The Official Newsletter of EAA Chapter 35 San Antonio

DECEMBER 1999

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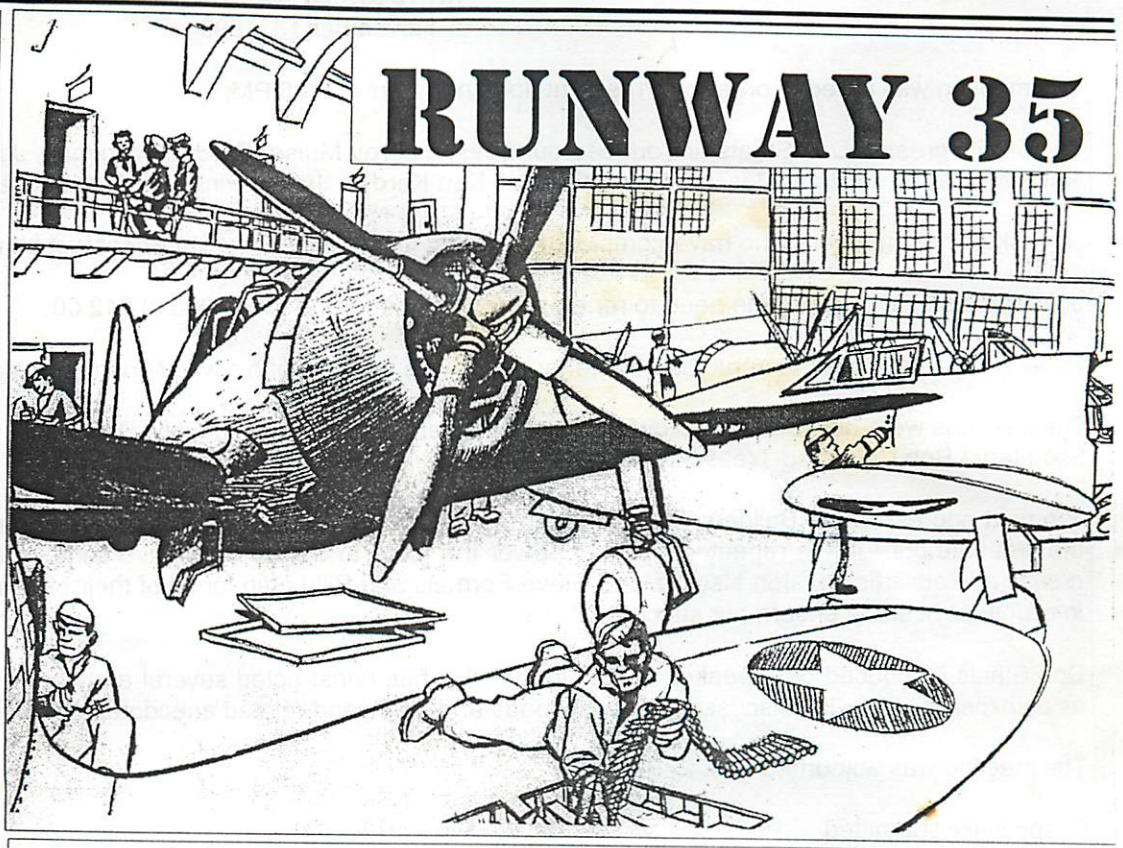
RUNWAY 35



Inside this issue:

All Good Things...

Well it is now official! This will be my last newsletter as editor. I can't tell you how much fun it has been putting this news rag out month after month for the past two years, (Wow! Has it been that long?). Unfortunately, my responsibilities and workload at my employer have increased ten-fold! And I just can't devote the time that I did to our newsletter. It's been a great pleasure hearing all the kind comments from chapter members both local and nationally on the quality material included each month. The torch has now been passed to David Talley, who is no stranger to publishing the newsletter. It was him that I took the honor of editor from in 1998 because of his work load. I know that it will be in good hands. I'm not gone for good though! I still may be convinced to print an article or two in some issues. Heck, I may even be persuaded to be editor again, but not for now. I'm presently involved with the Sino-Swearingen SJ-30 Business Jet that is headquartered here in San Antonio. The first 4 aircraft will be built here locally, and it's been really exciting watching and being involved with the "hatching" of this new bird. So thanks again to all and I look forward to seeing you at the Christmas Party December 11th! If you haven't purchased your tickets, I urge you to do so as soon as possible! We need a head count to tell the caterer how much to bring! We wouldn't want to run out of food! **-See Page 2 for more details!**

New Chapter Officers Announced

Your new chapter officers for 2000-2001 are as follows:

President
Ed Seurer

Vice-President
Bob Day

Secretary
Bob Cabe

Treasurer
Joanne Warner

Greeter
Not Filled

Newsletter Editors
David & Miriam Talley, Mark Moscrip

Webmaster
Bryan Tobias

Please welcome and support these individuals to these positions as leaders of EAA Chapter 35 for 2000-2001

Minutes of Meeting

November 13, 1999

The meeting was called to order by President Jonathon Farr at 6:45 PM.

Our official greeter, Don Staats, introduced our guests: Leroy Muise, Gordon Workman, Julius Junge, Dan Barger, Ron Powlas, Rusty McCauley, Michael Moscrip, Burke Bristew, Ken Kardys, James Pinkham, Don Jansen, Jim Sikking and Wes Rosene.

Jon asked that members who have completed their first flights on a new aircraft contact him.

Jon reminded the group of the need to renew memberships for the year 2000 at $12.00.

Dave Talley has agreed to serve as newsletter editor with the help of his wife Miriam and Mark Moscrip.

The elections were held and the following nominees were elected unanimously: President - Ed Seurer; Vice President - Bob Day; Secretary - Bob Cabe and Treasurer - Joanne Warner.

Jon next addressed the Builders Forum held in early October. We have broken even financially, and consider it a success for the first time out. If it is repeated we may: lower the price to $20 to $30; have some events for others; encourage fly-ins; increase free advertising. Jon also praised Steve Formals and Bill Loftin for all of their efforts. Bill, as the administrative chief, put in countless hours to ensure our success.

Don Staats introduced our speaker, Julius Junge. He has constructed several early aircraft replicas and has a wide reputation as an expert builder. He discussed various woods and glues and related anecdotes on many of his projects.

The meeting was adjourned at 8:45 PM.

Respectfully submitted

Norris E. Warner, Secretary

ANNUAL CHRISTMAS PARTY!!!

Our last Christmas party for the millennium will be held at the San Geronimo Airpark EAA Building on December 11th, 1999 starting at 7:00 PM. We plan to follow all of our traditions of camaraderie and gift giving (under $10). Because it is not an EAA sponsored event, you may bring your own choice of beverage as you wish. Because of the great response to our caterer last year, we plan to use him again this year. The meal cost will be $11 per person. Contact Norris Warner at 210-510-4334 for tickets

This year's menu includes: Paprika Schnitzel with Mushroom Sauce and Swiss Cheese
German Fried Potatoes, German Red Cabbage, Special Salad with 2 Dressings, Bread Pudding with Jack Daniels Sauce, Home made rolls and Tea.

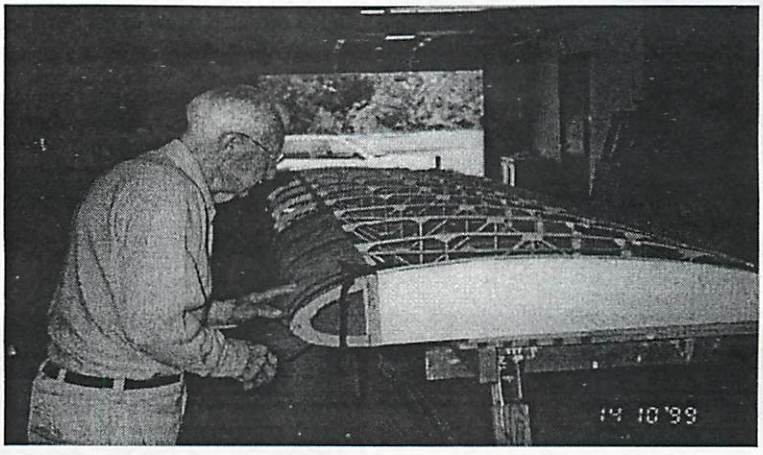
You can send payment to Norris and Joanne Warner, 719 Oak Hills Rd, Pipe Creek, Texas 78063 and pick up your tickets at the party due to mailing times!

It is important the you get your tickets as early as possible! We need to know a head count to give to the caterer!!!!

GEORGE (CLIF) WATERMAN

By Norris arner

This is a story of "then and now" about our most-senior chapter member. To go back to the beginning, it was in the fall of 1917, at age 9 that George saw his first airplane—a Wright Flyer from Fort Sam Houston. Growing up around Boerne and living in the country, libraries were not readily available but he read everything he could about airplanes—and of course built models. He once even used a window shade roller for motive power—but that didn't work!



A few short years later he went to work for the Jordan Automobile Company, a name that survives in San Antonio today. It turned out that a mechanic there by the name of Harry was building an airplane with a member of a local prominent family, the Herffs. The airframe was progressing smoothly, but the lack of a suitable engine was the real sticking point.

Harry and Mr Herff tried different motorcycle engines, but none proved satisfactory, even though the airplane weighed only about 330 pounds. After a couple of years of experimenting, the well-heeled partner ordered an engine from France, the three-cylinder 45 hp air-cooled radial by Anzani. By this time, Mr Herff had gotten too large to fit in the cockpit, and so Harry, the mechanic, was the only one to fly the airplane—which they had named the "Canary." He finally came to grief one day when he ran out of gas and ended up stuck up in a tree.

Well—George eagerly helped Harry in the retrieval of the airplane, which Mr Herff literally gave to Harry, provided he rebuild it and would keep it flying. George now got his first taste of aircraft building/rebuilding, an obsession that would flavor his life forever.

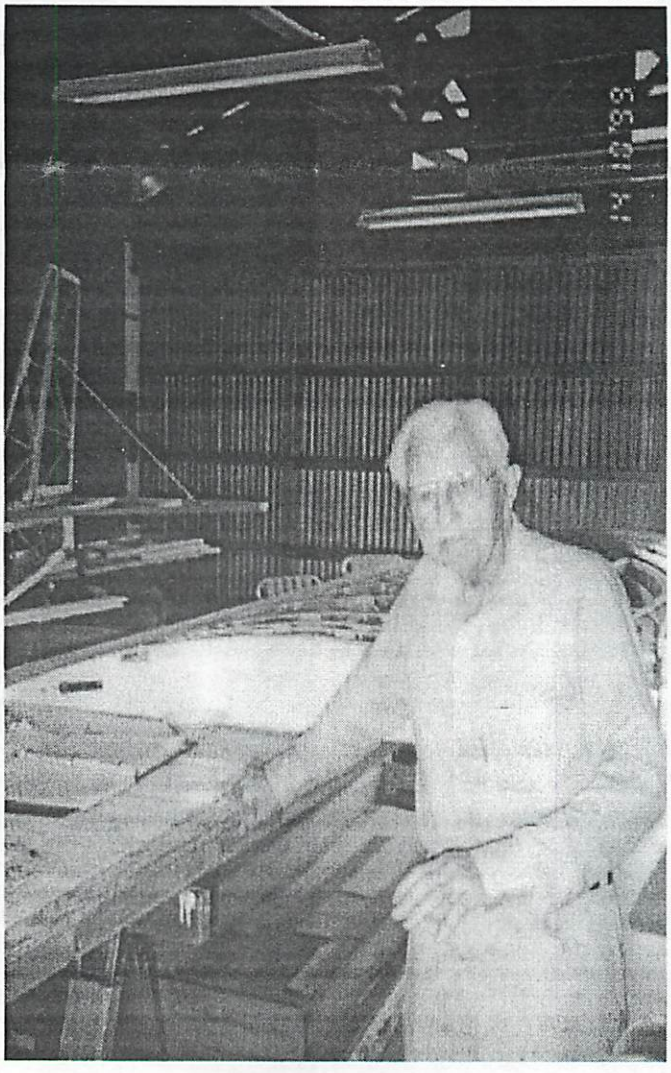
Now Harry was at that time spending his weekends flying various biplanes at the unnamed field on Roosevelt Ave across from the San Jose Mission, and one day invited George to come on down with him. There George got his first airplane ride in a J-1 Standard, powered by the legendary Curtiss OX-5 engine. That Standard pilot, Joe Ben, worked at what we now know as Kelly Field, but named Duncan Field then. By a turn of fate, George had a good friend by the name of Victor who also worked at Duncan, and he knew of a Curtiss JN-4 that was stored in a barn and just might be for sale. George bought the Jenny without a motor for $100, on credit. But motors were not a problem at that time, and he was able to buy a surplus Hispano Suiza, 180 HP, V-8 water-cooled engine, new for $35 still pickled in the crate. Finding a friend with a building big enough to work on it was the key to starting the required rebuild, and so the long rebuilding job began.

Now Victor tipped George off to the "boneyard" at Duncan field where he could scavenge for all sorts of spare parts—especially aircraft wood, but also cables, pulleys, and so on. It was a literal gold mine for George, though not all of his needs could be found there. Among other costly and scarce items, he needed a propeller and tires, and money was always tight for this young man about town.

One of life's setbacks came along as George found himself suddenly unemployed—and so he took the time to brush up on current stories about airplanes—especially homebuilts. And guess what? Bernie Pietenpol's Model A Ford powered airplane popped out at him from the pages of "Modern Mechanics." And since he was still short some very significant and costly parts to get the Jenny in the air, the Pietenpol design looked more promising. George enlisted another friend, Johnny, into a partnership, and Harry promised to teach them both to fly it. Now this Piet was built solely from the tiny Modern Mechanics drawings, and believe it or not, George still has some of the pages from that old magazine—and he even has the rib jig built at that time.

With George finally employed once again, this pair worked feverishly at the homebuilt. Money was still very short, and so George sold his Jenny/Hisso for $150—again on credit. There were other demands also on George's meager salary of $16 per week and so the Pietenpol progress was slow. Compounding their problems, the depression now arrived in force. And at the same time, Harry, the pilot who was giving them a little stick time in various OX-5 powered biplanes, was killed in an accident when the engine failed on take off in a Mohawk Pinto. George was really to miss Harry.

Well, trouble comes in bunches, and George found this out for sure when his partner, Johnny, wanted out. George was able to buy him out—once again on credit. And almost at the same time, the fellow who had bought the Jenny/Hisso from George had managed to get the airplane airborne, but he promptly crashed it. Since George had never been paid for the Jenny, he borrowed a truck and retrieved it, and eventually traded all that was left, mainly the Hisso—for a 5 cylinder Velie, 55-hp engine that he could use in the Pietenpol. Now Victor showed George the steps to getting the CAA to issue an I.D. number (not an N, NX or NC number, but only an identifying number), which was finally issued as 11964, and of course those numbers had to be put on the wings in the three foot-high letters. Here is when he had his first problem with the Feds, and it was only 1933! Anyway, the airplane was now at the flying stage.



Now an instructor to the rescue—for just $2 an hour. However this didn't work out too well as this chap had his own agenda. He was more interested in hopping paying passengers with George's new airplane than providing instruction, and one day, over George's strong protests, attempted to fly a 250-pound passenger with near-disastrous consequences. On takeoff, a bounce led to gear failure, broken prop, and a broken carb. Of course, that was the end of that guy!

George managed to repair the gear, but the $55 prop from Ole Fahlin was a real problem for a while. Eventually that hefty sum was secured and George completed the rebuild by patching the carburetor together.

At this juncture, George learned of a young pilot by the name of Wes Hogue, who had just joined up at the newly opened Randolph Field. Now George was 23 years old at the time, and Wes was only 21, but claimed 1500 hours of flying time. Of course George did not believe this, but was so anxious to learn to fly that he let it pass. In return for ferrying Wes back and forth to Randolph by auto or by bus fare, Wes agreed to do the instructing on the weekends. Needing to feel out the airplane solo, Wes flew a local hop and pronounced it a sound, well

built airplane. The first dual ride went very well, and the second period likewise. George quickly recognized that Wes was a crackerjack instructor, and very thorough in all areas. Maybe he did have all those hours! After three such weekends, Wes was a "no show" and George later learned by mail that he had been "confined to base," but the letter stated that if he kept his nose clean he might be available the following weekend.

On that weekend, Wes showed up and another instructional flight was flown. Well—an engine failure during that flight (a rocker box cover decide to go it alone) and George—though drenched with oil--flew a forced landing into a 600 foot-long oats field, breaking only the tailskid. Wes was more than complimentary, and George was grateful for the forced-landing drills Wes had put him through. The aircraft was dismantled and trucked back for the repairs—again!

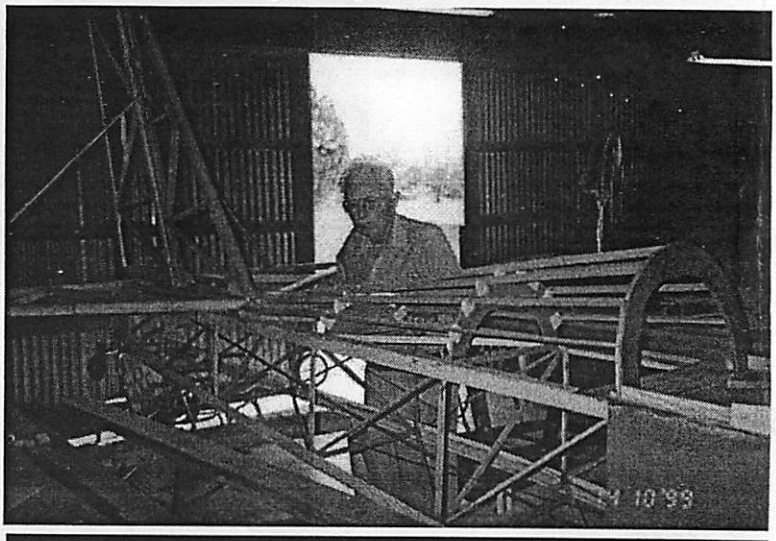
After a couple of months the airplane was again ready for flight, and after two more flights, Wes turned George loose on his first solo flight—successfully! And if we think our first solo flights in this era are something, think what it must *have been like back* in those days! Yes,----homebuilding and flying nearly 70 years ago—well before EAA—and before most of us were born!

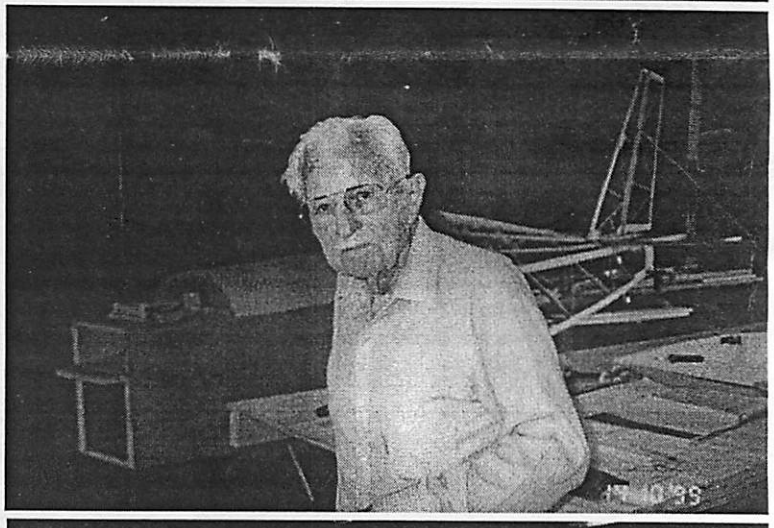
We now fast-forward to 1999, with George in his 91st year,--and tons of flying hours and many other homebuilts and many, many complete rebuilds of factory ships to his credit. And guess what? The old war-horse still can't leave it alone!

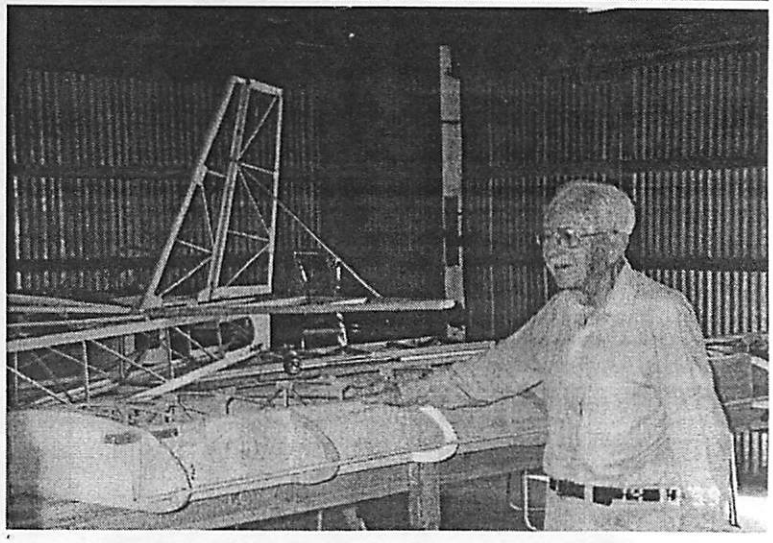
In George's cavernous shop, his latest homebuilt is taking shape—a TEAM Max 103 all-wood ultralight is nearly at the covering stage, and he's only been working on it since this past June. George has not settled on an engine, but is going to install an electric start version of the Rotax 277, if that is available. If not, well, he'll have to explore other options! (Is anyone listening?)

As you can see from the pictures, the craftsmanship is excellent, and George has incorporated a few of his own mods to make the manufacturing more simple or to add durability.

He doesn't have a deadline for completion, insisting that "getting there should be fun." But make no mistake, when this Max 103 is flight ready, so will be George Waterman. Way to go, George, EAA #2423!







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The Traveling Tool Kit

It's a well-known scientific fact. Most light plane mechanical problems occur between Friday night and Sunday afternoon when you're hundreds of miles from home. The difference between a minor annoyance and a major disruption can hinge on whether you brought along an adequate tool kit. Here are some thoughts about what you should carry with you. As you'll see, there's more to it than meets the eye. This originally appeared in The Aviation Consumer.

by Mike Busch (mbusch@avweb.com)

It was late Friday afternoon, the first day of our month-long vacation trip to the East Coast. We were somewhere between Albuquerque NM and Dalhart TX, headed for Tulsa, cruising at FL180 to stay above the ice. My wife was fast asleep in the back of our Cessna Turbo 310, bundled tightly in her security blanket with a cannula up her nose. I occupied the left front seat, and was freezing my tush off because the damn cabin heater had decided to flame out. It had been working fine at 12,000 feet but quit when we climbed to top the icing layer. Now the sun was going down, the OAT gauge indicated -15C, and I couldn't feel my toes anymore.

We reached Tulsa after dark. My wife informed me in no undertain terms through chattering teeth that she had no intention of getting back into the airplane until the heater was fixed. I could scarcely blame her. At the same time, I wasn't too keen on being stuck in Tulsa for the weekend.

I was confident I knew what the problem was (an air leak between the combustion air blower and the heater) because I'd seen this happen before. I was sure I could fix it easily with a piece of duct tape or strategically placed dab of RTV sealant.

But first I had to gain access to the heater which is buried deep in the nose of the 310. I didn't have the necessary tools. Naturally, all the mechanics had gone home for the weekend. And the hardware stores were closed. Bummer.

Ultimately, I found some really awful Taiwanese tools in the auto department of a Wal-Mart store, and managed to get the heater fixed. I resolved that before I headed off on another long X-C, I would assemble a basic survival tool kit to carry in the airplane.

Ask the expert

I decided to consult with my close friend John Frank, who is the Executive Director of the Cessna Pilots Association. John is a 14,000-hour pilot, a licensed A&P with Inspection Authorization, and probably knows more about buying, owning, and fixing Cessnas than anyone else on earth. I learned most of what I know about aircraft maintenance from John.

Several times a year, John and I travel around the country together teaching technical seminars for the Cessna Pilots Association. Sometimes we travel in my airplane, and sometimes we take John's. John carries a very complete tool kit in the baggage compartment of his Cessna T210, and it has bailed us out hot water on several occasions.

I remember one Sunday when John and I were flying to Wichita in John's T210 from our home base in California. About 90 minutes into the flight as we approached the Colorado River where it divides California from Arizona, there was a loud bang, followed by a big increase in air noise and a 15-knot loss of airspeed. Looking in the under-wing gear mirror, it appeared that the nose gear doors were hanging wide open. We obviously couldn't fly to Wichita in this condition. I figured we'd have to make a 180 and slowly limp back to home base for repairs.

John had a better idea. He canceled IFR, landed at nearby Bullhead City AZ airport, jumped out, grabbed a flashlight, and stuck his head up into the nose wheel well. What he found was that the rod-end had unscrewed itself from the gear door actuator shaft. John opened the baggage door and hauled out his trusty survival tool kit. It was the first time I'd ever seen it. John thoughtfully selected a half-dozen wrenches and pliers and set to work. Within 15 minutes, the gear door linkage was repaired and we were on our way to Wichita once again. I was impressed.

Anyway, it seemed logical for me to pick John's brains before assembling a traveling tool kit of my own.

As it turned out, John had done a lot of thinking about this subject. His own tool kit had been incrementally refined over more than a decade of traveling by light plane. John was in the process of putting together a detailed handout on the subject for CPA members. He had a wealth of good ideas and information to share.

Keep it light and tight

A decent aircraft mechanic's toolbox weighs at least 400 pounds and stands five feet tall. Obviously you can't carry that much stuff around in the airplane. You need to take only what you really might need to get home. Everything you put in your traveling tool kit should be essential, compact, and lightweight.

For example, the big roll-around toolbox I use at home must have 30 different screwdrivers plus a cordless Makita with two battery packs and a quick charger. The traveling tool kit can only afford to have one or two screwdrivers. A ratcheting screwdriver handle with interchangeable tips will handle almost anything. A stubby #2 Phillips driver is useful for working in tight quarters

Likewise, the home toolbox has four entire drawers full of wrenches: sockets, box wrenches, open-end wrenches, offset wrenches, cylinder wrenches, obstacle wrenches, etc. The traveling tool kit must make do with a basic socket and combination wrench set, supplemented with an adjustable wrench and a vice-grip pliers.

Carry hard-to-find stuff

John stressed that the most important tools and supplies to put in your traveling tool kit are the ones that might be hard to find while on-the-road. When you're stuck in the boondocks with a mechanical problem, you can almost always come up with a hammer or a 1/4" nut at a local hardware store, auto parts store, or K-Mart. But coming up with an aircraft spark plug socket, safety-wire pliers, or exhaust gasket on Sunday morning in Sheep Dip, Nebraska, is another story.

Another important point is to buy only good quality tools for your travel tool kit. When you're stuck someplace, you want pliers that don't slip and wrenches that don't break. If you try to save a few bucks by buying a cheap Taiwan special, you'll wind up regretting it later.

Snap-On Tools are generally the best (and most expensive), and they offer some wonderful specialty tools that are hard to find from any other source. Craftsman brand tools are pretty good, can be purchased at any Sears store, and come with a lifetime replacement warranty. Other quality brand names are Mac, Matco, Proto, S-K, and Stanley. U.S. Industrial Tool is a good source for specialty aircraft tools. [See sidebar.]

Once you've assembled your traveling tool kit, put it in the airplane and DON'T RAID IT! If you borrow tools from your aircraft tool kit, they might not find their way back. You'll find yourself stranded one Friday night in Tulsa with a desperate need for your needle-nose pliers, only to find that they're back home in the drawer next to the kitchen sink.

Tool kit shopping list

Now let's get down to the real nitty-gritty and review what tools you might consider for your traveling tool kit. John carries enough tools to accomplish almost any conceivable field repair. I don't carry quite as much as John, but my tool kit keeps growing (they do that, you know) and eventually might catch up with his. In any case, you might want to pare down the following list to conform with your own mechanical aptitude and ambition.

TOOL BOX. Avoid metal boxes. They are heavy, and they can dent or scratch aluminum. John's tool kit is packaged in a nifty plastic Stack-On box with a handle that folds flush into the lid, making it easy to load stuff on top of it. The wing lockers of my 310 won't accommodate a box of that size, so I use two attach-style cases instead. The Sears Craftsman 65082 box is also a good one for airplane use.

SCREWDRIVERS. Get a screwdriver with interchangeable bits that store in the handle. Preferably a ratchet-action driver. I have a strong preference for Snap-On's lovely ratchet driver. Craftsman 41466 (ratchet) or 41467 (non-ratchet) are also fine. I also carry a stubby #2 Phillips screwdriver for working in close quarters (like getting to the cabin heater in the nose of my 310).

PLIERS. Pliers are probably the most versatile tools in any survival tool kit, and you'll want to carry several different types. John's tool kit contains seven: (a) 7" regular pliers, Craftsman 45378; (b) 10" slip joint pliers, Craftsman 45381; (c) 8" needle nose pliers, Craftsman 45085; (d) 10" straight jaw vise-grip, Craftsman 45341; (e) 6" needle nose vise-grip, Craftsman 45349; (f) 6" diagonal cutters ("dikes"), Craftsman 45075; and (g) 9" safety wire pliers, U.S. Industrial Tool TP68 (about $25).

BASIC WRENCHES. Combination wrenches are open-end at one end and box-end on the other. A quality set that runs from 1/4" through 3/4" will do nicely. Craftsman 44731 or equivalent.

ADJUSTABLE WRENCHES. Seems redundant when you have a good set of combinations, but John insists they are useful. (What if you need *two* 7/16" wrenches: one to hold the bolt head and another to turn the nut? What if you need a metric size?) John carries the Craftsman 44664 set, which includes 6", 8", and 10" adjustables.

SOCKET WRENCHES. Buy a socket set that includes 1/4" and 3/8" drives. Craftsman set 34788 makes a good starting point, to which you should add a Craftsman 43174 1/4" ratchet, a Craftsman 4280 1/4" universal joint, and a Craftsman 4435 3/8" universal joint. John also carries a Craftsman 43532 14-inch-long 1/4"-drive extension, which he says is particularly useful for removing exhaust nuts.

SPARK PLUG SOCKET. Get a genuine aviation spark plug socket, such as a Champion CT-907, about $25 from San-Val or Chief. An ordinary deep 7/8" socket may appear to fit but it can damage the plug. If your spark plug socket takes a 1/2" drive, you'll also need a 3/8"-to-1/2" drive adapter.

CROWS FEET. A 7/8" crows foot wrench (Craftsman 43628) that fits your 3/8" socket drive can come in handy when dealing with hard to reach spark plugs. If

your engine uses a spin-on oil filter, a 1" crows foot is also useful.

HEX WRENCHES. Also known as Allen wrenches. Get a set of long-arm wrenches in a pouch, such as Craftsman 46800.

FLASHLIGHT. John and I both carry a MagLight (three D-cell size), but any good D-cell flashlight will do. Make it part of your annual inspection to change the batteries, using date-coded Duracell alkalines. This flashlight is the item that most often walks away from the tool kit, so be strong in your resolve not to raid the kit.

TIRE GAUGE. Go to an auto supply store and get a metal truck tire pressure gauge that reads up to 90 PSI.

VALVE CORE TOOL. This is used to remove the valve core from tire tubes, and can also be used to remove the Schrader valve cores from oleo struts. You can get one at any auto supply or bicycle shop.

AIR PUMP. John carries a lightweight foot-operated bicycle tire pump. I don't, but one flat tire might change my mind. You can get one at any bicycle shop or K-Mart.

JACK. You can get a small scissors or bottle jack at an auto supply store. Usually a jack small enough to be practical to carry in an aircraft will have to be placed on something locally procured (bricks, blocks, etc.) in order to lift the aircraft sufficiently to get a *wheel off.*

JACK PADS. Your tool kit should include whatever you'd need to jack any wheel off the ground and remove it. Some aircraft have built-in jacking points, others require external jack pads or adapters. Consult your service and parts manuals, and make sure you have what you need.

ELECTRICAL TERMINAL KIT. Radio Shack sells a small plastic box that contains a wire stripper and crimping tool along with an assortment of crimp terminals. If you're a perfectionist, you should ask your avionics shop to replace the automotive-style crimp terminals with ones approved for aircraft use.

MULTIMETER. This is a vital piece of equipment for troubleshooting electrical problems in the field. John carries a tiny credit-card-size Micronta 22-169 digital multimeter, about $25 from Radio Shack. I prefer a larger Fluke-style digital meter with stout test leads and alligator clip adapters (Radio Shack sells those, too). Anything that will read volts, ohms and milliamps will do fine.

SPARK PLUG GAP GAUGE. A wire-type automotive gauge will work. Better, get the Champion CT-450, about $15 from San-Val or Chief.

SPARK PLUG HOLE CHASER. A specialty tool to clean up the threads in cylinder spark plug holes. It can be a lifesaver in the field if a plug starts to cross-thread. About $5 from San-Val or Chief.

PIN PUNCH. An 1/8" diameter punch is essential for removing roll pins and stuck fasteners. Craftsman 42883.

BATTERY HYDROMETER. Don't buy this at the auto supply store. A little-known fact is that aircraft battery electrolyte is different from car battery electrolyte: the aircraft electrolyte has a higher specific gravity. Get a hydrometer for aircraft electrolyte, about $18 from San-Val or Chief.

BRAKE RIVET TOOL. This little specialty tool is required to replace brake pads. John carries one, I don't (my brakes linings don't use rivets). U.S. Industrial Tool TP950, about $20.

HAMMER. If you have room, carry a light plastic-tip hammer such as Craftsman 38292.

INSPECTION MIRROR. Get a telescoping one, about 1" in diameter. About $5 from San- Val or Chief.

MAGNETIC PICK-UP. When you drop a nut or bolt down into a blind spot in the cowling, you need one of these to fish it out. You can buy one at Sears or any auto supply store. The kind with a magnet plus mechanical fingers works well.

MANUALS. The service and parts manuals for your aircraft are probably the most important "tools" you can carry. Even if you never do any work on your aircraft, you should carry them in case the shop doing emergency repairs doesn't have them, or if you need to order a part by phone to be FedExed to wherever you're stuck. Parts manuals have exploded diagrams that are very useful to see how various assemblies of your aircraft are put together. Beech, Cessna, Mooney and Piper all sell manuals for most of the airplanes they have ever built. ESSCO in Akron OH can provide photocopies of manuals for most aircraft even if the manufacturer no longer exists: phone (216) 724-1249, FAX (216) 724-5019.

Parts and supplies

You'll also need some parts and supplies. Dick Collins flies around the country with spare vacuum pumps, spare alternators, and half an airplane's worth of parts in his baggage compartment. That may be overkill. Take what you think you might need to get home. Keep parts and supplies in individual Ziploc freezer bags. That way, the parts don't get mixed up and the consumables can't leak. John stores his parts and consumables in a soft sided bag next to his tool box. I keep mine in a cardboard carton. Consider carrying the following items:

ALTERNATOR BELT. If your aircraft has a belt-driven alternator you definitely want to have a spare on board. You can buy one at San-Val or Chief. If your belt driven alternator is front-mounted requiring prop removal to change the belt (most Lycomings are this way), the next time the prop is off have your mechanic install a spare belt put over the crankshaft flange and tie-wrap it out of the way. Then if the belt breaks in the field, you simply loosen the alternator, cut the tie-wraps, position the spare belt, and re-tighten the alternator.

SPARK PLUGS. Carry two new spark plugs of the proper type for your engine. The most common types are RHB32E and REM40E, about $15 each at San-Val or Chief. (Fine-wire iridium plugs cost about $40 each at discount.) New Champion spark plugs come sealed in plastic, pre-gapped and with a new copper gasket.

EXHAUST GASKETS & NUTS. Carry the same number of spare gaskets as you have cylinders on your engine. Half a dozen exhaust nuts as well. You'll need them if you have to pull down your exhaust for any reason. San-Val and Chief sells them and can give you the right ones if you tell them what model engine you have. Or ask your mechanic to sell you what you need.

BRAKE LININGS. Carry enough brake linings and rivets to re-line one brake assembly, usually two or four pads for singles, six or eight for twins. Buy them at San-Val or Chief, or ask your mechanic.

TIRE TUBES. John says he used to carry a patch kit but found it to be an "iffy" field repair. Now he carries spare tubes for the nose and main tires, and claims it doesn't take much extra space. A good place to buy them is Desser Tire at 1-800-AIR-TIRE. About $25 or $35 each.

DUCT TAPE. Don't leave home without it! It's amazing stuff that can hold airplane pieces in formation until you get home. Also useful for patching leaks, replacing missing inspection plates, and 1001 other things. Get the genuine article, made of gray cloth with clearly visible threads. Don't be fooled by the imitation plastic junk that some stores will try to palm off on you. Available just about everywhere.

SAFETY WIRE. Stainless steel aircraft safety wire comes in three sizes: .020, .032 and .045. The .032 size is by far the most useful. San-Val and Chief sell it for about $9 a spool. Better yet, talk your A& P out of a three-foot length of each size, wrap them around a tongue depressor, and stash it in a Ziploc bag.

TIE-WRAPS. These are those plastic bundle ties with a built-in ratchet fastener, and they are second only to duct tape in usefulness and versatility. Carry a dozen of assorted sizes. Any auto supply store, hardware store, or Radio Shack has them.

RTV. Room temperature vulcanizing silicone rubber sealant. Also known as bathtub caulk. Invaluable for sealing leaks, making home-brew gaskets, and gluing things together. Buy it at any auto parts store. Comes in clear, white, and high-temp (orange) varieties under General Electric, Dow-Corning, and Permatex brand names.

HYDRAULIC FLUID. This is the thick red liquid used in brakes, oleo struts, and hydraulic landing gear retraction systems. Use nothing but genuine mil-spec 5606 fluid; automotive brake fluid is a major no-no. Carry a pint in a plastic bottle protected by a Ziploc freezer bag, because if it leaks you'll have a real mess. San-Val or Chief will sell you a quart can for $9, or get some from your A& P.

SPRAY LUBRICANT. Carry an aerosol can of LPS-1, a greaseless silicone lubricant. Manufactured by Holt Lloyd Corp. of Tucker GA, and available at San-Val, Chief, and some auto supply stores. Good for rod ends, piano hinges, door latches, and other squeaky things. Don't substitute WD-40, it should never be used on aircraft.

CONTACT CLEANER. Pick up a small spray can of "Tuner/Control Cleaner and Lubricant" at Radio Shack. It's great for electrical connectors, switches, relays, lighting rheostats, volume controls, and the frequency-select switches on older avionics.

PLEDGE. Forget those pricey windshield cleaners. Good ol' Pledge is as good a Plexiglas cleaner as you will find. The wax in Pledge fills in minor scratches and helps make them disappear. Lemon Pledge used on inside surface of windows makes the cabin smell nice. Pledge is available in a non-aerosol trigger spray bottle, which is a much better choice for your tool kit.

SIMPLE GREEN. A good biodegradable cleaner and de-greaser. Pick up a small spray bottle at any auto supply store. Incidentally, never use Formula 409 on an aircraft, because it attacks aluminum.

PAPER TOWELS. Choose these carefully. Most kitchen paper towels from the supermarket are abrasive to Plexiglas. Both John and I have become very partial to the soft blue "shop towels on a roll" that we buy at Costco and Price Club eight-roll packs.

A Mini-Tool kit for the Cockpit

In addition to the traveling tool kit that you carry in your baggage compartment, I recommend that you carry a mini-tool kit for dealing with in-flight cockpit emergencies. Carry it in the glove compartment or seat pouch where you can reach it easily while flying the airplane.

The most important cockpit tool is a small vice-grip pliers. If a fuel selector handle or radio knob breaks off in your hand at an inopportune moment, the vice-grips will bail you out quickly. I also carry a small jewelers screwdriver for tightening loose set screws on radio and lighting dimmer knobs.

I've also needed to pull a radio out of the avionics stack in-flight on several occasions to clean a corroded edge connector or re-seat a balky display board. Most of my radios are Bendix/King which require a hex (Allen) wrench to remove, but some radios require a thin straight-blade or #1 Phillips screwdriver. I carry all three tools in my glove compartment.

I also keep a small adjustable wrench, a small slip joint pliers, a folding pocket knife, a mini-MagLight flashlight, and a small pocket mirror.

Where to Buy Tools and Stuff

Craftsman tools and tool catalog can be obtained at any Sears store.

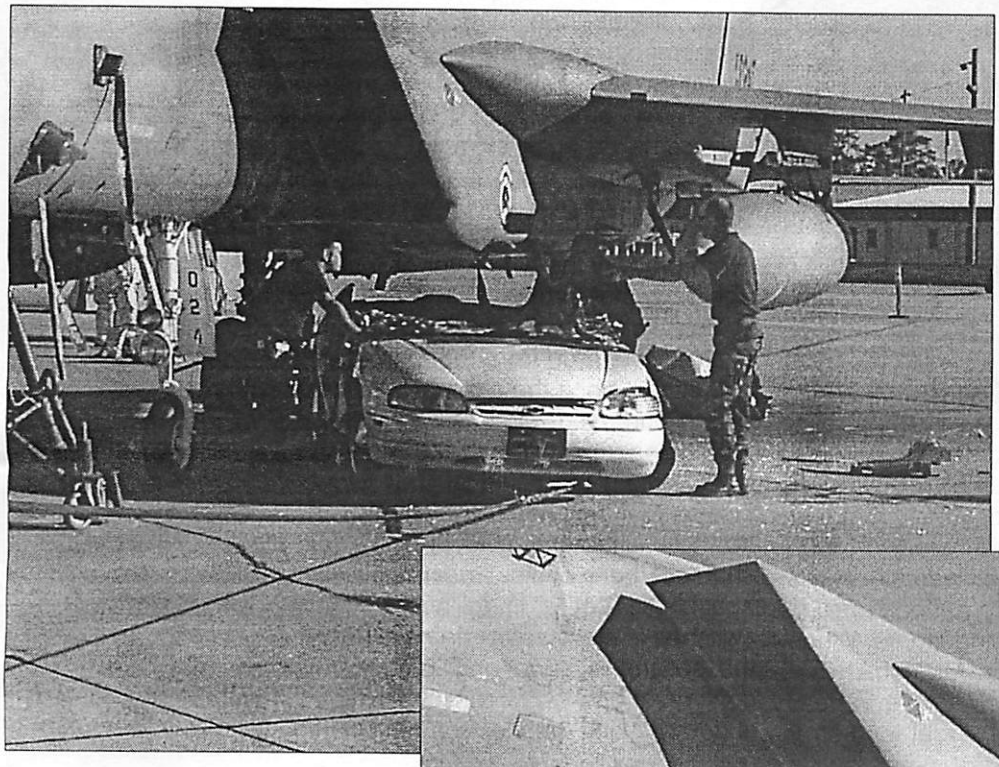
Snap-On Tools has dealers in trucks that call on automotive and aircraft shops. Your aircraft or auto mechanic can probably put you in touch with your local dealer. Or call Snap-On headquarters in Kenosha, Wisconsin, and ask for their hand tool catalog. Phone (414) 656-5200, FAX (414) 656-5577.

U.S. Industrial Tool in Plymouth, Michigan, is a good source for aircraft specialty tools. Phone (800) 521-4800, FAX (313) 455-3256. Check out their ad in Trade-A-Plane.

Discount aircraft parts, supplies and specialty tools may be ordered from San-Val Discount in Van Nuys, California, phone (800) 423-3281, FAX (818) 786-9072. Also from Chief Aircraft Supply in Grants Pass, Oregon, phone (800) 447-3408, FAX (503) 479-4431. Both firms run multi-page ads in Trade-A-Plane.

BAD DAY AT THE OFFICE?

SUBMITTED BY WELDON CRESSMAN



Don't really know the story on what officially happened here. You can bet that the driver is now guarding an outhouse somewhere well above the arctic circle! News reports that the car "Got away" from the driver. Luckily the military police officer escaped with only minor injuries.

No Juice

What happens when all those electrons in your aircraft's electrical system stop flowing? Which instruments and gauges remain? Got fresh batteries for your handheld communications radio and that fancy new GPS navigator? AVweb's Michael Maya Charles recently faced all these problems, and more, in his Cessna 185. Read all about it.

It had been a fantastic weekend. An airline pilot couple, good friends both, and fortunate to live on an idyllic, 3,000-foot grass strip just below the east boundary of the Memphis Class B airspace, each year gather friends and family to their home for a celebration of life in the sky. Most of the participants are skydivers, fliers and other n'er-do-wells who love airplanes, music and all things that fly. This year, we saw everything from a Twin Otter to T-6s, aerobats to antiques during the two days; it's an event not to miss. The weather for the weekend had been perfect, as usual, with time for renewing friendships, plenty of great flying and camaraderie, great food and drink. Too soon, it was time to return to the real world.

I left my Skywagon in the couple's hangar for a week after the party while I flew several airline trips in a Boeingsaurus. When I returned to retrieve my red bird, the ceiling in Memphis was a couple of hundred feet, visibility less than half a mile in heavy rain. It rained, and it rained ... and it rained -- a real toad strangler, in the vernacular of the Mid South.

Get Home Itis

Finally, after I'd spent two days of studying radar and weather sequences on the Internet, the slow-moving front finally passed through (for the last time) and I gathered my tent, sleeping bag, and work clothes, preparing to head west for Colorado. I was anxious to get back home, not wishing to overstay my welcome at the couple's wonderful hangar home.

We pushed the Skywagon from the hanger onto spongy ground outside and I started the engine. Tail towards Jim and Val's hangar, I kept the power very low, about 500 RPM initially, to avoid sending my prop wash through the open doors into the hangar. I was not surprised to see the red "Hi Voltage" light illuminated at this low idle, since the RPM was below the speed at which the alternator comes online. But as the idle rose easily to 800 RPM, the red light didn't go out; the alternator hadn't come online. Hmmm ... that's odd. I turned off the avionics to prevent a voltage spike then reset the alternator field with my split master switch; the alternator came online immediately. No big deal.

Cessna 185 Floatplane

Jim's billiard table-smooth strip was now awash in several inches of standing water from the endless rains. It was real ugly, but the 185 was light and I figured its 8.00 x 6.00 tires would "float" pretty well on top of the saturated turf. If the tires began to sink too deeply during taxi or takeoff, I reasoned, I would simply quit for the day and wait for the ground to dry. Ever wait for ground to dry in the Mid South?

After warming the big Continental and doing the run-up and preflight checks, I launched for Colorado with hope in my heart. I made a quick stop for fuel a few miles away at a county airport, and then headed for home.

Once over Arkansas, the weather opened up and the sun warmed me in the cockpit as I pushed into the west wind at 130 knots. With just under 800 nautical miles to go, I knew that a fuel stop would be required somewhere down the road. Level at 6,500, the JPI was singing its happy digital songs, the engine was smooth and the air seemed just plain friendly. I cued up Diana Krall's CD "When I Look in Your Eyes" and was enjoying her dusky, smoky-bar, jazz pipes when the red "Hi Voltage" light came on again. Hmmm ... two clues begin to tell a story. Two "Hmmm ... 's" in the same day call for closer investigation.

Where'd The Juice Go?

From the way the alternator dropped off line, I suspected a voltage regulator problem. The alternator breaker did not open; system voltage was steady before the failure; no high draw or excessive charge from the ammeter. It couldn't be an alternator belt either, since the alternator switch would reset the system. I wasn't surprised, since I knew that my voltage regulator was the original unit, with a 1978-manufacture date stamped on the front. I often marveled at that twenty-year service life when I inspected things under the cowling.

With the alternator field opened, and the alternator off line, I shut off the avionics master switch and reset the alternator again. I've got a thing about resetting circuit breakers and switches in electrical systems: The first reset of the flight is free; the second is done only after careful thought and caution. I don't reset opened circuits three times. Two trips tell you that all is not well with the electrons. It's time to gather information and make a new plan.

With the alternator now back online, I immediately studied the bus voltage display on the JPI, looking for signs of sickness. All looked steady at about 28.5 volts -- that's a little high but about where this particular system normally runs. Your mileage may vary.

Weather ahead in west Arkansas was turning downright ugly. A trough was tracking slowly across the area, with rain, low ceilings, and ridges obscured by fracto-cumulus left behind by earlier rain showers. With darkness less than two hours away, this was no place to push my pointy spinner with a questionable electrical system.

No Reset This Time

In a few minutes, the little red light illuminated again, making the decision about whether to proceed west an easy one.

There would be no reset this time.

With the battery now supplying all ship's power, I began to reduce the electrical load again. First, I turned off the avionics master switch, figuring that I really didn't need any radios to fly in the VFR weather I was in -- and intended to stay. This, of course, KO'd the JPI; I really missed those reassuring numbers cycling through the little digital display. Next, I turned off the strobes and inventoried the panel to see what was left.

Do you know what you lose in your airplane when the alternator quits and you are down to battery power? In the 185, the simple answer is: nothing. The battery will provide power for everything electrical. But I wouldn't want to rely on the battery to carry the whole enchilada for very long.

Electrical System Quiz

To conserve juice, I shut off the master switch. Now, the ball game changed. Quick quiz: what do you lose when you turn off the battery switch on your airplane?

Do you have any AC gauges in your panel? If you do, the AC gauges will likely stay where they were when power was removed. The more common DC gauges we have in our simpler GA airplanes will drop to the zero or off position. "AC lies and DC dies" is the old saw to help you remember what gauges do when they lose their source of power. Since my gauges are all DC, they played dead when power was removed.

What's Lost? What's Left?

Let's look at what I've lost in this single engine Cessna when the juice drains away: I lose the fuel gauges, the oil temperature and cylinder head temperature gauges, the turn coordinator, all lights and radios. But the oil pressure gauge is still working just fine because it's a direct-reading gauge connected through a 1/8" pressure line to the engine. My static instruments: airspeed, altimeter, and vertical speed all work, of course, as does my "whiskey" compass, plus the vacuum-driven artificial horizon and directional gyro. This is not a comfortable mode of operation for long, I must admit. But there's certainly nothing dangerous about it in good weather conditions.

This incident reminded me that I would do well to include the ammeter more often in my normal instrument scan; my tendency, like most pilots I suspect, is to rely on the "idiot light" to warn me of problems. That's probably not the best policy. Having had many electrical "events" over the years, including a few electrical fires, the ammeter is a gauge worth monitoring. I made a mental note to pay more attention to that little needle.

A Long Day

Within ten minutes of the alternator failure, the batteries in my hand-held GPS died. That was about the time I flew through several light rain showers, and it got quite bumpy. As I reached into the back of the airplane for the spare batteries kept in my chart bag, the resulting semi-aerobatic maneuver reminded me of a flight I made a year ago in Patty Wagstaff's famous airplane. Oh boy, this is fun ... Maybe it's time to reconsider installing that autopilot.

Periodically, I turned on the master switch, checked oil temperature, cylinder head temperature and fuel gauges, and then switched the master off to save the battery. All was well, even if I couldn't monitor the gauges constantly.

It had been a long day already; I pulled out the AOPA Airport Directory and decided to stop in Harrison, Arkansas (HRO) for the night. Five miles from the airport, I turned the avionics master and one radio back on, listened to the airport CTAF for other traffic, and announced my position as I negotiated the pattern. I wasn't quite off the hook yet; a healthy, "pay-attention" crosswind greeted my arrival in Arkansas just to keep things from getting boring. When I climbed out of the seat a few moments later on Tri-state Airmotive's ramp, it felt like the 01:30 flight had been twice that long.

We Bury Dead Pilots On Sunny Days

Sunday morning dawned clear, dry, bright and warm -- a perfect day for flying. Yesterday's angry, obscured ridges were now warming in the early morning sunlight, with brilliant yellow and orange maples and sweet gums in full fall glory. It's often said that dead pilots are buried on sunny days; if pilots would just quit when they run into mechanical and weather difficulties instead of pressing on, they might enjoy mornings like this ... instead of having no more.

Now ... if I could just find someone in this sleepy Arkansas town with a multi-meter -- on a Sunday -- to help me troubleshoot this system. An extra voltage regulator might be nice to have, too.

Renew your Dues!

Yep, it's that time of the year again. Annual membership dues for Chapter 35 are due again. Annual membership is $12 per year and payment can be made to our new treasurer, Joanne Warner. She can be contacted at 830-510-4334 or send payment* to:

Joanne Warner
719 Oak Hills Road
Pipe Creek, Texas 78063

*Make Checks Payable to EAA Chapter 35

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San Antonio, Texas 78247

Norris and Joanne Warner
719 Oak Hills Road
Pipe Creek, Texas 78063-

When Do you Meet?
Second Saturday of the Month
Social Hour 6-7PM
Meeting @ 7PM
Where do you meet?
(See Map)
Call Any member listed