once the aircraft has landed.

WiFi and frequency analyzers are readily available and can be found in many forms varying from expensive and complex testers to free applications for an Android. Interference can come from a variety of locations including other PEDS, aircraft wiring, and other electronic components. A sweep of an aircraft cabin using a frequency analyzer is a good first step in preventing issues with portable electronics.

The impact of a PED on an operating aircraft has not as yet been fully explored; but, it is still quite probable some impact will occur sooner or later. This may be due in part to frustration of the PED owner with the challenges of staying connected. I just hope the impact does not result from a throwing arm. **AMT**

Jim Sparks has been in aviation for 30 years and is a licensed A&P. He is the manager of aviation maintenance for a private company with a fleet including light single engine aircraft, helicopters, and several types of business jets. He can be reached at sparks-jim@sbcglobal.net.

FAA Enforcement Activity

Taking a look at tarmac delays and unapproved parts

By Stephen P. Prentice

You may have read recently about FAA enforcement levying fines on some air carriers for excessive delays on the tarmac while waiting to offload passengers. It just seems outrageous that some aircraft are forced to remain on the ramp for many hours without a way to get the passengers off and into the terminal. They talk about security and the like but when an aircraft is locked up on the ramp with passengers aboard it seems to me that it is either the FAA's fault or TSA's fault, not the airlines.

The "get tough" attitude of the FAA in all areas of enforcement recently seems to be playing the safety card to placate the public and respond to the outcries and the Congress. That is, the more the fines and sanctions then the more it looks like it is doing its "safety" job. A dubious conclusion at best.

When a gate is not available, vehicles should be ordered to transport the passengers. Even the captain could take charge and order the aircraft opened and passengers removed. Safety is the paramount consideration and locked up passengers have gone ballistic in certain cases. If the airline is responsible and is more concerned with money and moving the passengers in the system then maybe they should be held responsible, but passengers locked up in an aircraft on the ramp for hours at a time is just not acceptable and the FAA and TSA should make immediate joint demands for a solution … After all, the captain still has the power and the responsibility.

Charging airmen and other certificate holders with a crime is a somewhat rare occurrence.

Help on the way

A meeting with airlines, airports, and other government officials was held on ways to prevent the incidents of delay and confusion last October, mainly in the Northeast, when hundreds of passengers were stranded. Many of the flights sat on the ground for hours. The problem was attributed to a lack of communication between the airlines with regard to their delays due to the weather.

Tarmac delays are now limited to a maximum of three hours … at which time passengers must be let off the aircraft. Airlines that exceed that time (as has recently happened) can face maximum FAA fines of up to $27,500 per passenger!

Maintenance and repair criminal case

Meanwhile, maintenance operations enforcement has picked up in a serious way … The "Paper-clip Caper."

A recent federal indictment of personnel at a maintenance facility (repair station) in California came to my attention in September of last year. This facility itself was not indicted, nor the corporation, but rather, only some technicians and principals involved with the direction and management of the firm. We have to keep in mind that this is a *criminal* case and not a certificate action, or civil fine, which would be a companion administrative case against the airframe and powerplant ticket and any other FAA issued certificates held by those charged or the company. Six men in all were charged with crimes.

Charging airmen and other certificate holders with a crime is a somewhat rare occurrence. Although individual airmen have been charged with crimes involving aircraft maintenance for serious accidents and deaths caused by their alleged misdeeds, it is usually seen more frequently in European aviation, like what happened in France as a result of the Concorde disaster. As seen, it can happen here and we should all keep in mind when we perform maintenance that there are companion criminal sanctions as well as administrative sanctions that can be involved with aircraft maintenance.

The criminal charges in this indictment include, conspiracy to commit fraud involving aircraft parts in interstate and foreign commerce and fraud involving the same,

mail fraud, and also an order including criminal forfeiture for all ill-gotten gains from the alleged criminal activity.

The primary business of the company is the repair and overhaul of starter generators, alternators, and rotary or linear actuators, converters, and flight instruments. It is still in business although owned now by a larger company.

The indictment reads in part as follows: … *defendants and others known and unknown to the Grand Jury, knowingly and with intent to defraud; combined, conspired, and agreed with each other, in and affecting interstate and foreign commerce, to: (a) falsify and conceal material facts concerning aircraft parts; (b) make materially fraudulent representations concerning aircraft parts; (c) make and use any materially false writings; entries; certifications; documents; records; data plates; labels; and electronic communications concerning aircraft parts; and (d) export from and import and introduce into the United States, sell, trade, install on and in any aircraft; aircraft parts using and by means of fraudulent representations, documents, records, labels, certificates, data plates, and electronic communications, all in violation of Title 18 U.S. Code, Section 38(a).*

Records, 8130 forms, data plates

We all should be familiar with the usual charges regarding falsifying records, and concealing material facts involving the use of unapproved parts in repairs and overhauls. Falsified 8130s added to the charges along with internal records, work orders, and other paperwork. The paper trail is what nails down the charges. Furthermore, not completing required testing of repaired components adds to the charges. The station manuals set out in detail all of the required testing to be done on each part's item. Failure to follow its own company operations manuals adds to the laundry list of violations. (See FAR 145.109, 145.207, 145.211, 43.9, 43.12, and 43.13.)

Furthermore, swapping part data plates was common practice according to the indictment and the technicians were well aware of the practice. (Indeed, many would say that it is still common practice in many parts of the repair industry.)

The guts of the complaint

The gist of the indictment consists in these six men being charged with conspiring to use and using, unapproved parts in their repairs and falsely certifying that the FAA approved their use. They are alleged to have used cheaper and inferior parts in place of approved parts.

There are two allegations of using parts that were fabricated at the repair facility … hence we call this the *paper clip caper …*

To show how detailed the charges are, here is an excerpt from the indictment: "… on or about Sept. 12, 2007, the defendant … instructed a technician to fabricate an end bell locator pin from a drill bit, and install it on a windshield wiper motor … *on or about Sept. 13, 2007, the defendant … fabricated an end bell locator pin from a paper clip, and installed it on a windshield wiper motor …"*

These parts were made by the repair person from scratch and therefore, the FAA concludes that they are unapproved and illegal to use in the repair of aircraft accessories. It should be noted at this point however that the U.S. Attorney has said that there have been no crashes or in-flight emergencies or any incidents because of the repairs … (but) … that the charged persons needlessly took risks with the safety of the persons who used aircraft that they had repaired … (actually the component part or accessory that they had repaired).

It should also be noted that there is an approval process wherein the repair station can fabricate and manufacture parts to be used in repairs, but only with the approval of the FAA; this process was not followed in this case apparently.

Forfeiture

Finally, the government threw in and fired its final big gun and that is the forfeiture allegation as follows … *"upon conviction of one or more of the offenses alleged … defendants … shall forfeit to the United States … all property which constitutes or is derived from proceeds obtained, directly or indirectly, as a result of such violations and any property used, or intended to be used, in any manner, to commit or facilitate the commission of such violations."*

The forfeiture allegation against these defendants is the *coup de grace* in regard to sanctions because it is designed to strip them of all proceeds or property that may be deemed acquired as a result of the alleged actions. This of course includes real property as well as personal property, traceable to the violations. This is a very powerful weapon in the hands of the government and is derived primarily from the drug enforcement actions that generate huge amounts of cash and property.

These men charged will have a long and painful trip through the federal criminal trial procedure but may be forced to plead to the charges before a trial can be reached. It will be expensive for them, each must have a lawyer or have one appointed for him. There will be no quick resolution for them. Their lawyers will have to use all of their training and experience to bring about any kind of a acceptable result for these men, who will also lose all of their FAA certificates as the process continues. **AMT**

Stephen P. Prentice is an attorney whose practice involves FAA-NTSB issues. He has an Airframe and Powerplant certificate and is an ATP rated pilot. He is a USAF veteran. Send comments to aerolaw@att.net.

Mindset Matters

Mechanics today need to be particularly mindful and vigilant in maintaining aging aircraft (and helicopters) if future tragedies are to be prevented

By John Goglia

Ever since the first shocking photos of a crippled Aloha Airlines Boeing 737 — its fuselage skin peeled back from cockpit to wing — flashed across television screens and made front page news across the world more than 20 years ago, the potential impacts of aging aircraft have been well-known to aviation maintenance professionals.

For those too young to remember the original news story, the fuselage rupture of a Southwest 737 this past April was a stark reminder that actions taken by aircraft manufacturers, operators, and the FAA after the Aloha accident in 1988 have not been sufficient to eliminate the potentially catastrophic impacts of aircraft aging. Mechanics today need to be particularly mindful and vigilant in maintaining aging aircraft if future tragedies are to be prevented.

"I believe mechanics need to focus not just on the task at hand but also be alert to problems in the area where they are working."

Aging "aircraft"

While the term aging "aircraft" includes aging helicopters, most references in the media and even in some aviation publications, focus on airplanes. To some extent, that's understandable. Nothing quite grabs the public's attention as a plane full of passengers facing rapid or explosive decompression and staring up at the sky where the cabin ceiling once was.

Dramatic helicopter stories — even ones as deadly as the recent helicopter crash in Manhattan's East River (age does not appear to be a factor in this accident with the NTSB apparently focusing on winds and weight as possible causes) — tend to have a much shorter media life span. But the fact that helicopters don't garner quite the same media play does not mean that they are in any way immune from the cracks, corrosion, or frayed and brittle wiring that are the hallmarks of aging aircraft of every kind. Of course, the stresses of pressurization and depressurization on airliners is not a concern for most helicopters; however, the vibrations peculiar to helicopters should be.

Keep a vigilant eye

Helicopter mechanics — especially today when some operators are forced by the economics of buying new to keep flying older and older helicopters — need to be particularly aware of the impacts of an aging fleet. And that's where mindset is important. I believe mechanics need to focus not just on the task at hand but also be alert to indicators of problems in the area in and around where they are working.

For example, when doing a required inspection, mechanics, of course, need to familiarize themselves with all the latest information on the particular make and model helicopter, so they know areas that are vulnerable to age-related problems. However, it's important not to limit the inspection to these known areas. Keep an open mind — and vigilant eye — for indicators of problems outside these known problem areas. A too narrow focus may have been what caused mechanics to miss flaws in the upper fuselage of the Southwest aircraft.

Similarly, mechanics performing routine maintenance have a unique opportunity to not just accomplish their assigned task, but also look around for any problems that might be revealed when panels are removed or access is gained to areas that are not routinely visible.

Alert, inquisitive mechanics can and do save time, money … and lives! AMT

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

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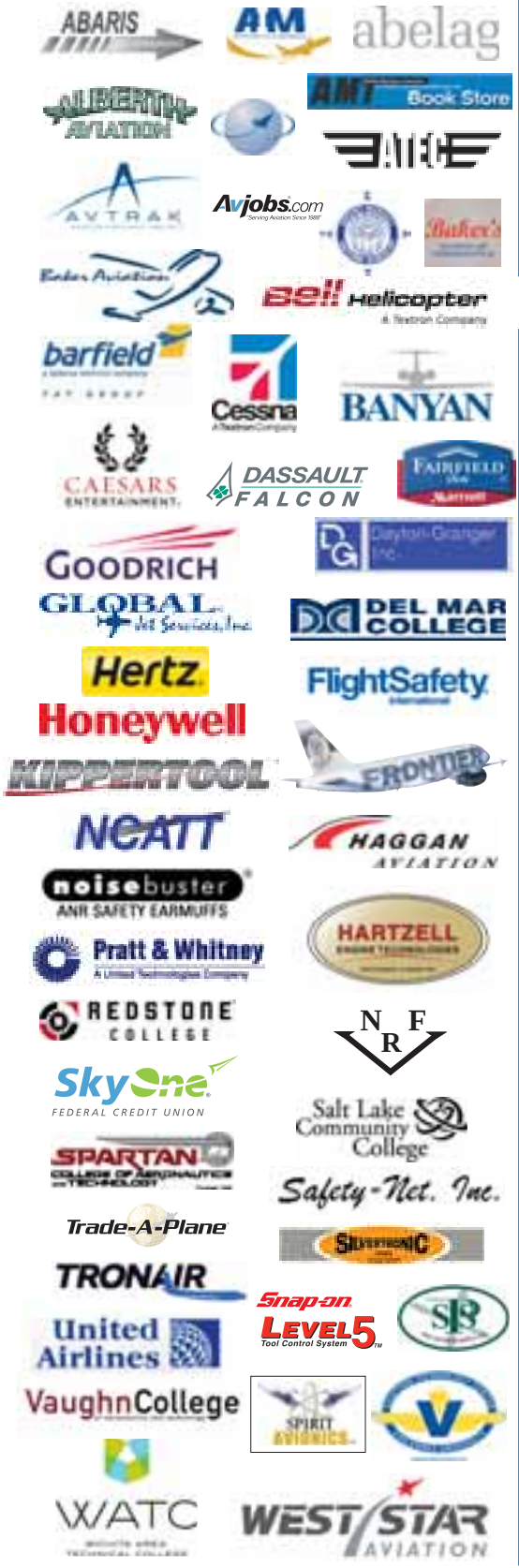

State of AMTSociety Address

The entire board of directors and I sincerely hope that 2012 will be a good and prosperous year for all.

The deadline has come and gone for our Scholarships Awards program and the Lifetime Achievement Award. The respective committees are in the process of reviewing the entries. I would like to thank each and every one of you who responded to these programs. We will announce the winner in the next magazine, and make the formal presentations to the respective winners at the Maintenance Skills Competition in Las Vegas, NV, on March 9, 2012.

Life is good! I count myself among the extremely few who can honestly say that they love what they are doing for a living. Because of my job and my passion for the aviation industry, I read a lot of material about our great industry. Hardly a day goes by that I don't read something about us. And oftentimes it is not something that is written by people outside the aviation industry trying to make us look bad by our own rank and file, and oftentimes it is our own leaders.

That is a heck of a way to inspire people to follow us. Most often they are being critical because we are not "changing with the times." They proclaim we are not working to improve the next generation. Maybe I am missing something, but I have been in the aviation industry for more than 56 years, and from where I sit, I see quite a different picture.

There are smart and bright young people both male and female who are enrolling in the aviation schools daily. This is made possible in no small part by some of us talking to these young people every chance we get. These young people have attended a career program, heard comments from the positive and negative sides of our jobs, they have even researched us on the Internet. For the most part, each of the schools that is a member of ATEC is showing an increase in its respective enrollments.

AMTSociety is dedicated in every endeavor possible for training for all persons in our great industry. Hey folks, why don't you look around, and catch someone doing something good and pat them on the back! If we all started doing that we wouldn't have time to wring our hands about our imminent demise.

Toolbox raffle

Each of the members who serve on the board of directors, including myself, has tickets available for you to purchase. Please remember this goes for a very worthwhile cause: the *AMTSociety* Scholarship program. Tickets are $5 each or $10 for three tickets. Also it is a tax-deductible donation. You have a Snap-on KRA 4107D toolbox in your choice of color, and your choice of $2,500 worth of tools from Snap-on. It is an excellent return on investment. Not only do you win, so does *AMTSociety* Scholarship program.

— Be safe, Tom Hendershot

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Each month *AMT* magazine publishes a page that displays the logos of each respective sponsor. Would you please take just a moment to review these logs, as these corporate sponsors do just that, they help each one of us with their sponsorships, and many of them do offer a reduction in the price

of their products and services to *AMTSociety* members.

Avjobs

Avjobs.com is an aviation career resource providing a means for industry employers and employees to connect. It delivers a global job market to inquiring applicants and a qualified collection of aviation professionals to hiring companies.

Avjobs was established in 1988 as The Airline Employment Assistance Corps. The president of the company, a former flight attendant and pilot, was often asked how he acquired his position with the airlines. What began as friendly conversations grew into a business.

It launched the first aviation job web site in 1992 with the unveiling of the Bulletin Board Service. Today, it is the longest running aviation employment web site of its kind and remains steadfast in its approach.

As both the business and the World Wide Web began to grow, the company identified a need to build a more recognizable brand. Thus, in 2002 it was renamed Avjobs.com emphasizing the broader scope of aviation it now touched.

The Employer and Applicant Portals enable both types of customers to login to secure webpages which were more tailored to fit their specific needs. Applicants are able to search for jobs using 56 different search criteria and are able to practice interview skills with an interactive system. Alternatively, employers can narrow a search on a potential employee to a particular certificate rating or explore deeper into a candidate's credentials.

For more information, please visit http://www.avjobs.com or call Brittany Davies at (303) 683-2322.

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Through this new relationship with *AMTSociety*, Hertz is pleased to offer the aircraft maintenance professionals discounts and promotional offers that will increase the value proposition of their membership. Call to find out more.

Scott Denequolo from Hertz accepting a plaque from Tom Hendershot for the benefits they offer AMTSociety members.

The Good Boss

Insights for a healthy and productive workplace in challenging economic times

By Jim & Matt Finkelstein

The best bosses are able to reflect upon their own natural inclinations and experiences, leveraging their assets, and developing areas of weakness.

The question often looms: Why do we work? Perhaps it doesn't really matter why — we all have to work to some degree or another. Some people work to live and others live to work. Some find a balance between the two where one flows naturally and seamlessly into another. We spend every day doing stuff and it turns out, oddly and intuitively enough, that the people we encounter and work with influence our experience at work as well. Our colleagues, clients, peers, and bosses, all of those we cross paths with at work bear some weight on our satisfaction, productivity, creativity, and diligence for the little niches we may find or cultivate.

Let's look at how one of these groups affects each and every one of us. Most of us have all had a boss at some point and many of us may be a boss or have been a boss in the past. In this case, we'll consider a "boss" as any position managerial, supervisory, or executive — really any time someone leads other people. Bosses are important for this reason, that they lead others through experience, vision, and honored time.

Not all bosses are created equal, however, and there are certain trends that make for better bosses. Forty years of combined experience — one of us with 35 as a professional management consultant and the other with five as a fresh and reflective worker — have uncovered prime examples of good bosses. To enlighten the modern workplace and work force, here are five examples of good bosses (and they are not mutually exclusive):

1. The Listener — a boss who will listen to and appreciates different points of view. This boss hears and honors their employees' thoughts and considerations respectfully but with a caveat being they may or may not put these ideas into action. The Listener listens to their employees because they were hired for a reason. As such, they trust their employees and value their input. Sometimes, they are even dependent upon it. The Listener is a good boss because they have insight beyond their own experience and vision, insight that is influenced by many angles, and because if their employees are allowed to voice their own opinions and ideas, they are inspired and engaged.

2. The Empowerer — a boss that lets employees run their own show and lets them learn by making some mistakes. To a degree of trust and support, this boss cultivates leadership in their team. Working together, they identify tasks and create a plan, but let the employees decide the nuts and bolts of how it actually gets done. The Empowerer doesn't delegate aimlessly, creating a sense of subordination in their team, but rather engages their employees from the ground up in a focused manner. Employees are inspired to take on leadership roles and collaborate both with their boss and with others. The Empowerer is a good boss because they can simultaneously ignite productivity, personal development, and satisfaction among their employees.

3. The Mentor — a boss that teaches, coaches, and guides. This boss doesn't necessarily need to be older, but a tad wiser or simply just willing to share. They seek to understand their employees' experiences and identify which ones need or want mentoring. The relationship with their employees is constructive, meaning both criticism and praise are offered with the intentions of growing the employees' set of skills. An offer to mentor is either explicitly offered or subtly developed over time. The goal is both in current interest and looking toward the future, always geared to enhance the employees' skills. The Mentor is a good boss because they ensure a future for the employee and the company while inspiring immediate productivity and engagement.

4. The Cool Dude (or Dudette) — a boss that has fun and lets their employees have fun. This boss maintains a certain aura of authority while creating a likable and lively atmosphere. They let their employees enjoy their time at work and find time for small diversions, within the confines that the job still gets done … and done well. At those

instances, this boss rewards their employees with time off or special workplace events within the realm of a respectable workplace culture. The Cool Dude or Dudette is a good boss because they understand that all employees are people, that all people need some kind of fun, and that happy employees are healthy, productive, and engaged.

5. The Creator — a boss who inspires invention and creativity. This boss pushes the limits of their employees to ignite innovation. They challenge intellect and question the status quo, so that new products and ideas are developed from within. The Creator embodies the spirit of imagination and is never overly demanding. Creativity and invention come from a unique mindset, so this boss correctly identifies those in their team that are keen to this way of thinking. As such, the Creator is a good boss because they are motivational and collaborative.

These five bosses, or rather their respective characteristics, exemplify what makes for healthy leadership within organizations. Many bosses may embody many or all of these characteristics. The best bosses are able to reflect upon their own natural inclinations and experiences, leveraging their assets, and developing areas of weakness. Common trends amongst these five good bosses make for a great boss as well — collaborative, communicative, engaging, and inspirational.

Our new cogenerational world is crying out for leaders — of all ages and generations — and hopefully many of us will realize that great leaders can exist in the smallest, biggest, nearest, and furthest of places. **AMT**

Jim Finkelstein, with 34+ years of consulting and corporate experience, has specialized in business and people strategy, motivation and reward, and organizational assessment, development, communications and transformation. He has worked for diverse industries, from health care to high tech. He received his MBA from the Wharton School of the University of Pennsylvania (1976) and a BA in psychology and economics from Trinity College in Hartford, CT (1974). His experience includes being a partner in a Big Five firm, a CEO of a professional services firm, a corporate executive for Fortune 500 companies, and an entrepreneur with his current company, FutureSense®, Inc. He has experienced business from every possible angle and through every possible change. For more information: www.fusethebook.com, www.futuresense.com.

Joint school in Oklahoma

Southeastern Oklahoma State University and Rose State College have opened a joint aviation program at the Rose State campus in Midwest City. The Tom Steed Community Learning Center will serve as a new focal point for the burgeoning industry in central Oklahoma, particularly nearby Tinker Air Force Base, Rose State President Terry Britton said. Tinker's work force development office also is at Rose State.

Last year Southeastern received approval to offer its aviation program at Rose State as expansion of the Durant-based school's courses. In addition to classes at Rose State, Southeastern will continue to provide instruction at Tinker and at Oklahoma City Community College. Associate degrees can be conferred by Rose State, but more advanced degrees such as a master's in aerospace administration and logistics will bear Southeastern's name. For undergraduates, the aviation management course track is divided into four: business, maintenance management, safety, and security.

B/E Aerospace wins Boeing award

The Boeing Company has selected B/E Aerospace to become the exclusive manufacturer of modular lavatory systems for Boeing's 737 Next-Generation family of airplanes, as well as the 737 MAX which is expected to be introduced into service later this decade. The estimated value of the award is in excess of $800 million, exclusive of retrofit orders, which are expected to be substantial. The B/E Aerospace modular lavatory system (MLS) utilizes B/E Aerospace, patent pending, Spacewall technology, which frees up floor space in the cabin, creating the opportunity to add up to six incremental passenger seats on each airplane.

Boeing announces second segment of Dream Tour

The January schedule of the 787 Dream Tour includes the following stops: Jan. 20-23: Wichita, KS, to visit partner Spirit AeroSystems and Boeing employees. Jan. 23-25: Rockford, IL, to visit partner Hamilton Sundstrand. Jan. 25-27: Dublin, Ireland, to visit airline customers, leasing companies, financiers, and other stakeholders. Jan. 27-30: Huntsville, AL, to visit Boeing employees. The Dream Tour airplane, ZA003, is outfitted with the 787's special cabin features, including a welcoming entryway, dramatically larger dimmable windows, bigger bins, and LED lighting.

Kestrel to be in Wisconsin

Aircraft manufacturer will be locating its manufacturing facility and headquarters in Superior, WI. It is expected to hire 600 employees. The company is headed by Alan Klapmeier, co-founder and former chief executive officer of Duluth-based Cirrus Aircraft.

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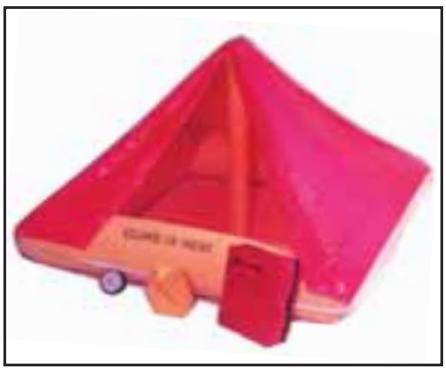

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Jon Jezo, Publisher

It's been almost three months since we launched www.AviationPROS.com and I hope you have had a chance to visit the new aviation portal, explore a bit, and maybe even participate in the social media conversations taking place throughout the site. Please let us know what you think about the new web site, and feel free to drop a note on our Facebook page www.facebook.com/AviationPROS.

Coming up very soon, *AMTSociety* will be hosting its first live webinar on February 7 at 1 p.m. Central Standard Time. This webinar titled *AMTSociety* Sharing Resources and Benefits will give you a chance to learn more about AMTS and ask questions while interacting with the *AMTSociety* board of directors. Subjects for discussion include: membership benefits, corporate membership opportunities, maintenance scholarship opportunities, training events approved for IA renewal, and Maintenance Skills Competition. Register now via this tag.

If you'd like to participate in any of our FREE webcasts simply sign up at www.AviationPROS.com/media-center/webinar and we'll be sure to send you a reminder before the live event. Can't attend on the date/time of the webcast? Don't worry! The webcasts will be archived on AviationPROS for an entire year for your viewing pleasure 24 hours a day, seven days a week.

AMTSociety will be hosting its first live webinar on February 7 at 1 p.m. CST.

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The annual *Cygnus Aviation Expo* is fast approaching, register now so you can join us this March 7-9 in Vegas www.cygnusaviationexpo.com

You won't want to miss a chance to win a 2012 Ford F150 truck just by being an attendee at the networking party!!

New this year, the Cygnus Aviation Expo will be held concurrently with SAE International's Aerospace and Defense Ground Support Equipment Conference.

AMTSociety will provide live IA renewal training on site and the bigger than ever Maintenance Skills Competition is definitely an aviation event you don't want to miss. Plan to attend now and show your support for the aircraft maintenance community!

If you can't join us in Vegas and need to get caught up on your recurrent training, check out www.AMTSociety.org for all of the latest IA Renewal Roadshow series locations. (IA renewal events will be held Feb. 1, Feb. 8, Feb. 15, Feb. 22, March 7 & 8, and March 21.) Don't forget each seminar meets the requirements contained in FAR 65.93(A)(4) for Inspection Authorization (IA) renewal training and is acceptable toward eight hours of training for IA renewal and the FAA AMT Awards Program.

Until next time we'll see you online!

Thanks for reading!
Jon Jezo

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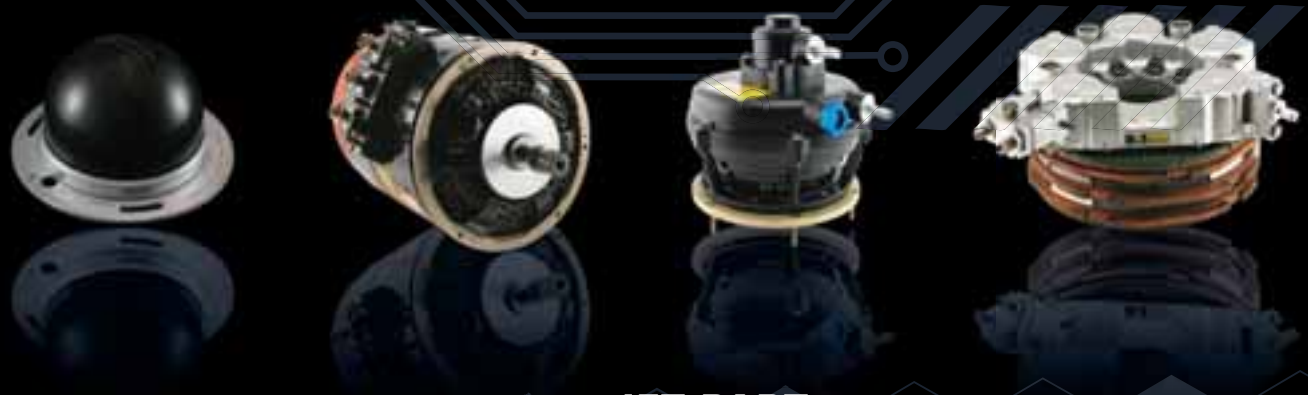

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