RVator's Log

Newsletter of the Twin Cities RV Builder's Group

June 2015

In this issue…

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Upcoming Events

June 20 – Twin Cities RV Builders June Lunch Meeting. - ANE at noon

See page 8.

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Minnesota Wing
Van's Air Force

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Shop Notes

The Big Five-Oh…

-Doug

If there ever was a boom-time in aviation, at least in my lifetime, it was the early 1970s. I was stationed in Dayton, Ohio in the Air Force and instructing "part-time" at Moraine Airpark. We had 12 training airplanes (mostly Citabrias) and they were flying constantly. All of the local airports were busy training students and selling airplanes (a local friend was a Cessna salesmen and he averaged selling a new Cessna every week!) I would have students every evening after work and all day on Saturday and Sunday and be booked up two weeks in advance. I easily racked up 1000 hours a year during those heady times.

Most of my instruction was primary training and I loved it. It was greatly rewarding to mold a guy or gal off the street into what I hoped would be a competent and safe private pilot. Although I was now a fairly experienced CFI, soloing a student for the first time was not without some apprehension. A couple of my instructor colleagues seemed to feel a student was an aeronautical klutz if they hadn't soloed in 7 or 8 hours. Thankfully we had no student accidents during my tenure there, but some of those solo flights were very "entertaining".

I was a chicken to solo students too soon. My philosophy was that they had to meet some rather specific skill sets or we'd be flying dual for a LONG time. I had one guy who took 29 hours to solo. I didn't think he'd ever see the light but he finally caught on and did a fine job. My criteria was that if they could get around the pattern safely and competently with me sitting on my hands and keeping my mouth shut, they were ready to go. Those guidelines served me well then and still do today in checking out a new RV pilot.

Long-suffering co-pilot on her first solo circa 1973

First solos back then were a BIG deal. We would ceremoniously cut off the wrinkled and sweaty shirt-tail of the newly anointed and hang them up on the wall emblazed with their name and solo date. I took special delight slicing out the entire back of my students' shirts (especially the couple young ladies that unfortunately had me as their CFI). Not sure if that tradition still is around, but it was fun. Two noteworthy first solos were my wife and #1 son. Shortly after we were married, I taught Jean to fly in a Citabria. Her first circuit of the pattern alone was a non-event and she later got her private license. Many years later, I soloed Craig also in a Citabria the day after his 16th birthday.

9.0 on the aviation geek scale - 1965

This past January with the 50th anniversary of my first solo. It was a cold day at the grass strip in southern Michigan. I had turned 16 a couple weeks before but the usual winter weather had precluded a "birthday" solo. I had logged 28 hours by now so I was probably reasonably proficient. But I was still a nerdy 16 year-old yet to take driver's ed and be trusted with my dad's Bonneville. My instructor Lefty was a man of few words. We made a couple circuits on the frozen turf and he told me to stop. He opened the door into a freezing prop blast and simply said, "Take it around three times." He slammed the door and I was on my own. After that I don't really recall what happened. My dad was there to watch and take some pictures and I do have photographic proof that me and the battered old Champ survived.

I've had the sincere pleasure to make many other "solos" over the years from BIG aluminum tubes to the first flights on a dozen RVs.

Every one was special!

During our next meeting on June 20th, the FAA will present yours truly with the Wright Brothers Master Pilot Award for 50 years of accident and violation-free flying (thankfully no judgment has been made of my RV landings!). ***You all are invited to come celebrate!! Details on page 8.*** *Looking forward to enjoying the day with some of my best RV friends!!*

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To Build or Not to Build – That is the Question!

-Bruce Fiedler

There might be some of you reading this that are wrestling with the questions all builders have faced. Can I do this? How much time and money will it take? Will I really be happy with the finished product (if I even make it that far)? All are legitimate concerns, and have been addressed in other articles on various websites. I would like to share my experiences with anyone considering starting a project.

Mine is but one story, and you can take it for what you will. Let's start at the beginning. I learned to fly at age 46, figuring that if I waited until I could truly afford to do it, it would never happen. I was fortunate to be able to purchase the 1969 model Cessna 172 that I took most of my primary training in. I added an Instrument Rating and built up over 700 hours in that trusty old bird over the next ten years or so. Somewhere along the way, I felt the need for speed, and the RV series of airplanes seemed to be the perfect fit. Living in close proximity to Oshkosh, I would fly my Skyhawk into Airventure and spend hours looking over the many finished RVs sitting there.

It was about ten years ago when I started looking in earnest for a flying RV to buy. I wanted the side-by-side seating of the -7 and kind of wanted the airplane to have started life as a quick build. Now, ten years ago there weren't as many flying RVs for sale as there are now. After a couple of months and a lot of phone calls, my wife actually told me that I could probably build a better plane than the ones I had been looking at, and to just get started.

I ordered a tail kit for a -7A in November of 2004 and got to work. I kept the Skyhawk and things went well for a couple of years. Owning the plane might have lowered my building motivation some, but I feel that I made pretty steady progress for a married guy working 60 hours a week. Fast forward to June of 2008. Three and a half years and around 1200 hours of building, when life took a couple of turns. I retired from work and decided to move to Texas. Put the project into storage and sold my Skyhawk to a fellow who had also learned to fly in it.

I figured that being retired, just how long could it take to finish that baby up and get back in the air!

Small world! I ended up renting a hangar at 52F, which is Northwest Regional Airport, and, of course, home to Doug Reeves, of Van's AirForce.net fame. I was fortunate to rent hangar space from Wayne Perry, an A & P and very accomplished pilot. BUT – now I needed to have a house built, make new friends in a brand new locale, and adjust to retirement life.

Fast forward once more and it's December of 2011. Walt Asbury just signed the Airworthiness Certificate for my RV-7A (with very few squawks, I might add). 2100 + hours of building and it's time to fly.

But here is the point of this narrative. There I was – haven't flown anything in over three years, needed a biannual flight review, needed transition training to an RV, and needed to insure the bird for it's first flight (I did insure it during building for not-in-motion). I was looking at between five and ten thousand dollars for the initial flight. Not the end of the world, but in the three years of since selling the Sky hawk, the build had become kind of a job, and I found that I had lost the passion for flight.

I went over to see Jay Pratt and RV Central and let him know that my project might be for sale. Word of mouth being what is in this community, the plane was sold in two weeks.

My advice is this. If you are thinking of building and maybe have access to another plane to fly while you build, you have the best of both worlds. If building will mean that you are tied to a shop for two or three years without flying - think again. There are other factors that I should mention. I was over 64 years old when I got the Airworthiness Certificate for the RV. A younger person has a longer timeline to consider. Also, when I ordered my tail kit, there we some RV's on the market, but nothing compared the numbers and quality of the aircraft for sale now.

Troubleshooting EMI and a new radio

-Warren Starkebaum

After a 14-year gestation period my RV-7 N671CW flew for the first time last July. While I built most the airframe by myself, as I got closer to doing all the system level assembly, it

really helped to have another pair of hands. Luckily for me, Eric Schraff, a senior mechanical engineering student at the U of M, was looking for a project to help with, so Eric became my intern and provided an enormous amount of help during the last year of the final assembly of the airplane.

I built my RV-7 as a day VFR flyer and the panel is therefore relatively simple: Dynon SkyView system and one com radio. After reading Pete Howell's experience with HID landing/taxi lights, I decided that looked so easy I could do it too. I bought a pair of HID projectors on eBay, and a retrofit HID lamp/ballast kit to supplement my strobes for recognition lighting.

As I was installing my SkyView system in fall of 2012, Dynon indicated they had a new radio in the works that integrated with SkyView. I waited thinking I could get the latest and greatest from Dynon. As I got all the SkyView stuff installed, there was still no announcement from Dynon, so with the clock ticking I bought a V6 radio from MGL avionics. I had carefully reviewed the specs on com radios available at the time, and I liked the V6 -- it had a ton of features, fits a 2 1/4" cutout, is only 5" deep, and weighs 250 grams. It also has a Garmin compatible RS232 so I can load radio frequencies from my SkyView system.

I built the tail, wings, and much of the fuselage at home, then moved the project to my hangar at MIC. As the authorities frown on first flights of experimental aircraft from Crystal, so as the project neared completion, the wings came off and I moved the project to Bernie Weiss' hanger at ANE last May. Bernie, Pete Howell, and Alex Peterson all provided experienced and cheerful advice as I was putting things together. Once I had everything reassembled and tested, I enlisted Tom Berge to inspect my project. Tom arrived with red pen and checklist in hand and proceeded to compile an embarrassingly long list of things I had forgotten, installed backwards or upside down, or had done incorrectly. Plus lots of other good suggestions. OK, so I fixed all these things, called Mike Hilger from SteinAir to do the transponder check, rented a set of scales for the weight and balance, then called Tim Mahoney who gave N671CW the official FAA blessing. Whew, now we are getting close.

Earlier in the year I traveled to Vernonia, Oregon for six hours of very helpful transition training with Mike Seager. While I had a lot of time in Cessna 140's and my '48 170, I decided it would be prudent to have someone more experienced do the first flight. Doug Weiler said he would be happy to oblige "...as long as Berge said it was OK". So with my new Airworthiness Certificate in hand, Doug and Tom arrived at ANE together to do the final inspection before the first flight. Amazingly, they managed to find a bunch of stuff that had escaped prior inspections. Those last squawks were fixed and we were getting close to really flying.

The first flight on July 18, 2014 was pretty short. The radio seemed to work fine on the ground, but not so in the air. After one quick orbit, Doug landed and taxied back to the hanger so we could sort out the radio. The mic gain on the V6 is especially critical for clear Rx/Tx and requires a bit of trial and error to get it right. This was one of about 20 menu set-up items I had neglected to check! Also, I came to really appreciate the patience of ANE tower crew with my fussy radio.

A couple days later, Doug was back for the second flight. He called me on his cell phone from Cambridge 25 nm to the north to say the airplane flew fine (hands off, even). The only issue was that in the pattern at CBG, he became aware that there was no chatter on the radio. The radio display looked fine, just no chatter and no one replied to his radio calls. He cycled the power to the radio, and voila, radio function restored! Hmm.

After putting about three hours on 1CW, Doug handed it over to me and I finally got to do my first flight the end of July. The radio would cut out occasionally, though not on every flight. I discovered that the V6 display blinks about 1/ sec during Rx or Tx making it was easy to see when the radio froze. I called MGL in Los Angeles and all their technical people were at Osh, but the office manger offered to send me a replacement unit, which arrived a few days later. This new radio seemed to work fine for about 5 hrs when it too froze during flight. I began to think the problem might not be with the radio but I was at a loss as to what the issue might be. The radio would work fine for hours on end in the hanger. Except for the usual "...check all your wiring..." the technical people at MGL had no suggestions either. (note - I did install the factory supplied wiring harness). I was beginning to wonder about my radio choice and began to consider at buying a new radio.

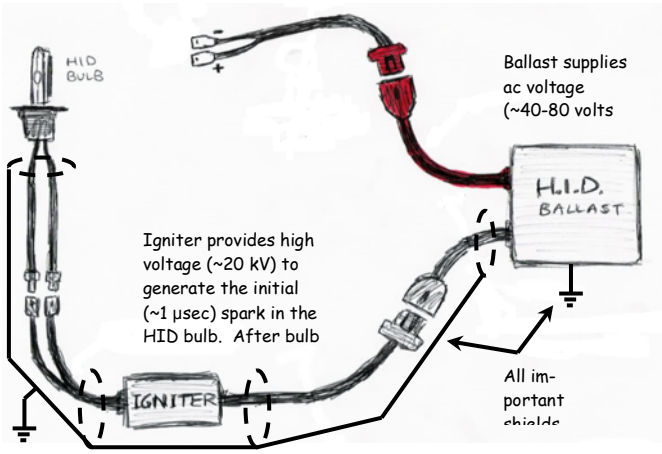

Tom Berge inspecting L aileron linkage

It occurred to me that perhaps there was an occasional voltage spike that could be knocking the radio off-line. So I installed a large electrolytic capacitor across the power input to the radio, and amazingly that seemed to fix the problem. For the next ~50 hours, the radio worked flawlessly until I made the short hop from MIC to 25D for the March TC Builder Group meeting. Back at my hanger at MIC it was time to finally get to the bottom of this.

My usual practice with 1CW had been to fly with the strobes and taxi (but not landing) light on for recognition lights. Back in the hanger, I tuned the radio to ATIS so I had a nice steady

radio signal, and started flipping light switches. Nothing happened when switching the strobes or taxi light on/off, but when I switched on the landing light I heard a faint 'click' and the radio froze. Ah ha! I had never turned on the landing light before. Maybe that was my problem?

Just a note on HID lights and their components: As shown in the figure below, a typical aftermarket system like mine has a xenon bulb, an igniter module (which provides a high voltage spark to ionize the gas in the bulb when the system is first turned on), and a "ballast" which generates an AC signal for steady state operation. (Note: some aftermarket HID system have the "ballast" and "igniter" modules integrated in a single box). Both the ballast and igniter modules are known to gen-



erate a lot of noise. My igniter module is labeled 20 kV and I guess generates a couple of pulses to ionize the gas in the bulb when the system is first turned on. Once lit (according to the internet gods) the lamp will stay lit with the ac signal (40-80 volts at a few hundred hz) from the ballast. It must have been the igniter module putting out a few 20 Kv pulses that I heard as a click when I turned on the landing light. Also, when I had installed the lights and radio, I had dimwittedly routed the landing light power lines close to the antenna co-ax where the landing light power lines entered the fuselage from the R wing. On the L side (taxi light), the power HID power lines were not as close to the antenna co-ax as on R side but they all are close to each other behind the panel.

Though I never had any audible noise associated with my HID lights, I began to suspect that there was some sort form of electromagnetic interference (EMI) from the HID's that might be saturating either the receiver or transmitter in my radio. A little internet searching turned up a lot of reports of car enthusiasts who had installed retrofit HID light kits--their lights would work great, but the HID lights would wreck havoc with the car radio. At this point it would have been nice to have some better tools (like a spectrum analyze or oscilloscope) to troubleshoot my supposed noise issue, so I used the next best thing -- an inexpensive AM/FM radio. With either HID light on, there was a **lot** of noise on the AM/FM radio near the wingtips, though there seemed to be more from the right side (landing light) than the left. The noise seemed to be about the same anywhere on both AM/FM bands. My guess is that the noise from the HID igniter and ballast modules was radiating back through the HID power lines and was picked up by the radio, sometimes overwhelming it so it would freeze up. I still don't understand why the radio froze up only intermittently with the taxi light on.

From all the reading I did on the web, I landed on three changes for dealing with the HID noise issue:

- Make sure all the HID components are grounded
- Shield (and ground) the power lines between the HID ballast and lamp
- Install a low pass filter on the power lines to the HID ballast.

I decided to do all three. The ballast is in a metal box that is painted on the top, but the bottom is bare metal. The bracket mount that came with the ballast is also painted, so I grounded the ballast by inserting some heavy Al foil tape between ballast and bracket, and securing the foil tape to the chassis. For shielding, I used some 1" copper braid that could be compressed over the lamp connector and the igniter module so it covered the cable all the way from the lamp connector to the ballast. I found the low pass filter at http://forums.swedespeed.com/showthread.php?127030-Reduce-HID-ballast-radio-interference, and a friend who is an electrical engineer suggested I add 0.1 µF cap to help filter out highest frequencies.

After making these three changes, I can no longer detect any noise with the HID's on using my AM/FM radio test, and the V6 radio works great both on the ground and in the air with all lights on or off.

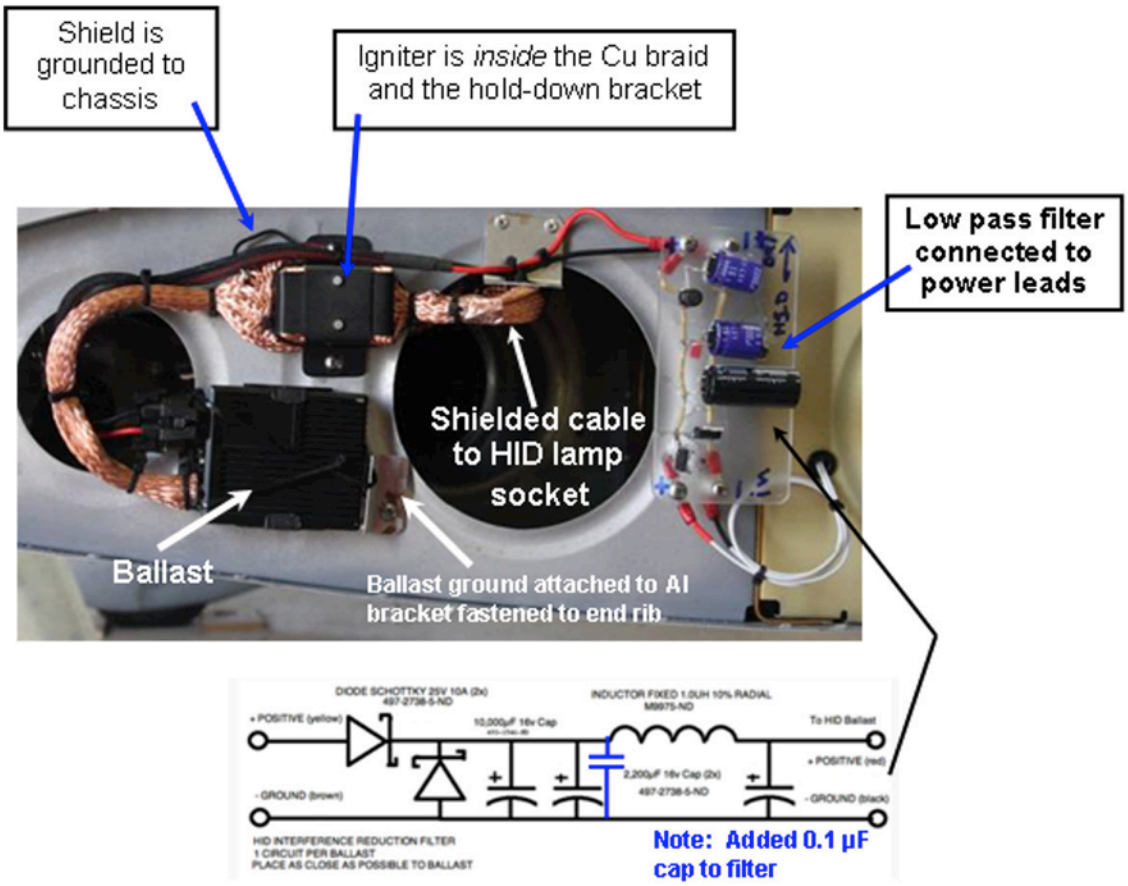
I am not certain that I needed to do all the things I did. Given that this problem was intermittent, this approach made sense to me. Getting a good ground to the ballast and shielding the cable from the ballast to the lamp might have been all that was necessary. I really don't know if the low pass filter was needed, but the radio and HID's seem to work OK with it. I will need to fly it some more to know for sure. Stay tuned.

Lessons Learned:

1. If the new radio in your brand new airplane is acting flaky, and the new replacement radio behaves the same way, the root of the problem may not the radio.
2. If the radio works great in the comfort of the hangar but malfunctions intermittently in the air, the problem might have something to do with one or more of the things that are turned on with the engine running and in the air.
3. EMI issues can be difficult to trace, especially if they manifest themselves intermittently. A more systematic approach to isolate the source of the problem could have led me to a root cause earlier. Definitely easier said than done

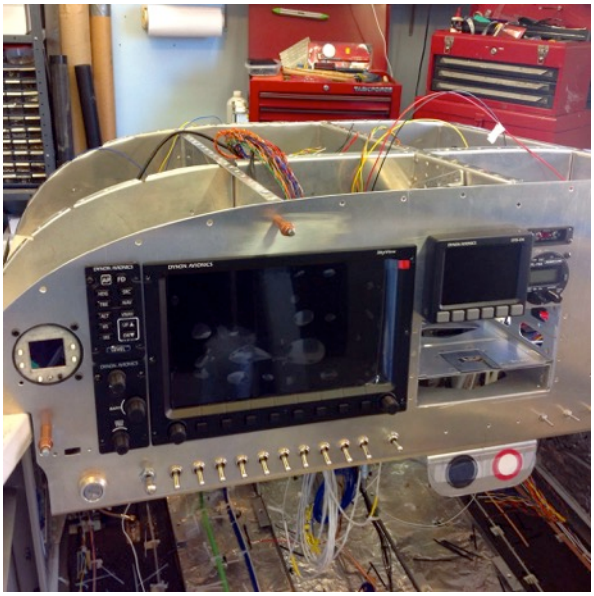
Finally, I want to thank Tom Berge for his careful inspection of my airplane before first flight, and Doug Weiler for undertaking the first couple of flights before handing it back to me. I ended up with a safer airplane as a result of their help. Thanks guys!

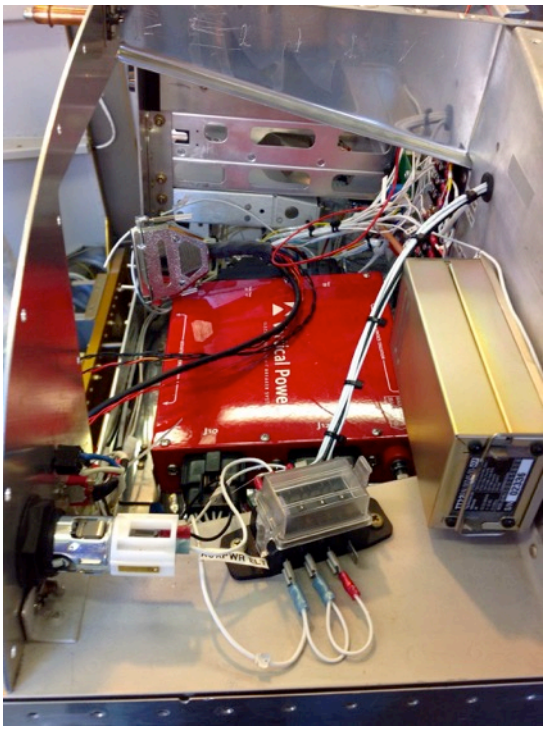
Here is the final installation.

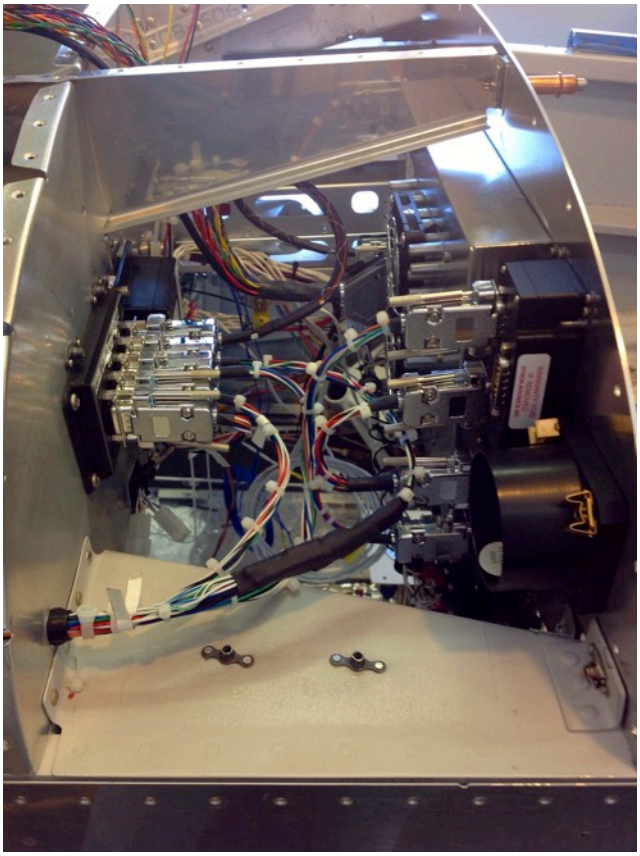


Progress at the Huber Hangar

Retired DAL captain Frank Huber has been zipping right along on his RV-7A project. Most of his work this past winter has been wiring the avionics system. Hanging the engine is on the horizon. Here are some recent photos of his wiring and the installation of the VPX electrical system.







Stomp out that Shakin'

- Doug Shears

25Th Anniversary Pricing!

In celebration of Harmony Aviation's 25th anniversary, and as a token of appreciation for GA's support over the years, I am temporarily featuring/offering **a return to 1990 pricing (only $169/single engine recips. only**) for on-site Dynamic Prop Balancing ("Harmonizing") service, delivered anywhere in Minnesota and Wisconsin! This offer may be extended further geographically as the summer progresses. Also, additional discounts may be available to some groups or fleet operators. Call/text or email for a quote.

Note: Over the years many of our past customers have observed and indicated that had they known "up-front", the kind of improvement dynamic prop balancing (Harmonizing) would make in their aircraft and 'flying experience', the investment would have been worthwhile, even at many times the regular price.

This is a Public Service Announcement!

At this incredibly low (almost not-for-profit) price-point; I consider this to be a public service offering to the Midwest GA community. In addition, when a group of at least four aircraft owners get together and request a balancing day, (at the end of the day or weekend) I will issue a commission check for 10% of revenue from our 'balancing party' to Young Eagles or whatever other entity the group sees fit to donate to--You name it; a beloved local mechanic, FBO, Pilot shack coffee & donut fund etc.etc ....

This is also an especially great opportunity for those who are attempting to maintain their aircraft on a budget and/or for smaller (fixed pitch single) aircraft owners who may be operating under the false assumption that dynamic prop balancing was only "for high performance aircraft".

Let's make it an 'event' to remember!

My most memorable days, over the years, have been while conducting prop balancing 'parties' on-site all over the Midwest. The hospitality of our GA community has never ceased to amaze me! In fact you've all been so much fun to work with; I'm not sure Harmony Aviation falls under the normal category of a business-as-usual capitalist enterprise. (My wife once quipped "you've never made enough money with Harmony to call it a business, it's just another expensive hobby") Still, If only I could afford to deliver and perform my 'balancing act' for free, undoubtedly, many thousands more people would be flying smoother (and more reliable) aircraft by now.

Still, I'm willing to perform my 'balancing act' for any audience; Even if there is only one interested party at your location, the offer stands, On-Site DPB service delivered for only $169. Contact me at dshears@propbalancing.com, http://harmonyaviation.com, or **651-295-4313.**

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First Class

Twin Cities RV Builders – Lunch at Fox Hollow

Saturday, June 20, eatin' starts at noon

Bernie Weiss' hangar at Anoka County Airport (KANE)

The RV folks at Fox Hollow at ANE have again invited us to hang out and enjoy some more great food from the Holy Land Deli. We've done this before so most of you know the drill. Everthing is provided so just bring your appetite! (oh, how about some camp chairs for your dining comfort).

Fly-ins are welcome. You can park at the north end of the hangar line (ask for taxi instructions to "Fox Hollow" at the west end of the airport (taxi lane "India")) or on the grass on India Lane opposite the hangars. Driving directions are:

From Rte 65: Turn east on 93rd Lane NE. Turn left at airport entrance (gate code 12185). Turn right at T intersection then immediate left on India Lane.

From I35W and Rte 10: Go west on Rte 10 and exit on 93rd Lane. Turn right and take second airport entrance to the right and follow directions above.

Park on grass clear of taxiways and hangar doors. Questions, call Doug at 651-398-1184

Lastly: We need a headcount for the food order!! Please go on line to www.mnwing.org and follow the link to sign up.