



RVator's Log

Newsletter of the Twin Cities RV Builder's Group

June 2016

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Upcoming Events

June 12 – Twin Cities RV Builders June BBQ – Anoka County Airport.

See page 8.

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**Minnesota Wing
Van's Air Force**

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Shop Notes

It was a clear and calm night over northern California. We were descending out of FL 360 at the end of a 3-½ hour MSP to SFO leg. Our usually routing was due west across Yosemite Park, over Modesto with vectors to the ILS 28L. Tonight it was something new: the Point Reys One, over Sacramento to the Point Reys VOR and then vectors to San Fran. Neither the captain nor I had flown this arrival before and had no idea why were being routed so far north. But the pay is the same and we were just along for the ATC ride anyway. It was another 12-hour duty day and we were serious late after a mechanical issue back in MSP. It was pushing 1 am as we descended over PYE and turned southeast towards the lights of the city.

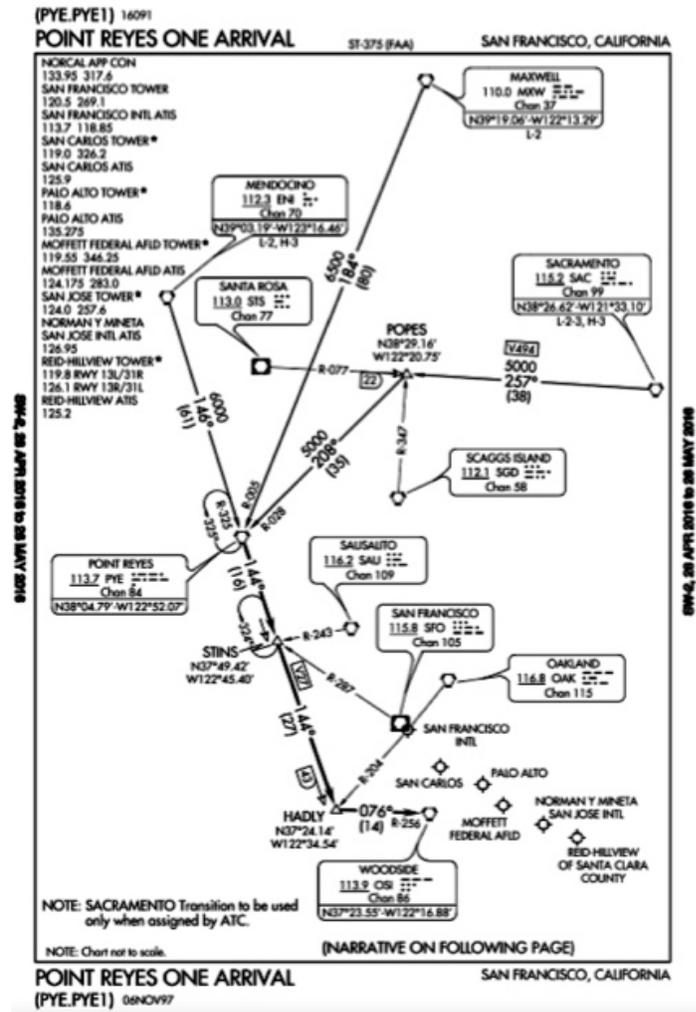


It was my leg and I was still fairly new to the B-757. I had pretty much mastered most of the but-
tonology in commanding the flight management computer to make the 100-ton Boeing do what it was supposed to do. Since I was pilot flying tonight, the captain was radio operator and chief button pusher. All I had to do was fly the jet, which was the easy part. Or so I thought.

The radio was suspiciously quiet that night as it seem3d we were the only airplane on the frequency. Approach gave us vectors over the airport to a left downwind to 28L at 8000 feet. Cleared on down to 4000, I was beginning to get a little behind the eight ball. Big smooth, low drag jets are super-efficient gliders with lots of inertia that made slow-

ing down and going down a bit of a challenge. I reached for the speed brake handle to at least get some drag out there to get down to flap speed. The usual rumble was perceptible up front as the boards extended probably waking half the passengers. A good pilot shouldn't have to resort to popping the boards to slow the beast, but I made no claim to being a good pilot.

Cleared down to 3000 feet, I manage to at least get flaps to 10 degrees and then 15 as we pass though 180 knots. "Northwest 356, turn left heading 360, report the airport in sight." We are the only guy in town at this late hour and ATC is doing us a favor



giving us a short approach. The captain obviously sees the airport and reports it in sight. "Northwest 356, cleared visual 28L. Contact the tower 120.5." I'm descending through 3500 feet and click off the autopilot. Rolling out on base leg, I have yet to see the airport from my side of the airplane. Tower clears us to land and I finally can get a quick glance at the runway. Oh great... we are really high! I call for "gear down, flaps 20." More rumbling and shaking as millions of air molecules scream in protest. My brain seems to separate from my body and now lags behind the airplane about a mile. Flaps 30 and landing check and I retract the speed brakes. The captain is pretty cool doing as I ask. He doesn't know his co-pilot's brain is now 2 miles behind the airplane and getting worse. Turning final with gear and flaps down, power off and about 1500 agl, I finally reach Vref (final approach speed). I look ahead at the runway and realize we are hopelessly high. There is no way we are going to be on speed with the power up for a stabilized approach at our mandatory 1000-foot agl point. I tell the captain, "I think this is hopeless. Tell him we're going around." He nods silently and I hit the go-around toggles and the power comes up. "Go around thrust, flaps 15", I command as if I know what I'm doing. "Positive rate, gear up." I feel like an idiot.

Tower makes some comment about what's the problem. Fortunately the captain handles it well and doesn't advertise that the F/O should stick to flying his little RV back in Minnesota. Captain gets on the PA and explains why we are going around. He fibs something about aircraft spacing (what a great guy!) We motor back around the pattern probably burning up an extra \$500 of NWA's gas. We are still the only airplane on the frequency and this time I get my act together and land without any further undue embarrassment.

Fast forward years later, a Korean Air 777 comes to grief on this same runway, under similar circumstances trying to salvage a messed up visual approach. There are times in any airplane when you get that "feelin". You know that thing in your gut that all is not going as it should. I've had it a few times, not just in big machines but light airplanes and even the RV. Time to go-around, turn back, or maybe even stay on the ground and fly another day.

* * * * *

Ultimate RV: a conventional tri-gear with a sliding tip-up canopy!

Ed note: The ever lasting questions: should I built a tail-dragger or a tri-gear? What about a slider or a tip-up? Here are two great articles from the archives of Van's Air Force by Martin Sutter

Tri-gear or taildragger?

The RV6, RV7, RV8 and the RV9 come in two basic flavors - taildragger and tricycle. Now if any RV topic gets the faithful on the barricades, this is it. Immediately you hear passionate statements like "tricycles are for wimps, real pilots fly tail-draggers" or "taildraggers are an anachronism or an accident waiting to happen". Reality is probably not as simple as this so let's consider the facts from a less emotional point of view. Most airplanes of newer origin are designed with a tricycle gear. The simple reason for that is dynamic stability. Since the center of gravity lies ahead of the pivot axis, the natural tendency is for the airplane to go straight until disturbed by other forces. Taildraggers are inherently less directionally stable because the opposite is the case. Beyond these facts the arguments get emotional but I will try to examine the pros and cons point by point.

Visibility: This one is a clear winner for the tri-gear. The ground in front of the airplane remains in full view and running over chocks on the ramp, pot holes and off the pavement in turns is inexcusable if you keep your eyes open. The same is the case on take off and landing. Proper seating position in the taildragger will mitigate some of the visibility problem but not all of it. Make sure your head is as high up as possible without banging the canopy.



RV-7A builder/pilot Bob Collins: diehard tri-gear fan.

Ground Handling: The tri-gear RV's manners are straight forward and honest but it is not an airplane that tolerates poor pilot skills as well as a Cessna 152, for instance. The nose wheel is free casting so steering has to be done with brakes at low speeds and the nose wheel may follow ruts on rough ground. While I have no engineering data on nose gear strength, I am aware of quite a few 6A's loosing their nose gear because their pilots did not use proper technique. Landing nose wheel first or taxiing thru dips and chuckholes without elevator backpressure are good ways to feed that new prop some asphalt. The taildragger takes continuous rudder input on the roll to keep it in the direction you want to go but it's positive tail wheel steering make it a snap to taxi even in strong winds. Since the tail wheel is quite small, a constant vigil must be kept to steer clear of potholes and reflective marker dots

(they sound like someone is hitting the back of the fuselage when you taxi over them). Another point to remember is that a taildragger can go over on its nose if you do not keep the stick back on full power run-ups or when suddenly applying hard braking.

Take off and Landing: The taildragger RV is one of the easier handling members of its genre and take offs are easy to keep straight with appropriate rudder input. On higher horsepower airplanes with constant speed props there is a lot of torque (p - factor) at play, which can easily be overcome by leaving the tail wheel on the ground until the rudder becomes fully effective. Raising the tail a bit after that greatly improves down the runway visibility. The tri-gear takes a little dancing on the brakes to keep things straight until the rudder becomes effective since the nose wheel is not steerable. In the landing phase the tri-gear really shines and is a pussycat as long as you fly it properly (do not land on the nose gear as many spam can drivers do and get away with it). Touch down speed is forgiving as long as it is above stall of course. With a little nose up attitude and the proper flare it's a greaser. Not so with the taildragger. Unlike its brother, it demands a precise pitch attitude and touch down speed and zero sink rate on touch down or it will bounce. Roll out is easier since it is quite stable directionally for a taildragger. Unlike many production taildraggers like the Champ and the Taylorcraft, full stick back in the flare will result in a higher angle of attack than three point attitude resulting in a clumsy touch down with the tail wheel first and a big clunk when the mains finally crash down after the wing stalls. So this one is definitely in favor of the tri-gear.

Rough field Capability: You might surmise that the taildragger would be the clear winner there since most bush planes have conventional gear but those airplanes have big beefy tail wheels. The RV's tail wheel is quite small and on airplanes with smaller engines and wood props there is quite a bit of weight on the tail. This means it takes a fair amount of speed to get the tail up. The tri-gear's nose wheel can be unloaded while taxiing by applying full up elevator and it is considerably larger. An additional advantage is the over the nose visibility to avoid rough spots in the first place. Which one gets off shorter and lands shorter? Believe it or not, it's the tri-gear. Because the taildragger sits nowhere near at maximum angle of attack on the ground, it must reach greater speed before it can fly. The same is true on landing unless you want to land tail wheel first. Of course these factors only come into play with a skilled pilot at the control. Van used to demonstrate an unbelievably short take off and touch down in the former red trigear 180hp cs prop 6. On both take off and touch down the tail would only be an inch or so off the ground and the aircraft at a ridiculous angle of attack.



Yes, REAL men do fly taildraggers! Chris Stenstrom and his award winning RV-8.

So which one should you get? Practical reasons favor the tri-gear but it's not that simple. We all get into this because we have a passion for it and practical reasons are not the only thing we consider. The taildragger demands good piloting technique but does the tri-gear deserve anything less? Both airplanes look the best when flown by a skilled pilot, so get your skills honed before you start flying these beauties. My airplane is a taildragger, mostly because that is all Van had to offer when I built it. At the time of first flight, I was coming out of a thousand hours in a Cherokee. I thought I was a pretty competent pilot, but once I started tail wheel training in a Taylorcraft, I realized I had a couple of very lazy feet and had a long way to go to truly be flying an airplane instead of just riding in it. When I started flying the 6, it made me even more aware what precise flying meant. Not that I ever felt out of control, but being a perfectionist I was always painfully aware when my technique was lacking. Today I have almost ten years and 1,650 hrs in the RV and really enjoy flying it, including crosswind landings. Do I think the taildragger is the only way to go? Of course not - but then I just am in love with its looks.

Tip-up or Slider?

You are ready to make the plunge and order that RV7 or RV9 kit. Now you have to make some choices on the options. One of them is tip-up canopy or slider. Maybe you are passionate about one or the other but before you mark down your option, take a moment and consider more than just the obvious. Here are the pros and cons from someone who has built and flown both versions.

Difficulty of construction: Notice I said difficulty, not ease because the canopy is one of the harder components to build. The basic frame for the slider is made from welded steel tubing and comes as a complete unit in the kit. The tip-up is made from aluminum components that have to be riveted together by the builder. That means more labor from you but gives you

the opportunity to build the frame to precisely match your fuselage. The slider frame may or may not fit your fuselage precisely due to minor variances in fuselage shape along the canopy interface and small distortions that occur during welding of the steel tubing. To get this frame to fit it will have to be bent and tweaked and in some cases you might even have to cut and re-weld a tube or two to get that perfect fit, depending on the level of perfection you are striving for. One thing you must remember is that the entire fitting has to be done before drilling the canopy bubble to the frame or the holes will no longer match and that is a certain invitation to a cracked bubble during installation.



Vince Bastiani and Tom Berge – basking under a vast tip-up bubble of Plexiglas.

Visibility: On that one the tip-up wins hands down, at least looking forward. However if you worry about bogies at your six, the slider offers an advantage there.

Ease of entry and exit: The tip-up opens up a longer area from front to back for you to get inside. On taildraggers the advantage is even more pronounced, yet the tilt of the fuselage causes the top of the windshield of the tip-up to protrude in your chest (and the open canopy behind you is not the appropriate place to support your out of shape rump). In this case the sturdy roll bar of the tip-up is a much better support for you.

Sturdiness in daily use: Definite advantage to the slider. The biggest draw back of the tip-up is its vulnerability while it is open. Since it sticks up like a big sail, quick harm can come from a strong gust of wind or an inconsiderate fellow pilot with a strong prop blast. Installing gas struts and reinforcing the forward frame with a composite lay-up can make the tip-up sturdier but not to the point where it can take the wind blasts and rough handling the slider can tolerate.



Bernie Weiss – The RV grin is great but nothing can beat the RV SLIDER grin!!

Ventilation on the ground: If you like to hang your elbow out the side and let the wind blow thru your hair while taxiing on a hot day, the slider will not disappoint you. The tip-up can be raised in the back by a few inches to allow for a nice air flow while taxiing but it is more like having the windows in your car down by a few inches than like riding in a convertible as is the case with the slider.

Canopy seal: The slider is harder to seal against drafts in flight. A certain amount of airflow is difficult to keep from coming thru the gap between the canopy skirt and the fuselage sides and turtle deck. This air is especially noticeable in the wintertime. Since the tilt-up drops down on the fuselage rather than sliding along it, gaskets can easily provide a draft free environment. The tip-up requires very careful fitting in the front to eliminate water leaks along the hinge line. Sliders tend to leak water around the rear skirt in flight. So which one do I have? I won't tell in order not to bias your choice. Look at all the above points and decide which ones are most important to you and then make your decision.

Addition comment from Mel Asberry:

Subject: Tip-up vs. Slider

Martin did a very good job of presenting the facts on the two optional canopies. However, he left out one VERY important one. The fact that access to the back of the instrument panel is MUCH better with the tip-up. With the slider, working behind the panel is not much fun. In addition, with a pull of the jettison handle the tip-up can be completely removed giving even more access and easier work on the canopy itself.

My Favorite Building Quotes

-Tim Olson

"When working out how much a project is going to cost, write down how much you think, then double it. Then throw the paper in the bin and just keep spending money until its finished!!"

-Scott Lewis
RV-10 40172 VH-DRS

"The world is divided into two kinds of people: those who spend a great deal of time saving money, and those who spend a great deal of money saving time."

- Peter Cochrane

"Building an airplane is not one hugely expensive, monumentally difficult, and enormously time consuming task. It is hundreds of hugely expensive, monumentally difficult, and enormously time consuming tasks in a series."

- Brian (N9612S)

"I fly because it releases my mind from the tyranny of petty things . . ."

-Antoine de Saint-Exupry

"When once you have tasted flight, you will forever walk the Earth with your eyes turned skyward, for there you have been, and there you will always long to return."

-Leonardo DaVinci

Ed note: When I was deep in the throes of building my RV-7, fellow builder Bernie Weiss coined the term "AMU" which stands for Aviation Monetary Unit. One AMU equals a thousand bucks. It just seems SO much easier to think in terms of AMUs especially when relating the building costs to one's spouse! "Honey, that Garmin G3X panel we just HAVE to have is only 15 AMUs!!" Plus... you ignore any item costing less than one AMU. It just doesn't count!

CFI Tom Berge presents a four-part series of ground instruction topics he covers in his RV transition-training course.

Part 2 – Taxi and Takeoff

-Tom Berge

In my previous article, I discussed RV controls and trim. In a nutshell, STOP MOVING and TRIM THE AIRPLANE! I also mentioned habits and the difficulty of changing ingrained habits. My guess would be that you put the same shoe on each time you do so, in sequence, every time. The trip home from the airport becomes a habit that sometimes has you sitting in your driveway not remembering



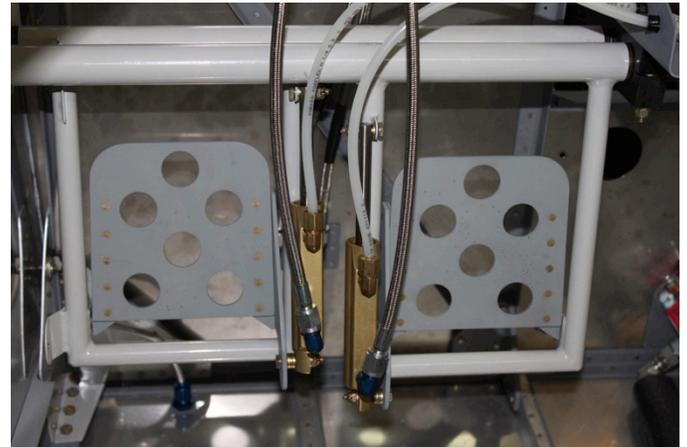
how you got there. It's spooky but that's what habits do. They automate your repetitive functions giving you additional mental horsepower to use on more pressing issues.

Taxiing is one of those habits in need of a little bit of alteration. I use my side-by-side RV7A for training and thus my focus is on that model though it applies to the rest of the bunch as well. In your previous life the instructors would holler at



you to stay off the brakes. RV steering is by differential braking. **YOU MUST USE BRAKES.** Unless you are taxiing quite fast, there's not enough airflow over the rudder to give the crisp control you want. I'm not saying don't use rudder. Far from

it. When taxiing with a crosswind, the wind will turn you into the wind. Your options are drag a brake leading to very hot brakes, or put in rudder to counter the wind and then using brakes to fine tune. Either way, you'll look like a drunk going down the taxiway. I tend to taxi at a modest pace, stick back to help the nose gear, wind permitting and fingers off the avionics. By the way, I have seen brakes smoke from excessive use. Just saying.....



And speaking of brakes, use them just as you would in your car. Apply small amounts of pressure, increasing as required, but please don't stomp on them. The first attempt at taxiing may have you applying too much, too quick on one brake then the other leaving you zigzagging across the taxiway. Slow down and drag just enough to effect the change wanted. With the exception of crosswind control, my feet are normally neutral with very small brake applications to maintain centerline. (you know that yellow line up the middle!) Also, if you hear lots of noise but are going very slow, someone is riding the brakes. Use them, don't ride them. Lead the turns with rudder, dragging the inside brake as required, adding enough power to overcome the drag of the brake, opposite rudder before coming out of the turn, reduce power back to taxi power, rinse and repeat.

Going back to my initial private pilot training, the takeoff was taught this way. Shove in the power, reach 60 knots, pull back, lift off. Rudder usage was not emphasized. Left turning tendency was unheard of in a Cessna 152. Yes, I was controlling the beast. Then it was on to my RV6 tailwheel where rudder control became my intimate friend. Sixteen hundred hours was enough to firmly set the habit. When I built my RV7A, my takeoff sequence was very much like I had been taught during initial training. Power, speed, pull and it worked just fine. Before being listed on Vans website as a transition instructor, I had to fly with Mike Seagar and wouldn't you know it, he showed me a better way. Important hint #2, you never know so much that you can't learn more. I like to characterize my takeoffs now as more partnership than control. I give the airplane what it wants and it gives me what I want. You see, the plane is much smarter at flying than I am. Here is how I take-off now.

Roll onto the runway centerline, the white dotted lines in the middle of the runway, neutral controls, clear the brakes, keeping it rolling. Next, apply about 25% power to confirm the plane is tracking straight, neutral controls, smoothly add full power. A trick to know when you are at full power is when the throttle stops moving forward. As the throttle is advanced, start adding RIGHT RUDDER, stop pushing left rudder. Pushing with both feet at the same time equals no rudder. If there is no rudder usage, an RV will go left. That is caused by the three evil forces of P-Factor, slipstream and torque. My guess is this will be the first time you have really experienced these three forces. If you continue to go left, add more right rudder, stop pushing left rudder and don't use aileron. Aileron usage to stop the drift won't help but will drop the right wing upon liftoff that is sure to get my attention. You won't notice because you are both saturated and elated at not having to worry about drift anymore.

As the throttle hits the stop and the centerline is being tracked, start adding sufficient backpressure to raise the nose. Sounds like a soft field takeoff, doesn't it? It is, just with lots more finesse. It takes quite a lot of pressure to lift the nose against the trimmed takeoff airspeed, so be prepared. Watch the top of the cowl and at the first sign that it's starting to lift, start relaxing the back pressure on the stick to keep the nose wheel just clear of the runway. Once the nose is off, the backpressure will have to be reduced throughout the takeoff roll because the elevator is getting more and more effective with the increasing speed. Just keep the nose stationary. This will be the same sight picture at touchdown, so remember it. At some point, the wing will get enough airflow to generate sufficient lift and off you'll go. There is no need to pull the plane off with a mighty tug. You've given the plane what it wants which is speed and angle of attack, and it will give you a nice, "Wow, was that a smooth takeoff or what?" Students ask what my liftoff speed is. I frankly don't know and don't care. The wing has what it wants and is happy.



OK, we're off!! Top of the cowl on the horizon so you can see what's coming at you. Things like airplanes landing the opposite way, eagles, ducks, and those known airplane killers, geese. Yeah, I know it's a cruise climb and not V_y , but I can see and I'm still climbing at 1000 FPM or better. Recently during an instructional flight, we missed a bald eagle that was not squawking on the ADS-B. We missed by so little, I know it passed underneath the wing. I'm sure the eagle thought we were a couple of amateurs, and he's right.

All of this from the initial rollout onto the runway to liftoff happens in about 4-5 seconds or so. There's not much time to correct sloppy technique. If you're pulled off the centerline, don't try to return, just stop any additional drift. If you pull too much on the stick, you'll yank the plane off before it's ready, though it will fly. It's just not a smooth takeoff. Enough of this taxi and takeoff stuff. Next issue we'll look at two emergency operations, go-arounds and engine failure.

It's the little things.....

- Doug

It started off innocently enough. Me, Tom Berge in his RV-7A, and Bernie Weiss in his Bonanza off on another pancake run to BRD. I was solo and decided to file IFR just for the practice. The weather was good VFR with a few high broken clouds. Tom was well in the lead and Bernie was a little behind me as we made our way north. I was talking to center most of the time but had 122.75 on the #2 radio to yap with the guys if the need arose.

In the upper LHS of my panel is a Monroy Traffic Watch transponder detector. Since installing my ADS-B system, I don't rely on the Traffic Watch much but it does provide a little re-

dundancy for traffic avoidance, which certainly is a good thing. It also has a low voltage warning capability, which monitors those crazy electrons flowing into the little unit.

I was about 30 miles out of BRD when the Traffic Watch lady suddenly called out “low voltage”. Hmm.. now that is weird. I looked at the main system voltage on my AFS EFIS display and it showed a solid 14.3 volts. But I kept getting this “low voltage” aural warning and a display of 12 volts on the Traffic Watch. I was baffled. Maybe the unit is going bad. Anyway I landed at BRD with no further warnings and figured there could be some gremlins that I could address later.

After another great breakfast and full of those super good wild rice pancakes, we headed out to our machines for the trip back to civilization. Tom and Bernie cranked up and taxied out ahead of me. I fired up the -7 and was about to start rolling when suddenly all of the avionics went dead. Oh, this is great! I have a wedding to get to this afternoon and 22DW is letting me down. Now what?

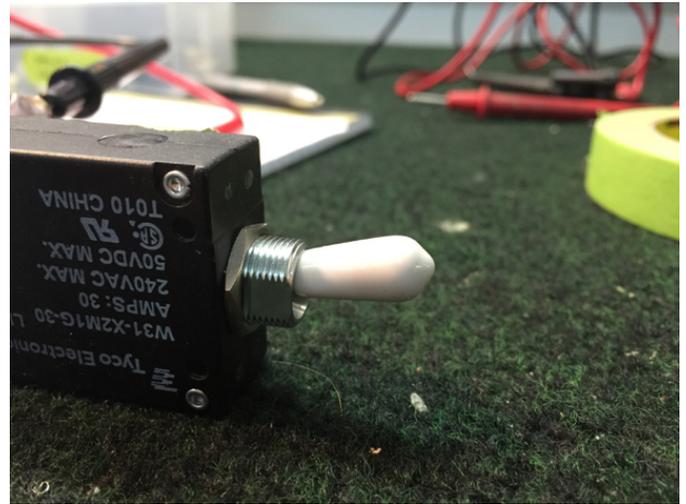
I detect a faint smell of something burning so that adds to the confusion and concern. I switch off the avionics master switch and sit there for a minute. The smell is gone and everything seems to be running except everything on my avionics bus. Maybe a short on the bus somewhere. Well the weather is fine. My EFIS screens are all working but I have no radios or GPS. I have all of the necessary charts in my iPad. Can I actually find my way back to Lake Elmo using pilotage and a sectional? Hey, Lindbergh didn’t need any GPS to cross the Atlantic. The iPad says 145 degrees to Lake Elmo. How hard can that be?

Tom and Bernie are long gone and I can’t talk to them without any radios. I launch and head southwest. Following the lakes, rivers, and roads back home is a non-event although flying without an autopilot in the bumpy air is a pain. Thirty minutes later the skyline of Minneapolis is in sight and soon I’m in the pattern at Lake Elmo. Taxiing in, I turn on the avionic master and everything comes up and seems normal. Great! What is that supposed to mean?

In the hangar, I start experimenting. Turning the avionics master on and off results in sporadic power to the boxes. I’m confused. I am beginning to suspect the switch. I check the voltage going into the switch: 12 volts. Voltage coming out: 5 volts. Hmmm... that is weird. I call Tom to tell him my tale of woe and also report I’m back in the hangar safe and sound. We decide to get a new switch.

A 30-amp circuit breaker switch controls my avionics buss. I order another and a couple days later, pull out the old to install the new one. Examining the old switch on the bench, it begins to dawn on me what may have caused my problem. All of my switches have cool color-coded plastic covers and the avionics circuit breaker switch is no exception. But it is a little different from the other switches and as I look at it, I realize that the plastic cover has prevented the switch from moving “up” as far as it could go (see photos.) There is a distinct difference in its “clickability” when the plastic cover is removed. Since I

have a new switch, I crack open the old one and discover the electrical contacts are burnt and scored. My theory is that from day one, the avionics circuit breaker switch was never quite as “engaged” as it needed to be and finally the contacts wore down and were not firmly touching each other. The Traffic Watch is on the avionics bus and it was sometimes getting system voltage, sometimes 12 volts or less and sometimes nothing. I have only flown a few times in solid IFR condition but losing all comm and nav then might not have been much fun.



The errant plastic cover. It extends into the threaded housing possibly preventing “full ON”!!



Three seconds with my Xacto knife and all is well.

Cutting off a 1/8” from the plastic cover solves the problem and the new switch has a solid click to it and all the electrons are happily flowing with no complaints. It is amazing how little things can trip you up in an airplane. One never stops learning!!!

Twin Cities RV Builders Group
12 Island View Lane
North Oaks, MN 55127

First Class

Twin Cities RV Builders Group – BBQ time!!!

Sunday, June 12, eatin' starts around 1:00 pm

Bernie Weiss' hangar at Anoka County (KANE, India Lane)

It's summer (almost) which means time to gather at Anoka for another afternoon of food and friends. Our hosts are again Bernie Weiss and Pete Howell (and daughter Kate). BBQ is on the menu this year and all you have to do is be there!! Bring along a camp chair for your dining comfort. Everything else is provided!!

We do need a headcount so PLEASE go to the website (www.mnwing.org) and follow the link on the home page to indicate how many in your party are planning to come.

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.

Please park on grass or hard surface clear of hangar doors!!!!!! Questions: Call Doug at 651-398-1184

