

AMT

Aircraft Maintenance Technology

Written by aircraft maintenance professionals
for the professional maintenance team

Official publication for AMTSociety

July 2012

OPPORTUNITY!

Light Sport Aircraft maintenance,
repair, alteration under the ASTM
consensus standards

Recip Technology:

What About Those Diesels? Part 2

Today's aero-diesels

page 10

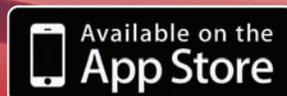


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Eric Paradis of AeroParadise LLC has embraced the opportunities
that Light Sport Aircraft have provided. Photo by Ron Donner





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AMT Magazine and AMTSociety



Ron Donner, Editor

Ron Donner has held both technical and management roles in general aviation and during his 27 years with Northwest Airlines. He holds FAA certificates as an A&P/IA and a commercial pilot.

The cover of *AMT magazine* proudly states, *Official Publication for AMTSociety*. *AMT magazine* and the *AMTSociety* are separate organizations, and perhaps to some people they seem to appear to be one in the same. Make no mistake *AMT magazine* and *AMTSociety* work closely together for the mutual benefit of the aircraft maintenance industry which we serve.

As the official publication for *AMTSociety*, the pages of *AMT magazine* regularly contain *AMTSociety* updates from Executive Director Tom Hendershot, schedules for upcoming *AMTSociety* educational events, mention of new and existing *AMTSociety* corporate sponsors, coverage of the *AMTSociety* Maintenance Skills Competition, and highlights of industry activities that *AMTSociety* is involved with.

Earlier this year *AMT magazine* took on the task of producing a monthly digital newsletter for *AMTSociety* and I hosted a webinar where several of the *AMTSociety* board members spoke about the organization and the many benefits provided to its members and to the industry.

Over the last year I attended several of *AMTSociety's* IA Renewal Consortium training events, affectionately called the "IA Roadshows" where I had the pleasure to meet and speak with many *AMT magazine* readers, aircraft maintenance technicians,

maintenance managers, FAA staff, and event speakers. Once a new *IA Roadshow* schedule is finalized by *AMTSociety*, it will be published in *AMT magazine* and staff from the magazine plan to continue attending as many *AMTSociety* events as possible.

The relationship between *AMT magazine* and *AMTSociety* has become stronger than ever. I am pleased to announce that my colleague Michael Sasso, *AMT* National Sales Manager, who like me holds an A&P with decades of industry experience, and I have both been elected to the *AMTSociety*

board of directors. Additionally, Gloria Cosby, executive vice president at Cygnus Business Media, having overall corporate responsibility for both *AMT magazine* and *AMTSociety*, has also become a member of

the *AMTSociety* board of directors.

We are all very excited at the opportunity to work closely with *AMTSociety* Executive Director Tom Hendershot and all the board members who volunteer their time and individual talents. It's our sincere intention that the support *AMT magazine* already provides to *AMTSociety* will be strengthened as *AMTSociety* continues to position itself as a premier industry organization.

For more information on how you or your company can become involved in the *AMTSociety* visit www.AviationPros.com and click on the *AMTSociety* logo, or go directly to www.AMTSociety.org.

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SPEED UNIFORMITY EFFICIENCY

Fw190m Engine Change

The Fighter Factory keeps those warbirds flying



By Brad Groom

Brad Groom currently is the Director Foreign AMT Training for the Aviation Institute of Maintenance in Virginia Beach, VA. He holds an A&P certificate and a Bachelor degree in technical education. Contacted him at dirforamt@aviation-maintenance.edu

Located at the Virginia Beach Airport in the Pungo section of Virginia Beach, VA, an aircraft facility sits quietly among the grass landing strip and farm land maintaining and working on some of the most unique aircraft in the world. The Fighter Factory is the restoration and maintenance facility of the Military Aviation Museum, more on this later. The Fighter Factory maintains and restores WWI, WWII, and some aircraft from the Korean War.

Some of the aircraft the Fighter Factory maintains in flying status are, Spitfire, Hurricane, Mustang, Corsair, Curtiss, Wildcat, Hawker, Fury, Peashooter, Yak, four Polikarpovs, B-17 Flying Fortress, B-25J, Skyraider, Avenger, Sopwith, Fokker, Catalina, Dragon Rapide, and many more. With over 50 flying vintage aircraft to maintain the Fighter Factory is a very busy place!

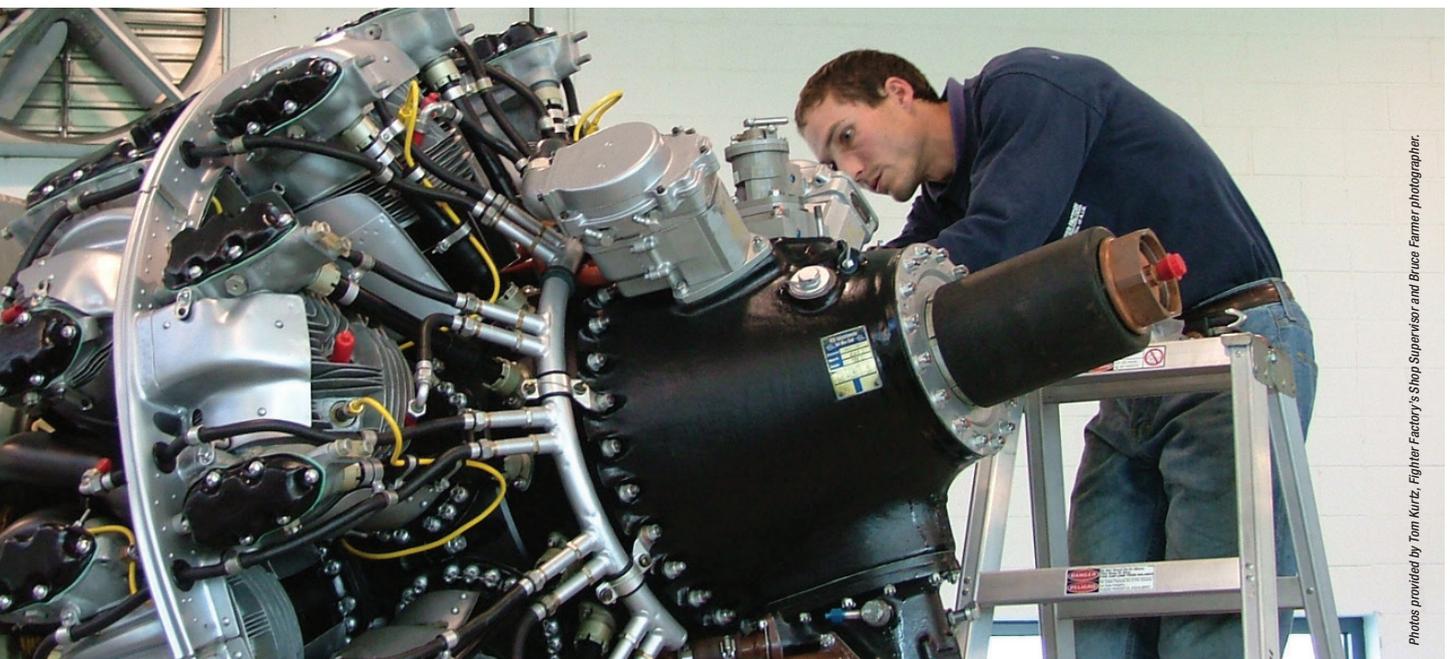
Jeffrey May installing 28 spark plugs in the 14-cylinder Asch-82t radial engine.

Photos provided by Tom Kurtz, Fighter Factory's Shop Supervisor and Bruce Farmer photographer.



Jeffrey May is preparing the engine mount before engine installation.

When I visited the Fighter Factory recently one of the projects was the removal and replacement of a large radial engine from one of the most successful German aircraft



Photos provided by Tom Kurtz, Fighter Factory's Shop Supervisor and Bruce Farmer photographer.

AIRFRAME TECHNOLOGY

of WWII: the Focke-Wulf Fw190. This aircraft along with the BF109 was the backbone of the *Jadwaffe*. The nickname for this aircraft was the "Butcher Bird" and it had much success especially against Soviet ground troops.

Shvetsov Asch-82t engine change

The Fw190m at the Fighter Factory was slated to get a newly overhauled Shvetsov Asch-82t powerplant from Vintage Radial located in Tehachapi, CA. This shop is an FAA certified repair station that specializes in overhaul of radial engines. The Asch-82t is a beast of an engine with 14 cylinders in a double radial construction. It is an air-cooled four-stroke aircraft engine with a blower and mechanical fuel injection system.

The ignition system has two independent ignition magnetos with one spark plug per magneto per cylinder. High voltage is accomplished by these two magnetos, attached to the front casing and they are driven by cogwheels from the propeller shaft. Electrical power is fed from the cap of the ignition timer of the magnetos to the spark plugs, shielded against humidity and mechanical damage protecting the ignition cables. The left magneto is connected to the rear spark plugs and the right magneto is connected to the front spark plugs of both rows of cylinders.

If there was an ignition problem it would not likely lead to a complete failure of the engine, since both magnetos work independently. The fuel supply to the injection pump is performed by a fuel pump located on the right side of the blower casing. The fuel injection pump is located on the rear cover of the engine which uses high pressure tubes and fuel nozzles to deliver fuel into the cylinders. This radial has 1,900 horsepower at 2,600 rpm.

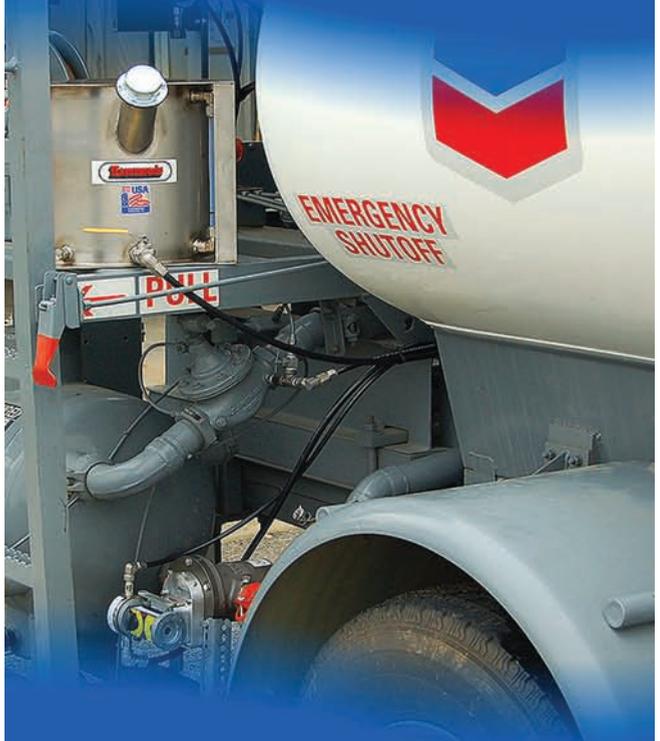
Removing the old powerplant and replacing it with this newly overhauled motor takes time and educating yourself before wrenches are ever used. The point man for this project was Jeffrey May and he explained to me how he attacks a task like this.

His first step was to read all the required information he can but he also takes tons of digital pictures of the original radial installed on the aircraft. By doing this he always has points of references for this task and future jobs, he says.

Since this aircraft is a taildragger, a three-point sling with one point using the motor shaft for a pivot point was very helpful in keeping the engine at the correct angle for proper removal and installation. After the old radial was removed and before the new radial was installed some maintenance was performed. The oil system was purged, oil tank steamed, cleaned and flushed with solvent. Some baffling was fabricated along with a bracket



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Photos provided by Tom Kurtz, Fighter Factory Shop Supervisor and Bruce Farmer photographer.

Fighter Factory technicians Frank Owens, left, and Jeffrey May, right, connect lines between the firewall and the FW190m new engine.

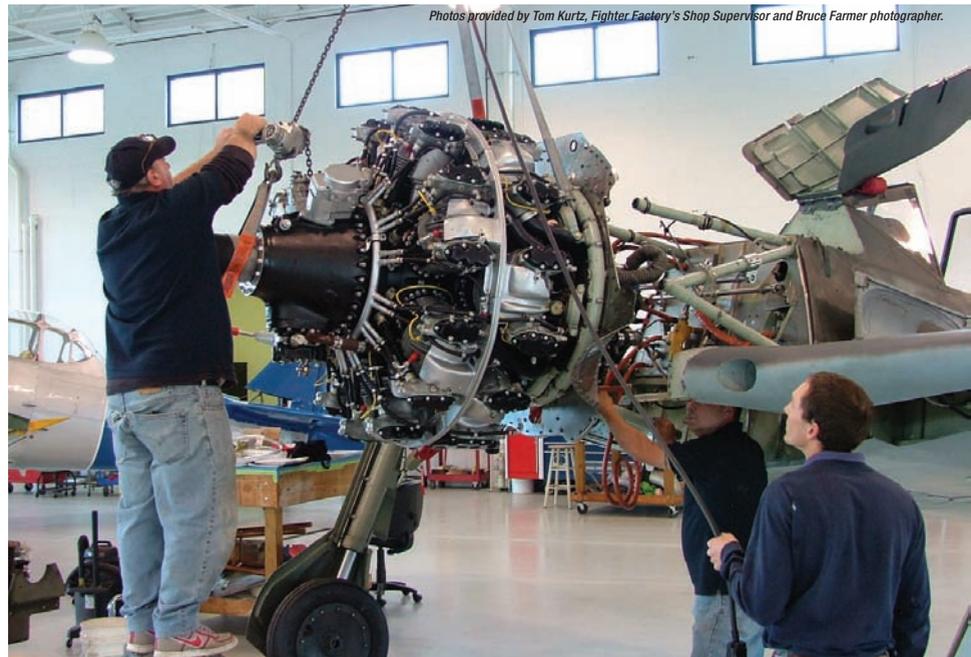
to replace the overspeed governor not on the new engine.

While this maintenance was being performed, another A&P was busy prepping the new radial with spark plugs, accessories, and doing a quality inspection. After the final inspection on both the airframe and powerplant the installation process began.

Installation went smooth and once secured to the mount some additional work needed to be accomplished. The angle of the fuel pump was slightly different with this radial which led to some fuel lines being rerouted and

new ones fabricated. Working on vintage aircraft and powerplants such as these takes special people. A&Ps who are willing to keep learning, not afraid of taking on new challenges, and to do the job right the first time are always needed. Removal and replacement of this radial took two technicians, three weeks, from the start to the check-out engine run.

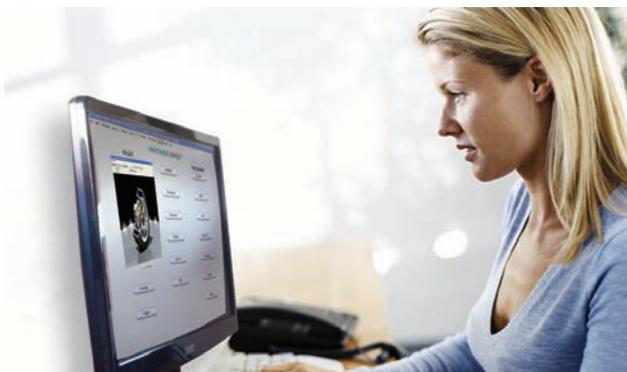
During engine installation Pat Romaine controls the angle of the engine; Don Clark guides it onto the firewall; and Jeffrey May manages movement of the overhead hoist.



Photos provided by Tom Kurtz, Fighter Factory's Shop Supervisor and Bruce Farmer photographer.



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Supporting the NextGen of A&Ps

Fighter Factory has many talented A&Ps accomplishing tasks that are very different in nature compared to most aviation jobs. They are always looking for talented people. To do their part helping upcoming A&Ps Fighter Factory in partnership with the local Part 147 technician school, the Aviation Institute of Maintenance, is starting an apprenticeship program. This program is meant to help future A&Ps get some hands-on experience working in an aviation maintenance shop under the guidance of an A&P.

Staying true to the period

As mentioned before the Fighter Factory keeps one of the largest private collections of WWI, WWII, and some Korean era aircraft maintained in flying status for the Military Aviation Museum also located on the Virginia Beach Airport in the Pungo section of Virginia Beach, VA.

This museum is not an ordinary static display of aircraft; it is what you would call a fully operational living aircraft museum. The aircraft are truly special but also the Military Aviation Museum stays true to the time period by building hangars and buildings that represent the architecture of the times of the aircraft.

For instance, the Fighter Factory maintenance hangar is



Photos provided by Tom Kurtz, Fighter Factory's Shop Supervisor and Bruce Farmer photographer.

Mike Spalding, Fighter Factory Chief pilot, in the cockpit during the first run of the overhauled Fw190m engine.

an original design from a hangar in Waukesha County, WI, at the Waukesha County Airport in 1937. This original stone hangar was redrawn by an architect and those plans were used to build the Fighter Factory facility.

The main museum's hangar is 60,000 square feet of art deco style that houses much of the aircraft. Other buildings being constructed are a German Luftwaffe Hangar (1936 era) from Cottbus, Germany, being reassembled on site, and a RAF Goxhill Control Tower from the Northeast coast of England was disassembled in sections and transported to the museum to also be erected at the airfield.

Throughout the year events are held at the museum such as

the Flying Proms, Hangar Talk Series, Warbirds Over the Beach, SummerCamp, Biplanes and Triplanes, Proptoberfest, Trains and Planes, and many more events.

It was good to visit and learn about the Fighter Factory and the Military Aviation Museum and seeing the professionalism and dedication given to these vintage aircraft to keep them in flying condition for all to see and hear the distinctive sound of radial engines and props in the skies overhead. **AMT**

More information on the Fighter Factory and the Military Aviation Museum can be found by visiting t: www.fighterfactory.com and www.militaryaviationmuseum.org.



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What About Those Diesels? Part 2

Today's aero-diesels



By Tim Kern

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.

Diesels (compression-ignition piston engines) have a long history in aviation, but their numbers have never been impressive. After my first article on this topic appeared in the May 2012 issue of *AMT*, I was bombarded by diesel historians, and I promised to mention some of what they told me.

Dr. Hugo Junkers built successful aero-diesels as early as 1913; by 1916, these oil-injected (for fuel) beasts were making 500 hp. They powered Lufthansa airliners by 1935, and by WWII, they were making one horse for every 1.4 pounds of weight – better than most modern private-aviation gasoline engines. BMW made a water-cooled radial (with radiators between the cylinders); Daimler-Benz's diesels powered the *Hindenburg*. The first USA-built Packard diesel-powered airplane flew in 1929. A Ford Tri-motor so equipped famously flew for a fuel cost of three cents a mile. Guiberson took up the mantle in the U.S., equipping prototype Navy airplanes (and then battle tanks).

In Britain, the Bristol Phoenix, the unsuccessful and heavy Beardmore Tornado, and the Jumo-designed Napier Culverin also flew, some with better-than-gas-engine per-



The WAM (Wilksch) at Sun 'n Fun 2008.

formance. Even Rolls-Royce tried converting a Condor to diesel power. The Czech ZOD, Italian Fiat, Russian Charomski, and French diesels (Clerget, Salmson, Jalbert-Loire, and Jumo-licensed C.L.M.) also flew in the pre-war period, with varying degrees of success.

Thielert, Centurion, and Austro

Recent history recalls the Thielert 1.7-liter unit, originally (2002) used in the Diamond DA42. This breakthrough powerplant, based on the Mercedes OM640 car engine but with an aluminum block, became notorious for its maintenance requirements: its 600-hour (later 1,000 hour) TBR (time before replacement) was interrupted every 300 hours by a mandatory clutch and gearbox rebuild. But local mechanics could do nothing but the swap-outs; only the factory was authorized to perform the overhauls and repairs.

The second generation (135 hp, 2.0 liter) had a longer TBR and longer-lived gearbox, but the company hit hard times and emerged under new ownership and management to build the Centurion, whose engineers looked at every weak point to improve it; it now has a 1,500-hour TBR (1,200 for the more-powerful



Diamond's DA42 has been home to several auto-block diesels.

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155 hp 2.0s version) and gearbox improvements that have also doubled that unit's TBR to 600 hours. All the 1.7-liter engines have either been replaced by the 2.0, or are set to be replaced at their next service. The Thielert Mercedes-based 4-liter V-8 shown in 2007 received a TC (Type Certificate) and STCs for the Cirrus SR22 and Cessna 206, but has not been heard from since the reorganization.

While Diamond was sweating out the Thielert situation, another aircraft engine (using the original iron Mercedes block) came to life, closely allied with the Diamond company's ownership. The four-cylinder, 180-hp 2-liter Austro AE300 comes into the Austro Engine Factory and is stripped practically bare; and rebuilt with new components — electric controls, alternator and starter, a proprietary turbocharger, wastegate, sump, torsional damper (Thielert/Centurion uses a clutch in its gearbox), and countless other details have brought the Austro into volume production. Today, all heavy MRO work is done at the factory.

Austro Engine has offered EASA Part 147 maintenance training for the AE300 (E4-series) in



A Robin in 2003 with an early Thielert.



Gil McCarty's converted Mercedes turbo diesel on Ramphos flying boat, Sun 'n Fun 2005.

cooperation with Diamond Aircraft Industries since 2009. All maintenance procedures are specified in the maintenance and overhaul manuals. Austro Engine recently received its first extension of the TBO to 1,200 hours; the target is 2,000 hours. The formerly limited TBO on the alternator and torsional damper were also extended to "on condition," and the TBO on the high pressure fuel pump went up to 600 hours. In 2011, Austro and Steyr Motors entered an agreement to develop the Steyr M-1 Monobloc, a 280-hp six-cylinder design, for aviation use, but little has been heard since the announcement.

SMA and Continental

In contrast to the auto-based Centurion and Austro, the French company SMA has designed a traditional four-cylinder opposed, four-stroke, air-cooled, direct-drive diesel, which has garnered several STCs on various Cessna and other aircraft. The newest version, the 305e, features more power at altitude and several detail improvements. Any opposed four-cylinder, big-bore diesel will have sharp power pulses, which are tough on the props, but SMA is working on that with its four, and ... a six-cylinder version was long in the rumor mill.

Continental acquired technology

and engines from SMA; its TD300 displayed at Oshkosh 2011 was a lightly reconfigured SMA 305a. Teledyne Continental (TCM) had recently worked on two iterations of a two-stroke diesel (a six-cylinder radial from the General Products Division and the "NASA GAP" engine, an opposed four, from the Aircraft Products Division), but came around to the idea that the SMA four-stroke approach would be a better direction to take, particularly regarding cooling. Where Continental now plans to go with this project is anyone's guess, but the idea of a Continental diesel will not go away.

And there's more

There are two Wisconsin diesels on the horizon. Most-recently is the Engineered Propulsion Systems' flat-8, 4.4-liter, 350-hp (at 3,500 crank rpm), geared Vision 350-A44-POC, a turbocharged, common-rail injection, four-stroke design; it has been running since late 2011. This water-cooled cast-iron (very special) alloy block engine invokes many innovative features and is designed to fit in the space currently occupied by popular six-cylinder air-cooled gasoline engines. Its controls are designed to be "pilot-resistant," as well.

Engineer Steve Weinzierl notes, "We also have some interest-

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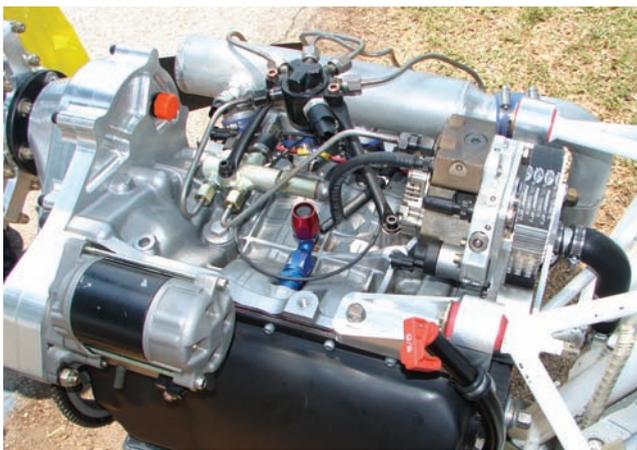
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EPS flat-8 invokes many innovative features and is designed to fit in the space currently occupied by popular six-cylinder air-cooled gasoline engines.



Honda-based Vulcan at Sun 'n Fun, April 2007.

ing technology in our electronic systems; we have already applied for several patents. We can use these to make the engine immune to cetane changes, for instance." As for the diesel's sharp power pulses, "Electronics can shape the pressure rise in a diesel, and shape the pressure, gradually and non-linearly, and affect the internal gas-pressure rise. This can yield a quieter, more-efficient fuel burn. Our telemetry monitors how much fuel gets through each injector, mechanically."

From the other side of the state comes the DeltaHawk, a 160/180/200-hp (at 2,700-rpm) direct-drive V-4, water-cooled two-stroke, loop-scavenged, turbo-supercharged diesel that has been flying for nearly a decade but has yet to reach certification. Its configuration as a two-stroke also allows mounting in V, inverted V, and vertical positions in a pusher, tractor, or upright-shaft position, with rotation in either direction — 18 models in all. With a 4-inch square bore and stroke (202 cubic inches) and 19:1 static compression ratio, the

DH200V4 DeltaHawk's power/weight ratio is similar to legacy gasoline aero-engine performance at roughly 2 pounds per horsepower. The projected TBO is 2,000 hours.

The DeltaHawk design pushed for overall simplicity, and it's easy to work on. If you don't open the block, you won't need to be a specially trained diesel or DeltaHawk-trained mechanic. Inside the block, there are only the crank, rods, and pistons; outside are all pumps, cooling, intake and fuel, controls, and so on. Some externals — the water pump belt, for instance — are 500-

hour items. (DeltaHawk's Rip Edmundson notes, "We have run them ragged, for dozens and dozens of hours after they were way past their obvious useful life.")

Neither Wisconsin-based engine maker has the volume to announce plans for training non-factory mechanics or to establish non-captive rebuild facilities, though some well-known STC developers have approached DeltaHawk about becoming authorized service centers.

In Germany, limited flight tests in a Yak-52 have been made by Raikhlin Aircraft Engine Developments (RED), with its A03, a 500-hp (at take-off) 6.1-liter double common-rail injected V-12. This purpose-built aero engine (that looks like it's auto-derived) has a dry sump, and is configured as a pair of straight-6 engines, each DOHC bank having its own monitoring, induction and fuel system, liquid cooling system, and turbo/exhaust. A single starter and twin alternators complete the configuration. All this runs through a 1.88:1 gearbox, yielding a maximum propeller rpm of 2,127 (4,000 engine rpm).

The Gemini, a promising three-cylinder, six-piston, two-crankshaft two stroke of 100 hp was shown for a few years by Powerplant Developments, a UK company that produced a working prototype/dyno test engine, but ran short of funding for development toward certi-



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fication. Several LSA (Light Sport Aircraft) manufacturers have expressed strong interest. Opposed piston engines like the Gemini have a built-in obstacle: with ports in the cylinder walls, they have either relatively low power or short lives. The project still exists on hold.

Some other diesel engines have shown promise in experimental in

recent years. WAM (Wilksch), of Gloucestershire, England, has flown since 1997 and has freely offered its three-cylinder, two-stroke 120-hp diesels to willing experimental airframers. This direct-drive engine is inverted and has a wet sump; and though it is a two-stroke, it uses a valve for exhaust. In the late 1980s and early 1990s, the Zoche family



The Gemini at Oshkosh 2007.

(of Munich) developed three (70-, 150-, and 300-hp), two-stroke turbocharged diesel engines, but I was told their major funding ceased, and the designs languished.

Certified and experimental

Many companies are planning to stay in the certified marketplace, though some have released power to particular experimentals. DeltaHawk, especially, has several engines flying in many designs, and also has test engines deployed among both experimental designers and certified airframers.

Experimenters (as opposed to volume developers) have flown just about everything, from Citroën to Pugeot to Opel to Subaru and beyond, but these are more projects for the hobbyists themselves, and MRO activities are often as not performed in private hangars and garages. Most companies offer some level of factory training on their engines. **AMT**

DeltaHawk: www.deltahawken-gines.com; Centurion: www.centurion-engines.com; Austro: www.austro-engine.at; SMA: www.smaengines.com; Continental: www.genuinecontinental.aero; Raikhlin Aircraft Engine Developments (RED): www.red-aircraft.com; Wilksch/WAM: www.wilksch.net; and Zoche: www.zoche.de

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By Ed Leineweber

OPPORTUNITY

With Light Sport Aircraft maintenance under the ASTM consensus standards

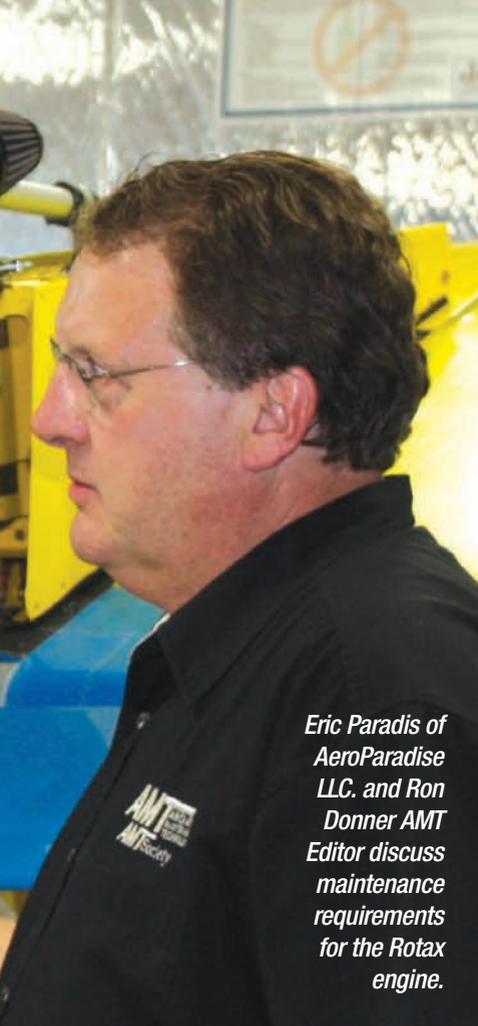
Ed Leineweber is an aviation and business attorney practicing in Madison, WI. He is a CFII and holds the LSRM certificate. He previously operated two FBOs and managed both airports. He is an incurable Bowers Fly Baby aficionado; currently restoring a nearly 50-year-old Fly Baby. Ed regularly writes a SP/LSA column for the Midwest Flyer Magazine. He can be reached at eleineweber@bmrllawyers.com and (608) 604-6515.

Although Light Sport Aircraft (LSA) have been around since the 2004 FAA acceptance of the ASTM consensus standards under which they are designed, manufactured, maintained, repaired, and altered, most A&Ps trained and experienced in aircraft with standard airworthiness certificates have been reluctant to venture into this new world. With 125 models now in production around the world, most of which are fixed wing aircraft, and 2,235 fixed-wing LSA already on the FAA registry as of the end of 2011, this newest aircraft industry segment offers growth potential for any maintenance shop willing to tackle the initially steep, but potentially rewarding learning curve.

Eric Paradis, of AeroParadise LLC, is proof positive of this proposition. A traditionally trained A&P/IA with

previous experience running from Piper J-3s to Boeing 747s, Paradis and his wife, Karla, settled down a few years ago at the Reedsburg, WI, municipal airport to develop a general aviation maintenance shop catering to standard category airplanes as well as Experimental Amateur-built aircraft, including a custom aircraft interior shop. Paradis was well poised to take advantage of the LSA rules. According to Paradis, this new focus on LSA maintenance services now accounts for about half of their maintenance business.

Paradis has been especially aggressive in his expansion efforts, attending many manufacturers' training courses, and securing service center designations from Remos, Tecnam, Sting Sport, and Rotax. Clearly he is one A&P/IA who has not been daunted by these new challenges, but chose instead to embrace the opportunities.



Eric Paradis of AeroParadise LLC and Ron Donner AMT Editor discuss maintenance requirements for the Rotax engine.

ASTM consensus standards

Following a federal mandate to promote the use of industry-developed consensus (voluntary) standards in government regulation and procurement, the ASTM Light Sport Committee F37 was created, comprised of industry members and overseen by the FAA, which “accepts,” rather than “approves” the individual standards as they are developed and amended.

The five most important standards concerning Light Sport fixed wing aircraft are F2626 Standard Terminology; F2245 Standard Specification for Design and Performance; F2279 Standard Practice for Quality Assurance in the Manufacture of Fixed Wing LSAs; F2295 Standard Practice for Continued Operational Safety Monitoring of LSAs; and F2483 Standard Practice for Maintenance and the Development of Maintenance Manuals for LSAs.

These last two standards, F2295 and F2483, along with a few definitions out of F2626, are probably the most important provisions to maintenance professionals.

The Sport Pilot/LSA rules created two new categories of Airworthiness Certificates (Figure 1). These are Special Light Sport Aircraft (S-LSA) and Experimental Light Sport Aircraft (E-LSA), as detailed in FARs 21.190, 21.191, and 21.193. The airworthiness certificates for both are pink, like the Experimental Amateur-built certificates for homebuilts.

S-LSA are the fully manufactured, fly-away aircraft such as the Flight Design CTLS; Czech Sport Aircraft SportCruiser; American Legend Cub; Cubcrafters Sport Cub; Tecnam P2008; and Remos GX NXT.

E-LSA are either: (1) kitted versions of an S-LSA; (2) aircraft that have been down-graded from an original S-LSA airworthiness certificate to an E-LSA; or (3) aircraft of various descriptions that were brought into the system during a brief window following the adoption of the new rules, usually two-

place ultralights. Our primary focus here is the S-LSAs.

Airworthiness certificates issued under LSA regulations come with operating limitations which must be scrupulously adhered to in maintaining these aircraft. For instance, these limitations typically include an express statement of what the logbook entries concerning the annual condition inspection must recite, and it varies from the more familiar language most often used in signing off an aircraft with a Standard Airworthiness Certificate for return to service. If the precise language is not used, the S-LSA will not be “in a condition for safe flight.”

Paperwork is different with LSA, and it is not unusual for an S-LSA to show up for maintenance with incorrect records, according to Paradis and other AMTs I’ve talked to. These problems often stem from an uninformed A&P failing to appreciate the system of manufacturer-controlled maintenance, and thinking he or she is operating in the Standard class system of FAA-controlled maintenance. Worse, the actual work done on the S-LSA that



AeroParadise LLC is a family business.

lies behind those erroneous maintenance records is often at odds with the manufacturer's maintenance manual, which is the maintenance bible for these aircraft, not AC 43.13. This fundamental misunderstanding is often reflected in an AMT sending the FAA a Form 337, which has no place in the ASTM-defined maintenance system.

Not only does the S-LSA manufacturer's maintenance manual define how maintenance is to be performed, but it also prescribes what tasks can be undertaken, and by who. F2295, the standard for continued operational safety monitoring of LSAs, varies substantially from the Airworthiness Directives system familiar to most AMTs, and needs to be understood as well.

S-LSA maintenance basics

Any maintenance, repair, inspection, or alteration for which instructions are provided in the maintenance manual is defined as "minor." Any such activities not detailed in the manual are "major." "Heavy" maintenance requires specialized training, equipment, or facilities, as determined by the manufacturer. "Line" maintenance includes tasks not defined as heavy that are approved by the manufacturer and specified in the manual. "Overhaul" includes activities

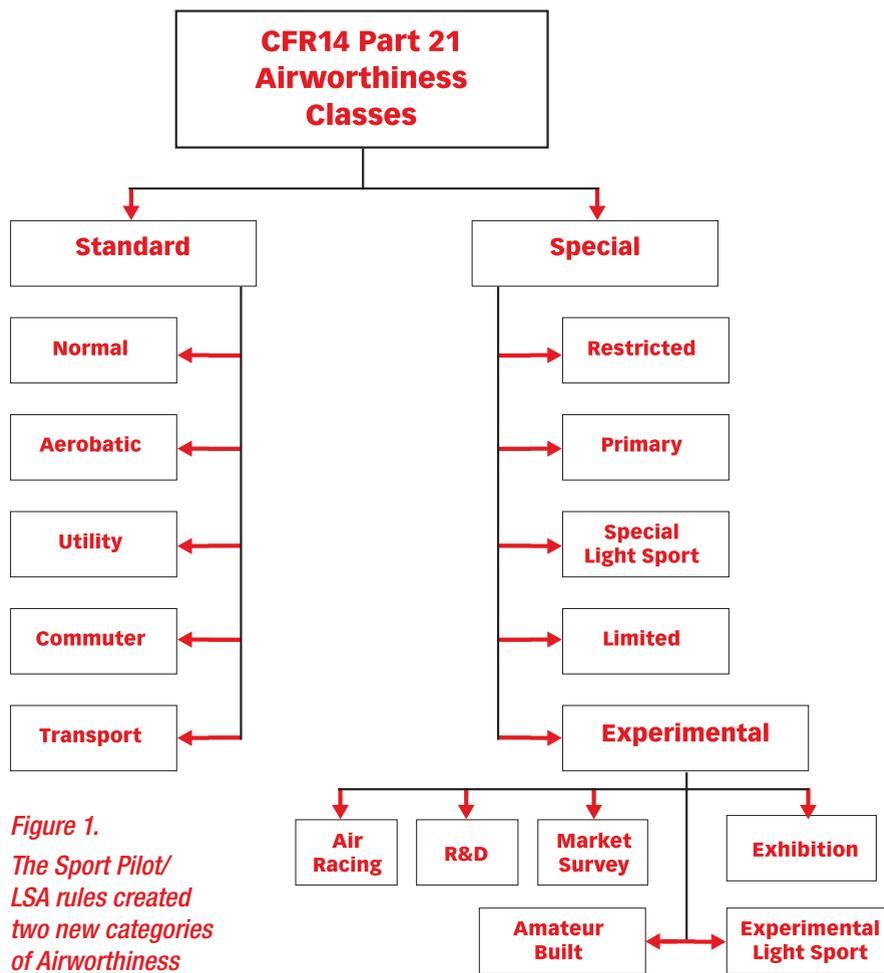


Figure 1. The Sport Pilot/LSA rules created two new categories of Airworthiness Certificates.

that may only be accomplished by the manufacturer, or at a facility specifically approved by the manufacturer. While these definitions, abbreviated here, are a little confusing, they appear to have some overlap, and raise additional questions of interpretation, the point is that

they are defined either by an applicable ASTM standard or the manufacturer, not by any FAR, Advisory Circular, or other FAA guidance. The manufacturer controls the maintenance process.

Any maintenance, repair, or alteration not specified in the maintenance manual must be accomplished pursuant to specific instructions from the manufacturer, which will issue a Letter of Authority (LOA) to the owner and AMT. This LOA must be made part of the aircraft's permanent maintenance records. (Do not send it to the FAA!) Some manufacturers are better than others in managing this procedure in actual practice, and many S-LSAs are technically no longer in a condition for safe flight due to failure to comply with this process.

Manufacturers' manuals also specify who may perform maintenance and required annual con-



Photo by Ron Donner.

With 125 models now in production around the world this newest aircraft industry segment offers growth potential for General Aviation maintenance shops.



Eric Paradis accomplishing maintenance on this Rotax powered Amateur Built airplane.

dition inspections on S-LSAs. Generally, this will be either an A&P mechanic (Inspection Authorization not required), a Light Sport repairman with a maintenance rating, LSR-M, or an employee of a certified repair station rated for this type of work. Holders of Sport and higher pilot certificates may also perform specified maintenance tasks. Again, it is all laid out in the manufacturer's maintenance manual, which is itself issued pursuant to requirements of ASTM Standard F2483.

Controversial issues

Two trouble spots have lately developed between ASTM and type certificated aircraft worlds. First, as part of the basic concept of manufacturer-controlled maintenance, it was initially thought that airframe and engine manufacturers of ASTM-compliant products could require that AMTs take factory-approved training before they could work on their products, and many manufacturers have done so. Rotax, whose engines are in about 80 percent of S-LSAs manufactured today, is the best example of this.

Many of the manufacturers of Rotax-powered S-LSAs, in turn, have made Rotax factory training a requirement of their aircraft maintenance manuals by requiring that the Rotax requirements be met. On Feb. 12, 2012, the Office of the Chief Counsel of the FAA issued a letter opining that manufacturers cannot legally require AMTs to obtain factory training before working on their products. This opinion surprised many in the industry since it seems to be at odds with the notion that the ASTM consensus standard system is controlled by the manufacturers. It is likely we have not seen the end of this controversy.

The second hot spot concerns the manner in which Airworthiness Directives on type certificated components incorporated into S-LSA are to be communicated to owners and maintenance personnel. Initially it was understood that such continued airworthiness information would be disseminated via the "Notice of Corrective Action" system established by ASTM Standard F2295. Again, FAA legal counsel have recently published an opinion that ADs are independently applicable to S-LSA pursuant to FAR 91.327(b)(3). Since some

S-LSA manufacturers have not done a very good job of running their continued airworthiness systems under the ASTM standard, the FAA's concern here is understandable. Any AMT working on these aircraft must pay close attention to this as yet unresolved issue, and be certain that all applicable ADs have been addressed. Do not rely upon the manufacturer to provide notice.

ASTM is here to stay

None of the apparent complexities of the new system, or the problem areas that have developed, have deterred Paradis. He enjoys working on these often very innovative aircraft. His reputation has developed to the point where most S-LSA owners in the area are aware of AeroParadise. (Visit www.aeroparadisellc.com.)

Although the industry is struggling to increase sales volume, S-LSAs and the ASTM consensus standard system are here to stay. It is inevitable that more and more maintenance shops will embrace this new segment in the next few years as the number of these aircraft needing service continues to increase. For now, the field is wide open to the early adapters. **AMT**

For more information on ASTM visit www.astm.org.

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Looking for the Big ASAP Success Story

The big success story may be lots of small stories

"Show me the success story for FAA's Aviation Safety Action Program and other such safety initiatives." I receive that request from senior management of both the commercial and government sectors. I recently made the promise to find the examples and document the "big stories" that demonstrate the value of ASAP. That search opened my eyes!



By Dr. Bill Johnson

Dr. William Johnson has spent more than 30 years as senior executive and scientist for engineering companies specializing in technical training and human factors before joining FAA in 2004. He is also an aviation maintenance technician and has been a pilot for more than 45 years.

For review, ASAP is a formalized voluntary reporting process that permits an employee to report an observed safety hazard or a personal action/possible error. ASAP is primarily used at large maintenance organizations or airlines. However, ASAP could be implemented into a smaller maintenance organization or flight department. For most reports the employee is protected from punitive action from the company and from the FAA. Using a pre-agreed upon process the voluntary report is reviewed by a committee of three, including a representative from company management, the work force, and the FAA.

ASAP has provided companies and the FAA an expanded awareness of safety hazards that otherwise would have gone unreported. For those involved with ASAP, they don't need the big story to see the value. To get the "big story" I went to the ideal information sources; companies and workers using ASAP and to the FAA parties responsible for the program.

Ask FAA about ASAP

I started my information quest at the FAA. I work there and knew it had the big picture and a lot of data. FAA's Voluntary Safety Programs Branch (AFS 230), headed by Inspector Chris MacWhorter is responsible for the program. There are more than 250 active ASAP programs in the U.S. The participants include pilots (oldest and largest group), maintenance and engineering,

cabin, and dispatch. In only four years, since October 2008, the total number of ASAP reports is about 220,000, and has been increasing by 20 percent annually. There is also a relatively new ASAP derivative used by controllers in FAA's Air Traffic Organization. By numbers alone ASAP is a success. It is obvious that the FAA numbers are important but more information was needed to show the big ASAP success story. My information search continued.

Ask industry about ASAP

There are 74 active maintenance and engineering (M&E) ASAP programs. I asked a group of M&E ASAP participants to help me tell the "big success stories." One large air-carrier ASAP leader was slow to offer the big stories. Instead, he invited me to their bi-weekly ASAP event review committee (ERC) so that I can choose a "big story." I said yes, expecting a meeting of one or two hours. Instead, I received a very formal information packet and a formal agenda for a five-hour meeting, with a 30-minute lunch break.

The meeting participants included the required ERC group of three people representing management, work force, and the FAA. There were also representatives from corporate safety, government affairs, and quality. There were telephone participants from key hubs. The Director of Safety reinforced corporate commitment to ASAP by attending some of the meeting. The ASAP ERC meeting was a significant financial and intellectual investment in safety.

Each event was presented by a worker or management representative. All presenters had the professional demeanor and fact-based precision of a trial lawyer. There were questions and enlightened discussion from everyone in the room and on the phone. Everyone involved had maintenance credentials and experience. The group members voiced opin-



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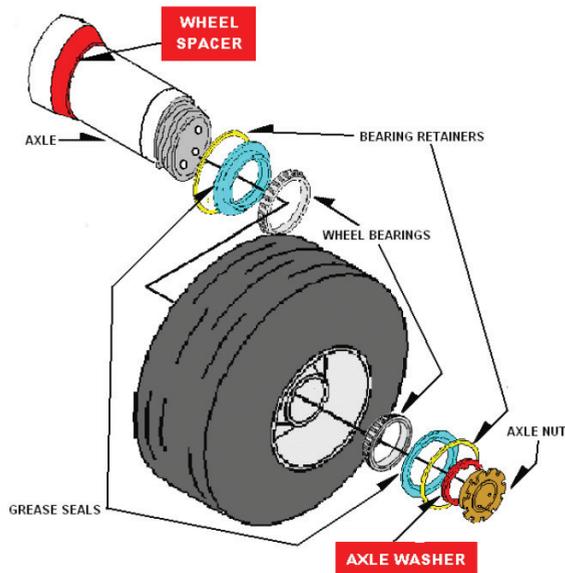


Figure 1. Landing gear assembly with axle washer.

An example success story

When one needs a specific success story, it is easy to find one in the databases of voluntary report systems. Nearly every ASAP report has value.

One company tells of experiences associated with installation of a tang axle washer on a particular Boeing aircraft. The washer is required on some, but not all aircraft. This situation contributes to possible confusion and installation error. It is located between the outer wheel bearing and the axle nut as shown in Figure 1. These washers come in various sizes, the most common being approximately .25-inch wide.

The washer is necessary to ensure that there are sufficient axle threads to properly tighten and torque the axle nut. Without the washer the axle runs out of threads before the wheel is properly tightened. This result is a loose wheel assembly that eventually vibrates and then wears the axle shrouds, the bearing, and the wheel. The error is discovered from either a pilot report of vibration or when a wheel shop employee finds the washer stuck to the grease of the old wheel assembly. Aside from parts, logistics, and labor there is sometimes a flight delay because of this flight line wheel assembly replacement.

Workers used ASAP to report the failure to replace the tang axle washer. The initial ASAP corrective actions centered on increased employee training and warning posters in the flight line break rooms. The posters showed the picture and explained the issue. The problem diminished but did not go away. Finally, an ASAP report suggested placing a large warning sticker on every wheel assembly destined for aircraft requiring washers. The sticker is large and obvious saying "Tang Axle Spacer Installed?"

ion about the possible intentions or actions of the employee.

In every case, there was an equal focus on the employee and on what the company could have done to prevent the event. Most importantly the group documented actions to prevent a repeat of the event. In some cases, where an employee

of hazards that contribute to risk every day. ASAP is about the corporate and regulatory commitment to collect and analyze the reports and then deliberate to improve maintenance practices accordingly. ASAP is about a work culture that takes the time to report hazards, to justly consider

ASAP reports helped to not only highlight a potential safety hazard but also offer high value corrective actions.

violated company procedures and FAA regulations, there was carefully deliberated action taken. In most cases the event was "accepted" as a legitimate ASAP reportable event. In all cases, the company and the employee remediation was documented, with a deadline. Everything was recorded in a well-designed data base projected on two large screens in the room.

It became obvious to me that ASAP is not necessarily about the process or even about the "big success story." ASAP is about well-intentioned maintenance employees, in 70 plus companies, voluntarily reporting hundreds

a worker error and remediation, to improve every appropriate process, and then do it over and over again. That "big success story" turned out to be a four-letter word; ASAP. OK, it is an acronym.

The big success story is ASAP. In order to claim such a title ASAP must be comprised of hundreds-thousands of small stories. These stories show that ASAP reports helped to not only highlight a potential safety hazard but also offer high value corrective actions. Every story does not have to be a big one. Safety, after all, is insured by a long list of small actions.

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In the eight-month period following the stickers there were no incidents of missing spacers. The problem appears to be solved. Let's try the FAA's return on investment process and software to calculate the return on investment. (See March 2012 *Ground Support Worldwide* or go to www.mxfatigue.com for more on ROI).

In the one year prior to the application of stickers the company had about 15 ASAP reports related to the washer. There were other washer events but the company chose to base the ROI on only the 15 events reported to ASAP. That is a conservative number. The estimated cost of the missing tang axle washer averaged an estimated \$14,000 per event. That average includes events ranging from a quick inspection to situations



Figure 2. The washer warning sticker.

wheel rework, and related logistics costs. It also estimated about \$10,000 parts and labor for line replacement of the axle and wheel assembly if at a maintenance hub. For this issue the company estimated approximately four hours of flight delay during the year at an estimated \$15,000/hour on a wide body aircraft (\$60,000).

savings of about \$210,000. The ROI is about 10 to 1. Yes, that is a 1,000 percent return in the first year alone.

The savings is attributable to ASAP reporting and the corrective action (tire sticker). This is an example of one of many success stories. Usually M&E departments do not take the time to calculate ROI and brag about every successful intervention. They are too busy tackling the next challenge. In many cases the ROI is so obvious that calculation is unnecessary as evidenced here. The company management must remain mindful that each of these small interventions results in large savings thus improvement to profits.

Success story conclusion

This big success story, therefore, is a lot of small stories. Most are documented in the corporate ASAP files. Many are released to large shared data bases like the FAA Aviation Safety Information Analysis and Sharing (ISIAS) system. Most importantly, no matter where the data ultimately resides, it is a way to find hazards that may otherwise go without proper corporate attention. Like the tang wheel washer above, ASAP and other voluntary reports are key components to ensure good data for the corporate safety management system, profitability to the share holders, and continuing on-time safety to the passenger. **AMT**

A detailed description of ASAP is available at faa.gov/about/initiatives/asap/.

Table 1: Example Range of Possible Costs

Example Parts/Labor/Logistics	\$ Cost (Rounded)
B767 Delay/hour	\$15,000.00
Wheel and Axle Inspection Time (2 labor hours)	\$125.00
Wheel Assembly Cost (exchange)	\$8,500.00
Axle Replacement Labor (24 labor hours)	\$1,500.00
Outstation repair requiring field trip with parts	\$18,500.00

requiring an axle replacement at an outstation resulting in a substitution aircraft or lengthy delay; a wide range of consequences.

That includes the price of damage to wheels, bearings, axle shrouds, premature tire and

The cost of creating, testing, and installing stickers was about \$18,000. In the eight-month post sticker period approximately there were no occurrences of the event. The annualized estimate in reduction is 15 events at an estimated

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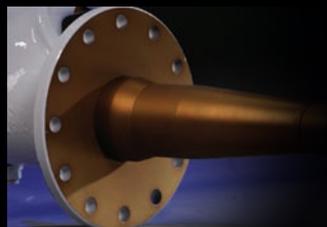
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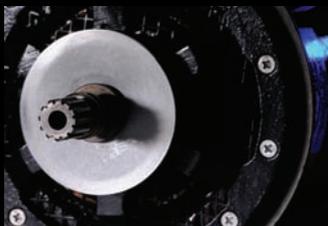
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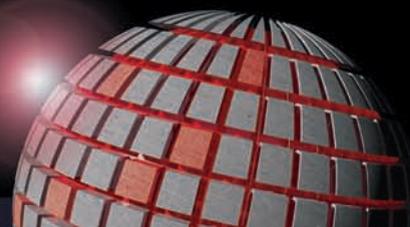
WHEELS



WINDOWS



ACCESSORIES



Driving Behavior

What type of consequence is the most powerful and most likely to trigger action and maintain a behavior?



By DeborahAnn Cavalcante

DeborahAnn Cavalcante earned her Master of Aeronautical Science, with a specialization in Safety Management from Embry Riddle Aeronautical University in Daytona, FL, and her Bachelor of Science from VA Tech in Business and Risk Management.

Much has been written and taught about leadership. I read somewhere once that on Amazon, there are in excess of 480,000 books today that have to do with leadership, and/or changing human behavior. If you ask 30 leadership development experts how to best achieve desired behaviors and results, you get 31 different answers. Not only are we confused, but despite our exhaustive efforts to drive organizational culture and employee behavior to desired result, we many times fall short of our goal.

Many of us as leaders desire to change the organization's culture for the better. We define our organization's mission/vision statements, and we are able to visualize clearly in our mind's eye what the outcome of these mission/vision statements should be. But when it comes to identifying a road map to take us there, our internal GPS loses satellite connection!

Without a map to get us to the destination, we might end up anywhere. We know we wish to change undesired behaviors to desired behaviors, resulting in a cultural shift. This of course, as we all know, is a process and not an event, and certainly one that can seem so overwhelming and daunting, we paralyze our efforts just thinking about it. My focus then is to present you some simple down and dirty basic concepts for leading others into desired behavioral changes that work.

Learn by example

Let's learn by example. Identify the behavior of your employees that you wish to change. For our purposes here we will identify our goal as enhancing our safety culture, and more specifically, changing our employee's behavior so they will wear PPE (personal protective equipment) while performing maintenance tasks and while on the ramp, as defined by company policy.

It is imperative for us to understand two basic concepts: The current culture,

whether safe or unsafe, has been established by employee patterns of behavior, in other words, what we say and what we do. These patterns of behavior, whether they occur by intent or by accident, and whether they occur by people or by systems, create our culture over time. The list of stimuli that trigger action or behavior is virtually unending, but consider some of the more common: deadlines and time pressure, regulations, training or lack thereof, "norms" or accepted practices whether safe or unsafe, complacency, feedback, "that's the way we have always done it," rumors the list goes on and on.

The second critical understanding is that consequences for current or past behavior have the strongest influence on future behavior. This is so important to grasp and where we will focus. A basic analysis of consequences supports that the consequence may be positive or negative, immediate or future, and certain or uncertain.

Positive, immediate, and certain

So let's ask ourselves what type of consequence is the most powerful and most likely to trigger action and best maintain a behavior? Without a doubt it is those consequences which are positive, immediate, and certain. The least powerful consequences and least likely to trigger action and maintain a behavior obviously are those at the opposite end of the spectrum, those being negative, in the future, and uncertain. OK, you say, great concepts, but what do I do with them?

Let's add some practicality and apply them to aviation operations in the maintenance shop, on the FBO ramp, or within corporate flight departments. We determined earlier our goal of enhancing our safety culture, and more specifically, changing our employee's behavior so they will wear PPE while performing maintenance tasks and while on the ramp, as defined by company policy. Begin by asking the question, why would anyone work unsafely by not wearing PPE?

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HOT BONDERS

Wearing or not wearing PPE

Let's consider the likely stimuli or factors that trigger the behavior of wearing or not wearing safety equipment as being: time demands, company policy, the boss desiring higher output levels, and feedback. Ask, and define, what are the consequences of not wearing PPE? A likely consequence is that the employee may get hurt. The questions then follow: is the consequence of getting hurt positive or negative? Is the consequence immediate or in the future? Is the consequence certain or uncertain?

Benefits of not wearing

Knowing that positive, immediate, and certain consequences drive and maintain a behavior as we stated earlier, are there any positive, immediate, and certain consequences to not wearing PPE? Of course, there are.

1. If the employee chooses not to wear PPE he eliminates extra time it takes to find PPE and put it on. He stays on schedule, a positive, immediate, and certain consequence.

2. If he does not wear the PPE he will not be mocked by others (he has experienced being mocked wearing PPE in the past) and he experiences a positive, immediate, and certain consequence for not wearing PPE.

3. When not wearing the PPE he does tasks faster, the boss praises him for productivity with positive feedback, and he experiences positive, immediate, and certain consequences for not wearing PPE.

4. When not wearing PPE he is more comfortable, a positive, immediate, and certain consequence.

The only negative consequence the employee sees to not wearing the PPE is getting hurt, and it is

uncertain. The obvious behavior, do not wear PPE.

Negative consequences

The analysis for the employee's behavioral choice is further supported and maintained when he considers that wearing PPE supports negative, immediate, and certain consequences, with the exception of getting hurt, and the accumulation of those negative consequences support the positive consequences of not wearing PPE, and re-confirm the choice.

1. The sign says "Wear PPE." By taking the extra time it takes to find it and put it on, he falls behind schedule and he will take flack from the boss, a negative, immediate, and certain consequence.

2. Wearing the PPE he will be mocked by others as has happened in the past, a negative, immediate, and certain consequence.

3. He is less comfortable when wearing PPE, a negative, immediate, and certain consequence.

4. If the employee wears the PPE he avoids getting hurt, a positive, immediate, and certain consequence.

The employee's behavior has been guided by the past experience and the certainty of the negative consequences of wearing PPE.

What if the consequences of wearing PPE were different? What if the consequence was to avoid being hurt and the PPE was within reach, and additional time to find the PPE was not a factor? What if the PPE were of a quality that made it comfortable to wear and not uncomfortable, changing the consequence to positive? What if the employee were praised for wearing the PPE in lieu of taking flack for being behind, resulting in a positive consequence? What if that praise included a bonus for complying with company policy?

What we have essentially done here is move the consequences to the positive end of the spectrum where they are most powerful and most likely to have the strongest influence on behavior. Voila! The employee chooses to wear PPE and you have successfully changed the behavior. Over time this will result in an enhanced safety culture just as you desired the outcome to be.

One more example

Let's apply one more example specific to aviation operations. Our employee is driving the tug too fast across the ramp. What triggers this behavior? Remember, consequences positive or negative are critical in the choice or the action taken. We determine the stimuli and factors that will influence the behavior to be time pressure demands of high customer traffic, others are waiting, the boss wants you to stay on schedule, feedback, and getting hurt.

So what do our consequences look like? If we drive faster we can get to more customers, avoid keeping others waiting, be more productive by finishing more jobs, and be praised for getting it all done ... all of which are positive, immediate, and certain consequences, that far outweigh the only uncertain negative of maybe getting hurt. What an eye-opener!

In conclusion, what can we take from this to become a more effective leader? It is simpler than you may think. As leaders we are positioned within our organizations to create positive, immediate, and certain consequences to drive, direct, and change human behaviors. Examine your policies, processes, procedures, resources, and attitudes. Where they lead to negative consequences make the necessary changes to turn them to positive. **AMT**

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SPEED UNIFORMITY EFFICIENCY

Cygnus Aviation Expo 2012 Report

Actively engaged update and more



By Stephen P. Prentice

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.

If you attended the Cygnus Aviation Expo in Las Vegas you probably sat in on the IA renewal seminars. If you did not, here is a brief summary of two of the topics discussed.

The discussion relating to renewing your IA authority (not a certificate) was of particular interest to those in attendance to say the least. There is still a lot of concern on the part of IAs regarding renewal of their authority come next March 31, 2013. The waters are still a little muddy and we still do not have a copy of the new guidance for ASI's which is to be published later this year.

According to Edward L. Hall, ASI, FAA Airworthiness, Eastern Division, who was present, he said that the expanded (second revision) of the "guidance" Order 8900.1, Vol. 5, Chapter 5 will not be printed until later this year and that both he and his FAA counsel, a Mr. Hawk, have been involved in the drafting of the revision to the guidance order. Hall works out of the FSDO located at the Richmond International Airport in Virginia and is an ASI as well. He can be reached at edward.l.hall@faa.gov.

Ms. Carol E. Giles, a former FAA employee who worked with Hall and now has her own consulting business in Washington, said that she had reviewed my *AMT* article (February/March 2012) with apparent approval of my comments regarding the issue of being *actively engaged*. Based on her reading, my comments should track the ASI guidance manual closely. It would appear from Hall's comments, that the thrust of the changes to the order is directed more toward the issuance of new

authorizations and less to the renewal process. Ms. Giles' consultancy can be reached through carol@carolgiles.com.

Federal Register Aug. 4, 2011

In the early policy statement that was published in the *Federal Register* on Aug. 4, 2011, actively engaged was broadly defined as ... "someone who has an active role in exercising the privileges of an airframe and powerplant mechanic certificate in the maintenance of civil aircraft ..." Needless to say, this has been expanded to include even those involved with aircraft maintenance on a part-time, or even occasional basis. Additionally, we should recall that anyone directly related to airworthiness issues, like technical representatives, IA seminar presenters, all can be considered *actively engaged*.

As I have stated, it seems clear that the proposed revised policy is designed to include as many people as possible who have something to contribute to aviation safety, and or possessed of the required expertise in the maintenance of civil aircraft.

No change to basic regulation

Keep in mind that the regulation has not been changed. For example, an eight-hour seminar attendance is still sufficient and has always been one of several ways to renew your authority. The regulation citing the eight-hour seminar, by itself, still meets the recency requirement for renewal (14CFR 65.93 (a)(4)).

This has always been an option for renewal without having even performed any annual inspections or other pertinent labor. The addition of annual inspections or other labor active items, simply supports your position as being *actively engaged*! You should attend a renewal seminar even though some say that it is insufficient as a renewal component. *Nothing can be further from the truth.* The regulation is still crystal clear. *Attend a seminar.* This can be done online or in person

Attend a seminar. This can be done online or in person and clearly satisfies the renewal regulation. Save your attendance confirmation and attach it to your renewal applications.



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and clearly satisfies the renewal regulation! Save your attendance confirmation and attach to your renewal applications. Keep in mind also that next March you should prepare two applications and have at least two (one for each term) seminar attendance documents. (Make and keep extra copies for your records.) Again, physical work component can simply be support for being actively engaged, the real renewal force comes from the regulation, i.e., the seminar attendance!

Also, doing certain other things can also satisfy this engagement requirement. Note that this active engagement requirement has always been connected to getting initial IA authority and never in the past has been attached to those who already have gone through the application and testing process for his or her authority. (Although mentioned in the renewal section of the regulation), Hall told me quite clearly that anyone who was renewed last year and in years past need not be concerned, you will be approved so long as your A&P certificate is current and valid. An IA is not valid unless accompanied with a valid A&P certificate.

The current and latest guidance as I understand it so far, after listening to Hall, the FAA person who set it all out, is that anyone who has been renewed in the past will have to be considered as being actively engaged going forward under any new guidance interpretation so long as his or her A&P certificate is valid.

Aging aircraft issues — corrosion

Like all of us, all of our aircraft are aging if not gracefully, with great speed. Cessna has been for some time now very concerned with structural internal corrosion

in particular and component integrity in general. Beth Gamble from Cessna Aircraft in Wichita, (bgamble@cessna.textron.com) presented interesting details of the present ongoing aging aircraft structural program progress at Wichita.

We should be aware of the massive Supplemental Inspection Documents (SIDs) that have been published for the 300 and 400 twin model series aircraft. Keep in mind that SIDs are not mandatory for any of the Cessna products except those

few known structural wing spar failures, Cessna is urgently concerned about structural failure because of the single wing spar construction of the C 210 series.

Cessna has stated that the SID for the 210 series is valid for aircraft with less than 30,000 hours ... It further states that beyond 30,000 flight hours the airworthiness of the aircraft cannot be assured. This apparently means that after these hours are reached the aircraft should be retired from service.

Supplemental Inspection Documents set out in detail the additional inspections, checks, and various servicing steps that Cessna feels should be performed concerning internal corrosion.

in commercial service that volunteer to include them or are required in their operations specifications. They set out in detail the additional inspections, checks, and various servicing steps that Cessna feels should be performed, the bulk of which concern internal corrosion that can attack the structural integrity of any aircraft. They are very basic in some parts and in others can be very time consuming and or expensive to complete as well. Nondestructive testing is an integral part of the inspections.

C210 AD note

A good example of Cessna's concern shows in the recent AD on certain Cessna 210 series aircraft, to inspect the wing lower spar cap for stress cracks on all 1967 through 1986 C210s, AD 2012-10-04 effective June 5, 2012. This was a result of finding some C 210 aircraft in Australia with cracks at this location. Although there has been very

I doubt this life limit has been reached by any C210s so far.

SID structural inspection requirements are added or will be added to the published Service Instructions manuals for each of the models concerned.

Ms. Gamble, as a senior manager, heads up part of the engineering structures group at Cessna and is concerned with the preparation and publishing of the SIDs and told us that the new inspection requirements for the 200 series aircraft are now published. The instructions for the 100 series aircraft are or will be available very soon. Since I am an owner of an older "legacy" C182 I am particularly interested in seeing what the inspections for my model would recommend. All of the publications including the SIDs can be conveniently found at Cessna.com which contains all you ever wanted to find out about Cessna publications and everything else concerned with Cessna aircraft. **AMT**

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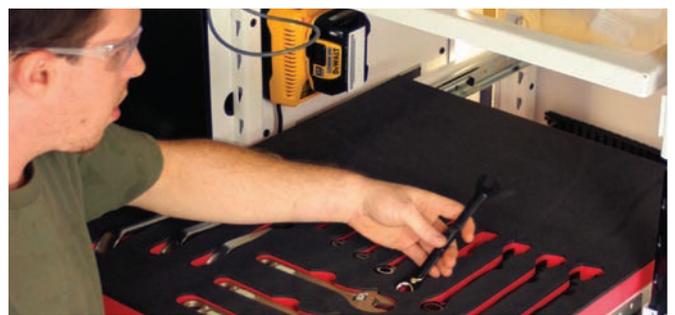
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GA Mechanics: Good Customer Service Can Keep the FAA Away!

Every consideration possible should be given to the customer, to keep him a satisfied customer



By John Goglia

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.

Yes, it's true. Good customer service — resolving disputes with your customers — can keep the FAA from looking into your operation. And no one wants an FAA audit — any more than anyone wants an IRS audit. Even if you are an outstanding mechanic and keep meticulous records, an audit could well turn up: an *i* you didn't dot or a *t* you forgot to cross.

It's just the nature of running a business with so many complex and detailed regulations. Of course, if you run a sloppy operation (and some people out there do), then you run the risk of some pretty substantial findings of violations. And some pretty hefty fines.

But the cost of violations can be high, even if you're ultimately exonerated. Chances are that an FAA audit would take you or your employees (or both) away from doing the maintenance work that keeps you and the company operating in the black. Worse, you might have to hire a lawyer and that means the expenses go up really quickly since you can't just hire any lawyer.

In a dispute with the FAA, you really need to hire an expert in the Federal Aviation Regulations. And aviation attorneys do not come cheap. Three hundred dollars an hour or more is pretty standard in many parts of the country. Even a simple case can quickly wipe out a mechanic's profits for a year, or at least the better part of one.

Satisfied customers don't complain to the FAA

So how does good customer service help keep the FAA away? Well, in my experience at the National Transportation Safety Board reviewing FAA enforcement cases, I saw

a number of cases against mechanics (and pilots, too, for that matter) that came to light after a disgruntled customer complained to the FAA. Invariably, the customer had attempted more than once to resolve the issues with the mechanic. For whatever reason, the mechanic in these cases had failed to do enough to satisfy the customer.

In some of these cases, I could not figure out why the mechanic had not tried harder to be responsive to the customers' complaints. For example, some complaints involve problems that show up immediately or shortly after an annual. Often, these problems are a

In a dispute with the FAA, you really need to hire an expert ... And aviation attorneys do not come cheap.

reflection of the inspection that was done by the mechanic and should be addressed immediately. If the problem does involve quality control at the shop, every consideration possible should be given to the customer, to keep him as a satisfied customer. And to keep him from filing a complaint with the FAA.

Sure, not every customer can be satisfied. But if you have an unhappy customer, know that they may well file a complaint against you. Make sure that the reasons you do not believe that the problems raised by the customer were a result of poor maintenance on your part are fully documented and recorded. If an FAA inspector ever knocks on your door, a week, a month, or a year later, you will have the records you need to show why your maintenance was properly done. **AMT**



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AMTSociety State of the Industry Address

With maintenance vehicles and aircraft towing, you have a lot of responsibility and a job to do and you also want to get it done right – right? This, in many cases, requires you to drive maintenance vehicles or move aircraft by taxi or towing in the airfield maintenance areas. Be proactive and learn the tower frequencies, especially the ground control frequency (jot them down), recognize and be certain that you understand the airfield markings and signs, and by all means, before you move, get authorization/clearance – and VERIFY!

Following this procedure each and every time will reduce your risk of: causing an unauthorized or unapproved movement within the movement area or an occurrence in the movement associated with the operation of an aircraft that affects or could affect the safety of flight resulting in a reported surface deviation incident – or causing any occurrence at an airport involving an aircraft involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in the loss of separation with an aircraft taking off, intending to take off, landing, or intending to land resulting in a reported runway incursion.

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Vision Statement: To actively promote and protect the professional aircraft maintenance technician's craft and profession, advance the future of our profes-

sion, and to provide resources and benefits to its members.

— Stay safe, Tom Hendershot

Additions to the board of directors

Thursday, May 17, 2012, three more individuals joined your AMTSociety Board: Gloria J. Cosby, EVP of the Diversified Group, Cygnus Business Media; Ronald W. Donner, Editor of AMT magazine; and Michael R. Sasso, National Sales Account Manager, AMT.



Gloria Cosby started as publisher at Cygnus Business Media in 1989. In 2007, she was promoted from Group

Publisher to Brand Director. In 2011, she was promoted to one of just four Executive Vice President positions overseeing the Diversified Group. As EVP, she is responsible for managing strategy and implementation of print, digital and tradeshow brands in several top U.S. industries including transportation and aviation. She is a recognized expert on digital assets and integrating business-to-business platforms for advertisers and was previously named to MIN's list of "11 Women to Watch."



Ronald (Ron) Donner is an aviation professional having spent his entire life involved in aviation. He holds FAA cer-

tificates as an A&P/IA, commercial pilot, single and multi engine land, instrument airplane, glider, and is an airplane owner.

Ron began his aviation career working line service while attending aviation school. From 1975 until 1983 he held positions in general aviation as line service, technician, inspector, and charter pilot. He then began a long career with Northwest Airlines holding positions as a technician, supervisor, manager, quality assurance auditor and FAA liaison. His activity in the QA/FAA liaison group gained him significant experience in regulatory compliance, safety, airport operations, and repair station/MRO activity worldwide. In January 2010 he left NWA and now uses his aviation experience as the Editor of *Aircraft Maintenance Technology (AMT)* magazine.

Ron has been a volunteer member of the board of directors for Minnesota based Stanton Sport Aviation Inc. from 2000 to present, president from 2004 to 2009, and is currently vice president. He serves on the advisory committee for the annual Minnesota Aviation Maintenance Conference, is an FAA Safety Team Representative, and a member in good standing of many aviation organizations.



As a second generation A&P technician **Mike Sasso** started his aviation career in high school graduating from Aviation

High School in New York with his Airframe and FCC License, graduating with honors and receiving a scholarship to attend Spartan School of Aeronautics in Tulsa, OK. He also received an AAS degree from Spartan as well as worked to complete a BS degree through Tulsa University.

He started in the industry as an avionics technician for United Airlines while completing his

Powerplant certification at Solano Community College. He worked his way up at United from technician to overhaul maintenance supervisor managing the 727/737 heavy check lines, the moving out to post check test flight management and then onto terminal opera-

tions and line operations including a stint as a station maintenance controller. Mike left United to move back to the Midwest and started at American Airlines as a sheet metal/structures mechanic, quickly moving up to run the 727 heavy check line once again and then moved to

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DFW where he managed the MD11 B check line operations.

After leaving American, he worked at Kitty Hawk as a MX controller and a second term as a base manager, as well as line maintenance manager for FedEx; station MX manager for Air Wisconsin; and a maintenance controller, then MRO supervisor for Comair.

More recently, he was the manager of maintenance control for Mesaba Airlines, as well as the director of the SOC and then director of maintenance until the time it was purchased by NWA. Upon moving out of the management realm, he was instrumental in the writing of the maintenance electronic logbook for the EFB for Teledyne Controls, and also spent some time with Jeppesen as a sales and service rep managing one of its largest accounts in NWA until it

was merged with Delta.

He became active in his community starting and managing a local chamber of commerce which focused on community and b2b networking and sales and marketing training for small to medium businesses. He still works with the Chamber at a local level in both Rockford, IL, and Minneapolis, MN.

Currently he has combined his aviation and sales knowledge at AMT magazine and Cygnus Aviation where he is National Sales Account Manager. And he has started working with Rock Valley College, preparing to lead a summer program as an adjunct instructor in its A&P program.

Membership benefits

Once again this year, Snap-On Tools is helping AMTSociety in

adding/expanding our membership by giving all NEW (first time) individuals a 6-inch ratcheting screwdriver with six different tips. The offer is limited to new members only, and is limited to shipment to North American members. While Snap-on is extending the offer, this offer is limited to 600 so become a member today!

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IA renewal schedule

We're still working on next year's schedule but the first IA event will be held Sept. 8, 2012 at Crimson Technical College, 8911 Aviation Blvd., Inglewood, CA 90301. Watch the web site, AMT magazine, and newsletters for schedule updates.

Keep us updated

AMTSociety wants to make sure you are receiving all the benefits of your membership. When you renew your membership you automatically receive a packet with valuable information inside, including your new membership card. Unfortunately, if you have changed your mailing address without notifying us you may never receive all the benefits your membership entitles you to. If a move is in your future, or you have changed your email or phone number, please take

a moment to update your information at www.amtsociety.org. We value your continued support in making *AMTSociety* a success!

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2012 AMT Day Celebrations



By Barb Zuehlke

Barb Zuehlke is Senior Editor for AMT magazine.

May 24 is a day set aside to honor Charles Taylor and those that have come after, making the world's aircraft safe to fly. Thank you for your dedication to the profession. Here are some of the celebrations that took place this year.

California

The AMTA sponsored a table for the second year in a row at the San Diego International Airport on May 24th. Ken MacTiernan talked to passengers about Charles E. Taylor and the importance of AMT Day and the resolutions that have been introduced and passed. There was a bust of Charlie on loan from the San Diego Air & Space Museum which the AMTA donated back in 2005 as well as magazines and stickers to hand out. The reception was 100 percent positive from passengers and the word is getting out. AMTA also had Howard Du Four's book, Charles E. Taylor: The Wright Brothers Mechanician, on display along with a copy of The Mechanic's Creed, California State AMT Day Resolution, and a picture of the engine Charlie made.



Celebrations at San Joaquin Valley College Aviation Campus.

AMT Day was a huge success at San Joaquin Valley College Aviation Campus in Fresno, CA. To honor AMT Day, SJVC Aviation Campus celebrated with a cake and had an academic decathlon between the General, Airframe, and Powerplant classes for some friendly competition between the students. Some of the organized competitions included safety wiring, rigid line forming, composite testing, weight and balance, and a timed ground handling exercise which gave the most laughs. The Powerplant class won and received a pizza lunch hosted by the Dean of the college.

Colorado

The weather cooperated in every way for the Haggan Aviation celebration — 76 degrees, crystal blue sky, and snow on the "Fourteener's" tops. Sixty-one employees and guests were in attendance as Geno Haggan served as a chef for the day, and the food was great with all the fixings and trimmings included. It was fun filled and everyone had the opportunity to talk and network with others. There were several corporate entities there also: The Anschutz Corporation, Denver Jet Center, Energy Corporation of America, and Jet Repair Anywhere. There were numerous door prizes including a one-year membership for *AMTSociety*, and tools from Snap-on. As



An afterwork toast to Charles E. Taylor in Crestview, FL. From left to right: AMTs Hardy, Bob Kilbourne, Gary Hamilton, and Dan Crawley with barkeeper Ashley holding photo of Charles.



At Baker's 8th annual AMT Day picnic hamburgers, hot dogs, and barbecue were served to a crowd of 130 people.

Geno says, "Wait until next year, it will be bigger and better."

Florida

Representing Segers Aero Corp (test cell) and Emerald Coast Aviation (FBO) in Crestview, FL, four gathered for lunch in honor of Charles E. Taylor Day. In attendance were Robbie Moseley, Bob Kilbourne, Gary Hamilton from ECA, and Daniel Crawley from SAC. They

had a great lunch and visit talking aviation and about activities at the local airport (KCEW).

Georgia

Several of FlightSafety International's Maintenance Training locations celebrated AMT Day around the country. It had a luncheon at its Savannah Maintenance Learning Center — which included inducting seven more technicians into the ranks

of more than 2,000 FlightSafety Master Technicians!

During the barbecue lunch it held a Charles Taylor/AMT Trivia quiz and handed out FlightSafety and Gulfstream prizes to participants who correctly answered the questions.

At FlightSafety's Savannah Learning Center on May 24 seven of its technicians graduated as Master Technicians and the ceremony was held in front of those attending the luncheon.



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At Haggan Aviation's AMT Day events, Geno Haggan, assisted by Tom Hendershot, served 61 employees and guests.



Ohio

AMT Day 2012 was celebrated at Lunken Airport in Cincinnati, OH, by having a cookout to honor aviation maintenance technicians. The cookout was open to all airport personnel and the food and refreshments were free. Several valuable door prizes were also donated by sponsors and were

raffled off. More than 200 people attended the event. Ohio Aircraft Technician's Society Volunteers included: Jim Ries, Garry Meyer, Don Streitenberger, Rich Brannock, Jason Deitsch, and Sam Hennessey. Sponsors included: Ohio Aircraft Technician's Society, AMTSociety, PAMA, West Star Aviation – Dave Godo, Apex Aircraft Cleaning – John Cotton, Standard Aero – Randy Engleking, Spirit Avionics – Rick Ochs, Gulfstream – Grant Kennedy, and Turbine Engine Specialist – Tom Memering.

South Carolina

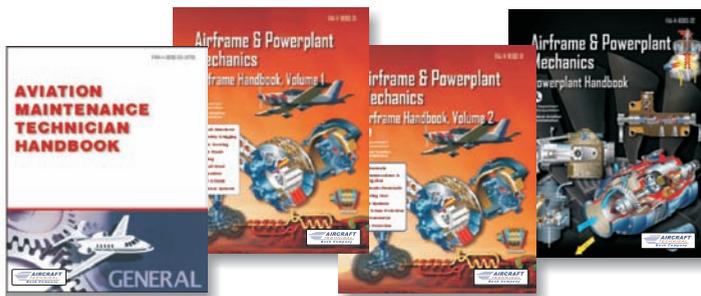
This year's South Carolina AMT Day was held May 24th at the Pittsburgh Institute of Aeronautics facility at Myrtle Beach, SC. A luncheon was held with more than 100 people in attendance. During the luncheon the Charles Taylor Award was presented to Carl Knuth, director of maintenance for Huffman Helicopters, and the technicians played an aircraft maintenance related Jeopardy game and prizes were given away.

Tennessee

Sunny skies and warm weather welcomed Baker's 8th Annual AMT Day Picnic this year. It was held on Friday, May 25, and was free to all AMTs and aviation associates. The Master Grillers were Eddie Baker and Orville Hale. They grilled up plenty of hamburgers,

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Carl Knuth receives the Charles Taylor Master Mechanic Award from FAAS Team program manager Scott Camp with his wife at his side during the South Carolina AMT Day events.

hot dogs, and barbecued bologna for the crowd of about 130 people. There were also pork barbecue, turkey barbecue, potato salad, slaw, baked beans, chips, and cookies. Approximately 140 door prizes were available, so no one went home empty handed.

Country and blue grass music was provided by a live band, "The Chambrey." All guests received

a small foiled lined lunch bag with Charles E. Taylor's picture on it, donated by Baker's School of Aeronautics. There was a dunking booth and two local DMEs volunteered to be the "dunkees," to help raise money for an aviation maintenance scholarship program. The big winner this year was Daniel Hatmaker from Tennessee Technology Center. He accumulated the highest points in the corn hole competition and went home with a 2,000-psi pressure washer.

This picnic is made possible by several sponsors, including Baker's School of Aeronautics, The Tennessee Mid-South Aviation Maintenance Conference, Stevens Aviation, Trade-A-Plane, and Wing Aero. Rapco and AWAM donated several door prizes for the event as well. **AMT**

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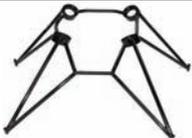
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Jon Jezo, Publisher

Again this summer the *AMT* team will be attending EAA's annual AirVenture to see what's new in general aviation and of course enjoy the air show. If you're looking for a great aviation event to take your children and family to, AirVenture is it.

KidVenture, located at Pioneer Airport and supported by United Technologies, is held Monday to Saturday from 9 a.m. to 3:30 p.m., and Sunday from 9 a.m. to 2 p.m. It allows young people to explore aviation from several different fronts. They receive loggable flight instruction on a simulator, earn FAA credit toward an A&P certificate through hands-on building projects, learn how to fly a radio-controlled airplane, modify a wing on

a computer then find out how well it flies, and even see what it's like to land on Mars.

While you're at Pioneer Airport, spend some time walking through the

many period hangars located there housing close to 50 vintage airplanes. After Pioneer Airport and KidVenture you might as well go over to the EAA Museum which houses more than 200 aircraft, with free admission to AirVenture attendees.

Recognition, career advancement, and history

The General Aviation Awards program and the FAA will recognize a small group of aviation professionals in the fields of flight

instruction, aviation maintenance, avionics, and safety for their contributions to aviation, education, and flight safety. The FAA Administrator will present the national GA Awards during a "Theater in the Woods" program on Wednesday night.

The Helicopter Association International will be holding a couple of sessions on the helicopter industry and the opportunities it offers. Another interesting session will feature 21st century aviation maintenance training and what it takes to get ahead.

If your interests are vintage aircraft there will be a large gathering of Piper Cubs in the Vintage Area celebrating their 75th anniversary. On the south end of the AirVenture grounds the Ultralight Area will be celebrating the 30th anniversary of FAR Part 103.

Workshops

This year AirVenture has many hands-on workshops and training sessions to participate in, here are some events you should checkout: Daily sessions will be held on composites, sheet metal, fabric covering, TIG welding, and gas welding. At the Vintage Hangar and AeroPlane Factory you can witness restoration practices and metal forming demonstrations. If engines are your interest, you can learn about new or old engines at AirVenture. Sessions include the PT6A turboprop, Corvair aero-engines, Franklin engines, as well as the more common Lycoming and Continental engines found on so many GA aircraft.

If you can't make it to Wisconsin for AirVenture be sure to check for air shows in your community; you never know there may be a great opportunity at your local airport!

Until next time we'll see you online: AviationPROS.com

Thanks for reading!

Jon Jezo



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