RVator's Log

Newsletter of the Twin Cities RV Builder's Group

March 2014

In this issue…

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Upcoming Events

March 22 – The Great Minnesota Aviation Gathering. Golden Wings Aviation Museum. RV presentation at 0900. See page 6.

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Minnesota Wing
Van's Air Force

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Shop Notes

After 5 ½ years of "retirement" from that long-lost hometown airline, I have finally reached the milestone of age 65. I was thoroughly warned beginning about six months ago, as my mailbox was regularly deluged with Medicare supplement insurance offers. Not to mention the weekly plea from AARP (membership requires ownership of a champaign-colored Buick LeSabre… no red BMWs allowed so I'm safe!) Now that I've also passed the FAA mandated pilot retirement age, I guess I can stop waiting for Delta to beg me to come back and fly for them.

I probably don't have to convince you that the best thing to do in retirement is to fly my RV-7 as much as possible. So that has been my goal since finishing the project two years ago. I'm sure I have told you before that I am 100% convinced the only way to maintain one's safety margin is to fly, fly, fly in one's old age. I really try to fly a couple times a week no matter what excuse I may have not to. It's all a matter of staying proficient, which becomes more and more critical in the senior years. Plus I love it!! After 50 years and almost 20,000 hours, I just like to fly. So I appreciate every chance to get airborne even if it's just for a couple laps around the airport.

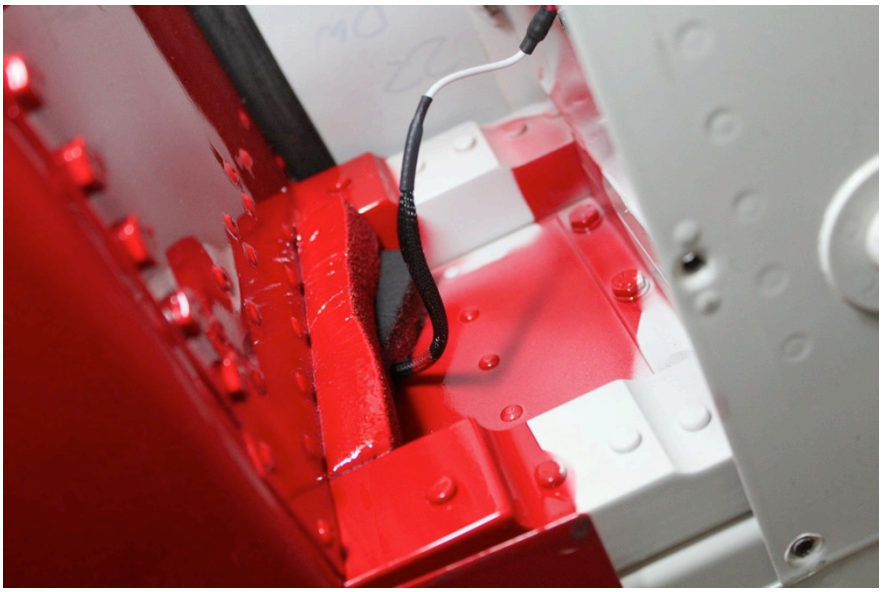
But I also don't have to tell you this winter has been a killer. In fact, I don't recall a winter that has been so bad for fun flying. Whether it's our twice weekly snowfalls or day after day of sub zero temps, the good flying days have been few and far between. But, even though many of my friends flee to Florida or Arizona, I try to suck it up and not let the cold slow me down any more than I have to. If you're currently building or flying, let's talk a bit on ways to do battle with some bracing temps. After all… you've got WAY too much money invested to let that RV molder in the hangar 5 months out of the year.

To begin, you need to pump as much heat into the cabin as possible. You MUST have two heat muffs each with their own source of inlet air with two hot air inlets through the firewall into the cabin. For side-by-side RVs, cabin heat runs into a plenum which distributes the heat very nicely (and keeps those toes nice and toasty.) The tandems are a little harder since it difficult to get heat back to the rear seat, but it can be done. If you spring for the Vetterman muffler system, you will have plenty of heat so that is a plus.

But getting the heat into the cabin is only half the problem. You have to keep the cold air out. So carefully look for all the possible ways for cold air to leak in. Our resident RV guru Tom Berge has all sorts of methods to combat the cold. Here are some I used:

Seal the gap around the wing spar at the wing root. I used cut pieces of foam and RTV. Lot's of air comes in here and migrates up through the stick openings.

You can install aileron pushrod boots that are commercially available or you can make your own. I didn't install these and have no air coming up through the stick boots. I think it is more important to seal around the wing spar.



Install proper weather stripping around the canopy. The tip-ups seem to be a little harder to seal according to Tom. Pay attention to the area behind the instrument panel and around the canopy sides and top. The slider (which I have) seems to be a little easier if you have taken pains to have a good fitting canopy skirt. Air can come into the area at the top rear of the skirt (be sure to install the little plastic slider seal thingy that Van's calls for in the plans). I have very little air coming in at this point (although I do get some rain coming in here at times)

My "winterization kit" also consists of three rolled up bath towels (many coordinated colors available at Target). I cram them between the seats and along the sides of the cabin next to one's legs. There is a lot of cold air in the baggage compartment and this keeps it at bay. Also seal up the corrugations along the outer edges of the rear baggage bulkhead to keep the cold stuff in the tailcone.

Check to be sure your fresh air vents are sealed and close up well. The plastic air vents are notorious leakers…. spring the big bucks for the high quality aluminum models. I've flown the -7 down to about -6 degrees F and have been perfectly comfortable. Now this was done on a sunny day and that truly does help with that big bubble helping to trap the radiant energy of the sun.

I like cold weather flying if the cabin is comfortable. Those little bitty air molecules are all crammed together tightly holding hands, which makes your RV a rocket ship. Nothing like a minus 2000 feet density altitude to get the adrenalin going! SO… don't let a little Polar Vortex keep you grounded. We're tough!!

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News Flash……

Dyed in the Wool Steam Gauge Guy Goes GLASS!!!!

- Tom Berge

As some of you may have known, I'm a dyed in the wool, true blue steam gauge guy. My panel was adorned by a compliment of three electric gyros, an airspeed indicator, and an altimeter. A Garmin CDI with the usual VSI being a 2.25-inch unit mounted nearby occupied the "sixth" spot.

When building my RV7A, glass was just starting to come out and the thought of living on the bleeding edge of these new-fangled EFIS systems just did not appeal to me. Besides, my panel provided me with all I really needed to know. The panel was clean, well-organized and just plain functional. What more do you need?

First flight was in June of 2003, ten long years ago. I had mounted those very expensive electric gyros on a separate panel, which was isolated from the main panel by 4 small rubber mounts. The attitude and directional gyros worked ok, not great, but ok. I had always thought the attitude gyro was not as crisp as a vacuum driven unit, but it did the job. Fast-forward to the fall of last year as N369TB passed the 1500-hour mark and I started to notice a slight lean to the left. That's the attitude gyro, not me. If the air were a bit rough, the lean became more noticeable. Sometimes the mind plays tricks on you, but not this time, it was definitely leaning. The DG and turn coordinator were operating fine. What to do?

The way it used to be. Can you see the steam pouring out of this panel?

The way I saw it, I had two choices. Choice one was to repair my existing gyro. Choice two was to replace it with…..? Now that's a great question, but with all the available options out there, some research was in order. I spoke with SteinAir about the possibilities. Since I had 1500 hours on my gyros, I had to entertain the chance the DG and turn coordinator might not be too far off from failing as well. There was a digital direct replacement available, but only in the attitude gyro, so if the DG failed, I'd be left out in the cold. The two EFIS screens on my radar were the Garmin G3X and the Aspen Avionics system. Here's how the thinking went. Pay attention because this is how you drink the Kool Aid.

To repair my existing gyro was $700 plus shipping. The digital gyro was $2600, the Garmin around $4000 and the Aspen around $5000. Breathe Tom, breathe. While on the phone with the company to repair my electric gyro, the call went kind of bad and I got a bad taste in my mouth thus slanting the decision somewhat. Bad customer service does funny things to the desire to do business. You would think in today's age companies would know that, but I guess not. Now all this was happening over the course of a month or two and then, the darn DG up and died. Well, well, isn't that just wonderful? Now to repair both gyros would cost around $1500. Wheels were certainly turning faster and faster. The digital attitude gyro was decided against because of the bad customer service as well as lack of a suitable DG replacement. The Garmin G3X looked promising, but would require considerably more work to install due to existing instrumentation and structure. To top it off, those pesky database updates would be painful. That left the Aspen System.

The Aspen EFD 1000 Pilot was the clear winner. The install was very straightforward and took about 12 hours. The hardest part was the mounting of the Remote Sensor Module, which resembles a GPS antenna. Finding a suitable location, making a doubler and running the small cable took some time. Installing the EFIS was quite simple, just mount the supplied attachment plate, and then slip the unit in. It couldn't have been easier. Next was removing the rubber mounts that isolated the gyro panel since trying to protect the delicate electric gyros was no longer needed. Of course, nothing ever goes perfectly smooth. The pitot/static lines had to be hooked up and that was a royal pain in the rear. Every single legacy steam gauge I've ever seen has a 1/8 NPT port on the backside. Very simple in that you get a fitting to match your existing pneumatic system and complete the install, but no, couldn't do it the easy way. Aspen decided to use a quick disconnect such as you would find on an air compressor hose. That coupling went into a ¼ inch ID hose, not ¼ OD like what most use and certainly not the 3/16 aluminum I was using. The only thing I could do is come up with a reducer system which I finally managed to get a good seal on. Grrrrr….. After running power, ground and the ARINC lines from my Garmin 530W, I was done.

The power up was straight forward as was setting all the parameters such as VNE, VA and so forth. After the test flight, I was hooked. It just looked real nice. Got the compass swung which straightened up all the heading and wind speed info and have been enjoying it ever since. And then my third and last gyro, the turn coordinator failed. Go figure, 1500 hours on all new electric gyros and they all fail within 3 months of each other. That one I had rebuilt.

Wow… look at all of those dazzling electrons. Wonder if Tom is ready to ditch his rotary phone?

So here's what I got. Instead of paying $1500 to rebuild old mechanical gyros, I now have a new, modern EFIS. The way I see it, it cost me $3500 for the upgrade since I would have had to do something anyway. $5000 minus $1500 equals $3500. Rationalization is a wonderful human trait, don't you agree? So what more did I get from the EFIS that I didn't already have with my steam gauges? I guess I don't have to set a DG on a regular basis because of precession. I also got a wind vector so I know where the wind is coming from and how strong it is. But so what? I'm going where I'm going and knowing how much wind is on the nose where it always is for me anyway doesn't really change anything, but it is cool to

know. Yup, I've arrived in the 21st century and now about my simple, trusted flip phone……

P.S. In case you missed it and to clarify it, I LOVE IT!

Off airport landings!!!

-Doug

Wow… this is not a pleasant thought but perhaps it needs more attention. Certainly motoring over the mountains or over other less than ideal terrain causes one to pause. We put a lot of trust in that whirling mass of machinery forward of the firewall. That's why I am a firm believer, from the very beginning of the building process, to make one's powerplant installation the safest and most reliable as it possibility can be. But, if something bad does happen, preparation and forethought are priceless. This narrative is from Mastery Flying Lessons (one of the best flight safety resources on the web). The discussion had been on off-airport landings and this commentary comes from master CFI and aerobatic instructor Tony Johnstone:

Good commentary on emergency landings. I believe it is an area that does not get enough attention from some CFIs.
I certainly notice on flight reviews that many pilots don't have a good plan for dealing with an engine failure. You shouldn't be trying to work it out on the fly.

My priorities:

1. Best glide speed IMMEDIATELY to maximize time in the air and options. (Rolling the elevator trim all the way back will do this for you in most high-wing Cessnas, for instance.). *Ed note: not sure about RVs… need to try it sometime*

2. Look for a place to land and head right at it. Be realistic about how far you can get, know what your rate of descent is power-off, how high you are, so you know how long you have in the air. If you are gliding at 60 kts at 3000 feet AGL, descending at 700 FPM, you've realistically got just over 3 minutes to get to your landing site with enough altitude to maneuver to land. So count on about 3 miles gliding distance with no wind, you will not get to that airport that is 5 miles away unless you have a significant tailwind.

Best choices, in descending order:

1. Airfield (always be aware of the closest one as you go cross-country, and remember it may be behind you). *Ed note: I check the "nearest airport" function on my Garmin 430 often.*

2. Paved road. 4- lanes will not have wires most of the time. Land WITH the traffic flow, which should be moving at about the same speed as you.

3. Unpaved road. Look for wires, even if there are wires they are often far enough back to allow you to get down, but if there are buildings on the opposite side there are probably overhead wires crossing the road.

4. Fields are my last choice unless you can be sure they are dry and hard. Wet or muddy surfaces will almost always result in you winding up on your back. If you are heading to a landing site and you see something better, my rule is you can change your mind one time only! Don't take time dithering between two sites and winding up between them. And I agree with your last point, if I'm going to roll an airplane up into a ball in an off-airport landing, I'd like it to be close to someone who can help to get me out of the airplane! If you can't get the engine to restart and you are committed, make the radio call, if you are already in contact with a facility tell them first, then go to 121.5 if instructed. Hopefully they will have the sheriff and the EMS guys waiting or at least enroute when you get down. And follow Bob Hoover's advice; fly it all the way into the crash. Even if you have to land in a less-than optimal spot, if you touch down at minimum speed with the wings level you are probably going to walk away from it!

Tip Time #1 – Fuel Pressure

-Doug

Last summer I started to get some rather strange fuel pressure readings. Usually it happened right after startup. Normally my fuel pressure readings would be very consistent around 25 psi and would bump up to around 27 with the boost bump on. Now I was getting readings around 35 psi or more which didn't make much sense. Problem solved after reading this tip from Mark Olson:

I had a problem like this on my RV. The setup it has is the AFS 3400 Engine monitor, which uses a VDO resistance type fuel pressure transducer. The way these work is that the pressure diaphragm inside the sender moves a little wiper along a coil of resistance wire. Because during cruise the wiper sits at a very similar position and "wiggles" a bit due to pressure fluctuations, it wears a spot on this coil until it wears through.

This means that the normal resistance gradient it would normally encounter is now discontinuous and, depending on the position of the wiper, can show either very low fuel pressure or very high pressure. It can also show close to normal at times when the wiper happens to bridge the gap or the gap temporarily closes due to temperature, mechanical perturbations, or who knows what else. Turning on the electric pump generally results in moving the wiper elsewhere, especially if the boost pump provides higher pressure than the mechanical pump, which then causes a different reading.

A bad ground to the sensor can also cause erratic readings, but I don't think turning on the boost pump would stabilize these.

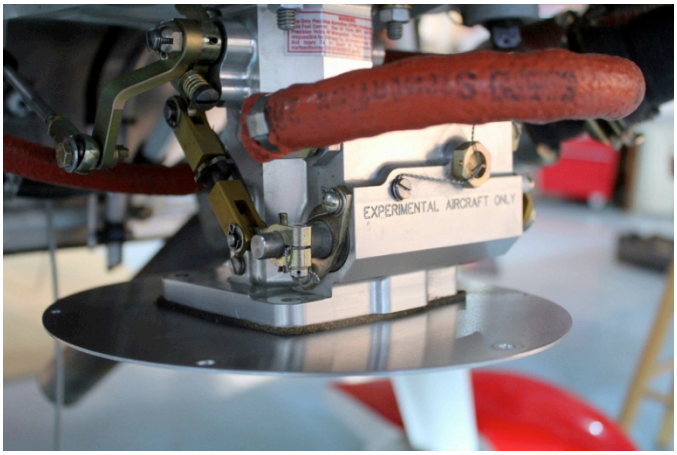
I cut my defective sender apart to verify this and indeed there was a noticeably worn spot on the coil.

Replacing the sender cured the problem I was seeing, but I anticipate it will come back when the new sender wears in a similar way to the old one.

Mark Olson RV-7A F1-EVO Rocket

Tip Time #2 - Airbox Mounting

- Doug



A very common issue with the Filtered Air Box mounting is cracking of the mounting plate, which often happens at the first condition inspection. There is a two-fold method to avoid this frustration. First, make a duplicate FAB mounting plate out of 6061-T6 aluminum, which is far less brittle than 2024-T3. I have never seen this piece crack when using the T6 alloy. Second, make a "gasket" out of cork material from your local auto store. At Tom Berge's suggestion, I used some 1/8 material, which seems to cushion the vibration between the engine and the mounting plate. At 250 hours, no cracks!

Minnesota Pilots Association

- Randy Corfman, president

The Minnesota Pilots Association was established in April of 2013 by a number of people who felt strongly about the need for an organization that represented the interests of pilots and aviation enthusiasts in our state.

We recognize the importance of the Minnesota Seaplane Pilots Association, as well as the EAA and AOPA. Further, the FAAST and MNDOT are active governmental organizations, which are good resources for pilots. There are many pilots, however, that "fall through the cracks" in that they are not owners of aircraft, or are not builders of aircraft, but have a distinct need for representation and an important role in shaping aviation in Minnesota. We feel the Minnesota Pilots Association can meet the need of bringing all pilots together through advocacy, education, outreach and social events.

Many of us have attended or presented at a number of excellent aviation conferences, such as the annual events like the Montana Aviation Conference and the Alaska Airmen's Aviation Tradeshow and Conference. We have returned to Minnesota and felt a significant void present by the lack of such an annual conference in our state. Out of this concern has emerged the concept of an annual gathering of pilots and aviation enthusiasts during the Spring, when we are often wishing for the Winter to end (like this year!), thinking of getting out an exercising the privilege of flight.

The first annual Great Minnesota Aviation Gathering will provide an opportunity to come together to celebrate aviation. This event will be highlighted by a number of terrific presentations for pilots that we have called "Hangar Flying", in which we focus on piloting skills, safety aspects of flying and topics which will help us come out of the doldrums of shoveling snow and back into the cockpit. Before and after the hangar flying sessions will be exhibits of aviation-related products and organizations.

We hope you will join not only the Minnesota Pilots Association (with free admission to the Gathering), but also join us at the Great Minnesota Aviation Gathering.

http://www.mnpilots.org/

Minnesota Wing – Van's Air Force
65 15th Ave. SW
New Brighton, MN 55112-3454

First Class

The Great Minnesota Aviation Gathering

Saturday, March 22, 9 am to 4 pm

Golden Wings Aviation Museum, Anoka County Airport (KANE), Blaine, MN

The Great MINNESOTA Aviation Gathering
3/21 & 3/22
2014

Golden Wings Museum
Anoka County Airport (ANE)

Friday 9 - 9
Saturday 9 - 4

As you have read, the Minnesota Pilots Association was formed last year to provide a specialized advocacy group to address the specific interests of the Minnesota aviation community. This month, we are taking part in their first Great Minnesota Aviation Gathering. It is a two day event (March 21 and 22). Instead of our regular March meeting, we are encouraging everyone to attend the "Gathering" on Saturday, March 22. Specifically, Doug Weiler, Peter Fruehling, and Pete Howell will be presenting a talk at 9:00 am on RV building and flying. There will be speakers all day long discussing a variety of aviation topics. There will be aviation vendors also displaying their wares.

The venue is the Golden Wings Aviation Museum with its extensive collection of antique aircraft. Coffee and donuts in the morning as well as lunch will be avilable. Admission to the "Gathering" is $5.00. Join us in the morning and help support the Minnesota Pilots Association. See you there!

Web links:

Minnesota Pilots Association:

www.mnpilots.org

Great Minnesota Aviation Gathering:

www.mnpilots.org/gmag/

Golden Wings Aviation Museum

http://www.goldenwingsmuseum.com/