

AMT

Aircraft Maintenance Technology

*Written by aircraft maintenance professionals
for the professional maintenance team*

Official publication for AMTSociety

August 2012

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with L-3 PI**
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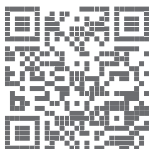
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 1233 Janesville Ave., P.O. Box 803,
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 Toll Free: (877) 382-9187 or Local: (847) 559-7598
 Email: circ.amt@omedia.com
 Web: www.AviationPROS.com



JON JEZO



RONALD DONNER

Publisher.....Jon Jezo
 jon.jezo@cygnusaviation.com
 Editor.....Ronald Donner
 ron.donner@cygnusaviation.com
 Senior Editor.....Barb Zuehlke
 barb.zuehlke@cygnusaviation.com
 Associate Editor.....Stephen P. Prentice
 aperlaw@att.net
 Field Editor.....Charles Chandler
 cchandler@amtonline.com
 Contributors: DeborahAnn Cavalcante, John Goglia, Dr. Bill Johnson, W. Scott Olsen

Sales
 National Accounts Manager..... Michael Sasso
 michael.sasso@AviationPros.com
 National Accounts Manager.....Randy Graper
 randy.graper@AviationPros.com

International Sales
 Benedict Hume
 benedict@itsluk.com
 +44.1442.288287; Fax: +44.1442.219898
 Julian Maddocks-Born
 julian@itsluk.com
 +44.1442.219898; Fax: +44.1442.219898

Production
 Graphic Designer.....Meredith Burger
 meredith.burger@cygnuspub.com
 Media Production Rep.....Carmen Seeber
 carmen.seeber@cygnuspub.com
 Production Director.....Steve Swick



BARB ZUEHLKE



MICHAEL SASSO



RANDY GRAPER

Circulation
 Group Circulation Manager..... Jackie Dandoy
 Circulation Manager.....Debbie Dumke
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 ejackson@meritdirect.com · (847) 492-1350, Ext. 18
Cygnus Transportation & Aviation Group
 Executive Vice President.....Gloria Cosby
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Maintenance Training for the Next Generation of AMTs



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.

Aviation has clearly seen rapid advancements in technology over the past 20 years with shifts toward advanced composite primary structure, glass-cockpits and electronic-flight control systems, and information management systems in the aircraft and in the maintenance facility. At the same time we've seen the business of aircraft maintenance change with shifts toward using specialized maintenance providers and managed maintenance programs. The basis for educating AMT students here in the United States comes from CFR 14 Part 147, yet this part of the regulations appears to have not kept pace with technology advancements and changes to the business environment.

I recently returned from the EAA's 2012 AirVenture, where one of the sessions I attended provided some interesting and timely information relating to the subject of AMT training. Terry Michmerhuizen, assistant professor with Western Michigan University's College of Aviation, presented on the topic of 21st Century Aviation Maintenance Training.

Michmerhuizen contends that knowing what to teach new AMT students should be relatively easy by asking these few basic questions; What do the regulations require; Where will AMT graduates be working; What equipment will they be working on? However, changes in technology greatly outpace the ability to amend and update training regulations, and the implementation of new training material by the Part 147 schools. One of

the first pieces of information presented was the following quote from the "Background Information" released with the 1992 revision to CFR 14 Part 147:

"Part 147 was adopted in 1970 and except for some minor changes, has not been revised since that time. The civil aviation environment in which the aviation maintenance technician operates has changed significantly since that regulation was adopted. Thus a person could graduate from a Part 147 approved school and not be fully prepared to function in the current aviation environment."

Again, this statement was written 20 years ago and arguably it is more applicable today. In 1998 the FAA published through the Notice of Proposed Rulemaking (NPRM), Part 66 as an updated regulation relating to Part 147 schools and AMT training. Good parts existed in proposed Part 66, but it resulted in much industry comment and was eventually withdrawn.

Michmerhuizen adds that today's AMTs need to learn and embrace non-technical skills such as the four Cs: critical thinking skills; concern for quality and integrity; comprehension of the effects of human factors on their work; and clear ability to communicate. Not part of a traditional AMT training curriculum, yet many feel skills such as these have a place in both the current and next generation of AMTs. In this rapidly changing global industry who should take the lead regarding advancement of the education and training for the current and next generation of AMTs; the regulators, industry, or academia?

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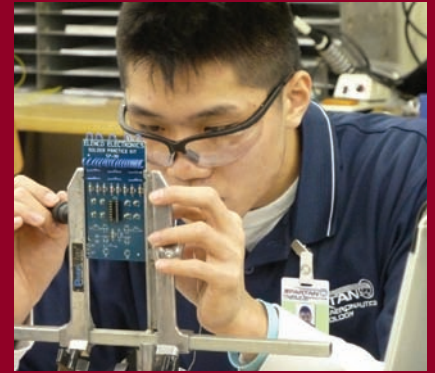
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By Ron Donner

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.

Aircraft Maintenance Technician Outlook

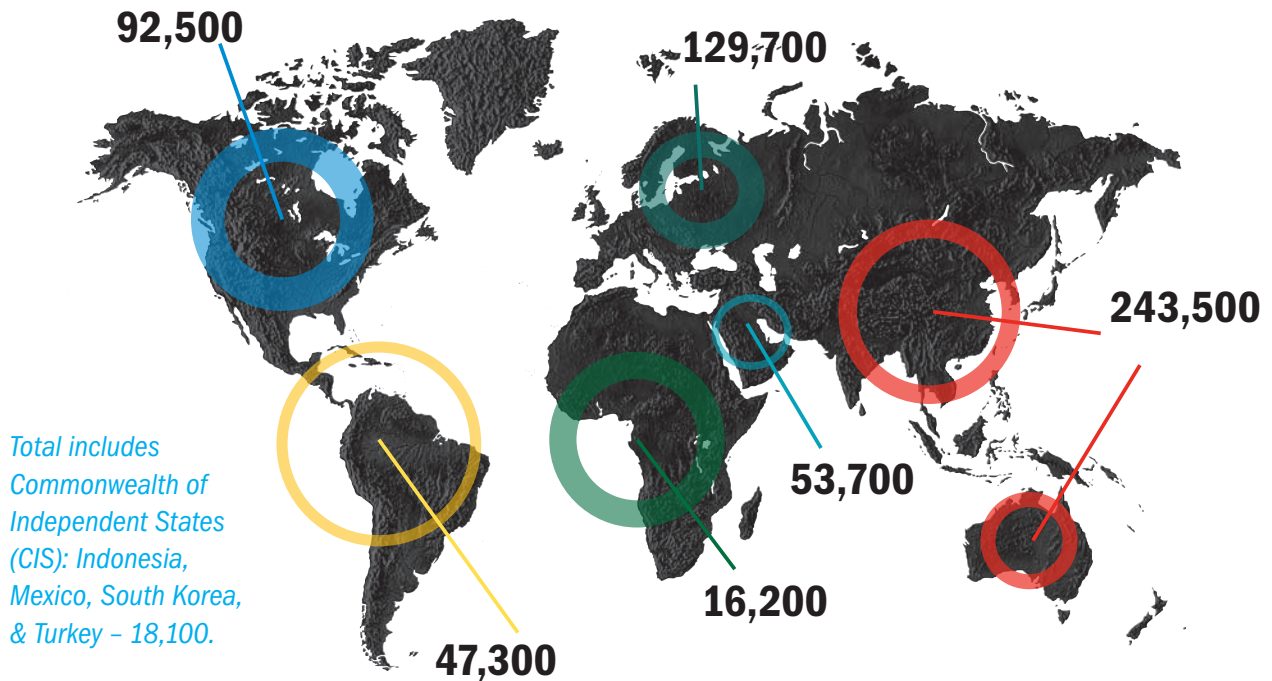
Knowledge about this changing industry can help guide your career

Over the years and decades most of us have heard the prediction, *there's an aircraft mechanic shortage coming*. Yet the industry seems to get by and this wholesale shortage of AMTs, at least here in North America has not yet occurred. One can speculate any number of factors contribute to this shortage not yet occurring; the cyclic nature of the industry; recently the global economic recession; mergers and acquisitions; displaced AMTs taking jobs in different segments of aviation. One can also speculate that these same factors apply to many legacy industries

not only aviation, careers once viewed as stable with low-turnover. So when will the prediction of an AMT shortage become reality? Some information predicts it's finally approaching or already here.

Let's begin with some demographic information taken from a recent *AMT* readership survey with responses from various segments of aviation; airline maintenance, general aviation maintenance, business aircraft maintenance, and the maintenance, repair, and overhaul (MRO) and repair station segments. One question on the survey was short and simple, "What is your age

New technicians by region 2012 - 2031



Information from the Boeing Current Market Outlook 2012-2031.

Total 601,000

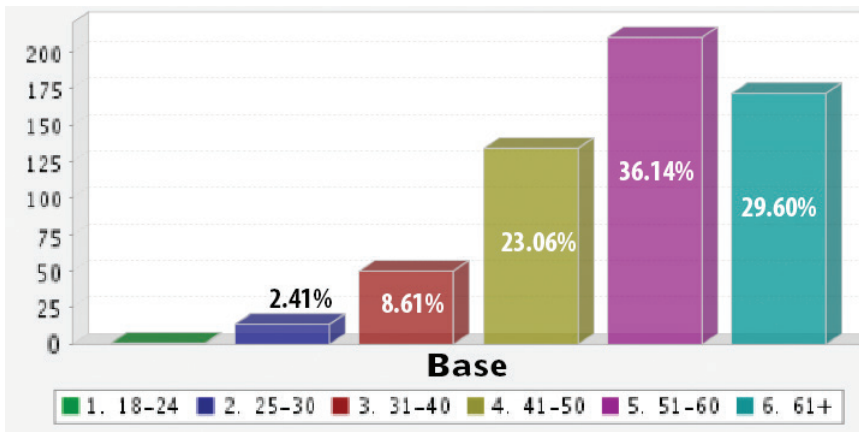


Figure 1. AMT readership survey age groups.

group?" For those of us on the far right side of the chart (purple and turquoise bars) this is probably no surprise. See Figure 1 above.

What factors account for the small numbers on the left side of the chart? Granted this is only one small sampling and does not represent the ages of all AMTs today, but it does prompt a few questions. Are there currently no aircraft maintenance jobs for young people? Or does this suggest that aircraft maintenance is not a desired career choice today?

Many people beginning their career journey have probably witnessed family members or friends becoming unemployed due to company downsizing, lack of business, airline mergers, other corporate decisions out of their control, or people who have moved into careers other than aviation. We have also heard negative (and I feel unfortunate) comments from our peers such as, *why would I tell my kids to work in aviation?* There are competing career choices, many with promise of better pay, benefits, or job security. Valid reasons for young people to be cautious when considering an aviation career.

Using the industry data available

There is no crystal ball we can gaze into that will show the better

career choice, but we can learn and understand as much about the aviation industry as possible. Industry analysis, forecasts, reports, trends, opinions, and news are available, and a search of the internet will result in piles of data that can be used in making educated career decisions. Much of today's data suggests there is a future in choosing an aviation career. However, it will not be the same experience as those of us on the right side of the demographic chart.

To provide some framework on the aircraft maintenance industry, I visited the Aeronautical Repair Station Association (ARSA) website. In August 2009 ARSA published a report titled Global MRO Market Economic Assessment, which was prepared by AeroStrategy for ARSA. The conclusion provides some

scale of the current MRO and repair station segment. Paraphrased the report says there are approximately 480,000 employees within more than 4,800 firms worldwide participating in the civil MRO supply chain. Nearly 80 percent of these firms are small to medium size companies.

Globally, there are more than 290,000 technicians; 24 percent of which are FAA-certificated. In the United States, there are 4,200 firms with more than 200,000 employees. Small to medium size companies make up 85 percent and account for 21 percent of all employees. There are more than 145,000 technicians in the United States and approximately half are FAA-certificated. These repair stations include all segments of aviation and all types of aircraft maintenance services.

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Aircraft delivery forecasts as an indicator

The General Aviation Manufacturers Association (GAMA) 2011 General Aviation Statistical Databook & Industry Outlook market review summarizes 2011 new general aviation (GA) deliveries as not yet rebounding to levels seen during better economic times. The introduction states there are more than 320,000 general aviation aircraft worldwide, ranging from two-seat trainers to intercontinental business jets. The report states there are more than 223,000 active GA aircraft in the United States in all segments, including types such as Lighter-than-Air, Gliders, Experimental, and Light Sport Aircraft.

No surprise the group with the largest number of aircraft is Single Engine with more than 155,000. Interestingly, the next largest segment is Experimental-Amateur Built, followed by Turbo Jet, Rotorcraft, and Turboprop. The 20-year forecast for all GA aircraft shows growth in the United States up to nearly 271,000 aircraft by the year 2031. The report also states that just over half of the aircraft produced in the U.S. are exported supporting the fact that aviation continues to rapidly emerge in developing regions around the world. Although this forecast reflects only modest growth in total, GA will continue to be a vital part of

Nearly 80 percent of the people who responded to the *AMT* readership survey have some level of higher responsibility within their aircraft maintenance organization. That will likely be you someday if it isn't already. A regular topic of discussion these days among organizations small and large, is potential employers regularly seek candidates with not only technical experience and skill, but also the ability to gain the necessary skills to become future leaders. Employers these days often times want people who display the aptitude and attitude to continually grow their knowledge in technical, managerial, and leadership skills. Many want employees to grow within their organization and often times want the "full meal deal" when hiring. Many aviation training companies and industry organizations have identified this need, and offer specialized maintenance management courses. You can view previous *AMT* Webinars on the subject of moving to a supervisory role by visiting www.aviationpros.com/media-center and select More Webcasts.

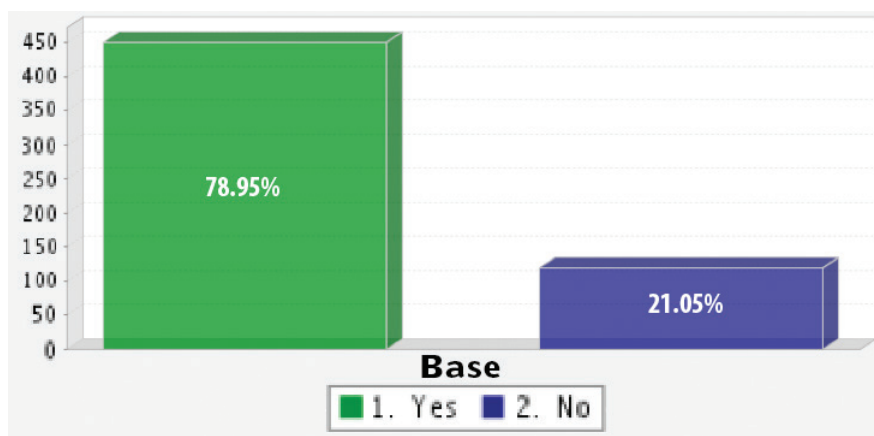


Figure 2. AMT readers with direct or supervisory influence over maintenance work.

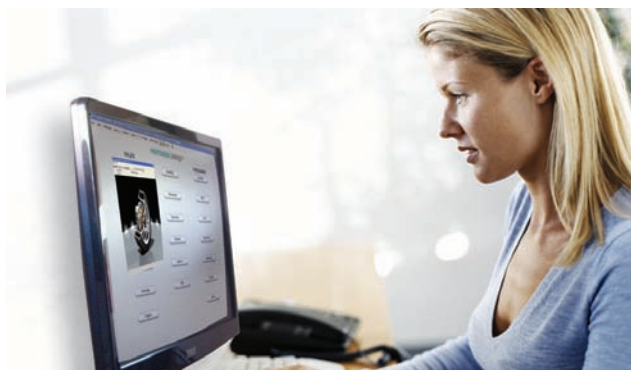
the global aviation industry. Many people of my generation began their careers in GA and continue their involvement even though they have moved on to other aviation careers.

Embraer, the Brazilian manufacturer of business jet and commercial airline aircraft of 120 seats

and less, forecasts in a July 2012 press release that the world air-transport demand will require 6,792 new jet deliveries in the 30- to 120-seat capacity over the next 20 years. North America will lead the deliveries followed by Europe and China. Included in with the Europe



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deliveries is the Commonwealth of Independent States (CIS) which is comprised of Indonesia, Mexico, South Korea, and Turkey.

Bombardier, the Canadian manufacturer of business jets and commercial airline aircraft, forecasts that 24,000 business jet aircraft (in all segments which Bombardier competes) will be delivered over the next 20 years. This forecast anticipates North America will receive nearly 9,500 of these aircraft, followed by Europe, with China being the third largest market. On the commercial airliner side, Bombardier forecasts 12,800

world's airlines will need 601,000 aircraft maintenance technicians. Other interesting points, new-generation airplanes will dominate the world fleet, reliability will improve, and maintenance check intervals will be lengthened. New-generation aircraft will have new and different maintenance philosophies and different maintenance requirements than older fleets. The report goes on to say that currently many emerging markets in the world recruit already-trained personnel from outside their region. However, in the years ahead they will need to develop a foundation for training

few data points begin to paint a picture. Based on the forecasted volume of new aircraft deliveries, there will be an increasing demand for aircraft maintenance technicians worldwide. Adding in the demographics of the current AMT workforce (at least in North America) further suggests the AMT shortage may be approaching. These simple conclusions do prompt more questions, such as why some AMT schools in this country struggle with enrollment and some have closed. What involvement should regulators, academia, and industry have in this discussion? All subjects better left for separate discussions.

The AMT career of the future will not be the same as it is today, or as it was for many of us yesterday — but the data suggests it is there. New-generation aircraft will require technicians to continually develop new skills; holding an A&P certificate alone may get you in the door, but continuing education and knowledge will be key factors to the career-minded AMT. Some future career opportunities may require you to spend time or relocate overseas. Effective communication skills, learning another language, or learning about other cultures would all be beneficial when preparing for this career track. Regardless of your career choice, the advice from many is to be prepared for what comes next. **AMT**

The Boeing report predicts the Asia/Pacific region will need the most technicians, followed by Europe, North America, and Latin America.

deliveries in the 20- to 149-seat commercial aircraft. Again, it predicts North America will lead the way, but in this case followed by China.

Last month the Boeing Company released its Current Market Outlook 2012-2031 which anticipates the global airline industry will need 34,000 airplanes; essentially doubling today's worldwide fleet size. The forecast goes on to say 41 percent of these will replace older less efficient airplanes, and 59 percent will be growth. The report states that over the next 20 years the

qualified technicians directly from within their regions.

As for the regions of the world aircraft maintenance technicians will be needed, the Boeing report predicts the Asia/Pacific region will need the most, followed by Europe, North America, and Latin America.

Can conclusions be drawn

One can argue that today's data may not necessarily be tomorrow's reality, but lacking that crystal ball, you can use today's data to form your own conclusions; even these

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Major Modifications with L-3 PI

Some MROs have all the fun



By Charles Chandler

Charles Chandler began his aviation career as a junior mechanic for American Airlines and retired after 27 years of service. After that he held both line and staff positions in six other major companies. He has a Master's of Science Degree in Adult and Occupational Education with a major in Human Resources Development.

The aerospace and aviation industry is a vast and diverse global industry serviced by an endless list of OEMs, MROs, specialty shops, and FBOs. If you are considering a career in aviation maintenance or changing jobs within the industry, there are two factors that you may want to consider.

Do you want to work for a company that is operationally focused like an airline and OEM where change is usually brought about by alterations in route structure or the introduction of a new airplane or engine? Or, would you like to work for a company that is contract or project-focused and the work is usually very diverse and nonroutine. Many career coaches recommend that you follow your passion and do work that you like and that suits your personality. If you like variety, change, and interesting projects, I suggest you consider L-3 Communications.

L-3 is a huge Fortune 500 aviation company with diverse business divisions and service locations around the world. In 2009 it established the Platform Integration Division at the old James Connally Air

Force Base in Waco, TX. The former base is now a modern industrial airpark operated by Texas State Technical College (TSTC). Platform Integration (PI) is a certified repair station and holds the FAA's Organization Designation Authorization, the most current airworthiness certification authority.

Its MRO operations are supported by about 2,000 engineers; aircraft structure specialists, tool and die makers, systems mechanics, riggers, electricians, avionics technicians, cabinet makers, and interior craftsmen. If you like variety then L-3 PI is for you. The industry buzz is that L-3 PI Division is a good group to work for and has completed many interesting projects. I asked Lance Martin, L-3's media contact, if he could give us a sampling of their projects. He said, "Some we can talk about in more detail than others" due to the sensitivity of the technologies or privacy guarantees to high profile customers.

SOFIA project

One of the high-tech projects was the Stratospheric Observatory for Infrared Astronomy or SOFIA project. This was about a 10-year project and one that took hundreds of engineers and maintenance staff to complete. According to NASA, SOFIA is "a world-class airborne observatory that will complement the Hubble, Spitzer, Herschel, and James Webb space telescopes and major Earth-based telescopes."

The engine of the SOFIA observatory is a German-built 100-inch (2.5 meter) diameter far-infrared telescope weighing 20 tons that is mounted in the rear fuselage of a Boeing 747SP aircraft. PI had the responsibility for

L-3 mechanics in the dedicated wing refurbishment facility work on a P-3 wing as part of the U.S. Navy sustainment, modification and installation program (SMIP).



All Photos provided by L-3 PI.

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MRO OPERATIONS

engineering, airframe modification, telescope mounting, and supporting systems installation and integration. It moved the pressure bulkhead forward, rerouted the flight control cables down the side of the fuselage, and fortified the airframe structure to accommodate the telescope compartment door that is about "16 feet wide and weighs about 3,500 pounds."

It added new mechanical systems to operate the door, built a wind foil on the outside of the fuselage to spoil the air when the massive door was open, and installed a liquid nitrogen system so that the compartment and telescope could be cooled to match the outside air temperature when the door was opened. PI used a dismantled section from another 747SP as a full-size mock-up to ensure that concepts and dimensions were



L-3 sheetmetal mechanic Kent Carlson works on an aft wing assembly for a P-3 wing as part of the U.S. Navy sustainment, modification and installation program (SMIP).

accurate before applying them on the actual aircraft.

Navy P-3 SMIP contract

Platform Integration also competes for modification and maintenance contracts that arise from the

intelligence and defense sectors. Martin says that in June 2011, L-3 PI was awarded the contract "to perform aircraft sustainment for the U.S. Navy's fleet of P-3, EP-3, and NP-3 aircraft. The sustainment, modification, and installation

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program (SMIP) provides for an intensive depot-level process for P-3 airframe and component inspection and deficiency identification. The program corrects deficiencies to ensure safe and reliable operation, as well as to enhance the aircraft service life."

This is a long-term, heavy metal bill of work. The program goal is to keep the Navy fleet of 147 P-3s operational until they are replaced by the B737-800 P-8s. Senior structural specialist technician, Jason Brown, a 15-year PI veteran, spoke to the scope of work for the P-3 SMIP contract that includes: "accomplishing all required modifications, conducting phased inspections, repairing all found discrepancies, and refurbishing the outer wings."

"We are a big family with a lot of skills and experience. We all like the challenges of working on new and complicated projects."

— Jason Brown,
L-3 PI Senior Structural
Specialist Technician

According to Brown, the P-3s are taken to the paint hangar and stripped. The wings are removed and fitted on special dollies, placed on freight liners, and trucked across Waco to the Wing Shop. Inspectors and the Nondestructive Team (NDT) have a look and document their findings. The structural work consists of repairing or replacing main wing surfaces, supporting stringers, brackets, and clips. While the wings are in the shop the NDT team conducts ultrasound inspections of the fuselage wing mounting structures, area skin, and the tail section. All sys-



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The SOFIA observatory is a German-built 100-inch (2.5 meter) diameter far-infrared telescope weighing 20 tons that is mounted in the rear fuselage of a Boeing 747SP aircraft.

tems modifications and upgrades are accomplished during this visit. Depending on the findings, a P-3 can be in overhaul from nine to 18 months. After all the sustainment work has been completed, the refitted P-3 gets a new coat of primer and paint, and the Navy gets a serviceable aircraft ready for mission assignment.

Corporate culture

I commented to Martin that PI must have a work force with the skills necessary to fulfill the diverse contracts that come through the Waco Center. The SOFIA project and other surveillance and military projects would require electronics and avionics experience. The Navy's P-3 SMIP project needs heavy structure specialists.

Martin asked Brown to weigh in on that discussion. He agrees that PI is a great place to work. "We are a big family with a lot of skills and experience. We really enjoy working on the variety of projects that come through PI. We all like the challenges of working on new and complicated projects. When we have a big problem, all the departments will pull together to solve it."

Asked if he had some tips for new AMTs or others looking to move to a division like PI, he says that "MRO operations are good places to work. Get your certificates, degrees, and work experience and be sure that you can work in confined spaces. You can come in through a program like the Texas State Technical College (TSTC) Aviation Career Education (ACE) program. I was hired through a predecessor to our ACE program many years ago."

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L-3 sheetmetal mechanic Jason Brown, left, measures a P-3 ring fitting, as sheetmetal mechanic Christopher Rico takes notes.

ments at the Waco facility in order to be more efficient and competitive. It air-conditioned its hangars and moved parts and hardware plane-side. These changes created a more comfortable working environment and eliminated the queues at the tool cribs and parts department.

Coming attractions

I asked Martin what other interesting projects were in PI's pipeline. The VIP Interiors and Head of State Completion Center staff in Waco is excited about an upcoming B747-8 project. "The new B747-8 is the largest B747 version, the largest commercial aircraft built in the United States, the longest passenger aircraft in the world." The innovative interior and exterior enhancements to this airplane are going to be a "mind-boggling project." Some MROs have all the fun! **AMT**

program where they complete the six-semester program and gain the necessary skills to become aircraft modification technicians. After demonstrating some success in the program, PI will pick up the student's tuition and make them an intern. After students graduate and complete their internship, they must commit to two years of employment with PI.

I asked Martin about PI's recruiting strategy: "We recruit throughout the U.S. and collaborate with TSTC. PI is like many similar companies. The work force is aging and we are seeing fewer candidates coming from the military and more coming directly from good technical and vocational schools." He says that they "try to balance their work force with experienced staff and entry-level employees." Many of PI's staff members have degrees and A&P certificates (not required but encouraged to get it).

Competitive strategies

In the aviation industry some companies do better than others during these periods of budget cuts and austerity programs. MROs and specialty shops can actually thrive because companies, including the military, will delay building or buying new aircraft or expanding their operations, so they keep operating their existing fleets. This usually means opportunities for major modifications, systems upgrades,

or delayed maintenance.

PI is positioned to capture more projects and additional sustainment work. Martin says that the company is working smarter and harder to make sure that it fulfills the U.S. Navy's P-3 SMIP contract on time and within budget. It is also making capital and process improve-

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August 2012 15

To Make a Difference

Outreach and mentoring to create tomorrow's aviators



By W. Scott Olsen

W. Scott Olsen is an English professor at Concordia College in Moorhead, MN, where he also edits the literary magazine Ascent. He holds a Private Pilot certificate and is the author of 10 nonfiction travel/adventure books; the last three have been about aviation.

In a long, windowless, fluorescent-bright room at the Fargo Jet Center, surrounded by two long benches filled with equipment and panels for radar tests, transponder tests, nav and com radio tests, Dave Mohn sits on a stool that can roll off by itself where the floor slopes. Baseball cap on his head, gray beard barely hiding the grin on his face, he's the kind of person you tend to like right away.

Mohn's history and experience are deep. Most of the test panels he built himself. He's worked on everything from 1942 Cubs and 1939 Skylanders to the new King Airs and Challenger 604s. Mohn began his career as an avionics technician in 1979 at Pietsch Flying Service in Minot, ND. He later moved to Waypoint Avionics in Fargo, which was then acquired by the Fargo Jet Center. Mohn is an avionics bench technician. If you bring him an airplane instrument, he is authorized to open and repair it all the way down to the compo-

nent level — the individual transistors and resistors. This morning he's already finished complete inspections on five or six radios.

His talent with radios and instruments and electronics is extraordinary. But that's not why people smile when you say his name. Mohn is one of those people who believe in service, in mentoring kids, who believe in making a real difference. As a merit badge counselor for the Boy Scouts of America, he has recently seen his 275th Scout earn the Aviation Merit Badge.

How it began for Mohn

Dave Mohn grew up in Moorhead, MN. His family background is Norwegian, but Mohn was the name given to his family at Ellis Island. "Our Norwegian name wasn't even close to Mohn," he says. "That's just what someone came up with. All the other Mohns we know are German." Like many school kids, Mohn was asked in his 9th grade

social studies class to think about his future vocation. He loved electronics. He also loved airplanes. "I used to watch them go by all the time," he says. "I still do." His teacher gave him an FAA pamphlet that described a career in aviation electronics and he was hooked.

"I had my intro flight when I was 16," he says. "I don't have a pilot's license, but I do have about 35 hours as PIC. And because I do all the certification and recertification flights, I sit in the right seat all the time. I have more hours in the right seat than most pilots have in the left!" When I ask him why he never finished his private pilot's license, Mohn tells me he has two children, both with Muscular Dystrophy and one with aspergers syndrome. His wife, who also has Muscular Dystrophy, and he have adopted two children with special needs as well. "My time, effort, and energy went to my kids," he says, proudly.



All photos provided by W. Scott Olsen.

Dave Mohn avionics technician with Fargo Jet Center strongly believes youth outreach is a way to generate interest in the next generation of aviation professionals.

Scouting as a means of creating aviation interest

Mohn himself was never a Boy Scout. "I wish I would have been one," he says. One day several years ago, however, a friend of his son's invited his son to a Boy Scout camp-out. His wife wanted him to go along. "Once I got involved, it was all over. Every time I was around kids it was a lot of fun," he says. "I was always trying to create a positive atmosphere."

Mohn remembers the first aviation merit badge he guided. It was in 2005, Troop 244 from North Fargo. He helped the Scouts build a wind tunnel out of Lexan glass for a Scout Show at Moorhead, MN,

The Aviation merit badge is one of the original 57 Boy Scout merit badges offered in 1911. To earn the badge a Scout has to complete 10 activities which range from a preflight inspection to explaining how an airfoil creates lift . . .

Center Mall, a gathering of dozens of Boy Scout troops that showcases projects and activities. That air tunnel took Best-in-Show and is still on display at the Fargo Air Museum.

His most recent group was just last week. Fifteen students from Troop 68 in Long Prairie, MN, and Troop 222 in Fargo, ND, appeared at the Fargo Jet Center to work on their Electronics and Aviation badges.

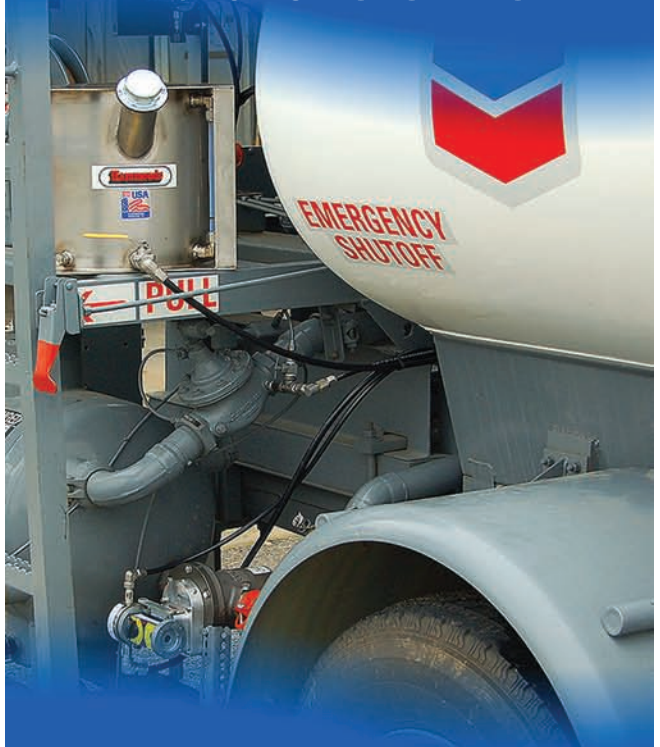
The Aviation merit badge

The Aviation merit badge is one of the original 57



Dave Mohn describes a variety of aviation topics to a group of Boy Scouts at the Fargo Air Museum.

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MENTORING

Boy Scout merit badges offered in 1911. To earn the badge, a Scout has to complete 10 activities which range from a preflight inspection to explaining how an airfoil creates lift, from creating a flight plan with destination times to building a gas-powered model airplane, from visiting a tower to visiting the FAA. It's not an easy merit badge to earn.

Mohn has acted as mentor, or counselor, for more than 275 Scouts who have earned this badge. He's acted as counselor for more than 150 merit badges in electronics. In fact, he has been the adult behind more than 700 merit badges including hiking, small boat sailing, personal fitness, communications, orienteering, and more. In 2010, he helped more than 300 boys earn their Centennial badges for Signaling, the old art of communicating by semaphore flags and



Youth groups in Fargo North Dakota get tours of aviation related organizations as part of local aviation outreach programs.

Morse Code. Fifty-seven of them earned the badge in one weekend. "You help them get there. That's what you do," he says. "You get to have a significant impact on kids. That's why I do it."

I ask Mohn about his most memorable badge. "I was sitting on an Eagle board, the panel of Scout leaders who review the applications of young men who want the rank of Eagle Scout — the highest rank we have," he says, "and, as always, we asked the boy about his career aspirations. He said he wanted to be an aerospace engineer. I couldn't

see the Aviation badge. It was way down on the sash — one of the more recent ones in this boy's Scout history. I asked him about it and he showed it to us, and then reminded me that I was the mentor for his project. He said he had thought he was going into civil engineering. But his experience with the aviation badge really lit a fire and changed his mind." Mohn pauses and says, "That was exciting!"

Mohn has had significant career influence in a great many Scouts. "When the lightbulb goes on, you can almost see it happen," he says.

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“That’s a wonderful moment.” Another project he recalls happily was another Eagle project. The Scout built a display table with a laminated sectional map on top and a CDI built into the wood. You could manipulate the CDI and set up all sorts of approaches. The Scout put about 170 hours into it; Mohn about 25 hours. “Eagle Scout

projects are big at the Fargo Air Museum,” he says. Perhaps his greatest thrill, however, was at Camp Wilderness, a Boy Scout camp in the Minnesota northwoods. “I saw a boy who was not participating at all,” Mohn says. “He just sat there, a bit off by himself. I sent one or two of the older boys over that way to see what was

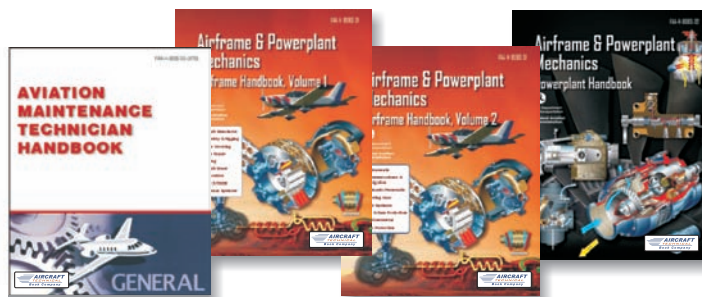
wrong, then I went over myself. He said he really wanted to be working on a different merit badge — not aviation — but the other class had a cap on the number of Scouts and it was full by the time he tried to register. That’s fine, I said, I certainly understand that. But I told the kid he should at least get the Aviation badge for all the time he had to spend sitting there. The Scout agreed and in fact came up to me at the end of camp and said that badge was the most fun he had in his entire Scouting career. As a matter of fact, at the end of that camp, every student said thank you.”

Mohn and I tell stories of other Scouts and other projects until he has to get back to work. Every story is special. Every Scout seems remembered. Before he turns back to work he grins one more time. “It’s just so much fun,” he says. **AMT**



Students from Troop 68 in Long Prairie, MN, and Troop 222 in Fargo, ND, visit Fargo Jet Center to work on their Electronics and Aviation merit badges.

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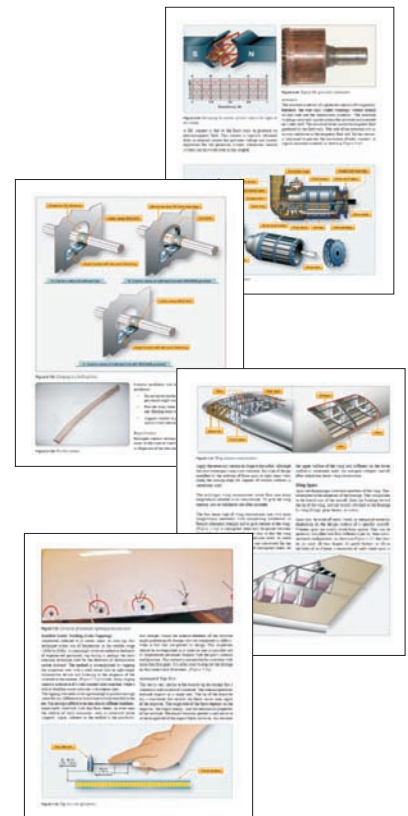
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Moving Up the Career Ladder

Brushing up on basic reading and writing skills can help



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.

We often think of moving up in our careers as requiring advanced or specialized skills in our field. We often look for training or courses that allow us to work on larger or more complex aircraft or systems. To that end, I often counsel mechanics to add avionics and electronics to their skill sets as a necessary tool for future opportunities. Aircraft operate more and more via computerized systems and today a mechanic needs computer training to be able to remain competitive in his/her field.

But at the same time, many mechanics – myself included – have at some point in our careers realized that to move up the ladder, we need to improve some basic skills – like reading and writing. Of course mechanics need to be able to read and write to perform their jobs. They need to be able to read and follow detailed technical instructions and fill out maintenance and other logs, clearly enough for any one reading or auditing the records to understand exactly what the mechanic did to a particular aircraft or component part.

Reading more than manuals

Yet, mechanics who want to move up the management ladder need to be able to read and understand more than just technical manuals and be able to write more than logbook entries. In particular, moving into supervisory and management positions usually means being able to articulate maintenance issues or needs to an audience not intimately familiar with maintenance.

For example, a supervisor may have to write up budget justifications and incident or accident reports, including government inquiries from the FAA, OSHA, the Airport Authority, and other agencies. With the cutbacks in administrative and human resource personnel, maintenance supervisors and managers are often left on their own to

fill out government paperwork. And since maintenance is a 24/7 operation, problems that require written reports can occur at times when 9-5 employees are off duty and unavailable for assistance.

Communication skills

Mechanics with the skills to write up reports and communicate effectively orally and in writing will clearly have an edge on those who don't when supervisory and management positions need to be filled. I realized early on in my career that I needed to improve my writing skills. Let's face it, most of us become mechanics because we enjoy knowing how things work and repairing things that don't work. We were not English majors and never wanted to be. But in order to get promoted we may well

Mechanics who want to move up the management ladder need to be able to read and understand more than just technical manuals . . .

have to hone our reading and writing (and other communication skills, such as public speaking) to fit a broader audience.

I took a technical writing course which taught me the basics of writing technical information in a way that others could understand it. This served me well when I began managing a crew of mechanics and had to prepare written reports for my boss. Of course, I had no idea at the time that I took my technical writing course, how critical writing and orally communicating would become when I was appointed by the President to the National Transportation Safety Board. **AMT**

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The Student View of AMT Training

Feedback from sessions at NBAA and WATS



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.

FAA makes the regulations and oversees the AMT schools. School personnel adhere to the regulations, develop and deliver curricula, and try to ensure that current training is matched to learners' needs and to job requirements. There are many opportunities for improvements.

Earlier this year two conferences dedicated sessions to asking students about their perspective as the recipients of maintenance training. The sessions were at the Halldale World Aviation Training Symposium (WATS) and at the National Business Aircraft Association (NBAA) Maintenance Manager's Conference. The students articulated a mature and respectful opinion of the FAA and of their respective schools. However, the students were perplexed that aviation maintenance training rules and practices have not evolved like most other training and education, in other college classes.

The students were from Western Michigan University, Embry-Riddle Aeronautical University, and Middle Tennessee State University. In most cases the students were in the final stages of programs that award a university degree and preparation to certify as an Airframe and Powerplant aviation maintenance technician. Most of the students were in the lows 20s, or late 20s if they had some military experience.

Let's look at the student perspective.

Why do students gravitate to aviation maintenance training?

Every student had a clear reason for being in an aviation maintenance curriculum. No one just "ended-up" there. Some had relatives in aviation but that was not the most popular answer. Many had a view that there is an upcoming shortage of qualified personnel with "Return to Service" author-

ity. Most expressed confidence that the college degree and the maintenance certification would ensure immediate satisfying employment in aviation or any number of technical fields.

Some of the students were interested in flight and were building hours and ratings accordingly. The pilots felt that the maintenance training ensured that they were more qualified than other entry-level flight crew members. It was a delight to know that many of the students expressed a long-time interest in aerospace and aviation. It seems like that interest permeates the profession from the young students to the seniors in our industry.

Did they make the right decision, selecting an AMT program?

The answer was "yes!" A research purist would suggest that there was some bias in the group. The students that represented their universities were a select group and ready to graduate. The timing would be inappropriate to say that it was not a good decision.

In side discussions the students said that those who did not like aviation withdrew early in the program. Those former students recognized early that they were not inclined for the rigors and regiment of a maintenance training program. They were among a very high percentage of undergraduates who often "change majors."

The primary likes and dislikes?

The students understood that their school curriculum is driven by FAA regulations and the opinion/interpretation of a local FAA Aviation Safety Inspector. With that caveat they had numerous likes and dislikes. They liked the fact that they have developed the ability to learn about and understand "technical things." They felt that the combination of technical informa-

tion and hands-on laboratory work prepared them for AMT certification. They felt that, given the right documentation, they could fix anything. That trait is shared by most competent whether students or experienced AMTs.

For the most part, the students felt that it took too much time to learn some of the fundamentals, like math, electricity, regulations, and such knowledge-based things. They felt that they should be able to

Students liked the fact that they have developed the ability to learn about and understand "technical things." They felt that, given the right documentation, they could fix anything.

use technology-based training media to accelerate through the basics. That would give them time to learn about modern aircraft systems and topics like composites. The students did not blame their schools or their instructors. They felt that the FAA was an obstacle to learning more within the required number of training hours. Most felt they could capitalize on instructional technology to build expanded knowledge and skill with the prescribed duration of the training.

The students felt the curricula could be improved by letting them accelerate through the topics that they can master quickly. They said that learning should be based on mastery of knowledge and skill rather than on number of hours in a class or a lab. Of course, competency-based training is a practice that exists in most current curricula, except prescribed aviation maintenance, training.

Comments about apprenticeships and type ratings

The students understood that certifying staff in Canada, Europe, and other non-FAA regulated countries spend more time in training and in on-the-job learning. They liked the idea of learning more, even if it took more time. They felt that additional knowledge and skill would help ensure employment and also a higher starting wage.

Career aspirations


There were a variety of career aspirations. The range included jobs like aviation missionary work in developing countries to working on modern rotary wing aircraft for a manufacturer. Airline mechanic was not a popular choice.

The bottom line

The female and male students who spoke at the two conferences were glad to be entering a career that involves aviation maintenance. The students observed, at both conferences, that the audience was comprised of gray/no hair males that have retirement in the foreseeable future. That means that there are a lot of opportunities for properly qualified job incumbents.

The students paid close attention to the advice that aviation is a global industry and that they must consider their employment opportunities accordingly. Students listened closely as the large manufacturers talked about the looming worldwide shortage of aviation personnel. They recognized that there were many opportunities to modernize maintenance training practices but were confident the current system has them prepared for a first job.

The bright young aviation maintenance students that spoke at WATS and NBAA made the audience and this author feel that the future of aviation maintenance will be in good hands. It would serve the industry well to listen to the student opinion more often. **AMT**



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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.

Customer Service: Internal and External

Practicing internal customer service can benefit your career

Since the downturn in general aviation business of 2008 many general aviation businesses including MROs and maintenance facilities are seeking ways to gain a bigger piece of a smaller pie. Much of the buzz has been centered on enhancing customer service levels to distinguish or brand themselves in the marketplace and separate themselves from the rest of the pack.

Most often, our perception of customer service usually begins and remains focused on the end users who patronize our business. These end users are our external cus-

tomers. We focus training and awareness on serving these external customers in a fashion that creates loyalty, and retains their business. The ultimate success is turning them into ambassadors for our company where they tell others of the incredible service they received.

But how do we treat our internal customers? Do we have standards and guidelines for them as we do for external customers? Are we as diligent and equally committed to delivering what our internal customers require or need from us? First, who or what are internal customers? Why are they important and what, if any, is their ultimate effect on our external customers?

Internal customers

So let's begin with an understanding of internal customers. Maintenance shops and other general aviation businesses do not operate in a vacuum. They interact and transact with other entities such as vendors, suppliers, manufacturers, and professional advisors, without whom the business would be challenged to grow and thrive. They require parts, labor, and services of others to deliver the finished end product or service to their customer.

These internal relationships, who together, engage in meeting and exceeding the customer's needs and wants, are what we term internal customers. But there is yet a more significant internal customer that we have not yet mentioned ... that being our own peers and co-workers; yes I mean the employees within our own organization and its numerous departments. So we might conclude that an internal customer is anyone, who at any time is dependent on someone else in the organization.

Ironically the internal customer can be someone you work for or someone who works for you. That may seem strange when you think that if he/she works for you, you are his/her internal customer because you are the



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Ronald Donner, AMT Editor

Ronald (Ron) Donner is the current editor of Aircraft Maintenance Technology (AMT) magazine. He's spent his entire life devoted to aviation and he holds FAA certificates as an A&P/ IA, and a Commercial Pilot with Single and Multi-Engine Land, Instrument Airplane and Glider ratings. Ron has worked in a variety of maintenance related roles, both technical and management in general aviation as well as with a major airline.

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boss. It then would follow that as you are dependent on those you manage or supervise to carry out responsibilities for which you are ultimately accountable, your team is equally as dependent on you to provide vital and accurate information and training so they can do the best job possible.

Customer satisfaction

There is a close link between how internal customers, including co-workers, are treated and the resulting customer satisfaction of the external customer. Simply put, what you do as an employee and how you interact and treat other employees and vendors has a direct effect on the customer.

Here are four key elements by which internal customer service and cooperation and teamwork between co-workers and departments can be measured and

enhanced: Helpfulness, responsiveness, respectfulness, and finally, be someone who is easy to do business with or easy to work with.

Helpfulness: Was the issue resolved? Was the task sheet clear? Was progress made? Was the shift turnover sheet data completed? Was the logbook entry clear and concise? Was the work environment left clean and ready for the next shift?

Responsiveness: Was the request acknowledged or communication returned quickly? In the maintenance world satisfactorily and safely meeting a delivery date for repair and returning an aircraft to airworthiness as promised means everything. An A&P technician is dependent on the parts department to obtain the part he or she needs. The parts department is dependent on the supplier to deliver the part as promised. The A&P may be dependent on

the IA to accomplish and sign off an inspection.

You can see how responsiveness is critical. The participating parties form both a chain and a cohesive team which must function seamlessly to meet the delivery date to the customer as promised. As we are all aware, failing to do this will likely result in decreased customer loyalty at minimum, potentially losing the customer all together as well as immeasurable unnecessary costs.

Respectfulness: Was sincere interest and cooperation shown? How are we communicating with each other? If verbally, do we treat our co-worker as we would wish to be treated? If communicating via email, before we hit send, do we re-read our email through the eyes and ears of the receiver? Is the message clear and not ambiguous? Is the tone receptive and



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friendly as opposed to argumentative, curt, or sarcastic? Have we communicated the desired intent?

Make it easy to do business with you or make it easy to work and cooperate with you:

Evaluate your internal processes for gaps and areas where the ball gets dropped. Make accountability a priority. Place the right personalities in the right jobs. Hiring a front counter person who is a whiz at processing a transaction, but reluctant to talk to a customer is not the right personality for the job.

We are all human, and internal customer service failures will happen. Here are some suggestions for improvement:

- Identify who your internal customers are
- Ask your internal customers (co-workers) what is needed for them to do the job they provide
- Ask them what disappoints

them or makes it difficult to deliver what they provide and what might be done to make their job easier

- Identify and address communication breakdowns

Most companies that have developed a reputation for excellent customer service did not achieve it without everyone in the organization adopting a customer service attitude. They have achieved it by fostering a customer service culture throughout the organization, one that supports the belief that customer service is not just a department.

Someone once said that if you are not working directly with the outside customer, you are probably working with someone who is. Virtually every skill and technique you have read or learned about general customer service applies to the internal customer as well as the external customer. By mastering

this you become a more valuable asset to your organization by positioning yourself as a leader and role model for others to follow.

Bottom line is companies that practice outstanding customer service find it easier to attract and retain customers and find it easier to attract and retain employees. Employees who practice outstanding internal service find it easier to keep and enhance their careers. **AMT**

DeborahAnn Cavalcante leads Diversified Aviation Consulting (DAC) and has firsthand experience in air carrier operations, private charter aircraft, general aviation operations, military/civilian interface, FBO management, maintenance repair station training, safety training, human factors training, and customer service training. For more information on DAC visit www.dac.aero.

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Finish all the steps before calling the task complete.

Does this sound basic?

Yes, it is ... But, there continue to be maintenance-induced aircraft accidents where the mechanic did not follow the order of the steps, did not finish a step, or did not complete all the steps of the task as instructed.

Instructions for continued airworthiness contain sequential steps for completing a task. It goes without saying (but we'll say it anyway!) that the sequence of steps developed by the manufacturer is very important! The job will be performed correctly and safely when each individual step is started and completed; one step at a time, in sequential order.

It is not a bingo game out there, it really is a matter of safety, and safety cannot be compromised.

Stay safe — Tom Hendershot

Charles E. Taylor

As most of you are aware by now, the Smithsonian National Air and Space Museum has undertaken a major project to honor the man who made it possible for the Wright Glider to become the Wright Flyer. In doing so, it is expanding the Wall of Honor that is established in the Steven F. Udvar-Hazy Center.

Kenneth J. MacTiernan, director of AMTA, as well as board member for AMTSociety, has spent many hours requesting contributions from

all of the aviation industry to assure that the name of Charles E. Taylor will be written in 1-inch lettering on this wall. Attached is the list of donors.



AMT Editor Ron Donner made a recent visit to the Charles Taylor exhibit at the Steven F. Udvar-Hazy Center at the Smithsonian National Air & Space Museum.

As of press time, the donations went over the \$10,000 needed to have 1-inch letters which are the largest size. This will not only place his name on the Wall of Honor at the Steven F. Udvar-Hazy Center in recognition of Charles E. Taylor's achievements, it will also bring attention to the thousands of skilled craftsmen that have followed in his footsteps.

Wall of Honor donors

Thank you to everyone who has made a donation or helped spread the word about the Wall of Honor effort. Here is the list of donors:

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Tom Hendershot

Tom Hendershot's name is also going to be engraved on the Wall of Honor at the Smithsonian National Air and Space Museum's Steven F. Udvar-Hazy Center for his contributions to the preservation of the aviation and space exploration history and as a testament to his commitment to and passion for flight. **AMT**



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For Information on the AMTSociety go to www.AMTSociety.org

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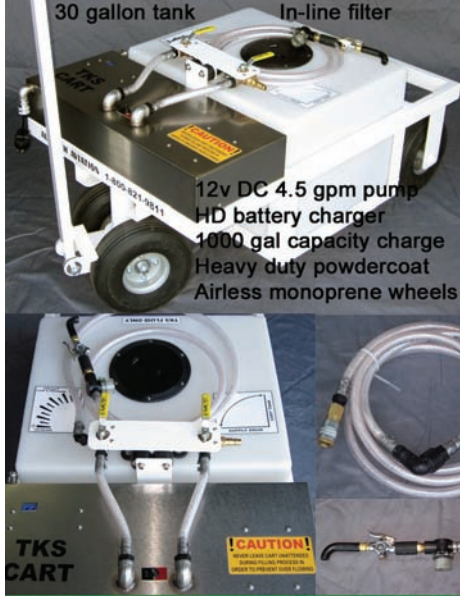


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Cessna to open service center in Spain

Cessna Aircraft's Valencia Citation Service Center will have approximately 62,400 square feet (5,800 sq. m.) of hangar space and 38,000 square feet (3,500 sq. m.) of office and administration space. The center will provide full line and base maintenance, warranty work, paint, small modifications, and mobile support teams. Seventeen employees who will work in maintenance have already received six months of training on all Citation models with FlightSafety International and are currently receiving a year of on-the-job training at Cessna-owned service centers in the United States.

For the most up-to-date news visit www.AviationPros.com.

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iPad Mania



Jon Jezo, Publisher

Apple iPads are taking over throughout aviation! Pilots in both general aviation and the airlines were some of the early adopters to use iPads in the cockpit as electronic flight bags. This has basically eliminated the hassle of paper navigation charts and manuals.

Then we saw American Airlines flight crews being provided with iPads and the FAA even granted permission to use them during all phases of flight, yes even during takeoff and landings! (Doesn't Alec Baldwin wish he could do that!) And now we are starting to see the iPad in hangars more often throughout the world. Technology can be our friend and guess what folks, it can make your life better!

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Thanks for reading!

Jon Jezo



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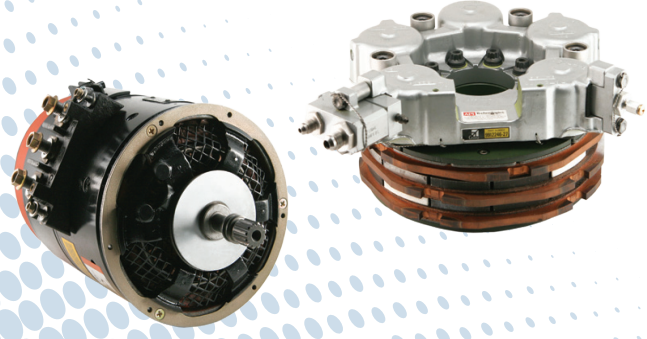
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