



RVator's Log

Newsletter of the Twin Cities RV Builder's Group

March 2015

In this issue...

Welcome to the World	...2
Winter Project	...4
Have Plane will Travel	...6

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Upcoming Events

March 21 – Twin Cities RV Builders March Meeting.

“What Were You Thinking?”

See page 9.

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Minnesota Wing Van's Air Force

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Shop Notes

A few months ago (when the sun was shining on one of those beautiful fall days), I flew the RV down to Rochester to have lunch with son #2. As we basked in the sun on the mall in downtown, Dale asked how we ended up moving to the Twin Cities back when he was a toddler. I told him that it was really the chance conversation from just one casual friend that eventually triggered a move to Minnesota and changed our entire lives. But for a thirty second conversation life for us may have gone off in a total different path. The details....



In the early 1970s, I was stationed at Wright-Patterson AFB in Dayton, Ohio making the best of an unforeseen draft notice that found me signing up for the Air Force two steps ahead of the Army. My AF job was really not all that bad. Reasonable working hours allowed me to flight instruct and teach ground school at Moraine Airpark, which used a fleet of Citabrias for training. One of our other instructors was “Esh” Eshelman (his first name was Irwin but everyone called him “Esh”). He was a part-timer like me, a good 30 years my senior. In addition to teaching, Esh had a long history of flying old antique airplanes especially a 36 horsepower Aeronca C-3 (you can look that one up). GA was booming then and we all stayed as busy as we wanted with a seemingly endless supply of students. After I got out of the AF in 1975, we stayed in Dayton and eventually I went through several corporate flying jobs gaining experience in various turbo-props and finally a Westwind and Sabreliner bizjets. By 1986, I was beginning to get a little tired of the corporate flying life. Always on call, no job security, and gone all the time.

Esh was still instructing at Moraine and one day I was talking with him and he casually mentioned why don't I give his son Doug a call. He was a Convair 580 captain for Republic up in Minneapolis. Maybe he'd have some insight. Well I had nothing to lose and since we both shared a classic first name, why not? I really hadn't thought much about airline flying. Seemed like you had to be a



super pilot to be considered. Most airlines required perfect vision (which I certainly lacked), a PHD in aeronautical engineering, Blue Angel experience, and several moon landings. I doubt if I would get to first base.

But that 30-second encounter with Esh got me to thinking. So I decided to call Doug in Minnesota totally out of the blue. Told him I was an acquaintance of his dad and asked if I might possibly have a chance applying to Republic. Well to make a very long story short, Doug turned out to be a wonderful friend. For the next two years, he took up my cause and ran with it. With his guidance, I eventually got an interview with Republic and to my total surprise; I was notified with a job offer!! BUT.... they were just in the final stages of the merger with Northwest. I was in the last interview class to be evaluated at Republic and now Northwest would make the final decision as to who would be hired. Hmmm... Northwest had a reputation as being a tough nut to crack. Two weeks went by and then came the letter. I was out... Northwest would only hire pilots with perfect uncorrected vision and my warped and deformed eyeballs wouldn't cut it (10,000 hours and 500 in bizjets meant nothing.)

Doug was sympathetic but that's how the airline business is. So I went back to part-time flying copilot on Citation but this was only on a contract basis and the outlook was glum. At this stage, I really didn't know what to do. I hate to say it, but the scuttlebutt around Dayton at that time was if you couldn't get a good flying job, try the Feds. The FAA was hiring air safety inspectors so I applied. I went through a couple months of evaluations and a check ride in Cincinnati with FAA inspector Martha Lunken (who now is a writer for Flying Magazine.) More waiting.... Then I get a call from Doug. Northwest has just finished a new training center in Minneapolis and is looking for ground instructors. Hmm... maybe that's worth a try. So I sent them a resume, got an interview in Minneapolis and went home to wait. No sooner had I got back, I get a call from the FAA offering a position in Salt Lake City with a start date in 3 weeks (June 1). Take it or leave it. Northwest didn't know when they would make a hiring decision. So I accepted the FAA job and we put the house up for sale (it sold in 3 days... way too fast!!). We were off for wilds of Utah. One week from our planned moving date I get a call from the FAA. They now can't start me until October (something about budgetary constraints, fiscal year, no money, blah, blah, blah). What am I supposed to do in Salt Lake for the next four months? (the movers come in 3 days). Feds say maybe I could get a job instructing. A career of faithful government service is starting to lose its luster! Next day... a call from Northwest offering me a job in flight simulation development. I'll take it... quick call to the FAA. You lose... we're off to Minnesota!



Doug and the -7 – outside Nashville, TN

Doug and I became close friends. I went on to get hired as a pilot in 1994. Doug continued as an A320 captain and retired in the left seat of the 747-400. His sons (who are the same age as mine) are both fighter pilots. This past September, I flew the RV-7 down to his home in Nashville and we had a great reunion (Doug owns a Cessna 170, but I know deep in his heart he wants an RV!!!). I told him that I really owe my career to that chance conversation with his dad. Otherwise who knows where our lives would have branched off to (think of it.... I might have never met Jerry VanGrunsven who got me started in RVs... probably would have built some plastic fiberglass rocket ship with a Corvette engine... bad, bad thoughts!!!...)

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Welcome to the World of Homebuilts

- Tom Berge



This has become one of my favorite sayings whose use increases which each RV I look at. I have to say the ingenuity on display in homebuilt aircraft can be impressive. There are some truly

clever builders out there coming up with all sorts of ideas solving the onslaught of problems one runs into during the

process of building an airplane. Some of these are even real live problems.

In the course of looking at many RV's over the years, I've seen some very interesting efforts. I'd bet most of you have seen the internet pictures of people doing strange things like standing on a ladder balanced on a bottle over a pool working on electrical lines. It seems a group of pictures depicting similar ingenuity go around the web occasionally leaving you scratching your head asking, "What were they thinking?" That being said, at least when the picture was taken, things were working out well, so what's the problem? Following are some of the many things I've run into while inspecting both for first flights as well as pre-buy inspections. If I mention something odd that resembles what you have done or bought, what can I say? Deal with it.

One of the more common issues I run into while evaluating RV's is the ever-present heavy wing. Having a heavy wing after the first flight is normal. In fact, not having one is surprising. I usually like to disconnect the aileron trim while doing first flights just to get a good feel for the relative heaviness of a wing. The fix is quite easy and it's disappointing to see RV's out there with the test time flown off still sporting a heavy wing and using aileron trim to counter the effects. Come on guys, fix it!



An RV I was ferrying recently had the passenger side headset and mic wired wrong. I could hear ok, but couldn't talk on the radio, although the intercom functioned OK. The new owner and I had an interesting flight back home. It turned out the audio was wired into the aux input instead of co-pilot audio and the mic was simply wired wrong. This same RV developed a crack in a wheel pant intersection fairing. The builder had applied automotive bondo to the side of the wheel pant and stuck the intersection fairing to it. Guys, bondo is not structural! And yes, I've seen this on other RV's as well.

A different RV had a non-standard oil cooler installation. Now I know there are a few ways to do it, but this one I'd never seen. The oil cooler was mounted on



the left side next to the cowling. The airflow was taken from a NACA scoop installed on the side of the cowling. The air had to enter and immediately turn 90 degrees to enter the cooler. I knew before I traveled to this particular RV that it had high oil temps so I was prepared for it. The thing I was not prepared for were the incorrectly installed oil lines to the cooler. The line to the cooler should have been taken from the port under the right mag but was instead taken from the oil temperature sending unit port. As I understand the flow, the oil comes from the oil-out port to the cooler, returns above the left mag, passing by the temperature probe, the oil filter and back to the engine. Clearly, this was not happening here. After getting the oil lines in the correct position, the temperatures did drop quite a bit but were still high due to the cooler location.

Another thing I've run into is a personal preference issue. On a couple of RV's equipped with Flightcom 403MC intercoms, I found them factory wired to give the radio priority over eve-

rything else. In other words, when the radio goes hot, everything else mutes. So when someone in another airplane transmits to anyone, your conversation is muted. What? They are talking to ATC and my conversation is muted? Really? A quick clip of a wire fixed it, but the ferry time from the west coast back home was annoying, especially since we were using flight following and the radio was busy.

Fuel leaks are another of those things I see on a regular basis. If you get into an airplane and you smell fuel, THERE'S A LEAK SOMEWHERE! Find it and fix it. While giving transition training in an RV9A, I noticed that a cylinder head temp was quite cold, but was running fine. Upon further examination, the builder had mounted the CHT probe in the primer port. Yup, the one right behind the intake valve where all the

nice cool fuel/air mixture is passing. Wonder why the temps were so low? Now bear in mind that this RV had been flying for many years and



had been inspected by a number of A&P's. And during all this time nothing was done about an obvious problem? Really? That's just "plane" laziness. On the subject of not fixing known problems, not getting the engine parameters set correctly kind of negates the value of that nice expensive engine monitor. One RV I inspected had been flying for 100 hours with both engine and EFIS alarms blaring away. There had to be half a dozen or more. This same RV also had no holes in the nose wheel pant for a tow bar. The seller's wife put her arm over the fuselage in front of the vertical and pushed down to unload the nose wheel while the husband guided it into the hangar. Something tells me that area of the fuselage is not designed for that load.

Recently, while helping with an RV that had a booboo requiring an engine teardown, I ran into another must check item I've added to my inspection checklist. My checklist is more of a work in progress due to the WTH (heck) items I run into. I had remounted the engine with new Lords mounts, new prop, hooked up most of the important stuff and then tried to install the lower cowl. It wouldn't fit. WTH? The cowl was hitting the bottom of the spinner bulkhead. There was no clearance.

After scratching my head for a bit, I opened the plans for the Lords mount installation to make sure dummy didn't do an unthinkable. No, I'd done it correctly, thank goodness. If not, the



words would have been interesting and heck would not have been one of them. I then retrieved the old mounts and with the wear patterns on the parts determined the builder had installed them backwards. So instead of a down and right thrust line, it was an up and right thrust line. So now the cowl wouldn't fit until we filled all the Camlock holes, re-drilled and trimmed the rear of the cowl. We got it fixed, but we sure weren't planning for the experience. Then a few days later while helping with an alternator problem on an RV9A, I was explaining the Lords mount problem to him and while looking at his mounts, I discovered the thick washer the plans call for between the lower mount and the engine was missing on both sides. Because of an interference problem with the oil pan, the mount didn't make contact with the engine. Now we have to hook up an engine hoist, remove the lower mounts and insert the correct washer/spacers. Read your instructions and study your plans.

And speaking of not following instructions, the Ray Allen stick grip cushions are installed upside down on half of the RV's I look at. Half! Just look at the picture that comes with the grip, it shows how to do it! When installing canopies, the instructions state to fiberglass the front of the plexiglass to the forward skin. While replacing a cracked canopy on an RV9A, I found that the builder had not used fiberglass, but had instead used a micro balloon mixture to fill the gap. Micro balloons are used as a filler to smooth out irregularities. It's not structural. I see loose jam nuts, missing cotter pins (found the big cotter pin missing that captures the nut holding the nose wheel fork to the gear leg on 2 RV's), static ports not in the recommended location, loose nose gear legs, bone dry rod end bearings, crappy wiring, incorrect safety wire, rivnuts (shame on you), leaking brake master cylinders, missing control system stops, binding control sticks, lots of air in the brake lines, control sticks hitting engine controls, pressure transducers mounted on the engine, missing rivets, the list goes on and on.

I guess the best way to describe inspecting homebuilt aircraft is to accept the fact I'm stepping in front of a mini-gun. I'm bobbing and weaving trying to dodge all the bullets coming my way and I've come to the conclusion there's no way to dodge them all. My checklist continues to grow. Do yourself a favor and get someone who knows the type of homebuilt you completed or are thinking of buying and have it looked at. Don't proofread your own work. You will misspell your own name and never see it. If you are a builder, complete the project as if you're going to sell it because someday you will. Build it as if all installed components will need repair every week. Everything installed should be removable. Remember that once the top forward skin is on, the area behind the panel becomes a bit more difficult to access.

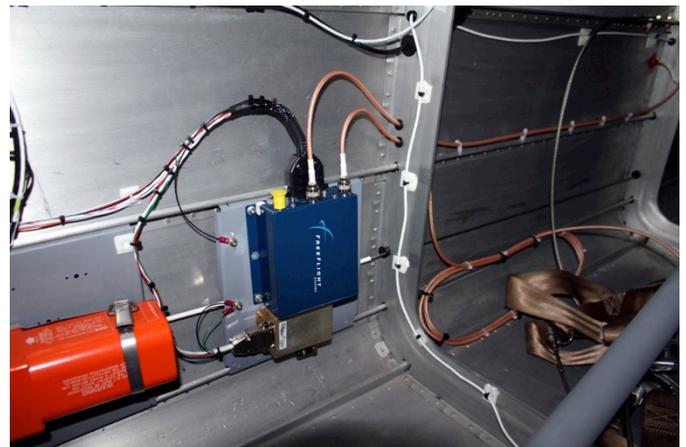
Winter in Minnesota... time for a project!!

-Doug

Having just returned from a warm-up in our 50th state, I was contemplating how those poor folks out in the islands get so bored with the SAME OLD WEATHER, DAY-AFTER-DAY!! Us upper Midwesterners couldn't handle endless days of sunshine and 72 degrees, right?? Well then again, it might be fun to try. Regardless, most of our winters make flying our RVs a test of endurance and fortitude. After a miserable December with few good flying days, I figured it was time to treat my gloom with a new RV project (and enjoy the satisfaction of spending several multiple aviation monetary units). After listening to uber RV geek Pete Howell shout the praises of ADSB, I figured it was time.

Yep, the ADSB mandatory date is still over 4 years out but after WAY too many close calls with all of the other crazies buzzing around under the Class B, I wanted traffic on my EFIS boxes. I already had XM weather, which is worth its weight in gold, but I have this phobia about swapping paint with someone I have never met. True, there may be changes to the ADSB mandate eventually and maybe prices will come down but we all know we didn't build our RVs to save money!

My Advanced Flight System EFIS boxes are just over three years old and antiques by now. Garmin's ADSB solutions will only talk to Garmin screens (hmm.. more smart marketing!) so I needed a more generic application. FreeFlight Systems had what looked good for me. Their FDL-978 transceiver provides the "out" transmission using a dedicated GPS receiver (the ADSB TSO mandates a specific quality of GPS/WAAS position data. My 430W would work, but the FreeFlight unit came with its own approved GPS receiver). The FreeFlight box would talk to my AFS displays and it also includes a little WIFI unit, which talks to my iPad. A panel mounted control head allows one to configure the system and monitors what's happening.



Working on a wiring and avionics installation on a finished airplane is not fun. There was no room up front under the panel to install the system, so I decided to mount the transceiver and WIFI box on one of Van's ELT mounts behind the baggage wall. The GPS antenna would have to go on top of the fuselage in front of the vertical stab, and the ADSB antenna (basically a transponder antenna) would go under the fuselage (it has to be at least 6 feet from the Garmin GTX-327 transponder antenna.)

Mounting the GPS antenna on top of the fuselage meant summoning an inordinate amount of courage to drill holes into my beautiful paint job. I think I measured a dozen times before gritting my teeth and drilled away. But the end result looked pretty good and I figured I could live with a couple more antennas sprouting from the -7.



With the help of Walt Aronow from EXP Aircraft (where I bought the FreeFlight units) and the tech reps at FreeFlight, I strung up a wiring harness. It ran up under the tunnel through the spar, up the fuel vent line on the right and into the panel. Connections are made to the transponder and encoder (your squawk code and altitude are sent to the ADSB box) and one simple wire to the AFS MFD, which would (or should) display weather and traffic.

The FreeFlight control head is really a Trig transponder control head, which has been rebranded and modified. It allows a means to setup the ADSB transceiver, display the transponder code and altitude being sent out, show the ADSB GPS position and display any warning messages. I didn't want to drill another 2-1/4 hole in my panel so I decided I really didn't need my old magnetic compass (which is not required). So out with the compass and in the control head.



After six weeks of pretty much constant work (I know, Tom could have done it in 3 days!!), I was ready for a test. Rolling it outside and cranking up, the GPS receiver locked on in just a few minutes. Shortly I was getting an ADSB signal even though the nearest transmitter is in South St. Paul. From what I could tell, everything was working but I'd have to get airborne for a true check of weather and traffic. So, a few days later, I finally got all of the pieces back together and took off to see who I could see. Immediately upon passing through a couple hundred feet, traffic came alive. Wow, this was WAY cool.



I could track all of the DAL airplanes coming into MSP and the sense of security was worth every strained muscle and cut finger. Textual weather works fine but the jury is still out on the ADSB Nexrad quality. It will take more flying around with precipitation in the area to compare ADSB and XM (which I can switch between). But I can conclude ADSB traffic is a game changer and right up there with in-flight weather as a MAJOR safety addition. You WILL love it!!!!

Have Plane, Will Travel – A VFR Story

by Pete Howell



I now have 1350 hours on 9PH and we racked up that many hours by getting out and stretching our legs a bit rather than just going around the patch at KANE! Our planes have great capacity for travel, able to hit either coast

in a single, albeit long, day. Andi and I have used this capability to go North for hiking, East for weddings, out West for vacations and down South to visit friends and relatives. Here is how we do it!

I do all my flying VFR. I have found as long as we have a bit of flexibility in our schedule and the understanding that we might need to spend the night somewhere interesting, we can go just about anywhere. We have been stuck a few times, but never for more than an evening, and most of the time it has been a chance to see things we never would have seen and meet some interesting people. My point is you can go VFR.

My goal here is to chronicle how I plan and execute a VFR XC trip – not to say there are not better tools and better ways to do it, but these work for me. I'll use our trip out East to the Poconos for our cousin's wedding as an example throughout. Here is my step-by-step guide:

1. Brief the passenger and visitees

One thing I always do when we plan a trip is to have a discussion with the passenger and people we are visiting about the fact that we might not be able to go. The good news is that family members tend to pick this up pretty quickly and understand if the weather is iffy, we ain't going. In the case of the wedding trip, we talked to the bride and groom and told them we were weather dependent – they understood and were great about it. They actually mentioned us and the little plane from Minnesota at the reception, meaning I got to talk airplanes all night, much to Andi's chagrin!

2. Find an airport at the destination

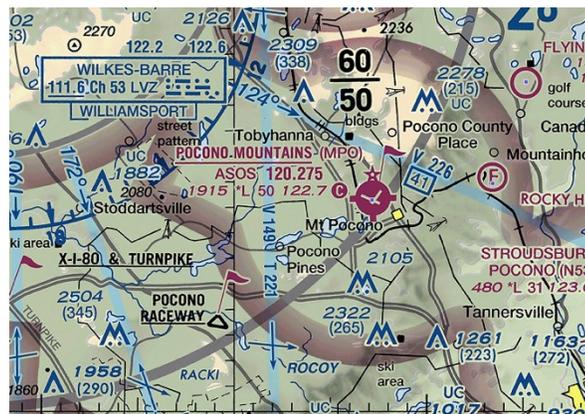
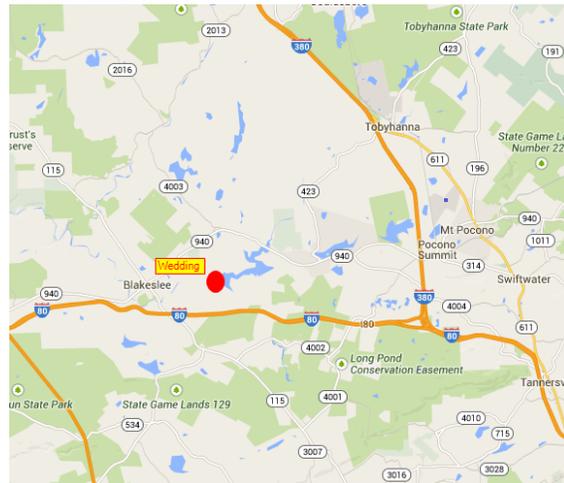
There are quite a few tools to find airports. I like a website called VFRmap.com, as it allows me to flip between sectionals and Google roadmaps to find an airport near where we want to go. We matched up the wedding invite with the map, flipped over to the sectional view, Boom! We found KMPO.

Next step was to look up KMPO on www.airnav.com and make sure they can handle the RV, and have fuel at a decent price. It also makes it easy to get phone

numbers to check for hangars, tiedowns, and local transportation.

KMPO had nice reviews and reasonable prices, they even gave us \$0.10 fuel discount on the weekend and helped us with a ride to Enterprise to pick up a rental car – nice people!

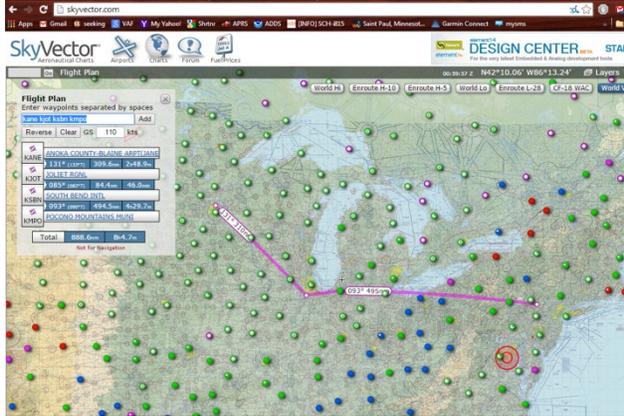
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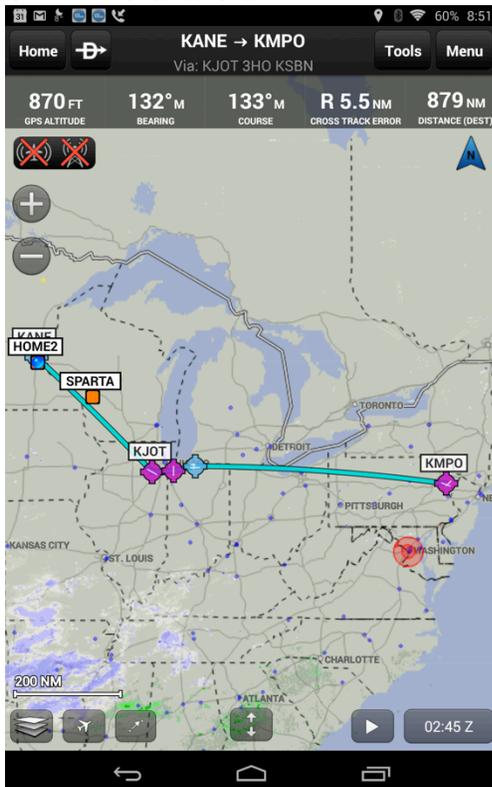
3. Flight plan for route and fuel stops

Ok – now we have a place to land, let's see how we are going to get there. One benefit of flying VFR is the ability to go direct. Let's see how that would work in this case. Another website, skyvector.com makes it easy to see routes projected on sectionals or WAC charts that are stitched together into one big map. The map showed 817nm direct, doable with a nice tailwind, but it also showed some other issues, like lakes with names like Michigan and Erie and a small trip over another country. Big, cold water is not for me, so we decided to head south around the tip of Lake Michigan. An added bonus was we would fly right by my Mom's home in South Bend and could stop for a lunch break. Bam! – win, win.

Airnav has a fuel stop planner that can help you save some \$\$ by finding cheap(er) gas along the way. The Garmin Pilot app on my tablet and phone also has fuel prices and great tools to plan a flight; it is even able to pull a legal flight brief at the touch of a button!



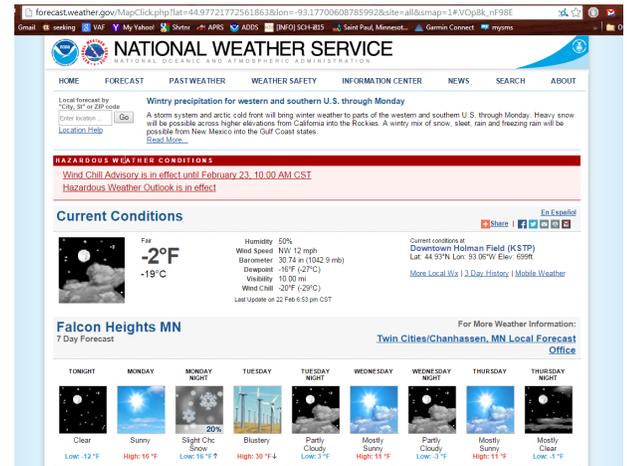
Garmin Pilot screenshot



4. Check long term weather

About 7 days out, I start checking the weather for the origin and destination and a few points in between. Aviation weather is good maybe 1-3 days out, so I use the National Weather Service site <http://www.weather.gov/> to get a feeling as to if the trip might be possible. I use this until about 3 days out and then start looking at the aviation weather. There are plenty of iPhone and Android apps that work for this, too.

In the case of the Poconos trip – we were blessed – huge high pressure from the Midwest to east coast – we were on!



5. Prep the plane

A few days before a long flight, I like to give the plane a thorough going over. Things like checking the tire inflation, pulling the cowl to give everything a good once over and check for leaks. If the seasons are changing, I make sure the proper blocking plates are in place. I'll also do a quick cleaning of the belly and a spritz and wipe down of the exterior and canopy. I'll clean out the cockpit and baggage area and make sure everything like sunglasses, chargers, headsets are in place and ready to go – we are gonna spend some quality time in there, so it better be ready!

Finally, fill up the O2 and gas tanks, and we are ready to go!

6. Check short term weather

I like to use a few tools for short-term weather – ADDS is great on the web, and FltPlan Mobile on my phone and tablet are wonderful, too. Once again however, the bulk of my planning is done with the Garmin Pilot app on my tablet. It has nice weather tools and will be with me in the cockpit when we actually fly.

The weather for the Poconos was still looking great – huge tailwind on the way out but no forecast turbulence – clearly clean livin' did it for us!

7. Pack the plane

If the launch will be at O' dark thirty, I like to pack the plane the night before so we are not rushed and we can think about what we might want accessible in flight and place that on top – we then just have a small bag of bathroom stuff to load in the morning. We travel with two bottles of water each and some trail mix and grapes to nibble on – works for us, your snacking may vary!

I travel with a quart of oil for the plane, my toolkit, and spare nosewheel, complete with tire. We have never been weight limited, so it seems like cheap insurance for a blown nose tube – so far, it has worked! Also make sure you have your tiedowns, and canopy cover.

8. **Launch!**

The day of the launch calls for a normal preflight and weather brief. Friday morning of the wedding dawned clear and cool so we loaded up. I requested flight following on the ground with Anoka Tower and they set us up to South Bend for the first leg. We climbed right up to 9500 feet and rode the 30kts on the tail!

I like to use flight following for XC flights – a nice second set of eyes to watch for traffic, a friendly voice if something goes wrong in flight, and often a quick clearance into airspace if needed.

9. **Weather and traffic in-flight**

With the launch of ADS-B real time traffic and weather inflight has become a reality. I use Garmin Pilot on a Nexus 7 tablet and a GDL39 on my dash for ADS-B in. This gives me radar, metars, winds aloft and more in the cockpit along with a traffic display that shows me what the controllers are seeing (I have ADS-B Out as well). It is hard to underestimate the situational awareness ADS-B provides – it is really slick!

10. **Enjoy the view**

One of best things about a XC flight is the chance to see new parts of the country. Don't forget to look out the window. The view from 10,000 feet lets you see a bigger picture and have a new appreciation for our country.

Our trip could not have gone better. After lunch with Mom in South Bend, we saw a big chunk of the eastern US on the way to the Beer Bash Friday night. The wedding was a hoot and we had a great trip home under sunny skies. Great weather, great family time, great fun. The cost was reasonable and we got some great pics along the way.

Let me know if you have any questions!



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

First Class

Twin Cities RV Builders – March Meeting

Saturday, March 21, 10 am to noon

Doug and Paul’s hangar, 41C Mooney Lane, Lake Elmo Airport (21D)

“So What Were You Thinking??”

Building your RV can be the ultimate means of self-expression. But a little forethought can help to cure a multitude of ills down the line. Our resident RV super-guru Tom Berge will go into detail on some of the strange things he has encountered during his travels doing pre-buy inspections and ferrying RVs around the country. Doug Weiler will be the opening act talking about how he built his RV-7 with the thought that some day he might have to sell it. Hmm.. hopefully not for a while! AND... we’ll have plenty of time for your building questions so bring your problems!!



Coffee and goodies as usual. Please park on the hard surface if the ground is soft (spring is coming!!). Directions are on the website at www.mnwing.org. Questions, call Doug at 651-398-1184 or dcw@mnwing.org