



RVator's Log

Newsletter of the Twin Cities RV Builder's Group

Shop Notes

- Doug

June 2025

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Upcoming Events

**TC RV Builders Summer
Lunch**

**Saturday, June 21, Noonish
Details page 7**

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**Minnesota Wing
Van's Air Force**

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course which I review every year. Yep, the old brain's processing power runs a little slower these days, but it's all familiar stuff I've lived with for years and years.

Our resident RV transition instructor Tom Berge, does not have an instrument instructor rating so I would need to step out of the RV world to find a 'double I' to give me the IPC. I think I had just the guy...

I met Andy Kins three years ago on a shared committee at church. Come to find out he had just got his private certificate at Lake Elmo and he was seriously flying as much as possible working on the rest of his ratings. He had a good day job in finance and data management which now fueled

Over the years I have played mentor to any number of young folks dreaming of becoming a pilot. One caveat I always bring up is that flying airplanes, whether big or small, requires a boatload of reading, study, quizzes, tests, and a lifetime of the dreaded "check ride." If it was only as simple as kicking the tires and lighting the fires to go aviating. Good old Uncle Sam stands there with this BIG book of regulations making sure us pilots adhere to some semblance of skill, knowledge and safety.

In the old days at NWA, five days every year was spent in recurrent training. I would tell the family that I would be unavailable for any life functions a couple weeks prior as I dived into the books and got my brain up to speed. Then a couple days of refresher ground school and then 8 hours of simulator training cumulated by the inevitable "you bet your job" check ride. There was no better feeling than walking out of the training center afterwards with a new lease on life (at least for one more year!)

Unbelievable it has been 17 years since retiring from the airline and the last 13 years flying the RV-7. 22DW is IFR certified and I've kept current doing these six approaches every six months and practicing a lot of button pushing. I file IFR on just about every cross-country trip but the RV is still a little airplane so my personal IFR limits are pretty high.

This spring, as a senior aviator, I thought maybe it's time for a real live Instrument Proficiency Check. This could be a great idea or extremely embarrassing. First of all, I hit the books with Sporty's IPC video



Andy teaching the old dog some new tricks



a lifelong passion for aviation. He impressed me as being a super sharp guy who I'm sure could excel in anything he put his mind to. Fast forward to 2025 and Andy has his commercial, ME, CFI and CFII and is working as a part-time instructor at Elmo Aero. I've taking him flying in the RV a couple times so he's been exposed to a "real" flying machine. Let's do an IPC!

At first, he's a little reluctant... new-be IFI with a couple hundred hours giving a check ride to old, old ex-airline guy who he apparently he thinks is a super pilot (wrong, wrong!!!) No, no, no.... let's do it... I'm the dumb student and you beat on me like anyone else!!

A date is set and we meet on a Thursday evening at my hangar. Since I've passed the Sporty's course, the ground training requirement is met but we spent a little over an hour on the basic regs of IFR flight. Andy is a great instructor and I'm impressed with his enthusiasm and knowledge. He really likes to teach and it shows. We filed a round robin IFR trip to St. Paul, Anoka and back, squeeze into the RV and off we go.

First up we tell approach we're going to do some air work east of Lake Elmo and I stumble my way through steep turns and unusual attitudes. As you know there is a reason we say autopilots are mandatory for IFR flight in our snappy RVs. Hand-flying under the "Foggles" is REAL work, especially when Andy throws in some vertigo inducing maneuvers. Fifteen minutes of that is plenty so we head over to STP for an ILS, with a missed to a holding pattern. Then to ANE for a non-precision approach and another missed. Things happen fast with reprogramming the Garmin 430 in rapid-fire succession. Back to Lake Elmo with the RNAV to 14 and then circle to land.

Whew!! Back on the ground in 90 minutes and I feel smashed into IFR submission just like the old days at Northwest. But it was all good and I feel ready to tackle the IFR world again for the next six months. And also it's great to see a young instructor with a heart for teaching. We need more.

But he really needs to build an RV!!!!!!

* * * * *

Like Looking at the Sun.....

- Pete Howell

So you want some bright lights for your bird. Sure, sure you can just look online and hand over a credit card number, get a well-designed kit delivered in the next few days with complete instructions and a warranty, maybe even customer support, but what fun is that?

What if I told you I had a much harder way to do it, one that involves designing all you all your own parts, creating your own global supply chain, and doing your own sketchy testing? Sound like fun? Then read on.....



The lights I had on my 9A were pretty good - adapted flashlight heads in an MR-16 like format in each wingtip. They were efficient and bright, but they could be better. I had been eyeing some of the newer generation LED chips and some Total Internal reflection spot focusing lenses that would give me wingtip lights similar to those produced by FLYLEDs.

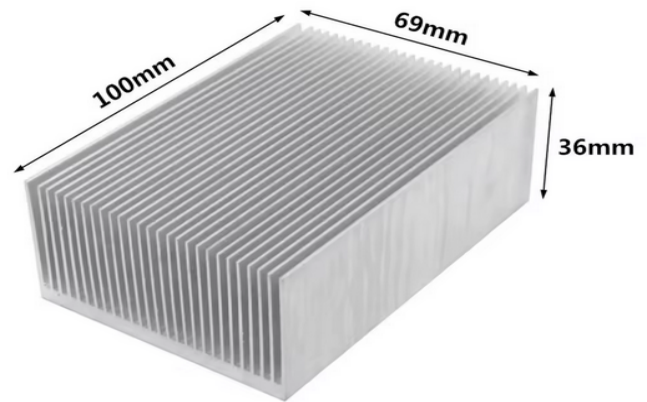
I started the design by looking for components - LEDs on star PCBs and Lenses. I was able to find some 3 deg spot lenses by a company called Kathod out of Italy. I had some great conversations with one of their sales engineers, Fabio, who confirmed the 35 mm PL1672 series lenses were just what I wanted (used on several DoD projects!). They even come with lens holders that would make my design easier. So lenses from Italy..... via an American distributor @ about 6\$ each. Free shipping over \$35 - bingo!

Even if you don't fly at night, super bright lights are essential so other planes can see and avoid you - especially under the Bravo, where I spend a fair amount of time.

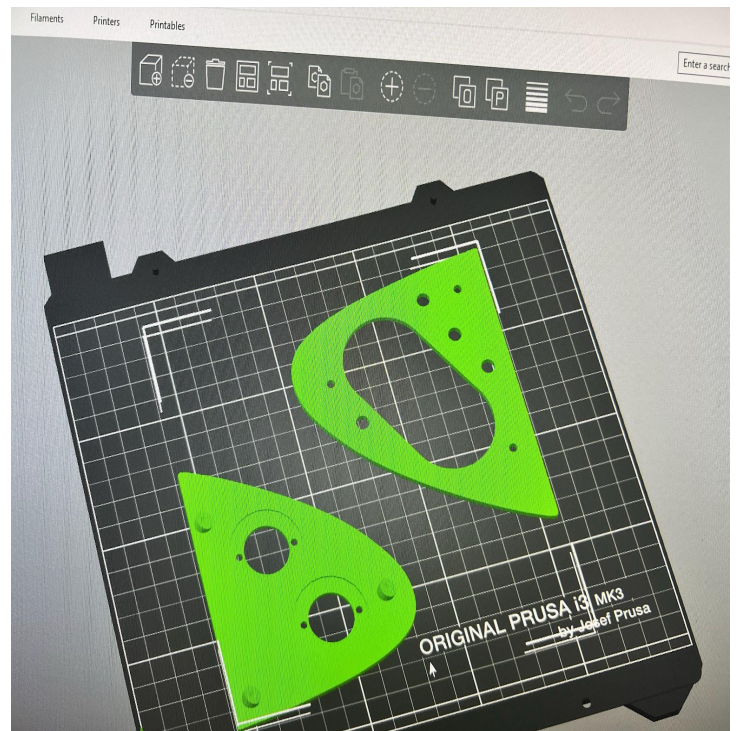
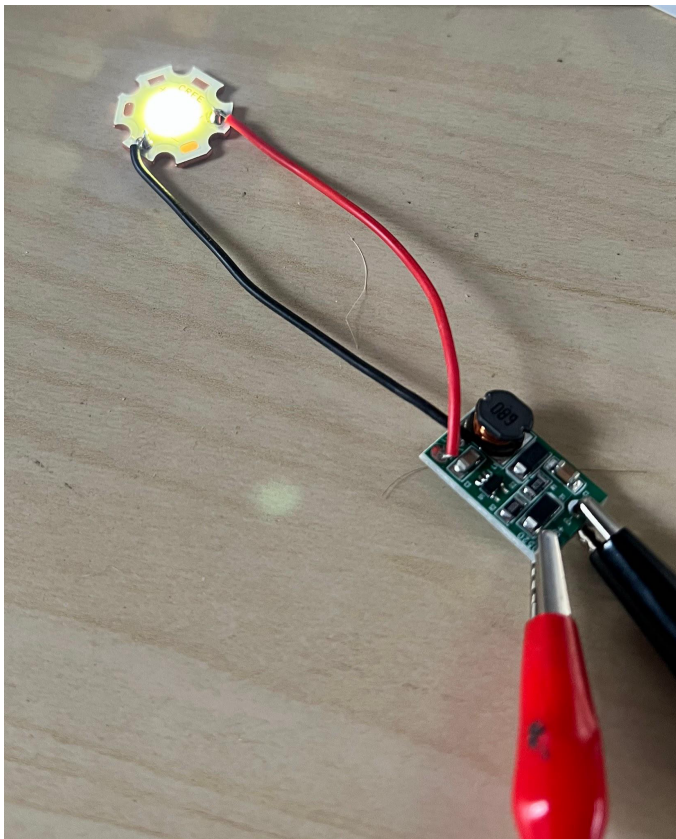


Next, we needed super bright LEDs to fill up the lenses with photons. These come in different colors and sizes. The lenses need .35in LEDs, so that decision was made. Colors come in a few shades of white, from warm (4000K) to cold (6500K). I wanted sunlight color or about 5000K. Next, there are voltage and current concerns. LEDs of these types are constant current driven vs voltage driven. So I was going to need LEDs with constant current drivers. Chinese marketplace Aliexpress came to the rescue. They have Cree XHP35 HI 12V LEDs with a constant current driver for about \$9 - free shipping.

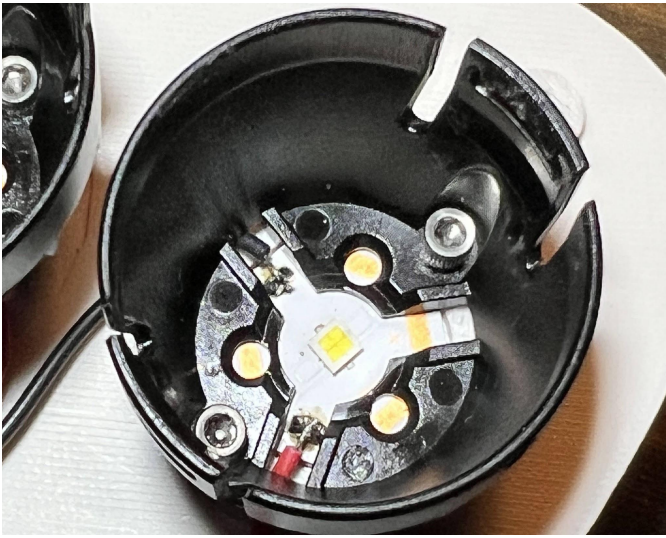
Now we are getting somewhere! An LED light, or Light Emitting Diode, works by passing an electric current through a semiconductor material, causing electrons to recombine with "holes" at the junction between two different types of semiconductors (P-type and N-type), releasing energy in the form of photons, which we perceive as light. Sorry for the geeky interlude from how stuff works, but I thought you would want to know. Even though LEDs are more efficient than most other forms of light, they still produce a crap-ton(technical term) of heat that needs to be dissipated. That requires a heat sink - this is typically a chunk of finned aluminum that you cut to size for your application. Once again, AliExpress to the rescue! About \$5!



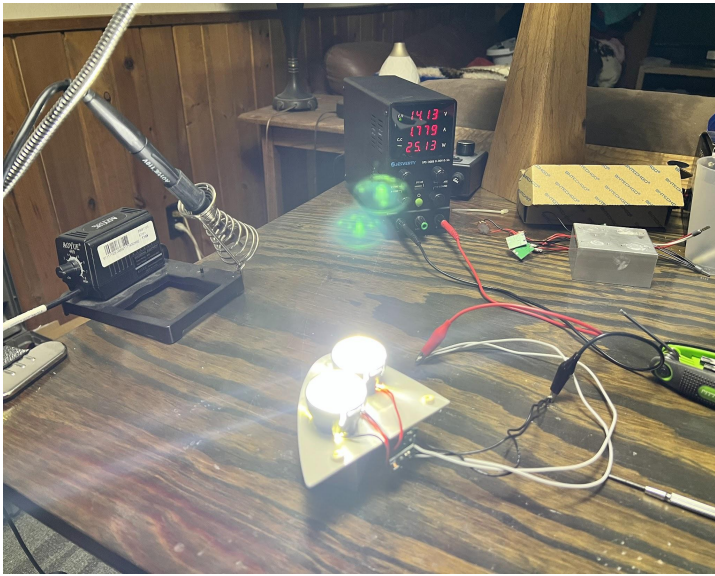
So Italian lenses, Chinese LEDs and heat sink. All we need now is a design. I needed a wingtip mount, so I fired up Tinkercad and started tinkering.



Soon, I had a baseplate and a cover plate that I was satisfied with. Adjustable and they would accommodate my LED position lights. I printed them in some high temp ASA material and started to assemble the lights. The heat sink is drilled and tapped for some 4-40 screws to hold everything together. Some heat sink compound is applied between the LED and the heat sink to facilitate heat transfer. Once the holders are bolted down, the lenses are popped in and you have a bug-eyed landing light!



Now to do some testing. I hooked the lights up to a bench power supply and let her rip at 14 volts - the constant current drivers limited the current to about 900ma - and the light was blinding. I let them run for a few hours at full tilt to make sure the ASA parts could handle the heat, and they did.



I enjoyed the education and entertainment provided by this project, but if you just want lights - order some FLYLEDS. If you like pain, I'd be happy to share my sources and design files.



Post testing, I installed them in my wingtip. They don't look too bad and kick out mucho photons. I have some more mods in mind, but I am thrilled with the result at less than \$50 per side.

A Shocking RV4 Flight

- Tom Berge

So here's a story about something that's never happened to me before. I was asked to help bring an RV4 from Indiana back to Minnesota. Simple enough. The plan was for Mark, the buyer, to fly us down in his RV8A, have one final look at the thing, then I fly it back. Of course, there were some issues. It was out of annual, the GPS didn't work, and the radio didn't work. None of this was unknown to us prior to departing.



We had a ferry permit, borrowed the same radio from a good friend and had an I-pad. What more did I need? Heck, even without the I-pad, fly west until I hit the Mississippi, turn right, and follow the river to the Minneapolis area. We were warned that the engine ran a bit hot on climb out and it didn't disappoint. Of course, upon leveling off, the temps didn't necessarily drop as much as I would have expected. In fact, I had to reduce power to keep things under control. Still, not a bad airplane. The autopilot worked well, though I had to fly by reference to the heading, making

small corrections as I flew along in bank mode. I managed not to get lost.

But as I continued along, I kept getting poked by something on my right leg. I'd feel the poke, run my hand along the bulkhead and my leg but found nothing. Very annoying. This happened numerous times throughout the flight. Our midway fuel stop was Dubuque, Iowa. The plan was to fill up the tanks and our bellies. Along the way I did a power off stall to get my approach speed figured out. Up to that point, nothing out of the ordinary other than that pesky poke on my leg. Darn it, couldn't find anything sharp. Hmmmm. Mark had flown ahead of me so as I pulled into the ramp area, he came over after I shut down to see how things were going. I had shut down everything except the master switch.

Sitting there marveling at my very good tail wheel landing after a long absence of tail wheel flying, I was talking to Mark still seated in the cockpit with my arm on the side rail, and now I'm getting poked on my arm! It felt like someone was using a needle on me. What the heck? As I ran my hand along the rail to figure out what was poking me, a thought occurred to me. Wait a minute. I reached down and shut off the master and the poking stopped! Turned it back on, the poking restarted! I wasn't being poked, I was being electrocuted! I did a couple of cycles to confirm and sure enough, something was zapping me. That explains a lot. Somewhere there's a short from a sizable wire to ground, perhaps intermittent, perhaps not. That could explain why both the GPS and radio had failed on this plane. Maybe?

We continued home with no further issues. To date, nothing has been found to explain the short. It's there but hiding. More than likely in plain sight.

The day after the flight I noticed a spot on my elbow. It was a 2nd degree burn. I felt the pain for almost a week before slowly subsiding.



The more I fly different RV's, the more interesting things I run across. I've had engines quit, smoke in the cockpit, weird stall characteristics, intermittent alternators, flat tires, a severely flooded engine (my fault). The list goes on and on. Hopefully I'll never see something this shocking again!

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Peter Fruehling slipping the surly bonds of earth in his RV-9A

Twin Cities RV Builder's Summer Luncheon

Saturday, June 21, 2025 – 12 noonish

**Bernie & Pete's hangar – India Lane
Anoka Airport, Blaine, MN (KANE)**

June is here and it's time to EAT!!!



Join us for our summer hangar party as guests of Bernie Weiss and Pete Howell. The process is the same as years past. Members are encouraged to bring along a guest and fly-ins are especially invited. Feel free to come a bit early and we'll start official eating at noon. AND... the best part.. lunch is on us courtesy of our club treasury (and your dues!)

Bring along a camp chair for your dining comfort. We'll be asking for a headcount via email so please send us a note on who all is coming at dcw@mnwing.org.

For fly-ins:

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. Please do not block any hangar doors.

For drivers:

From Rte 65: Turn east on 93rd Lane NE. Turn left at airport entrance (**gate code 9302**). 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

