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Welcome to the February issue of Piper Flyer.

We’ve taken a slightly different tack with our featured article this month. We usually bring you a fight review, a detailed history, or a restoration story about a particular model of Piper—and we will still have those.

This month, however, we’ve given Kristen Winter the assignment to write about her pick for the best entry-level Pipers.

I know that most of you are past the “entry-level” stage of Piper ownership, but exploring aspects of Piper aircraft and Piper ownership is what we do here. Looking at an aircraft from the point of view of its intended mission allows us to expand our focus a bit.

So whether you are looking for your first Piper or your fifth, I think you’ll enjoy reading Winter’s assessment.

Upcoming issues will tackle topics such as best Pipers for backcountry flying.

And if you want to weigh in with your own picks for the best entry-level Pipers—or the best Pipers in other categories—we’d love to hear from you. Drop us a line at editor@piperflyer.org.

Blue skies,

Jennifer Dellenbusch

The View From Here

Jennifer Dellenbusch

Piper Flyer Letters

Safety Recommendation
From the FAA Administrator

National Transportation Safety Board
Washington, DC 20594

Date: January 9, 2017

In reply refer to: A-17-1 (Urgent)

The Honorable Michael P. Huerta,
Administrator, Federal Aviation Administration,
Washington, DC 20591

On January 5, 2017, the National Transportation Safety Board (NTSB) adopted our report about unsafe wiring conditions in the floor-mounted circuit breaker panels on Piper model PA-31T-series airplanes.¹

Additional information about the investigative background and analysis that led to the resulting urgent recommendation may be found in the safety recommendation report, which can be accessed at our Aviation Information Resources webpage under NTSB report number ASR-17-001. (The link is https://ntsb.gov/about/organization/AS/Pages/air.aspx. —Ed.)

As a result of this investigation, we issued one new urgent recommendation to the Federal Aviation Administration:

A-17-1

Issue an emergency airworthiness directive (AD) that requires owners and operators of Piper PA-31T-series airplanes to take the actions recommended in Special Airworthiness Information Bulletin CE-17-05 immediately after the AD is issued.

Chairman HART, Vice Chairman DINH-ZARR, and Members SUMWALT and WEENER concurred in this recommendation.

The NTSB is vitally interested in this recommendation because it is designed to prevent accidents and save lives. We would appreciate receiving a response from you within 30 days detailing the actions you have taken or intend to take to implement it.


Continued on page 71...
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PFA EVENTS

Jul 22–23 — Waupaca, WI. Waupaca Municipal (KPCZ). The 13th Annual Gathering at Waupaca. Save the date for PFAs annual pre-OSH event with fun, food and friendship. Watch this space and PiperFlyer.org in the coming months for more details.

FEATURED EVENTS

Mar 2–4 — Lake Buena Vista, FL. WAI’s 28th Annual International Women in Aviation Conference. 113 scholarships totaling $662,625 from companies, organizations and individuals will be awarded at the conference held at Disney’s Coronado Springs Resort. WAI scholarships are offered for students and WAI members of all ages and pursuits, including mechanics, engineers, dispatchers, ag pilots, flight instructors and a range of other occupations. For more information about WAI, call 937-839-4647 or visit wai.org.

Apr 4–9 — Lakeland, FL. Lakeland Linder Regional (KLAL). 43rd annual Sun ‘n Fun International Fly-in and Expo. Meet aviation enthusiasts from around the globe and enjoy one of the world’s greatest aviation conventions. This six-day event on 2,200 acres celebrates aviation with thousands of airplanes, hundreds of commercial exhibitors and educational forums, seminars and hands-on workshops for virtually every aviation interest. The U.S. Navy Blue Angels are scheduled to perform. For more information, visit sun-n-fun.org.

April 5–8 — Friedrichshafen, Germany. 25th Annual AERO Friedrichshafen. Discover what direction developments in the GA industry are going. With more than 600 exhibitors from 35 countries, 33,000 visitors and 600 journalists from all over the world, AERO Friedrichshafen is the global show for General Aviation. For more information, visit aero-expo.com/aero-en.


OTHER EVENTS

Feb 4 — Hammond, LA. Hammond Northshore Regional (KHDC). Rusty

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Pilots hosted by Hammond Flying Club. Life may have gotten in the way, but the dream of flight can be yours again. Returning to the skies is not as difficult as most rusty pilots think. Developed by AOPA in partnership with local flight training providers in order to create the best environment for getting you back in the air. 9 am to 12 pm. Free for AOPA members; $69 for non-members. Email RustyPilots@AOPA.org. For more information, visit https://ww2.eventrebels.com/er/Registration/StepRegInfo.jsp?ActivityID=19705&StepNumber=1.

Feb 11 — Houston, TX. West Houston Airport (KIWS). Rusty Pilots presented by AOPA Ambassador Pat Brown and hosted by West Houston Airport. We will help you understand what’s changed in aviation since you last took the controls and brush up on your aviation knowledge. It is easier than most people think—no FAA checkride or test, and you might not even need a medical. Plus, by attending, you’ll be getting two to three hours of free ground instruction toward your flight review. 9 am to 12 pm. Free for AOPA members; $69 for non-members. Email RustyPilots@AOPA.org. For more information, visit https://ww2.eventrebels.com/er/Registration/StepRegInfo.jsp?ActivityID=19709&StepNumber=1.

Feb 11 — Fort Myers, FL. Page Field (KFMY). Rusty Pilots presented by Paragon Flight Training. We’re inviting you back in the cockpit and will help you get there. It is easier than most people think—no FAA checkride or test, and by attending, you’ll be getting two to three hours of free ground instruction toward your flight review. 9 am to 12 pm. Free for AOPA members; $69 for non-members. Email RustyPilots@AOPA.org. Visit https://ww2.eventrebels.com/er/Registration/StepRegInfo.jsp?ActivityID=19707&StepNumber=1.

Feb 18 — Fort Worth, TX. Fort Worth Alliance Airport (KAFW). Fort Worth Flying Club Seminar. Join AOPA’s You Can Fly Ambassador Pat Brown for a FREE seminar designed to demystify the process of starting and running a successful flying club. Learn more about the free resources available from AOPA that make starting and operating a flying club easier than ever. Hosted by the 99’s Fort Worth Chapter. 1 to 2:30 pm. Contact Pat Brown, Pat.Brown@aopa.org or visit https://ww2.eventrebels.com/er/Registration/StepRegInfo.jsp?ActivityID=18895&StepNumber=1.

Feb 18 — Mukilteo, WA. Snohomish County Paine Field (KPAE). Air Racers Lecture. Presented by the Historic Flight Foundation (HFF). What inspired men and woman to fly in these air races—piloting fast and sometimes unproven aircraft—pushing themselves and their planes to the limit? Bill McCutcheon addresses their backgrounds, personalities and idiosyncrasies. Successful air race pilots enjoyed celebrity status and often prospered financially. Others paid the cost of aviation progress with their lives. 12 to 1 pm. Cost is $15; $10 for HFF members. Contact Vanessa Dunn by emailing visitorservices@historicflight.org. Visit historicflight.org.

Feb 18 — Owls Head, ME. Knox County Regional (KRKD). Maine Aviation PIOPER PLYER  >>  FEBRUARY 2017

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Forum. Presentations at the Owls Head Transportation Museum with coffee and donuts in the morning and lunch. Registration starts at 9:30 am. Free to attend and open to all. 9:30 am to 4 pm. Rain date Sunday, Feb. 19. Contact Duke Tomlin, duketomlin@myfairpoint.net. Visit owlshead.org.

MARCH


APRIL

April 28-29 — Camarillo, CA. Camarillo (KCMA). AOPA Fly-in. Clinics and hands-on workshops will be held Friday from 9 am to 4 pm; Exhibit Hall, AOPA Village and aircraft display officially opens at 4 pm Friday, and at 6 pm, the always-popular, always sold-out Barnstormers Party begins. On Saturday pancake breakfast followed by seminars, lunch and a Pilot Town Hall and ice cream social with AOPA president Mark Baker. For more information, visit aopa.org.

Apr 28 - 30 — Ruston, LA. Ruston Municipal (KRSN). Louisiana Tech University Professional Aviation Department AvFest. AvFest, held each year the last weekend of April, is an opportunity for all alumni and current students to meet and discuss all aspects of aviation. We have more than 1,900 graduates in the industry. This year is a special occasion to commemorate the 50-year anniversary of the program. All alumni, family and friends are invited for an update on the program, a tour of the facilities, a barbeque at the hangar and an awards banquet on Saturday night. Event is free except for banquet. Contact Bill McNease by email, billmcnease@gmail.com.

JULY

Jul 24-30 — Oshkosh, WI. Wittman Regional (KOSH). EAA AirVenture Oshkosh 2017. The World’s Greatest Aviation Celebration with daily airshows; activities for youth and young adults; and thousands of forums and workshops. Special events; static displays; mass arrivals; exhibitors; concerts and more. For more information and updates, visit airventure.org.

SEPTEMBER

Sept 8-9 — Norman, OK. University of Oklahoma Westheimer Airport (KOUN). AOPA Fly-in. Expanded to two days in 2017! More opportunities, more time, more of everything. Exhibit Hall, AOPA Village, aircraft displays; Barnstormers Party, pancake breakfast and Pilot Town Hall with AOPA president Mark Baker. For more information, visit aopa.org.

Send events to editor@piperflyer.org.
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It is the dead of winter, which is a fine time to do some deep thinking. Right now I am hard at work on my couch, contemplating and organizing a box of chocolate-covered snack mix so I can eat each piece in a strictly enforced order of declining tastiness.

This isn’t as easy as you might think. Lining up a handful of chocolate-covered crackers, peanuts and little square cereals on my ample belly in a descending order of saltiness, crispiness and chocolatey-ness is not a chore for the faint of heart.

The decisions I make today will impact my fight with weight control. And if I choose to forego post-snack toothbrushing, I might end up making my dentist’s next boat payment, leading him to get a painful, peeling sunburn next summer. Decisions have consequences.

This is particularly true of all things flying. Every choice you have made in your aviation life has meant that you have left some other, less salty or less-chocolate-covered flying options behind.

Some of these decisions have been made by you based on haphazard encounters with people and situations that turned you from one future to another. Others, like your preference for flying low-wing airplanes over high-wing ones, were purely circumstance—an odd chance—or might be due to a leftover preference from a previous low-wing lifetime.

A van ride to my future

In the middle 1970s, I was a twenty-something commercial pilot, a CFI, and a recent college graduate looking for a job in the world of aviation. It looked like I had a lock on a marketing job for an aircraft manufacturer that would have me based in the New York City area.

The interview went well and they offered me the job. All I had to do was fly home to Tallahassee and sell my wife on the idea of living in New York.

Howard Johnson hotel near the Newark Airport (KEWR) and got on the shuttle van to the terminal. It was one of those miserable misty and cold rainy and gray days, and I felt like crap.

A TWA flight crew felt like crap, too, as they got on the van with me. Not one of them spoke to me. All they did was complain to each other.

 Somehow, though, I was hooked. I had to be one of those people. For me, the idea of experiencing the most miserable day as a flight crew member beat the living snot out of any other great day I might have selling airplanes.

For me, the idea of experiencing the most miserable day as a flight crew member beat the living snot out of any other great day I might have . . .

As strange as it may sound, it was on that gloomy, uncomfortable and unhappy hotel van that I decided to be an airline pilot. I just somehow felt at home on that van with those wretched pilots and flight attendants. (Explain that one to me, because I can’t.)

I have known lots of great people at Piper who are in marketing. They are happy and wonderful. I have to assume that if they were on that van that morning, they would have thanked their lucky stars that they had just landed a job at Piper and would never have to be an unhappy airline pilot.

Pivot points

I am sure that everybody has their metaphorical van ride in life and I believe that these pivot points happen every day—maybe hundreds of times a day.

Do you remember the day and the moment when you decided that you had to fly? I mean, the actual day that you decided that using your money for flying lessons was more important to you than whatever other use you had contemplated for that cash?

Exactly what moment did flying make it to the metaphorical front of the snack mix line over other things like groceries, rent or life insurance?

How would your life be now if you’d decided that having one more enormous flat-screen TV was a better choice than an hour of flying?

What if you’d picked another school or a different CFI to teach you how to fly back when you started? What made you pick the airplane you picked to buy? What if you picked another one? Thousands of these choices happen with each us, and we make them—for better or for worse.

We think over and over about some of these choices, especially if they scare us or can teach us a practical lesson. The very first time I made the choice to pilot an airplane into a thunderstorm when I was a kid taught me that I should be very afraid of convective storms. To this day, no matter how sophisticated or radar-equipped my airplane is, I am terrified of thunderstorms.

Pilots are products of what has frightened them in the past. Every time I flew with somebody who seemed to be particularly afraid of something, like fog or snow, they always had a story—and the story was always about a choice they made in the past. That choice informed and molded their behavior.

Widening Ripples is not a rock band from Toledo

The choices you make as you fly your aircraft have a widening, ripple-like effect on everyone and everything around you. Have you ever taken anybody for his or her very first airplane ride, only to have them go on to become a pilot themselves? That ride almost certainly
changed their life, but it also changed the lives of everybody else they later take for an airplane ride.

Your choice to fly aggressively safe all of the time will not only save your hide, it can save hundreds of other pilots down the line—certainly anyone who has met and flown with you, but also with those pilots they fly with in the future.

I have had many pivot points in my flying career. Some of my choices I regret and want a do-over, but most of my choices—even a fair amount of the stupid ones—I think turned out for the best.

How would your life be now if you’d decided that having one more enormous flat-screen TV was a better choice than an hour of flying?

If you believe that each decision a person makes results in more than one path and reality, perhaps that line of thinking will make your aviation decision-making easier.

For example, you may have decided that flying for a living with a disgruntled airline crew was not for you, but perhaps there is a separate version of you that is right now piloting a 747SP over the North Pole on your way to China, complaining and carping all the way.

Meanwhile, in another reality, there is a version of me who no longer thinks about flying airliners for a living. His life has been a warm collection of days at Piper Aircraft where he has been kind of successful. He made friends there, and had a good career; he only every so often looks up when an airliner flies over and feels that tug on his heart.

Kevin Garrison’s aviation career began at age 15 as a lineboy in Lakeland, Fla. He came up through General Aviation and retired as a 767 captain in 2006. Currently Garrison is a DC-9 simulator instructor and a 767 pilot instructor; his professional writing career has spanned three decades. He lives with the most patient woman on the planet on a horse farm in Kentucky. Send questions or comments to editor@piperflyer.org.

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Steel hub prop overhaul costs, seat problems in an Arrow II, shoulder belt repair/replacement and evaluating a fabric-covered Tri-Pacer

Q: Hi Steve,
   In a few months, I will need to overhaul the steel hub props of my 1961 Apache. Quotes I am getting range from 8,000 euros ($8,500 USD) to 11,000 euros for both.
   Would really appreciate inputs on two questions: Has anyone completed this at a more cost effective maintenance shop? Suggestion?
   My other option is to replace them with new STC props with a six-year TBO, but lower OH costs later on. Has anyone completed this, and were you satisfied with the solution?
   Thanks for the inputs.

Best regards,
Francisco

A: Hi Francisco,
   I suspect one reason you’re overhauling your propellers is to comply with AD 97-18-02 R1. This AD says: “Initially perform a fluorescent dye penetrant and eddy current inspection of the blade, an optical comparator inspection of the blade retention area, a dye penetrant inspection of the blade internal bearing bore, and a visual and magnetic particle inspection of the blade clamp and of the hub.”
   After the initial inspection, the AD further requires additional inspections. “Thereafter, perform repetitive fluorescent dye penetrant and eddy current inspection of the blade, an optical comparator inspection of the blade retention area, and a visual and magnetic particle inspection of the blade clamp.
   “The repetitive inspection is required at intervals not to exceed 500 hours TIS or 60 calendar months, whichever occurs first, since last inspection. (3) Thereafter, perform repetitive dye penetrant inspections of the blade internal bearing bore. This repetitive blade internal bearing bore inspection is required at intervals not to exceed 60 calendar months since last inspection.”
   Compliance cannot be done in the field, as all except the most minor servicing of propellers must be done by an approved propeller repair station. Therefore, both props must be removed for this inspection.
   I don’t know exactly which Apache you fly so for some rough numbers I contacted the prop shop I use. I asked for the overhaul cost of the steel hub prop installed on a PA-23-250. I believe that prop model is Hartzell HC-82XK-2C1.
   The flat rate provided by American Propeller for overhauling a non-icing-equipped prop is $4,712 USD. Therefore, the cost to overhaul both of your props at American is approximately $9,424 USD plus freight costs. That’s about 20 percent less than the cost you were quoted.
   I’d suggest you contact other prop shops to see if you can get a lower price.
   Hartzell recommended service centers in Europe are shown on the Hartzell website under “Services,” then “Overhaul and Repair Services” and finally “Recommended Service Facilities.” There’s one in England, one in France and two in Germany.

I also asked for a quote to replace both steel hub props with two new Hartzell aluminum hub propellers. This STC approved retrofit is part of Hartzell’s Top Prop program. I was quoted $24,300 USD for two props, STC paperwork and new spinner assemblies.
   As I said, I guessed that you fly a PA-23-250. If you fly a different model, prices may vary. You will be able to determine if there’s a Top Prop replacement kit for your airplane at Hartzellprop.com/TopProp.
   In conclusion, installing new aluminum hub props will cost more than twice as much as overhauling your steel hub propellers. However, the new aluminum hub props come with a long warranty—and unlike your steel hub props, to the best of my knowledge aren’t affected by any recurring AD notes.
   Happy flying.
Q: I have a 1975 Arrow II. I am not that big of a man, but the bottom of the seat seems to be somewhat narrow. I can’t slide over toward the left because the armrest is there. Have you ever heard of a way to move the seat to the right? Or can you make it about two inches wider?

Thank you in advance.

A: Hi,

I am guessing that you’re “hanging over” the inboard edge of the seat. If so, you can try a couple of things. First, see if the two front seats were swapped sometime in the past. The seat rails and seat rail spacing are the same for both sides, and it’s possible that the pilot’s seat was installed on the copilot side.

Secondly, if the armrest is the problem, take it out and see if that works better. It’s held in by two screws that are accessible from the bottom side. If neither of those solve your problem, you can take the seat to an upholsterer and have it built up with additional foam before recovering it with fire resistant fabric.

You can get approved supplies such as foam and fabric from specialty shops such as Skandia. As long as they use the proper materials, your local upholstery shop can do the job.

Happy flying.

Q: Hi Steve,

I’m looking at a Piper Tri-Pacer to buy. There are a couple of reasons. First, it’s cheap and it performs as well as the Cessna 172 I flew during my flight training. But I’m worried about buying an airplane with fabric covering.

If it weren’t for the fabric question, I would have bought it yesterday. What should I look for?

—Tri-Pacer Tony

A: Hi Tony,

Modern fabric coverings are amazingly tough and durable if properly installed. I once asked Ray Stits, the man that developed the Stits covering process which is now sold under the Poly-Fiber name, how to remove paint from synthetic fabric. Stits said the fabric would not be affected by chemical paint stripper. He said the only thing that will hurt the synthetic fabric used in the Poly-Fiber process is ultraviolet light from sunlight.

I was very surprised, but a few experiments proved him right. Some people think that today’s fabrics are too tough since a good recover can at least 20 years. That’s a long time to go without a thorough inspection of the steel tubing that forms the airframe.

One of the problem areas of any airframe that’s built with welded steel tubing is rust that attacks and eventually compromises the strength of the tubing. Because of this, I urge you to make your purchase dependent on an okay after a thorough survey by an A&P mechanic with experience on tube-and-fabric airplanes. The steel tubes near the aft end of the fuselage are usually the first to rust.

A source for additional Tri-Pacer information is the Short Wing Piper Club.

One of the advantages of owning a fabric-covered airplane is how easy it is to repair small fabric tears and cracks. The recovering and repair processes are covered in the Poly-Fiber procedure manual which is available in a free download. There are also how-to videos on the Poly-Fiber website.

Appendix A in FAR 43 provides a list of preventive maintenance tasks that owners can perform. Item 7 includes a sentence on fabric repairs where it reads: “Making simple fabric patches not requiring rib stitching or the removal of structural parts or control surfaces.”

If this Tri-Pacer passes the pre-purchase survey, I can’t think of reason not to go for it.

Happy flying.

Q: Hi Steve,

My shoulder belt inertia coil just bit the dust. I’m looking to replace both shoulder and lap belts in my 1983 PA-28-161 Warrior II. Would anyone know of a good supplier that I can purchase new belts from?

Thanks,

Marc

A: Hi Marc,

You can get your shoulder harness inertia reel repaired or get a new one at any of the following suppliers: Hooker Harness, AmSafe, Aircraft Belts Inc (ABI), Alpha Aviation and Aircraft Spruce & Specialty. Alpha Aviation and Aircraft Spruce are longtime PFA supporters.

If you’re considering a four-point inertia system, take a look at another Piper Flyer supporter, B.A.S., Inc. (Take a look at Kristin Winter’s article “Installing Shoulder Harnesses” in this issue. It can be found on page 22. —Ed.)

Happy flying.
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Steve Ells has been an A&P/IA for 44 years and is a commercial pilot with instrument and multi-engine ratings. Ells also loves utility and bush-style airplanes and operations. He’s a former tech rep and editor for Cessna Pilots Association and served as associate editor for AOPA Pilot until 2008. Ells is the owner of Ells Aviation (EllsAviation.com) and the proud owner of a 1960 Piper Comanche. He lives in Templeton, Calif. with his wife Audrey. Send questions and comments to editor@piperflyer.org.

RESOURCES >>>>

AD 97-18-02 R1, and other ADs
Hartzell Propeller Inc.

Hartzell recommended service centers and Top Prop replacement kits
Hartzell Propeller Inc.
– PFA supporter
HartzellProp.com
Hartzellprop.com/TopProp

Steel hub propeller overhaul
Ameritech Industries/ American Propeller
americanpropeller.com

CONTINUED ON PAGE 71...

01. A typical small triangular puncture.

02. The triangular puncture is increased in size, and lines are drawn around the area that the patch will overlie. Once the patch is applied, the fabric over the square hole can be heat shrunk, which tightens the fabric around the patch.

03. The patch is cemented with fabric cement; no sewing required. Note the two-inch overlap of the patch over the fabric.

04. Coatings are applied, then sanded smooth.

05. New topcoat paint is sprayed over the patched area.

Photos courtesy Consolidated Aircraft Coatings
Adding shoulder harnesses in at least the front seats should be a must for any aircraft that does not have them. A&P/IA Kristin Winter reports on the recent installation of a three-point system on an aircraft that previously had only lap belts.

By Kristin Winter

Before the early 1970s, Piper did not provide shoulder harnesses for its aircraft. In fairness, that was only slightly after the auto manufacturers did the same thing.

Lack of shoulder harnesses have resulted in life-altering brain injuries from accidents in which the front seat occupants could have walked away virtually unharmed. Fortunately, a number of companies have STCs for the retrofitting of shoulder harnesses in Piper aircraft.

Several retrofit options

The largest manufacturer of restraint systems is AmSafe. It supplies much of the OEM market, be it a GA manufacturer or a commercial aircraft manufacturer like Boeing.

The only product AmSafe currently offers as a GA retrofit is its seatbelt airbags. (Winter has a set of seatbelt airbags she plans to install in her Twin Comanche, and will report on that project in a future issue of Piper Flyer. —Ed.)

The largest holder of shoulder harness STCs for Piper aircraft is Alpha Aviation in Minnesota. Alpha Aviation has STCs covering early PA-23, PA-24, PA-28, PA-30, PA-32 and PA-39 aircraft.

B.A.S. in Washington has an STC for the PA-28/32/34. The kit offered by B.A.S. is a four-point shoulder harness/lap belt system.

Aero Fabricators, a company affiliated with Wag-Aero, has several STCs as well. Wisconsin-based Wag-Aero offers kits for J-3, PA-11, PA-18 and PA-20/22 aircraft, as well as PA-28s.

Univair in Aurora, Colo. markets AmSafe shoulder harness restraint systems for J-3s, PA-11s, PA-12s and PA-18s.

A brief look at the kits

Most of the STC kits have two sets of components. One is the belts and fittings. Some shoulder harnesses have inertia reels, and some include a fixed belt. The latter type generally costs less, but can be a bit less convenient for the pilot when he or she has to loosen the belt in order to reach something in the cockpit.

The other set of components in a kit is whatever is required to provide the necessary structure in order to mount the shoulder harness with enough strength to provide the necessary protection to the user.

This typically involves some reinforcements that need to be attached to the fuselage, usually involving riveting. For that reason, this is not a project for an owner alone unless he or she possesses an A&P license and the tools necessary for the job.

In addition, a shoulder harness installation constitutes a major alteration, and requires that an A&P/IA inspect and sign an FAA Form 337.

Required tools and supplies

The tooling necessary to complete this project will vary a bit depending on what structure is required. Some airplanes may already have the structure installed because shoulder harnesses were an optional item for that particular model year; others may need quite a bit of reinforcing pieces installed in order to provide the necessary support.

Regardless of the kit, the tools necessary for installing solid rivets—and possibly blind rivets as well—will be a necessity.

Any practicing A&P is likely to have the necessary tooling, but for an owner that is interested in participating and wants his or her own tools, the major item is a 2X rivet gun. U.S. Industrial Tool, Sioux Tools and Chicago Pneumatic are just a few of several rivet gun manufacturers.

The most important part of the rivet gun is a good “teasing” trigger that lets the operator control the force and frequency of the blows. The gun also needs a rivet
PHOTO 02: Gentle removal of the headliner provides access to the structure above the rear window. The installation side above the left rear window is shown here.

PHOTO 03: The doubler assembly is riveted to existing structure on the pilot’s side. Note the CherryMax blind fasteners used here. Careful measurement is key to ensure that the stringer and doubler are properly positioned.
set, which is the part that actually touches the rivet, and a spring retainer to hold it to the rivet gun.

In addition, a selection of Cleco temporary fasteners and pliers will also be necessary.

It goes without saying that the ability to drill holes will be key. A #30 drill bit is used for a 1/8-inch rivet and #40 is for a 3/32-inch rivet. There are some excellent YouTube videos done by EAA on the basics of sheet metal work. (See Resources for additional information. —Ed.)

This is a project that any owner with mechanical aptitude can tackle with supervision by an A&P. Doing so will be a great learning experience for those interested in understanding more about what is involved in aircraft maintenance.

A Comanche 250 project

Recently I participated in, inspected and signed the Form 337 on the installation for a 1959 PA-24-250 Comanche which had never had shoulder harnesses installed. The new owner was keen to have the safety advantage of shoulder harnesses.

The Alpha Aviation kit for the Comanche 250 was very complete and of excellent quality. (See photo 01, page 22.) The kit included all required parts and hardware including restraints for two front seats, an 8130-3 Airworthiness Certificate, an installation manual and a copy of the STC and signed STC authorization.

First steps

The first step is to gently remove the headliner from the area to provide access to the structure above the rear window. (See photo 02 on page 24, top.) Removing the headliner can be a challenging project and needs to be undertaken carefully to avoid damaging the headliner.

The structural portion of the kit consisted of a stringer and two doubler plates. The two doubler plates are riveted together with a carefully-laid-out pattern, and to this doubler plate assembly is mounted the attachment point for the inertia reel for the shoulder strap. Then a longitudinal stringer and the assembled doubler plate must be fitted and riveted to the airframe above the rear window.

Measuring and positioning

Careful measurement is key to making sure that the stringer and doubler are properly positioned. This is done by riveting the bottom of the assembled doubler to the existing stringer that runs above the window, as shown in photo 03 (page 24, bottom). Note that blind fasteners were used here.
The installation of the assembled doubler sets the position for the new stringer, which runs from the door frame back to the frame at the back bulkhead.

Photo 04 (below) shows the assembled doubler and the stringer fitted to the aircraft and held in with spring sheet clamps, referred to colloquially as Clecos. Clecos have been used since before World War II and are indispensable for aircraft sheet metal work. The most common type require a special set of pliers to install and remove them.

Clecos are color-coded based on the size of the hole they are designed to fill, and are used to pull tight the two sheets of metal. As mentioned earlier, there are several good videos available from EAA that cover Clecos and other basic sheet metal techniques and tools.

The temporary fastening process
As is good practice, the initial holes were drilled to a smaller size, in this case 3/32 inch, which later were enlarged to 1/8 inch as called for in the instructions. This technique works to clean up any shifting that takes place so that each hole is reasonably precise.

Once the structure is fitted and all the holes are drilled, the parts are removed in order to clean off the burrs and excess material from around the rivet holes. The parts are then reassembled and held in place with the Clecos.

Anchoring with rivets, and final steps
Solid rivets are generally preferred and more economical, but are not always practical, and the kit from Alpha Aviation provides both solid rivets and blind CherryMax rivets.

CherryMax rivets are souped-up pop rivets made to an aerospace standard and are designed with a locking collar to fasten the stem into the rivet as the stem forms much of the strength of the fastener.

CherryMax rivets are used when you can't get a bucking bar to the back of a solid rivet. They can be seen in photo 04 (below) as they are used to attach the lower side of the assembled doubler to the aircraft’s existing stringer. CherryMax
PHOTO 04: The doubler assembly and additional stringer are temporarily installed with Cleco fasteners on the copilot side.
rivets have a number of special pullers that can be used to install them; some are hand-operated and some are pneumatic.

Once all the rivets are installed, a strong support base has been created to anchor the inertia reel and shoulder harness, as shown in photo 05 (below).

Reinstallation of the headliner, carefully cutting a hole for the bolt, and subsequently bolting on the inertia reel completes the installation—save for the log entry and completing the Form 337.

**Labor may vary; added safety will not**

The labor necessary to install the shoulder harness kit varies with the amount of structure that must be added. It can take anywhere from a handful of hours to a couple of days’ worth of labor, but shoulder harnesses are most needed in the kind of accident that can happen to even the best pilots.

No restraint will help if you hit a mountain at cruise speed—but landing mishaps, loss of runway control, or even a controlled glide into favorable terrain after an engine failure are more common. These scenarios are where a shoulder harness might make all the difference.

**Know your FAR/AIM and check with your mechanic before starting any work.**

Kristin Winter has been an airport rat for almost four decades. She holds an ATP-SE/ME rating and is a CFI/IAIM, AGL, IGI. In addition, Winter is an A&P/IA. She has over 8,000 hours, of which about 1,000 are in the Twin Comanche and another 1,000 in the Navajo series. She owns and operates a 1969 C model Twinkie affectionately known as Maggie. She uses Maggie in furtherance of her aviation legal and consulting practice; she also assists would-be Comanche, Twin Comanche, and other Piper owners with training and pre-purchase consulting.
PHOTO 05: The completed installation after riveting of the copilot side. Once all the rivets are installed, a strong support base has been created to anchor the inertia reel and shoulder harness.
Many Piper aircraft depend on a carburetor. Piper Flyer contributing editor and A&P Jacqueline Shipe explains the operation of this fairly simple—and very reliable—invention.

By Jacqueline Shipe

One of the most recognized carburetor manufacturers for the GA fleet is Marvel-Schebler. The company has been around a long time, having its beginnings in the early 1900s when George Schebler and his friend Burt Pierce worked together to design the first carburetor using a tin can with a flap to regulate airflow.

They both went on to patent their designs, with Pierce calling his carburetor the “Marvel.” Both the Marvel and the Schebler designs were successful and used on a variety of engine types.

In the early days of General Motors, the two merged and became known as Marvel-Schebler Carburetor Co. (Author’s note: Burt Pierce also designed the still-popular Marvel Mystery Oil through Marvel Oil Co., which he founded in 1923.) In the beginning, the Marvel-Schebler Carburetor Co. made carburetors for cars, boats, tractors and airplanes.

The company has since changed hands several times, being purchased and resold by Facet Aerospace Products, Zenith Fuel Systems, Precision Airmotive and the Tempest Group (who called it Volare Carburetors until it acquired the Marvel-Schebler trademark in 2010). Today, Marvel-Schebler Aircraft Carburators LLC produces a complete line of aviation carburetors and parts.

Although Marvel-Schebler is the most recognized brand for aviation carburetors, there are other FAA approved manufacturers, including AVStar Fuel Systems in Florida.

AVStar was formed in 2007 and has gone on to become the supplier for Lycoming Engines as well as numerous individual customers. AVStar manufactures a line of carburetors as well as kits and parts for use in almost all carburetor models in the General Aviation fleet.

How a carburetor functions

Aircraft engines rely on a steady source of fuel to provide the energy needed to support combustion. Liquid fuel must be vaporized and mixed with the proper amount of air in order to burn properly in the cylinders.

Many General Aviation planes depend on a carburetor to provide a continuous, reliable source of properly mixed fuel and air to each cylinder. The aircraft carburetor has a relatively simple design and is typically very reliable.

Most aircraft carburetors are fairly straightforward in construction. A top part, called a throttle body, houses the throttle valve, mixture control and venturi; a lower bowl section, called a reservoir, holds a consistent volume of fuel.

Almost all aviation carburetors are float-style carburetors. This means that a float mechanism regulates the fuel level in the reservoir (i.e., bowl).

The float mechanism

The float is hinged on the rear, allowing it to pivot up and down. A pencil tip-
A throttle body (top half of carburetor) is shown here, disassembled from the bowl and turned upside-down. In the lower left corner of the image is the throttle arm; in the bottom center of the image is the mixture control arm. The mixture control valve is the long slender mechanism on the far right of this image (the end has a half-cut in it). The longer section of the mixture control valve covers or uncovers the fuel inlet opening in the sleeve (which is mounted in the bowl) as it is rotated to control the amount of fuel allowed into the fuel discharge nozzle.

An AVStar Fuel Systems' original equipment brass float. AVStar manufactures a line of carburetors as well as kits and parts for use in almost all carburetor models in the General Aviation fleet.

The float and attached float valve, shown here lifted up out of its seat. The small slotted tab above the float valve is adjustable by bending the tab to make it closer to, or further from, the top of the valve.

A closeup of a float valve. Here the valve has been removed and is lying next to its seat. This pencil tip-shaped valve is attached to the top rear of the float.

Float level clearance is measured between pontoon and throttle body gasket. It should be 7/32 inch on most of the smaller carburetors; a 7/32-inch drill bit (shown on left side of image) can be used as a gauge.
A carburetor fuel bowl; the large brass nozzle in the center with holes in it is the main fuel discharge nozzle. The smaller tube just to the left is the accelerator pump discharge tube. The fuel drain plug is shown with safety wire attached at the bottom of the plug.

The throttle body with float removed; the float seat is the brass fitting forward of the mixture control valve. The accelerator pump plunger is on the right, and the fuel inlet screen has been removed.

A venturi in the carburetor throat narrows the airflow opening, increasing the speed of the air, thereby lowering its pressure.

Throttle valve closed; idle air and economizer air openings visible in the bottom of the housing next to the throttle body edge.

Most aircraft carburetors are fairly straightforward in construction. A top part, called a throttle body, houses the throttle valve, mixture control and venturi; a lower bowl section, called a reservoir, holds a consistent volume of fuel.

Here the throttle valve is open. Four small holes in the bottom of the throttle body are for the idle fuel delivery and economizer air openings. The large port on the right side, closer to the bottom, is part of the fuel bowl vent.
shaped float valve is attached to the top rear of the float.

Fuel enters the carburetor through the inlet screen, flows down through the float valve and its seat, and into the carburetor bowl. As the fuel level rises, the float and the attached float valve also rise until the float valve is implanted in the seat, shutting off the fuel flow.

As the fuel level in the bowl drops, the float and float valve also descend, allowing fuel to once again flow into the bowl.

The float travel from full-up to full-down is relatively short; it is stopped on the descent by a tab on the rear hinge. The level to which it rises up is stopped by the attached float valve and seat.

Adjusting fuel level

It is important to maintain a correct fuel level in the bowl. If the fuel level is too low, the engine will run too lean; if it is too high, the engine will run rich and fuel may leak continuously from the discharge nozzle.

The fuel level is adjustable by adding or removing washers under the float valve seat to extend or lower it, or by bending a tab on the float itself at the point of contact with the float valve to extend or lower the valve.

Airflow

Airflow through the carburetor throat begins at the aircraft air filter and proceeds through the airbox into the throat of the carburetor.

A venturi in the carburetor throat narrows the airflow opening, increasing the speed of the air, thereby lowering its pressure. (This is based on Bernoulli's principle of airspeed and pressure being inversely proportionate: the same principle explains how an airfoil generates lift.)

The outlet for the fuel discharge nozzle from the bowl is placed in the center of this low-pressure area.

The air chamber on top of the fuel in the carburetor bowl is vented to atmospheric pressure. The pressure difference from the atmospheric pressure on top of the fuel in the bowl versus the low pressure on the fuel discharge nozzle causes fuel to flow out the fuel discharge nozzle.

A throttle valve (i.e., a butterfly valve) located just downstream of the venturi controls mass airflow through the carburetor throat. As airflow increases, the suction effect on the fuel discharge nozzle also increases proportionately, allowing more fuel to flow.

Fuel flow

Before fuel flows from the bowl out the fuel discharge nozzle, it is routed through the mixture control valve. The mixture control valve is attached to the mixture control arm.

The mixture control valve on most models contains a shaft (also called a stem). The bottom of this shaft is shaped like a half-cylinder. It rotates in a cylindrically-shaped sleeve with an opening on the side.

When the mixture is set at full rich, the open part of the shaft/stem is aligned with the opening in the sleeve, allowing full fuel flow through the valve and out of the nozzle. As the mixture control is pulled back to leaner settings, the opening becomes more and more narrow until it is completely closed at cutoff.

When the mixture control valve is open, fuel flows from the mixture sleeve through the main metering jet (this is a...
The mixture control arm. This arm rotates the mixture valve, which on most carburetors is made as a flexible shaft attached to the mixture control arm.

A closeup view of the mixture control valve. Auto fuel deposits can form on the inner surfaces of the fuel system and may seize the mixture control valve in place.

The mixture metering valve. When the mixture control is pulled back to leaner settings, the opening becomes more and more narrow until it is completely closed at cutoff.

The main discharge nozzle. As the mixture control is leaned, the suction effect and fuel flow out of the discharge nozzle is reduced.

A view of the bottom of fuel bowl, looking up through the carburetor throat. The accelerator pump discharge outlet and main fuel nozzle are in the center.

A top view of the carburetor bowl with the accelerator pump reservoir on the right. The main discharge nozzle and accelerator pump outlet are in the center.
fixed orifice that controls the maximum amount of fuel allowed to exit the main discharge nozzle once the mixture control is set to full rich) and into the discharge nozzle well, where it begins to be mixed with air from bleed holes in the nozzle. From there, it flows up and out the main discharge nozzle and into the intake pipes for the cylinders.

At low throttle settings with the throttle valve nearly closed, there is not enough suction on the main discharge nozzle to cause fuel to flow out of it, but there is a slight amount of airflow between the edge of the throttle valve and the wall of the throttle body.

This small area of airflow around the edges of the throttle valve acts as a venturi, forcing airflow to speed up as it passes between the edges of the throttle valve and the carburetor throat and lowering the air pressure.

In order to provide adequate fuel for idling, small openings are made in the throttle body in this area of low pressure. Ports connect the openings with the inner section of the main fuel nozzle and draw fuel from the nozzle at low throttle settings. This arrangement provides an adequate fuel supply for idle speeds.

**Idle adjustment**

The idle speed and mixture are adjustable, and are the only two adjustments that can be made on most carburetors. Most planes should idle at speeds of 600 to 650 rpm. The idle speed adjustment is simply a stop screw that limits the rear travel of the throttle arm. (It screws in to increase idle speed; moving the screw counterclockwise decreases idle speed.)

The idle mixture adjustment is a large screw on the top rear of the carburetor that screws a needle closer to or further from its seat, which allows more or less fuel to flow through the idle passageways.

The idle mixture is made leaner as the screw is turned in and richer as it is backed out. It should be adjusted so that there is a 25 to 50 rpm rise in engine speed when the mixture control is pulled all the way back to shut down the engine.

If there is no rise when the mixture is pulled back to cutoff, the idle mixture is too lean. If there is a rise of more than 50 rpm, it is too rich.

There have been instances where the idle mixture screw has vibrated loose and fallen out. If this happens, the engine won’t idle at all, but will try to shut down when the throttle is reduced to idle settings.

**Basic maintenance and troubleshooting**

Aircraft carburetors are generally reliable and seldom require much attention. The internal parts of a carburetor rarely need maintenance if the airplane is flown regularly and clean gas is used.

An inlet screen that the fuel supply line attaches to can be removed for cleaning. Generally it stays pretty clean, because most debris gets caught in the aircraft fuel strainer before it has a chance to enter the carburetor.

Over time, the throttle shaft bushings wear, especially on training aircraft that endure several power changes and throttle movements every hour. Worn bushings can allow a slight intake leak and cause an overly lean mixture.

Most carburetors have an accelerator pump that squirts a stream of extra fuel into the intake air as the throttle is advanced so the sudden burst of extra

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The opening for the mixture valve. This is the fuel entrance for the main metering jet and discharge nozzle.

Most carburetors have an accelerator pump. Shown here is the accelerator pump plunger with an outer edge made of leather.

The idle mixture adjusting screw is located on the top rear of the carburetor. Turn the screw counter-clockwise to richen, and clockwise to lean idle mixture. If a plane that was running properly suddenly develops a condition where it will not idle, one of the first things to check is that this screw is in place and hasn’t vibrated loose or fallen out.

The accelerator pump outlet. This pump squirts a stream of extra fuel into the intake air as the throttle is advanced, so the sudden burst of extra intake air doesn’t create a lean condition and cause the engine to stumble.
intake air doesn’t create a lean condition and cause the engine to stumble, especially if the throttle is opened suddenly. The accelerator pump has a plunger that gets worn with use and periodically requires replacement.

Any leaks coming from a carburetor are cause for concern. A carburetor that leaks when sitting with the engine off most likely just has a tiny bit of debris trapped between the float valve and seat. Draining the fuel from the carburetor bowl and then flushing it by allowing it to refill and draining it again will most likely clear it up.

**Long-term storage of an aircraft**

A carburetor on a plane that has sat with the aircraft fuel shut off may not allow fuel to enter the bowl when the fuel is turned on due to a stuck float valve. Gently tapping the side of the bowl with a small rubber mallet sometimes jars it loose and allows fuel to re-enter the bowl.

If a stuck valve is suspected, momentarily crack open the supply line with the fuel turned on to be sure gas is getting to the carburetor, then re-tighten. Next, slowly remove the drain plug to see if there is fuel in the bowl. An empty bowl indicates a stuck valve or an obstruction in the inlet.

For folks that have an auto gas STC, it is best to never leave a plane with auto fuel sitting in the tanks, lines or carburetor for extended periods. Auto fuel causes deposits of varnish to form on the inner surfaces of the fuel system and often seize the mixture control valve in place.

If a plane is left sitting for a season, it will be far better for it to sit with Avgas in it. (*Better yet, you may wish to “pickle” the aircraft. For more information, take a look at Steve Ellis’ 2015 article “Flying, Interrupted: Modern Engine Preservation” in the archives at PiperFlyer.org.*)

Aviation carburetors are some of the most reliable inventions ever made. Their simple design and quality construction offer years of trouble-free service as long as they are flown regularly and proper steps are taken to ensure a clean fuel supply.

Know your FAR/AIM and check with your mechanic before starting any work. Always get instruction from an A&P prior to attempting any aircraft maintenance tasks.

Jacqueline Shipe grew up in an aviation home; her dad was a flight instructor. She soloed at age 16 and went on to get her CFII and ATP certificate. Shipe also attended Kentucky Tech and obtained an airframe and powerplant license. She has worked as a mechanic for the airlines and on a variety of General Aviation planes. She’s also logged over 5,000 hours of flight instruction time. Send question or comments to editor@piperflyer.org.

**RESOURCES >>>>>>**

Avstar Fuel Systems Inc.
avstardirect.com

Marvel-Schebler Aircraft Carburetors, LLC
msacarbs.com

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The Best Entry-Level Piper
MY introduction to flight came in a Cessna 152, in which I did most of my primary training. As a leggy Norwegian from the Upper Midwest, it was not a great fit; it was a barely fit. Add springtime convective turbulence and a flight school that had us plan all of our cross-country flights at 3,000 feet, and that poor little Cessna and I never quite hit it off. I learned what airsick was before I learned what airspeed was.

A chance flight in a Piper Arrow II transported me upward in my eventual flying career—in more ways than one. I was smitten with the solid stability of the Arrow even in our brief dalliance. *(For details on this flight, take a look at “Saved by the Arrow,” published in Piper Flyer in June 2016. —Ed.)*

After passing my private pilot checkride, I cast longing looks at the two Arrows nestled among the gaggle of Cessna 152s and 172s. Unfortunately, the evil stepmother in this fairy tale—in the person of the FBO manager—decreed that I must have 100 hours before I could snuggle into one of the Arrows without a chaperone. This sent me in search of something similar that satisfied my urge for stability.
Discovering the Piper Cherokee 140

Back in the 1970s, there were seven FBOs on this suburban airport, a condition unheard of in the 21st century. A couple of hundred yards down the taxiway was a small FBO owned by a long-term instructor and airline pilot.

For a reasonable price, there I could explore the charms of what I consider the best entry-level Piper for local flying and short cross-country flights: the PA-28-140, commonly known as the Cherokee 140.

Here was a pair of 1967 models sporting Mark 12 navcoms, the greatest tube navcoms ever made. (For those less fossilized than myself, glowing vacuum tubes were what powered electronics until transistors and other solid-state circuitry took over a few years after these aircraft were produced.) One of the 140s had a coffee grinder-style ADF that required the pilot to carefully tune and listen for the ident to have any hope of finding the right frequency.

For night flying, the instrument panel was lit by a red floodlight on the ceiling, just behind the trim crank, which was also on the ceiling and looked like a window crank from a 1950s Chevy (and probably was). It was perfect. I felt like I had stepped into an Ernie Gann novel.

I put at least a hundred hours on those two planes as I forged toward my instrument rating, which was back when one needed 200 hours to qualify for it. I have flown numerous 140s since, and they are honest, straightforward little airplanes.

Production notes

The Cherokee was the replacement for the Tri-Pacer. It was designed to be simple to fly, simple to manufacture, and simple to maintain. This new model also got a new home as Piper opened up a factory in Vero Beach, Fla., which has been the home of the Cherokees and their derivatives ever since.

Originally the aircraft was produced in 150 and 160 hp models and was called the Cherokee until the 1963 model, when
For 1964 and most of 1965, buyers could purchase a Cherokee 140 with 140 hp engine. Thereafter, only a 150 hp engine was an option.

For a reasonable price, I could explore the charms of what I consider the best entry-level Piper for local flying and short cross-country flights: the PA-28-140, commonly known as the Cherokee 140.
it became the Cherokee B. With the B model, the buyer could choose a 150 hp engine, a 160 hp engine or a 180 hp engine. For the 1965 model, it became the Cherokee C, with the same engine options as the Cherokee B.

The aircraft got its “Cherokee 140” moniker when Piper decided to promote the basic Cherokee as a trainer. Piper removed the rear seats and tweaked the prop, and Lycoming tweaked the engine slightly to reduce the horsepower from 150 to 140 hp.

The PA-28-140 came out in early 1964. In 1965, the horsepower was upped back to 150 and it was offered with rear seats. (Piper sold a kit to add the rear seats to the 140s sold a year earlier.) About the only thing that remained was the name.

For 1964 and most of 1965, buyers could purchase a Cherokee 140 with 140 hp and thereafter, with only 150 hp engine as an option. From 1964 through 1967, buyers could also get a Cherokee B or Cherokee C with their choice of a 150, 160 or 180 hp engine.

It was a confusing mishmash of models that Piper simplified with the 1968 model year, when the company trimmed the offerings to two: the Cherokee 140 with the 150 hp engine, and the Cherokee D with the 180 hp engine.

The Cherokee 140 did not undergo too many significant changes over its run, which ended in 1977. The most notable changes included going from push-pull engine controls to a throttle quadrant; a standard “T” configuration instrument panel; and moving the pitch trim from the overhead crank to the wheel on the floor next to the Johnson bar for the flaps.

Various minor and cosmetic changes and refinements were made too, but these Cherokees are all the same basic airplane and they all fly the same way. Cherokee 140s were kept simple on purpose, as they were aimed at the trainer market and designed to keep the hundreds of Piper flight centers equipped back in the heyday of General Aviation training and activity. The production run only ended when the Tomahawk was introduced as the new Piper trainer.

**Flight characteristics**

If I had to describe a Cherokee in one word, it would be “honest.” They are simple and straightforward to fly, to land, and to maintain. In smooth air they can be trimmed to hold altitude so well you would think it was on autopilot.

For northern pilots, it is nice that Cherokees are warm in the winter. The heater and the insulation are adequate to
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keep the cabin comfortable, even when it is below zero outside.

They pretty handle well in a crosswind due to the low center of gravity and the wide stance of the landing gear, though the roll response is not stunning. The manual flaps also give you instant and immediate control, so if one needs to dump lift after touchdown, it is easy and quick.

I have a blast flying Cherokee 140s, but never flew one that had 140 hp. I doubt any that were made have not been converted to 150 hp. My first choice for an entry level, VFR, fun airplane that is a realistic option for a 200- to 300-mile trip carrying a couple of passengers would be a Cherokee 140.

**Cherokee 140 considerations**

Today a Cherokee 140 can be had for the price of a new Toyota. It would be hard to spend more than $40,000 on one, and many are available for $30,000 or less. Maintenance is simple and annual inspections should not much exceed $1,500 even in an expensive part of the United States, provided the aircraft is maintained as it goes and flown regularly.

It is also one of the cheapest aircraft to insure, even for low-time pilots. At 7 to 8 gph, fuel burn is reasonable and the aircraft can be STC’d for auto fuel if it is available in one’s area.

Most Cherokee 140s will have a useful load around 820 to 850 pounds, which means you can fill the tanks with 48 gallons of useable fuel and still put almost 600 pounds in the aircraft. That makes it a good three-person aircraft, though there are some limitations on back seat legroom.

At maybe 110 ktas burning about 8 gph, it has on-paper a range of around 450-plus nm with a VFR reserve—though backseat passengers might not be able to stick it out for four hours. Three hours is a reasonable maximum for these planes, yet they are also an economical choice for local flights and the proverbial hundred-dollar hamburger run.

**The PA-38: also a good choice**

My second choice for an entry level VFR aircraft might surprise some. I will make a pitch here for one much-maligned Piper, suitable for those who only need two seats. The Tomahawk is a very nice little plane. I have hundreds of hours in them.

The poor Tomahawk got a bad rap as the tail structure needed some beefing up and a few pilots got them into a spin that they couldn’t get out of.

Of all the planes I have flown—which covers most everything Piper has made in the last 50 years—the Tomahawk is the...
For aircraft owners who only need two seats, the Tomahawk is a very nice little plane. It cruises between 100 and 105 ktas burning 6 to 6.5 gph.

Of all the planes I have flown—which covers most everything Piper has made in the last 50 years—the Tomahawk is the most fun just to do touch-and-goes. There is no other airplane that I can consistently grease on the runway than a Tomahawk.
With its bubble canopy, the visibility in a Piper Tomahawk is unmatched.
most fun just to do touch-and-goes. There is no other airplane that I can consistently grease on the runway than a Tomahawk.

It is also just a fun little airplane, if you stay off soft strips. It would be a good choice to learn to fly in and to just bop around in. The visibility is unmatched with the bubble canopy and the panel is logical and well-laid-out.

The Tomahawk was designed as a trainer, so don’t expect it to be a great traveling machine. As it happens, I have flown as much as 400 nm in one leg, which is about as far as its 30 gallons of fuel will take it. It will cruise between 100 and 105 ktas burning 6 to 6.5 gph.

The Tomahawk deserves a more complete treatment than I can give it here. There is nothing intrinsically wrong with the little Tomahawk, despite disparaging names like “Traumahawk,” typically uttered by pilots who have never flown one. It is by far my favorite two-place trainer, and I would love to have one just to go around the patch and do touch-and-goes.

**Compare and contrast**

The Cherokee 140 and the Tomahawk are two excellent starter aircraft for VFR or light IFR, if properly equipped.

The 140 has more capability and is more expensive to buy and feed gas than the Tomahawk. There are also a lot more of them out there. For that reason, the Cherokee 140 gets my nod over the fun little Tomahawk, which is somewhat rarer to find in the market.

Both of these airplanes are great entry level choices for a first-time buyer looking for an economical plane for fun local flying and short trips.

**Look for Winter’s further explorations of the best Pipers for other missions in future issues of Piper Flyer. —Ed.**

Kristin Winter has been an airport rat for almost four decades. She holds an ATP-SE/ME rating and is a CFIAIM, AGI, IAI. In addition, Winter is an A&P/IA. She has over 8,000 hours, of which about 1,000 are in the Twin Comanche and another 1,000 in the Navajo series. She owns and operates a 1969 C model Twinkie affectionately known as Maggie. She uses Maggie in furtherance of her aviation legal and consulting practice; she also assists would-be Comanche, Twin Comanche, and other Piper owners with training and pre-purchase consulting. Send questions or comments to editor@piperflyer.org.
secure, with only the aircraft owners having access. It could be a social environment, too, which is good if the other pilots are responsible and fun people—or a nightmare if your hangar partners are a bunch of slobs.

3. Private hangar
This is the way to go if you can afford it, and these are the ones impossible to find. Of course, the owner(s) of a single aircraft have to pay all the rent, but at least they can control the use of their hangar.

Private hangars have many advantages:
• Security—Keys to the hangar and access to the plane are limited. You can lock up your headsets, flying and maintenance gear, including tools.
• Storage—Although the FAA is cracking down on “non-aviation uses” of hangars, especially at airports that receive federal funds, there’s room to store some stuff. An FAA investigation found hangars that held cars and boats, with nothing related to aviation, and they believe this takes space from people who actually want to house a flyable aircraft. Items stored in a private hangar should have some association to aviation, such as tools, aircraft skis or floats, covers, oil and other aircraft maintenance items.
• Workplace—For homebuilders, a hangar may be primarily a construction site. The FAA is not completely on board with the idea of a hangar being used to build a plane, when so many people need space to store flyable aircraft. Using a

“It’s impossible to find a hangar anywhere,” was the refrain every pilot around me sang, but within a month my new plane had a roof over its wings. Was it just luck? No matter how I acquired my hangar, it seems they are in short supply around here. “Here” being northern New Jersey, a modest drive west of New York City, but pilots from around the country seem to sing the same song.

There are many airports around here, from Newark Liberty International Airport (KEWR), which would be a preposterous base for an aircraft unless you own a Fortune 500 company and your aircraft is a multimillion-dollar jet, to grassy airstrips visited only by the taildragger crowd.

Fortunately, New Jersey really is the Garden State, just like it says on the license plates. Once you get a few miles from the I-95 corridor there are abundant, small and friendly airports west of NYC and north of, let’s say, Princeton. Even Charles Lindbergh built an airfield on his New Jersey estate. Many of these small airports are set amid rolling farmland and some of the most idyllic scenery in the country.

After visiting a number of these airports, I found the hangar facilities fell into three categories.

1. Common hangars
One airport offered only a single common hangar that housed about 20 airplanes and helicopters, from Cessna 172s to a Learjet. With so many different types and sizes, a pilot really needs to rely on the airport staff to pull out his plane, which might not be possible outside of working hours. Or your plane could be waiting for you on the tarmac if you call ahead—and fueled up, too.

Most of my friends shuddered at the prospect of serious “hangar rash” with so many aircraft being moved around. Also, there may be little security. I’d never leave my headsets or portable GPS in that sort of hangar.

I doubt if an owner could do much maintenance either, maybe just a simple oil change. You might be allowed to keep a small tool box along a wall, but the airport management would certainly not be responsible for any loss of that either.

Common hangars usually have some space available and are often the cheapest roof over your plane.

2. Shared hangars
Another airport had a couple hangars to share, big enough for three or four airplanes, but with no space available. This situation is better than a giant common hangar, as a tenant would get to know the other aircraft and how to move them if needed.

There’s still a risk of hangar rash, not just from moving aircraft. I can see even the most careful pilot twanging a wing with a broom handle while cleaning up.

Shared hangars are more expensive than a common hangar, but are more secure, with only the aircraft owners having access. It could be a social environment, too, which is good if the other pilots are responsible and fun people—or a nightmare if your hangar partners are a bunch of slobs.

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hangar (sometimes for years) for a plane that doesn’t need the access to runways is a real issue.

1. Maintenance—I’ve seen workshops of varying complexity in hangars, from a small box of tools to full machine shop. Having a private hangar allows owners to pull apart their plane and leave the parts spread across the floor, whether for an oil change or an annual inspection.

2. Social—Hangars can be a simple slab of concrete surrounded by tin to protect your airplane from the worst of nature’s elements, or it can be the ultimate recreational space. All pilots know that the coolness of an individual’s personal space is increased exponentially when an aircraft is parked within. (“You’ve got a pool table in your man cave? Bah! I have a P-51.”) Hangars are places where pilots can gather to relax, drink and talk flying.

Other cost factors

Besides the cost differential of common versus private hangars, I found prices were driven by a few other factors.

1. Location—With proximity to a large city, or a suburban town where big-city big shots live, the greater the price of hangars. No surprise there, especially if half the airport is used by business jets.

2. Amenities and upkeep—Hangars are as scarce as hen’s teeth at those beautiful, almost park-like airports, with neatly cut grass, a restaurant and a thriving community of pilots. Other airports only offer ancient, drafty, tin hangars with rusty doors, potholed runways and muddy taxiways. You get what you pay for.

3. Subsidies—One of the airports I considered was a state property, and the rental rates were the lowest around; your tax dollars at work. But, of course, they had no space available.

“Are you one of us?”

Does social politics play a role in who gets a hangar? Do tidelagger airport managers scoff at nosewheelers? I wondered, as pilots at a particular airport would say, “Yeah, the manager told me there were spaces available,” but when speaking to that manager, “Unfortunately, there aren’t.”

Then, an instructor would say, “Yup, he told me yesterday there was space available,” but when asked again, “Sorry, we’ve got no space.”

Is it the pilot or the plane? I kept hearing, “We’d love to have your airplane here.” Is he more interested in the airspeed, “We’d love to have your airplane here.” Is he more interested in the airspeed, “We’d love to have your airplane able,” but when asked again, “Sorry, we’ve told me yesterday there was space available,” but when would say, “Yeah, the manager told me there aren’t.”

speaking to that manager, “Unfortunately, there were spaces available,” but when

Managers scoff at nosewheelers? I wondered, as pilots at a particular airport would say, “Are you one of us?”

No doubt, if a pilot’s reputation as a troublemaker precedes him, I’d want the manager to claim there’s no room, too. I hope I’m not that guy.

No room at the inn

When all options fail, you may have to tie down your aircraft outside. If your airplane is worth any amount greater than the average car, it really deserves protection.

But, without a roof over your plane you should invest in a full set of wing and fuselage covers, engine plugs and pilot tube covers. Reflective shields will protect the interior from the summer sun, helping to slow the inevitable cracking of plastic and vinyl, and perhaps extending the life of your avionics, too.

The only advantage of a tiedown over a hangar is cost—as little as $50 per month—but you get what you pay for. Usually, that’s just a square of grass (if you’re lucky) or mud, and perhaps a concrete anchor to tie down your plane.

Place some metal grid or industrial rubber matting on your tiedown spot if you don’t want to wear a muddy hole in the ground where you climb in. Most pilots buy a locker to hold a small ladder, cleaning supplies and oil, and place it alongside their plot. (You’ll want the locker to store your covers while you’re out flying, too.)

If you tie down, be prepared to shovel snow or be grounded. Most airports can’t remove snow from grassy tiedown areas, and when the snow melts you still may not be able to taxi over the soft ground.

A heavy rainstorm might also keep you mired in mud.

For more cash you could get a tiedown on tarmac, which is better than a muddy spot and will usually be plowed after snowstorms. You’ll still have to deal with rain-soaked aircraft covers, bird droppings, frosty wings and muddy feet in your cockpit. You’ll also worry when there’s a forecast for hail in the area, and need to be wary of birds and bugs building nests in any available nook of your plane.

As in a common hangar, tied-down aircraft are not very secure. Any theft from a plane that I’ve heard of, usually a headset or GPS, was from a tied-down plane.

Tied-down aircraft cost a little more for insurance, too. Avemco, for example, gives a 10 percent discount on the hull coverage premium if you hangar your aircraft. That’s due to the number of claims from on-the-ground weather incidents, such as hail damage. All in all, hangars are better.

Beggars can’t be choosers

If you have few options, you’ll have to take the best you can get, as-is. I’m very happy with the airport I found, and feel lucky to have found a hangar there. It’s a beautiful spot, with a friendly group of pilots, a wide variety of aircraft, an EAA chapter and a pretty good restaurant.

I think my good fortune was just the luck of timing. It was autumn when I needed my space, so I think some pilots had sold airplanes and moved out during the summer.

However, there are a few items that my hangar lacks, which could be worth keeping in mind during your hangar search.

1. No running water, not even a hose faucet anywhere along the row of hangars. I can’t hose out the hangar or wash my plane, or even fill a bucket to do some cleaning.

2. My hangar has only one electrical outlet. I need to run a 40-foot extension cord to get power anywhere else in the space. A few more outlets would have been convenient.

3. The hangar has a small lip from the concrete floor to the tarmac. This seems really minor, but it can be a struggle to push my plane over that by myself. I did install a couple metal ramps, but it’s still a pain.

4. If I had my choice, I would have picked a south-facing hangar. Mine is in the shade all winter, and significantly colder than the ones across the taxiway. On a chilly but sunny winter day, those hangars get almost toasty.

Finding a hangar for your airplane can be more difficult, with fewer choices, than finding a home for yourself. And there are no Realtors to help. If you’re thinking of buying an aircraft, start early to explore the airports in the area where you’d like to fly.

Talk to pilots hanging around the airports, look over the facilities and let people know you’re in the market. A guy who knows a guy who’s thinking of moving out of his hangar could put you in the right place at the right time to find the right home for your plane.

Dennis K. Johnson is a writer and a New York City-based travel photographer, shooting primarily for Getty Images and select clients. He spends months each year traveling, flies sailplanes whenever possible and is the owner of N105T, a newly restored Piper Super Cub Special. Send questions or comments to editor@piperflyer.org.
ROCKS, RARITIES AND RUNWAYS: EXPLORING NEW MEXICO

By Heather Skumatz

The Sangre de Cristos. Turquoise. Ghost towns. Hot air balloons. Pueblos. Chili peppers. These are the things that I think of when I think about New Mexico. Upon closer inspection, though, none of these things even made my list for what’s most remarkable about New Mexico.
THERE isn’t enough space to discuss all of the wonderful attractions in and around New Mexico’s capital city, Santa Fe, or its largest city, Albuquerque. Perhaps we’ll cover those in future stories. Instead, this article will do some “touch-and-goes” on a variety of what I’ve found to be most intriguing about our 47th state.

The first thing you need to know is that New Mexico, like much of the Southwestern United States, is hugely diverse, in two major ways. Environmentally, it has areas of wilderness and desert, mountains and plains. Culturally, it has several groups of indigenous and nonindigenous peoples that have been coexisting for hundreds, if not thousands of years.

Next, elevation differences can be large—2,800 feet in the southern Rio Grande Valley to more than 13,000 feet on Wheeler Peak. Much of northern and central New Mexico is at or above 4,000 to 6,000 feet—Taos is at almost 7,000; Santa Fe is even higher—and altitude sickness for newcomers can be an issue. (I know of this firsthand.)

Six of the seven life zones found in the world are contained in New Mexico, and its dry climate is second in the nation for days of sunshine per year. New Mexico’s natural beauty, native history and geological and cultural significance are undisputed. And soon, it may also be notable for its network of airstrips.

Aviation in New Mexico

According to the New Mexico Aviation Aerospace Association (NMAAA), New Mexico has 61 public-use airports, 5,053 pilots and 4,075 General Aviation aircraft. There are 40 FBOs, and I was pleased to find that recreational flying is alive and well. (For a list of GA airports in the state, see the table on page 54. —Ed.)

Last November, the Recreational Aviation Foundation (RAF) signed a Memorandum of Understanding that created the New Mexico Airstrip Network (NMAN). This means that one of the most important aspects of New Mexico’s rural backcountry—its private and public airstrips—will be not only be preserved, but enhanced. A similar initiative was economically successful for rural parts of Idaho.

Phase one of this joint effort between the New Mexico Dept. of Transportation, the New Mexico Pilots Association and the RAF is to identify and maintain the existing airstrips, and phase two is a development plan that will add new
The Sangre de Cristo mountains near Taos in north central New Mexico comprise the southern end of the Rocky Mountain range.

The Towa Golf Club in Santa Fe has New Mexico’s only island green.

The Rio Grande near Las Cruces in southern New Mexico.
airstrips to the current system. For GA pilots who would like to explore the backcountry of New Mexico, this is great news.

So, instead of focusing on the restaurants, hotels and other developed attractions (as we often do for destination articles in Piper Flyer), I’m choosing to focus mostly on spectacular outdoor opportunities New Mexico can offer for out-of-state visitors.

I’ve divided my findings by region, and can only give a brief look at some of the major interest areas. I have to advise you, though: this is just the tip of the iceberg—or should I say, just the tip of the stalactite?—when it comes to cool stuff in New Mexico.

**NORTHERN *

**Shiprock**

This New Mexican landmark in the high desert plains is sacred to the Navajo, and is in the middle of the Navajo Nation. This remnant from a volcano was previously thousands of feet underground; now exposed, its peak is over 7,000 feet above sea level.

Very recent restrictions (they were just put in place in the summer of 2016) recommend that non-Native visitors to the site stay at least three miles from the formation unless they have tribal authorization. Flights in the area are permitted.

**NORTH CENTRAL**

**Ghost Ranch**

If you’ve seen “Red and Yellow Cliffs” by Georgia O’Keeffe, you’ve seen an image of Ghost Ranch in the Chama River Valley in Abiquiu. The vivid colors here inspired O’Keeffe to create seven paintings of the rock walls.

Today, Ghost Ranch offers painting workshops, spiritual retreats, lodging and outdoor adventures. *(Note: With 22 tribes calling New Mexico home, and sovereign nations inside the state, Native American place names are common. For a helpful guide on the pronunciation, take a look at the “Encyclopedia of Santa Fe.” It can be found online, and the link is in Resources at the end of this article.)*

**Taos**

The community of Taos was incorporated less than 100 years ago, but the adjacent Taos Pueblo it was named for has been continuously inhabited for over 1,000 years.

With just 5,000 residents, more than 80 art galleries and a long list of notable citizens (from Julia Roberts to Donald Rumsfeld; Kit Carson to Gary Johnson) this city really is a one-of-a-kind place.

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**New Mexico’s natural beauty, native history and geological and cultural significance are undisputed. And soon, it may also be notable for its network of airstrips.**

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**General Aviation Airports in New Mexico**

General Aviation airports are all over the state of New Mexico. Here is a current list of public use GA airports according to the New Mexico Aviation Aerospace Association, a group founded in 2012.

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Source: New Mexico Aviation Aerospace Association, nmaaa.org.
The vivid colors that surround Ghost Ranch in the Chama River Valley in Abiquiu inspired Georgia O'Keeffe to create paintings of the rock walls.

Photo courtesy New Mexico Tourism Department

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The Rio Grande River runs more than 500 feet below the Rio Grande Gorge Bridge on U.S. Route 64.

The Valles Caldera National Preserve was private land until it was purchased by the federal government and designated as a national preserve in 2000.

As a scuba diving destination, you might not do better than the 80-foot-deep Blue Hole in Santa Rosa.
The Enchanted Circle Scenic Byway, a 84-mile loop via four highways, also has its launching point in Taos.

**The Rio Grande Gorge Bridge**
For locals, it’s just part of U.S. Route 64. For Midwestern people like me, this steel bridge is a marvel with the Rio Grande River running more than 500 feet below.

The gorge begins near the border with Colorado to the Taos Plateau, a space of about 50 miles.

**Angel Fire**
This small village east of Taos has been known to skiers for decades, but is now popular with snowboarders and downhill mountain bikers, too. With over 560 skiable acres on 70 runs in the winter and more than 60 miles of purpose-built terrain for bikers in the summer, this Rocky Mountain location is full of outdoor activity year-round.

**Valles Caldera**
Valles Caldera National Preserve has thousands of acres and includes one of just three supervolcanoes in the U.S.—Valles Caldera. The floor of the 13-mile-wide caldera has volcanic domes, hot springs and other geological features, and the entire area is popular for hiking with both locals and visitors.

Previously private land, the area was purchased by the federal government and designated as a national preserve in 2000. The National Park Service took over management in 2015.

**CENTRAL**
**Santa Rosa Blue Hole**
As a scuba diving destination, you might not do better than the 80-foot-deep Blue Hole in Santa Rosa. The water temperature stays constant, and visibility is 100 feet. Paid permits (daily or annual) for divers are required; scuba diving equipment is available for rental on-site.

If diving doesn’t quite suit you, the Santa Rosa Blue Hole is still a neat locale for swimming. Camping, hiking, more swimming and biking are all available at nearby Blue Hole State Park.

**Petroglyph National Monument**
This site was created to protect the rock carvings made hundreds of years ago, mainly by the Pueblo, Apache and Navajo people, with some of the later carvings etched by Spanish explorers and settlers.

Boca Negra Canyon, Rinconada Canyon and Piedras Marcadas Canyon are the three main sections for petroglyph viewing, while the main trail located at the Volcano Day Use Area winds east to offer views of the Rio Grande Valley, Albuquerque and the Sandia Mountains.

To better see many of the petroglyphs, bring binoculars—and lots of water. Only the Boca Negra Canyon has a drinking fountain available at the entrance.

**SOUTHEAST**
**Carlsbad Caverns**
Over 119 caves in this area were formed by sulfuric acid eroding the limestone in the Chihuahuan Desert. The largest cave is 136 miles long, but you can’t tour it; Lechuguilla Cave is open to researchers only.

This National Park was designated by Congress in 1930 and offers both self-guided and reservable ranger-guided tours. I was surprised to discover that the park is open 364 days a year.

**SOUTHWEST**
**Gila National Forest**
Near Silver City, the Gila National Forest is a semi-desert with lots of biodiversity. Comprising over three million acres, the forest has abundant camping. Many of the unimproved sites charge no fees whatsoever.

The national forest is full of horseback trails, opportunities for bicycling and fishing—and allows for “rockhounding,” searching for various rocks and minerals in the area. Many types of agates, bloodstone, geodes, hematite, lava, obsidian and quartz can be found here.

**Elephant Butte Lake State Park**
Just to the north of Truth or Consequences on the Rio Grande is Elephant Butte Lake State Park. It’s the largest state park in New Mexico, and the reservoir is the largest (by total surface area) in New Mexico as well.

The dam was constructed in the early 1900s, and the butte in the center of the reservoir was so named because it looks like an elephant lying on its side. Common visitors here are boaters, jet skiers, kayakers and fishers. Swimming, picnicking and camping are also popular.

**SOUTH CENTRAL**
**White Sands National Monument**
Between Las Cruces and Almogordo on the east side of the San Andres are waves and waves of white sand dunes. It’s a phenomenon, truly.

Besides a view from the air, you can experience the sands in all kinds of ways—by taking the eight-mile Dune Drive; bicycling by on a shared-use road; getting a permit for backcountry camping for...
Carlsbad Caverns National Park has been a popular destination since it opened in 1930.

Elephant Butte Lake State Park is just to the north of Truth or Consequences on the Rio Grande. The reservoir is the largest (by total surface area) in New Mexico.

Between Las Cruces and Almogordo on the east side of the San Andres are waves and waves of white sand dunes. White Sands National Monument welcomes visitors to this unique landscape.
the incredible nighttime views; hiking on designated trails—or my first choice, sledding! It’s allowed, but takes some practice.

As I said earlier, this is just a brief look at some of the notable places in New Mexico. It’s a big state—only Alaska, Texas, California and Montana are larger—and with recent aviation-related initiatives, it’s a place that pilots will likely be hearing a lot more about in years to come.

Heather Skumatz is managing editor for Piper Flyer. Send questions or comments to editor@piperflyer.org.

From “New Mexico Airstrip Network takes off,” written by General Aviation News staff. The story was published on Nov. 10, 2016 and can be found at http://generalaviationnews.com/2016/11/10/new-mexico-airstrip-network-takes-off/.

Sources: New Mexico Aviation Aerospace Association (nmaaa.net); New Mexico Economic Development Department (gonm.biz); New Mexico Tourism Dept. (newmexico.org); Wikipedia.org.
EAA STATEMENT ON FAA RELEASE OF THIRD-CLASS MEDICAL REFORM RULE

EAA's BasicMed will take effect on May 1, 2017

EAA AVIATION CENTER, OSHKOSH, Jan. 10, 2017 – Years of effort by EAA and AOPA culminated on Tuesday morning as the FAA announced regulations that will implement the aero-medical reform law passed last July.

The regulations will be published Wednesday as a final rule, to take effect May 1, 2017. According to the FAA, no changes have been made to the language in the law.

Because it is final, the rule—named “BasicMed” by the FAA—will not go out for a typical public comment period. The FAA also said it would publish an Advisory Circular describing the implementation of the rule later this week.

“This is the moment we’ve been waiting for, as the provisions of aeromedical reform become something that pilots can now use,” said Jack J. Pelton, EAA CEO/chairman.

“EAA and AOPA worked to make this a reality through legislation in July, and since then the most common question from our members has been, ‘When will the rule come out?’ We now have the text and will work to educate members, pilots and physicians about the specifics in the regulation.”

Tuesday’s announcement finalized the highly anticipated measure that was signed into law last July as part of an FAA funding bill. The law guaranteed that pilots holding a valid third-class medical certificate issued in the 10 years before the reform was enacted will be eligible to fly under the new rules.

New pilots and pilots whose most recent medical expired more than 10 years prior to July 2016 will be required to get a one-time third-class exam from an FAA-designated AME.

Despite the release of the regulations as a final rule, EAA will be reviewing the language carefully to ensure it fully reflects the language and intent of the law.

EAA has updated its Q&A and will continue to update them to provide the latest information. EAA is also working with its aeromedical and legal advisory councils to provide resources that will help members and their personal doctors understand the provisions of the new regulations.

For more information, go to eaa.org. For continual news updates, connect with twitter.com/EAA.

SPORTY’S ANNUAL TREND REPORT

The state of the General Aviation market according to Sporty’s

BATAVIA, OHIO, Jan. 4, 2017 – Sporty’s want to take a moment to look back at 2016 and offer some thoughts on the General Aviation market, at least as we see it from Batavia, Ohio.

Flight training is strong. Airlines are hiring rapidly, airline pilot salaries are going up, and more people are pursuing their dream of being a pilot. Sporty’s Academy, our on-site flight school, is concluding a record year. It was a mix of “community learners” and career-oriented pilots, some of whom are looking for a midlife change in career.

Noncertified avionics in certified airplanes. EAA, AOPA and others are pursuing a variety of novel approaches for improving the avionics in Part 23 airplanes without requiring expensive certification programs.

In 2016, the Non Required Safety Enhancing Equipment (NORSEE) policy from the FAA came into force and a variety of groups are working on STCs to allow replacement attitude indicators and autopilots to be installed for far less than before. Garmin’s innovative G5 flight instrument is a prominent example, and Sporty’s has seen strong interest in these units.

Youth aviation programs pass important milestones. At The Sporty’s Foundation, we’re working every day to build a strong future for General Aviation, and 2016 saw some major successes.
PIPER RECEIVES APPROVAL OF M600 FROM CANADA

VERO BEACH, Jan. 4, 2017 – Piper Aircraft, Inc. was recently granted a type certification for its top-of-the-line M600 from Transport Canada, thus paving the way for deliveries of the M600 into the Canadian market.

“M600 validation in Canada is exciting news for Piper and our prospective customers in that region,” said Piper President and CEO Simon Caldecott.

“We have seen quite a bit of interest from Canadian owner-operators given the expanded range, payload and speed that the M600 offers. The added safety proposition provided by the M600 equipped with Garmin G3000 avionics is further expanding enthusiasm for this state-of-the-art product.”

Aviation Unlimited, Piper’s exclusive independent dealer in Canada, is pleased with the recent approval and intends to deliver its first M600 in the very near future.

“Canadian certification of the Piper M600 comes in response to the needs and wants of our clients regarding increased speed, range, payload and system redesigns.

“Piper has successfully addressed a segment of the market currently unserved in General Aviation and at a price point significantly below that of our competitors,” commented president of Aviation Unlimited, Solly Capua.

“The M600’s added capability will appeal to both flight departments and private owners alike,” Capua continued.

“We’re proud to stand along Piper’s side and applaud the management team for producing a result that has far exceeded expectations. We look forward to continuing our 33-year relationship with Piper as Canada’s exclusive dealer.”

For more information about Piper aircraft, visit piper.com.

For information about Aviation Unlimited, visit aviationunlimited.com/aircraft.

GUARDIAN AVIONICS INTRODUCES DUAL 2.1 AMP USB POWER PORT REPLACEMENT FOR STANDARD 12 VOLT CIGARETTE LIGHTER

Socket is for Certified Part 23, 27 and 29 aircraft and rotorcraft

TUCSON, Jan. 4, 2017 – Guardian Avionics is excited to introduce a new and simple USB power upgrade option for aircraft owners who have an old 12 volt cigarette lighter socket in their current panel.

Guardian Avionics’ Power 250-101R dual 2.1 amp USB power supply with a 0.9-inch

CONTINUED ON PAGE 63...

RETURN OF ‘BEST AND BRIGHTEST’ IDEAS FOR 2017 EDITION OF EAA FOUNDERS’ INNOVATION PRIZE COMPETITION

Winner to be chosen at public presentation at EAA AirVenture Oshkosh 2017

EAA AVIATION CENTER, OSHKOSH, Dec. 29, 2016 – The doers, dreamers, and innovators who are ready to change the way people fly are again invited to submit their best ideas for the 2017 Founders’ Innovation Prize competition sponsored by the EAA.

The second annual competition again welcomes ideas to counter loss-of-control accidents in amateur-built aircraft. Entries are being accepted through June 15, 2017.

The top five entries will be invited to showcase the innovation at a “Shark Tank”-style public presentation at EAA AirVenture Oshkosh next July. The top innovation will be awarded $25,000, with additional cash prizes for second and third place.

The inaugural competition in 2016 drew more than 140 entries from well-known aviation designers to those who had never submitted ideas for a design contest previously. Ihab Awad of San Jose, Calif. earned the 2016 top prize with his entry named “Airball,” which continually synthesized flight data so a pilot could quickly understand the current flight state of an airplane.

“Just as EAA has drawn from the ideas and abilities of its members through its first 65 years, the Founders’ Innovation Prize allows a pathway for these creative ideas in flight safety,” said Sean Elliott, EAA’s vice president of advocacy and safety.

“We do not build on the originality, practicality, and imagination shown in the competition’s first year in 2016, and we encourage individuals, groups and educational institutions to all get involved in our ultimate mission—improving flight safety by reducing loss-of-control accidents.”

The FAA and NTSB have identified loss-of-control scenarios as one of the leading causes of General Aviation accidents. As part of EAA’s widely praised efforts to improve safety, the Founders’ Innovation Prize was created to encourage ideas from every source that could help reduce such accidents.

Complete entry information and rules are available at eaa.org/prize.
In 2016, Sporty's introduced ForeFlight logbook integration so you can log your written test endorsement in your iPad logbook; an “ask a CFI” feature; an interactive Airman Certification Standards guide and more. Our 2017 Learn to Fly course shows how far these learning platforms have come.

**Drone hype fades, but reality is still exciting.** The FAA finally implemented its Part 107 rule for commercial UAS operations this year, and the first Remote Pilots were certified (including many Sporty’s employees). It’s still uncertain how big this market will be and how it will impact GA, but it’s clear is that drones are here to stay.

When it comes to training, Sporty’s is there... we partnered with the Unmanned Safety Institute to offer comprehensive, professional training courses that share some of the lessons from manned aviation with remote pilots. Sporty’s has also developed a Drone Study Buddy app for iOS devices.

**The iPad is still the most important avionics system for most pilots.** The glass cockpit revolution is already here, but it looks like a tablet more than a PFD/MFD.

The iPad has been out now for over six years, but new iPad accessories keep coming, including SiriusXM’s Aviation Receiver for ForeFlight; XNaut’s innovative iPad mounting system with built-in fans; new kneeboards from Flight Outfitters and much more.

**Connected avionics expand in all directions.** Garmin’s popular Flight Stream products allow pilots to send a flight plan from their tablet to their panel-mounted GPS, or to pull weather off the panel and onto the tablet. But there are other connections happening in the cockpit: Stratus 2S portable ADS-B receivers can be connected to the Stratus ESG transponder, and Garmin’s D2 Bravo watch can control a Garmin VIRB camera.

**Pilots on the go.** Pilots are keeping themselves informed more than ever on iPhones and iPads. This includes Sporty's Takeoff app, which offers quick bites of training anywhere.

We continue to live in interesting, challenging times where changes come at us at a rapid pace. What hasn’t changed is pilots’ passion for what they do and Sporty’s commitment to serving them.

Our new product development team is hard at work, so stay tuned for some exciting new products.

*For more information, visit sportys.com.*
diameter round faceplate is designed to fit a standard round cigarette lighter socket opening in the instrument panel.

Since USB has become a popular standard for powering smartphones and tablets, pilots in certified aircraft have been required to use bulky adapters for their existing 12 volt lighter socket to gain a usable USB port.

The new round USB unit perfectly replaces the lighter socket and adds a clean dual USB port that sits flush with the panel converting any aircraft power source from 9 VDC to 48 VDC down to an output of 5 VDC at 2.1 amp per USB port.

Only two countersunk screws need to be added to mount the new unit, and the power supply can be wired to aircraft power through a two-amp circuit breaker in place of the existing circuit breaker for the 12 volt lighter socket.

This round dual USB unit, along with all USB models offered by Guardian Avionics, are listed as part of the FAA Non-Required Safety Enhancing Equipment (NORSEE) letter of authorization issued to Guardian Avionics, meaning that the unit may be installed by an A&P/IA with only a minor alteration logbook entry in any CFR Part 23, 27 or 29 certified aircraft or rotorcraft. No time-consuming and costly STC or Form 337 required.

“There are tens of thousands of certified General Aviation currently flying in the United States with a factory installed cigarette lighter in their panel,” noted Ash Vij, president of Guardian Avionics.

“More and more of the pilots flying those aircraft are using tablets and phones with apps for navigation—and they need reliable and safe USB power to power them in flight. Our simple, affordable and attractive replacement is a fantastic upgrade for any aircraft owner.”

The USB unit also features a green LED backlight for easier use in night flying conditions, is EMI shielded to prevent noise in radios and features reverse polarity protection for added safety.

The power supply is also available with a 0.8-inch custom square faceplate as the Power 250-101S for custom installations in the panel or in the passenger cabin.

Both dual USB units are retail priced at $299 and are immediately available at GuardianAvionics.com and through authorized Guardian Avionics dealers and distributors.

For more information, visit GuardianAvionics.com or phone 520-889-1177.
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**LAWTON AVIATION SERVICES: SERVING THOSE WHO BRAVELY SERVE, AND THE GENERAL FLYING PUBLIC**

**LAWTON, OKLA., Jan. 3, 2017 —** Lawton Aviation Services, a division of the Lawton Metropolitan Area Airport Authority, is Lawton-Fort Sill’s and South-west Oklahoma’s premier full-service FBO. It services private, corporate, commercial and military aircraft and has a wide range of capabilities to accommodate any aviation need.

The FBO specializes in fuel handling, providing Phillips 66® Aviation fuel—along with hangar rental, tie down space, aircraft leasing, flight instruction, aircraft maintenance and aircraft detailing.

Lawton Aviation Services took over the FBO from the previous tenant, LaSill Aviation, in October 2016. Issues on the runway including cracking and water retention needed to be immediately addressed and traffic for heavy aircraft was restricted until the runway could be properly repaired.

“Fort Sill Regional Airport has proudly served the Southwestern Oklahoma region since 1950, and throughout the years the runway has undergone routine maintenance including overlays and other concrete projects,” said Barbara McNally, Airport Director, Lawton-Fort Sill Regional Airport (KLAW).

“Initially we believed a total runway reconstruction was necessary, but after a thorough inspection—and the discovery that the runway had 24 inches of concrete, rather than 13 inches—we happily realized the issue was not as serious as we originally thought, and less extreme repairs including crack sealing and underdrains could be employed.”

**Proudly Serving Jets and Java**

Today Lawton Aviation Services is open for business for all aircraft, including the heavies.

What’s also open is a brand-new café. Customers can stop into R&R Percolator Café for a fresh cup of coffee, always affordably priced at just one dollar, with blends named for unique community locations and terminology including Field Artillery, Medicine Park Sunrise and the 1880 Blend.

The unique space is furnished with tables and chairs constructed from repurposed military surplus materials and its walls are decorated with murals painted by...
a local artist which depict Lawton and Fort Sill’s rich history.

Customers can also purchase military-themed shirts and sweatshirts that proudly display their connection to the military, including “Army Mom,” “Army Dad,” “My Hero,” and more.

“The Café really represents what our community is about—supporting our military,” McNally explained. “The military is a huge part of Lawton and who we are.”

Relationships, support and service

While McNally has worked at the airport authority for the past 30-plus years and has a vast understanding of the business of aviation, running an FBO has been a whole new ball game.

“Moving the FBO in-house has been an exciting opportunity, but it’s also been a steep learning curve,” she said. “I and a dedicated group of employees have been able to learn a whole new side of the airport.

“Understanding the hard work it takes to run a busy FBO, including the large quantity of fuel we move here, has been a rewarding challenge—and the folks at Phillips 66 have made this transition as smooth as possible,” she said.

“Our reps have been awesome to work with. We’ve had many questions, from how to access Bizlink (Phillip 66’s internal customer portal), to how to manage the accounting system.

“No matter how small the request, the folks at Phillips 66 have been 100 percent available as our resource and have made running our FBO as easy as possible.”


To learn more about all of Phillips 66 Aviation’s FBO support and incentive programs, visit http://www.phillips66aviation.com/#/FBOPrograms?from=FBO.

For more information about Lawton-Fort Sill Regional Airport and Lawton Aviation Services, visit flylawton.org.
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FAA Aviation Safety

SPECIAL AIRWORTHINESS INFORMATION BULLETIN

SUBJ: Electrical Power/Electrical Power System Wiring

SAIB: CE-17-05

Date: December 16, 2016

This is information only. Recommendations aren’t mandatory.

Introduction

This Special Airworthiness Information Bulletin (SAIB) alerts you, owners and operators of certain Piper Aircraft, Inc. (Piper) Models PA-31T, PA-31T1, PA-31T2, PA-31T3, and PA-31P-350 airplanes of an airworthiness concern, specifically at the floor mounted circuit breaker panel (CB) area between the pilot and co-pilot. This SAIB also provides information on wiring conditions that could lead to chafing, thermal stress, or arcing in the area directly below the floor circuit breaker panel. Finally, this SAIB recommends best practices for securing high electric current wires in the referenced Piper airplane models.

Our reviews are ongoing, however at this time, this airworthiness concern has not been determined to be an unsafe condition that would warrant airworthiness (AD) action under Title 14 of the Code of Federal Aviation Regulations (14 CFR) part 39. Currently, the NTSB is investigating an accident involving a PA-31T where the pilot reported smoke in the cockpit and subsequently sustained an in-flight breakup and collision with tree-covered terrain near Arcata/Eureka Airport, McKinleyville, California. Evidence of thermal damage was present in the forward section of the fuselage.1

Background

During inspections of multiple Piper Model PA-31T airplanes, several airplanes showed unacceptable wire separation from hydraulic lines and / or adjacent structure below the floor-mounted main power distribution CB

AVIATION SAFETY ALERTS
Panel. The inspections also showed early signs of chafing, which can lead to thermal stress and arcing in an area where flammable liquids are routed. These conditions could sustain an uncontrollable fire in an inaccessible area below the pressurized deck. Photos of the area are shown in the following figures.

Further information regarding the ongoing NTSB investigation WPR16FA153 can be found at http://www.ntsb.gov/_layouts/ntsb.aviation/brief.aspx?ev_id=20160729X31455

Figure 1 – Location of Circuit Break Inspection Panel

Figure 2 – Example of Floor Mounted CB Panel – Interior (1981 and later production)

Figure 3 – Floor Mounted CB Panel – Interior (Typical of pre-1981 production)
The intent of this SAIB is to identify and recommend action to correct any wiring conditions that could lead to arcing, shorting, or other damage to the floor-mounted circuit breaker panel and associated wiring, which is located directly below the circuit breaker panel. In addition, the FAA is requesting to receive details and photographs of aircraft with these conditions present.

As pilots and plane owners, our members are doing things “worth the writing” every day.

“... Either write things worth reading, or do things worth the writing.”
—Ben Franklin

We welcome our members’ stories in the pages of Piper Flyer magazine.

To find out more, email editor@piperflyer.org
Recommendations

The FAA recommends the following:

• Inspections of the area shown in Figure 5, a mirror, a suitable light source or other equipment (small cameras, borescopes, magnification, etc.) capable of providing equal or better resolution.
• Inspections of the condition of all wiring.
• Repair or replacement of any wires with chafing, burning, breaks in insulation, corrosion, or any other apparent damage.
• Inspections for loose, corroded or broken terminals and repair or replacement on condition.
• A functional test on any electrical systems that were disturbed during any inspection.
• Reroute or rework as necessary to minimize the likelihood of chafing contact between adjacent components such as fluid carrying lines and airframe structure.
• Ensure proper hydraulic line and wire clearance is maintained. Use AC 43.13B – Acceptable Methods, Techniques and Practices – Aircraft Inspection and Repair as guidance.

The FAA recommends doing this inspection at the next scheduled maintenance visit and thereafter during annual airplane inspections.

Excerpt from AC 43.13-1B

“11-126. FLAMMABLE FLUIDS AND GASES.

An arcing fault between an electrical wire and a metallic flammable fluid line may puncture the line and result in a fire. Every effort must be made to avoid this hazard by physical separation of the wire from lines and equipment containing oxygen, oil, fuel, hydraulic fluid, or alcohol. Wiring must be routed above these lines and equipment with a minimum separation of 6 inches or more whenever possible. When such an arrangement is not practicable, wiring must be routed so that it does not run parallel to the fluid lines. A minimum of 2 inches must be maintained between wiring and such lines and equipment, except when the wiring is positively clamped to maintain at least 1/2-inch separation, or when it must be connected directly to the fluid-carrying equipment. Install clamps as shown in figure 11-10. These clamps should not be used as a means of supporting the wire bundle. Additional clamps should be installed to support the wire bundle and the clamps fastened to the same structure.
used to support the fluid line(s) to prevent relative motion.”

**Request for Inspection Results**

If you find any conditions where wires are in direct contact with hydraulic fluid lines, aircraft structure and/or any wiring condition that could lead to arcing, shorting, or other damage to the floor mounted circuit breaker panel, please send details (registration number of the aircraft, total hours, inspection results, etc) and photographs. Please send this information to Bryan Long, Aerospace Engineer, Atlanta ACO, 1701 Columbia Ave., College Park, GA 30337; phone: (404) 474-5578; email: Bryan.Long@faa.gov. Email is the preferred method of submission.

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For Further Information Contact

Bryan Long, Aerospace Engineer, Atlanta ACO, 1701 Columbia Ave., College Park, GA 30337; phone: (404) 474-5578; fax: (404) 474-5606; email: Bryan.Long@faa.gov.
Dear Editor,

I enjoyed reading Kevin’s column regarding the likely demise of Santa Monica Municipal (KSMO).

The only real solution to this problem, which is only likely to increase in the future as other cities follow this example, is to somehow convince the federal government to use its eminent domain power to take over and operate critical airports like KSMO.

As Kevin shows, a strong case can be made that the closure of KSMO is going to be a disaster for both commercial and General Aviation in the L.A. basin.

Henry Telfeian
Berkeley, Calif.

Send your letters to editor@piperflyer.org.
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