

The Newsletter of the Home Wing of Van's Air Force; Builders and Fliers of Van's RV Series Aircraft



February Meeting

As luck would have it, the February meeting fell on the same night that the rivers all were cresting in what is already being called "The Great Flood of '96". Even so, there were about 35 die-hards who braved the roads and made it out to Van's Skunkworks for the meeting (and one who didn't quite make it and wound up in the Tualatin River, but that's another story....)

Ken Scott again updated us on the installation of his Lightspeed electronic ignition (didn't we hear about that at the last meeting?) which he now has installed, and has run the engine, but subsequently found that the repair to his wood prop was starting to crack out. So he is now waiting for the delivery of his new Senenich *metal* prop.

Jeff Donaldson talked a bit about the EAA Technical Advisor program. Jeff is signed up with the EAA Tech Counselor program, along with Bill Benedict, Don Wentz, and Dave Lewis. Chapter 105 contact for that program is Scott Rider, 645-1934.

Bill Benedict took over for the second half of the meeting and described some of the newest improvements to the kits, and products and options that are available. Probably the most notable improvement is the pre-punched, match-drilled RV-6/6A firewall. There were about as many groans as there were cheers when Bill held up an example of the thing and told us that yes, this was how it is shipped to the builder, and you even get to keep the clecoes that are holding it all together! Man you new builders have it sooo easy....

Meeting Notice

Frank Justice, Meeting Coordinator (503) 590-3991 e-mail: Frank_K_Justice@ccm.ssd.intel.com

Place: Mike Seager's Hangar Vernonia Airport Date: March 9 (SATURDAY) Time: 1:00 pm Phone: (503) 429-1562, (503) 429-5103

The March meeting will be held at Mike Seager's hangar at Vernonia Airport, **1:00 pm Saturday** March 9. We decided to do it during the day on Saturday instead of the normal third Thursday so people could fly as well as drive in. I will be coordinating rides so please give me (Frank Justice) a call or send me e-mail if you have a seat available or are looking for one.

Mike is working on an RV-6 (his second). The fuselage is just out of the jig and right side up (the "canoe" stage). As the Flight instructor in Van's RV-6 checkout program, Mike also has Van's "Crew Training" RV-6 on the field, as well as a nice RV-4 owned by Ward Ogden, which Mike is preparing to ferry out to Vermont. So there will be plenty to look at and talk about!

As always, bring in any tools, templates, fixtures, etc. that you want to loan, trade, or show off.

To get there

On the ground:

Drive West on US 26 (Sunset Highway). Approx. 12 miles west of the North Plains exit turn right (North) on Hwy 47. Drive 15 miles and turn left at the sign to the Golf Course. This is Timber road but is not marked as such. Go 1.5 miles and turn right on Airport Road (Note: if you get to the golf course you've gone too far). Go 1/2 mile and turn left on Airport Way. Mike's hangar is the big blue one on the South side of the field.

In the air:

Vernonia airport is on the 262 radial from the Newberg VOR, 28 nautical miles out. The airport identifier is 05S. CTAF is 122.9. Vernonia is a 2600' long grass strip, with a dogleg approach on the East end and some deceivingly gently rising terrain to the West. It's not particularly difficult but it is different enough that if you haven't been in there before, you might want to talk to someone who has (or give Mike a call) first.



From the “Big Ugly” (that’s supposed to describe my shop, not me)

Randall Henderson, Editor

Sometimes something happens that reminds me just what all these hours spent toiling away in the garage are all about. Last Saturday was one of those days.

Carl Hay had asked me if I wanted to join him for breakfast, and although I had been all ready for a whole weekend of working on my plane, I have a tough time turning down stuff like that. So, bright and early Saturday morning I found myself helping Carl pull his RV-6 out of the hangar into the light of a beautiful pink sunrise. Soon we were aloft and Carl made a call on 122.75: “Dan, this is Carl, you up?” Dan Delano responded that he was over Newberg, so we discussed where to have breakfast (Albany), and soon joined up with him. A few miles later we heard another call “This is Bill, I’m just out of Twin Oaks, anyone up?”, and before long Bill Benedict’s RV-4 pulled alongside. Just as we were getting into the pattern at Albany, we heard another call from Van (late riser I guess).

This was the weekend after the rains stopped, and while the destruction was sobering, it was fascinating to look down on the Willamete Valley and see what amounted to a huge lake extending as far as the eye could see. Some places you could sort of tell where the river normally runs by the way the trees wound around, but there was virtually no place where the rivers and creeks had stayed confined to their banks. The runway at Twin Oaks was about 25% surrounded by the Tualatin River, and someone said that if you made 3 landings there Bob Stark would sign your logbook for carrier landings.

We all wound up at Burgundy’s, not bad food and of course since it’s next to the airport and has a taxiway right up to the door, a popular destination for pilot types on Saturday Mornings. We sat with a table of regulars, including Gordon Clappison, Cliff Lamb, and many others from the Willamette Valley area.

After breakfast we toiled on up to Independence where we stopped in for a look at some RV projects. Greg Robel is building an RV-6 AND a -6A there, and we also got a look at Alan Upright’s beautiful finished red, white and blue RV-6A.

On the trip back Dan Delano formed up alongside for some photos, but unfortunately I only had one shot left in my camera. He flipped us a victory roll and a loop as he peeled off to go home.

Yes, that’s what these guys do. Take off Saturday morning about the same time, call each other to decide where to go for breakfast. It’s a rough life, isn’t it? Needless to say I spent the rest of the day trying to finish my airplane before too many more Saturdays go by. Thanks Carl!



Fly-In

Fly-In Leader Don Wentz and I have tried to contact all of the “Principals” and check out as many of the possible conflicting fly-ins as we can, and have tentatively settled on **June 15** as the date for the fly-in. We’ll firm it up at the March Meeting. Bring any fly-in input to the meeting, or contact Don at 643-2298, e-mail don_wentz@SSD.intel.com

Top Ten List

Along the way I’ve made my share of screw-ups, and have also heard of (and seen!) some real whoppers. Of course I’d never want to admit to any, nor would I want to embarrass anyone by telling tales or naming names. So I’ll just do like Art Chard, who’s fond of saying “I’ve never done that, but I have a cousin who did once....”

TOP TEN SCREW-UPS MY “COUSIN” MADE

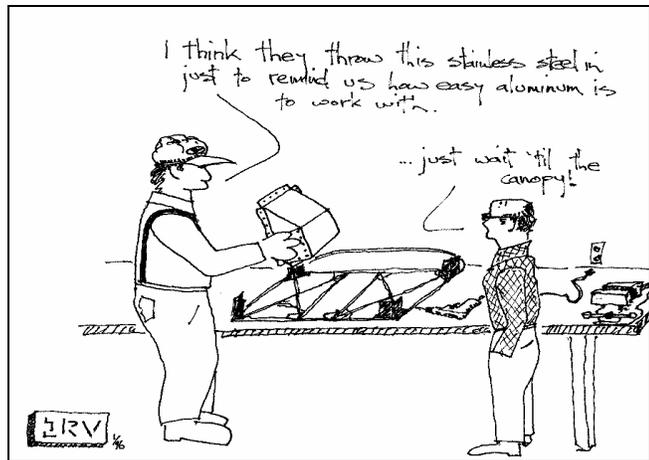
10. Fitted the cowling without taking into account the 5/8” prop flange, resulting in a perfectly fitted cowl (hinges and all) that was 5/8” too long.
9. Took 3 tries to get the forward fuselage top skin right, then picked up what he thought was a piece of scrap and put it on the shear.... it turned out to be the third, “perfect” skin. Fourth skin coming up!
8. Cut the fuel filler neck holes on the *inboard* ends of the tanks....
7. Riveted a bucking bar inside the horizontal stabilizer
6. S-turned his RV-6 just a little too wide on the ground and took out a taxi light
5. Dimpled the last few holes on a wing leading edge skin backwards.... trying to reverse the dimples resulted in cracked out holes and a big piece of scrap aluminum
4. Attempted to plow a raspberry field with one of Van’s airplanes
3. Cut the aft fuselage access hole on the “top” side of the fuselage only to find out that that’s really the “bottom” once you take it out of the jig and turn it over

2. Trimmed the top wing skin even with the spar -- you know, just like the bottom skin?

1. Built a *plastic* airplane

Subscriptions Due:

Look at the date under your address on the cover. **THAT IS THE DATE YOUR \$10 IS DUE.** Mail to me or give it to me at the next meeting (my address is the return address on the cover). A short note updating me on your status would be appreciated too. *If you are paid up but the date doesn't reflect this, please give me a call so I can correct it.*



Kevin Lane



EVENTS CALENDAR

EAA Chapter 105 Monthly Meeting Thursday March 21 (third Thursday of every month), 7:00 pm at the EAA 105 Hangar/Clubhouse, Twin Oaks Airpark. This month is the PIE AUCTION -- if you made it last year you know how much fun that can be, so bake a pie, and come and have some fun!

EAA Chapter 105 "Breakfast at the Aileron Cafe" Saturday April 6, (first Saturday of every month) at Twin Oaks Airpark, 8:00 am.

EAA Sun-n-Fun April 14-20. Lakeland FL.

EAA Young Eagle's Day Saturday June 8. If you want to give rides or help as "ground crew", contact Joel Haugen, 543-6879, jthaugen@bpa.gov.

Fifth Annual Northwest RV Fly-In, sponsored by the Home Wing of Van's Air Force (that's us!). June 15 (Tentative), Scappoose, OR. Don Wentz 643-2298, don_wentz@SSD.intel.com.



Getting Wired- Part One of Several

by Brent Anderson

After flying production aircraft for some number of years, and being directly involved in fleet maintenance

in a flying club environment, I have come to certain realizations. One of these is that a significant amount of aircraft maintenance headaches arise from electrical rather than mechanical problems. Further, the problems experienced are not typically caused by the equipment, (unless it's well aged) but by the connections and wiring involved. I once experienced a communications failure while traversing class B airspace that was later traced to a poorly (factory) crimped connector pin. On another occasion, I experienced an "alternator" failure on a holiday cross-country flight, which had to be aborted as a result. This failure was due to a wire that was not adequately supported, and failed at the crimped terminal due to the cumulative effects of vibration. More time and dollars than I care to remember have been spent on tracing phantom electrical intermittents finally attributed to bad grounds, chafed wires or loose connections. This last type of problem can be highly elusive.... capable of bringing the most seasoned and patient trouble shooter to his knees in anguish.

I'm not really very good at anguish, don't want to be, and in fact will try to avoid it at almost any cost. Armed with little more than this conviction, a determination to do better than the factory guys in Wichita, and zero wiring experience, I launched into wiring my RV-4. My forward fuselage at the moment looks more like a bowl of spaghetti with no sauce than a forward fuselage, but being in the middle of the malaise, I'm finding that the experience isn't really that bad (and it **will** look neat and tidy when finished). One wire and one connection at a time... not much more complicated than drilling one hole at a time, and bucking one rivet at a time... and there are a **lot** less wires in an RV than rivets!!

Since my wiring project is fresh in mind, now is a good time to reflect on the experience and pass along a few thoughts to those who have yet to tread this part of the path. Although most of the actual wiring work doesn't take place until well into the project, early questions will arise, and certain basic decisions will have to be made almost from the beginning. The following is a glimpse of a few general items every builder will work through during the construction project and of some preliminary planning and accommodation that can be done. Future articles are planned that will address topics more specific to the actual wiring work as it is engaged.

Tailfeather Stage

- Unless you plan to fly strictly day VFR, you will need position lights. What type will you use? If you choose the traditional arrangement you will need to plan a route for wiring into your rudder for the white position light. If you choose the wingtip type, you won't need to route wiring to the rudder, but you will want to opt for Van's bottom rudder fairing without the provision for mounting a light.

- What type of strobe lights will you incorporate, and how will you meet the visibility requirements specified in the FARs? RV-4 plans show a possible strobe installation in the top of the vertical stabilizer. Another option is a strobe in each wingtip. Also possible, is a combination wingtip package that includes red, green, and white position lights plus the strobes. Regardless of what strobes you choose, or where you mount them, make sure the cockpit is shadowed from any direct exposure to the light. The wingtip combination package could eliminate the need for routing any wiring to the tail, except for one last thing...

- Will you choose electric or mechanical trim? Whatever the case, plan accordingly for routing wire (or a trim cable) to your tail as the case may be.

Wing Stage

- Are you planning to fly at night? If so, will you mount a landing light or pair of landing lights in the wings?

- Position lights and strobes have already been mentioned. If you opted for the wingtip strobes, you will also want to consider which power supply to use. You can get a single power supply to drive both strobes, or opt for individual power supplies mounted in or near the wingtips. Wingtip power supplies offer the advantage of no long high voltage (& possibly noise producing) wiring runs, and conserve precious space in the fuselage. Access for service has to be provided however, which would be easier with the single power supply mounted in the fuselage.

- Are you planning to fly IFR? If so, don't forget to plan in wiring for that heated pitot tube.

Whatever your needs, make sure to plan for wire routing before you get too far into construction. The easiest time to make holes in your ribs for grommets and/or conduit is before the ribs are ever assembled. Conduit provides additional support to prevent wires from flexing due to flight loads, and makes it easy to fish wires through a structure after it is closed up. Van's offers a corrugated nylon conduit which can be used for this purpose. If something stiffer, or more compact is desired, other types are available. I used a flame retardant polyethylene type in my wings that had a small (.562 ") O.D., offered very good support, and was still reasonably light weight.

Will you route your wiring in front of or behind the main wing spar? One reason to route behind the spar is to keep a barrier between the wiring and the fuel tank. An electrical fire would most certainly get your attention, but adding fuel to that fire could really ruin an otherwise perfect day. The other side of the coin on this choice, of course, is that when the wiring is routed into the fuselage, you must now find a way to get it to the front side of the spar to make connections to your switch panel. If there are only a few wires, you might be able to route over the top of the spar in the space between the spar and your top wing fairing (depending

on what you do for the fairing). Another choice may be to make a minimum diameter hole in a **non-critical area** of the spar web to get through. If there is any doubt about what is non-critical, make sure you check with Van's before proceeding.

Fuselage Stage

Sometime during fuselage construction, you will finalize many decisions about instrumentation, avionics, electric flaps, aileron trim, cockpit lighting etc. Regardless of when the many details are actually worked out, it will be wise to at least anticipate major wire and antenna routes as early as possible for the same reasons applied to earlier structures. In addition, plan separate wire routes for electrical noise producing components (e.g. mags, strobe lights, alternator, transmitting antennas) and noise sensitive components (e.g. avionics and intercom audio). In the case of the fuselage, it may be easiest to provide wiring grommet holes in your bulkheads at the same time holes are made for rudder cables, trim cable, (and don't forget the tubing from your pitot-static ports to the instrument panel). Making these provisions will be much more difficult after the skins are riveted on, and you may not end up with just the routes you want. Personally, I wouldn't make any of these grommet holes until the bulkheads are in the fuselage jig where location and alignment can be readily checked (e.g. by stretching a piece of string).

Most of the wiring from the firewall aft can be done while the fuselage is being transformed from the canoe to the kayak stage i.e. before the engine is hung or the fuselage is stood up on its landing gear. After removal from the jig, I chose to level the fuselage at a convenient height, and bolt it to the floor using 1" square steel tubing for legs; two legs bolted where the motor mount will go, and one at the tail cone. After spending quite a few hours working on the inside of the fuselage, I found this to be quite comfortable, so it may be something you want to consider.

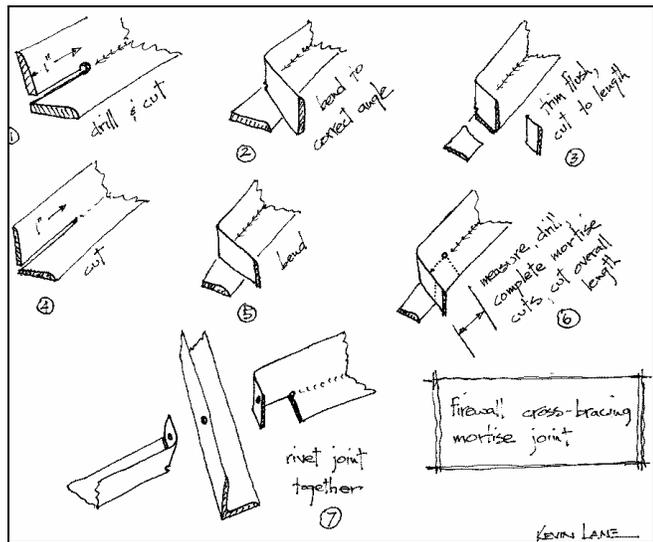
Plan on saving all firewall penetrations until the engine is mounted, and you know exactly where you want them. Also, remember that this very thin piece of stainless steel is the only barrier between you and an engine fire should one ever occur. Keep the openings as small as possible, and consider using firewall shields for your wires and cables. These are now available from Van's at a modest cost, and are an important safety consideration.



Builder's Tips ...Thanks to all who share them with us!

Firewall Mortise Joints

Kevin Lane sketched up a detail of the nice "mortise joints" he used on his firewall angle



Using a Reamer

Reamers are used to produce close tolerance holes for use in conjunction with NAS close tolerance bolts/washers. Reamers are not used for drilling, they usually have straight flutes and a flat end with 45 degree chamfered corners instead of a cutting point.

Reamers are only meant to take the last 0.005-0.0010" out of the hole and produce a fine finish. The standard undersize reamer for a 5/16" (0.3125") bolt size is 0.3115 -0.0000/+0.0002" but you can get special reamers in the 0.310 and 0.311". You can get reamers from a good supply house like MSC Industrial (800) 645-7270.

For a 0.3125" bolt, first drill the hole undersize using a letter N drill (0.3020"). Make sure the drill is straight and sharp or it will cut an oversize hole. Use a cutting fluid made for aluminum, like Tapmatic, and cut at low speed. You can even turn the reamer by hand using a drill chuck if the material isn't too thick. Don't let the material get hot or it will expand while cutting and then the hole will be too tight when it cools off.

For the wing spar bolt holes I'd go for the 0.311" end of the range. The idea is to end up with a press fit or a light drive fit (with a plastic hammer), mit no schlopp in der hole, so it is not enlarged by repeated flexing. If you have to drive the bolt in with a hammer, back up the material with something massive, like a bucking bar so you don't bend anything.

Ideally, close tolerance bolts should not be removed and reinstalled repeatedly. If you need to assemble the parts repeatedly, leave the holes undersize and use smaller bolts until ready for the final assembly. -- Phil Arter arter@acd.acd.ucar.edu (from the Internet RV-list)



Project Status

Brent Anderson -- when I went over to Brent's house to pick up the above article on wiring I got a chance to look over his RV-4 project which is coming along nicely. Brent is very meticulous and detail oriented, and it shows. Most of the instruments are in the panel, and his throttle quadrant (the one he showed off at a previous meeting) is installed. Overall a really nice looking RV-4. -- rh

Don Wentz's RV-6 is down for an annual (read "annual gear leg fairing re-build"). Don reports:

"The day after our last Chapter 105 breakfast, I put the -6 up on blocks and removed the landing gear. I stripped them down and began the 2nd rebuild of the fiberglassed-in place fairings. I used much better materials obtained from a Glasair custom shop, and am convinced that this time they will last, but wouldn't recommend this method to any but my worst enemies. The process is just too messy, stinky, itchy, and time consuming.

"Now that I have 250 hours on the plane, I reversed the tires, packed the wheel bearings and installed new brake pads. The brakes were probably due at 200 hrs (down to the rivets). The rest of the annual should start next weekend, when the fiberglassing is about done. Hope to complete by end of March, but it is looking marginal."

Bob Haan reports: "I am working on the wings. Doing both at once which turns out to be a mistake because it takes twice as many clecoes and a mistake in the sequence of operations happens to both wings. Have all the skins drilled and clecoed on the spars and ribs and starting to dimple them."

Eustace Bowhay, up in Salmon Arm BC, reports that he is working on his RV-6A and has the empennage and wings finished, and that the amphibious floats are finished to test flight stage (testing with his already flying RV-6).



New Members & Guests

Ed Cole recently signed up for our newsletter, which he found out about over the internet. Ed is currently building an RV-6A empennage (rudder). Ed has signed up for Van's builders workshop in May 1996 so hopefully he will get a chance to visit with some of us up here. Ed is a member of EAA Chapter 62 in San Jose, and he asked me to extend an invitation to anyone who travels down to that area to come to their EAA meeting.

Jeff and David Donaldson braved the storm to attend the meeting -- Jeff is an EAA Tech Counselor with Chapter 105.

Guest **Larry Medhaug** also attended



The Tool Exchange

Please give me a call (Randall Henderson, 297-5045) to let me know if you have jigs, tools, shop space, etc. to loan, exchange, or otherwise provide, or if you are looking for something specific to borrow. And whether your item is listed here or not, go ahead and bring it to the meeting.

Precision chemical scale, for measuring pro-seal. Brent Anderson, 646-6380.

Surveyor's transit level -- makes fast, accurate work of leveling your wing spars in the jigs. Also works to level your fuselage jig. Bill Kenny, 590-8011

Back Riveting Contraption -- large, counterweighted bucking bar and suspension system, and offset back rivet sets. (See "Back Riveting Wing Skins, December 1994 issue). Bob Neuner 771-6361

Lead crucible with electric heating element for melting lead for the elevator counterweights. Doug Stenger, 324-6993

Aileron bracket locator tool. Adjustable aileron push-pull tube (for measuring the exact length to cut the real ones). Last I saw, Rion Bourgeois had this -- 646-8763h

Table saw taper jig, for tapering wing spar flange strips. Carl Weston 649-8830.



Don't Want Ads

Let us know what you got but don't want, or vice-versa. Ads are FREE.

2x Rivet Gun, practically new \$110. Kevin Lane 233-1818

Mechanically experienced party interested in helping you put your RV kit together. George Ganoung 691-1694

RV-6/6A Empennage kit nearly untouched (only the HS Spar), Avery deluxe tool package. Will sell all for \$1400. Greg Strom (503) 284-1211.

For Sale, untouched RV6A empennage kit and brand new tool package from Avery. Discounted to sell. Call Craig or RoseMarie 360-887-0823 (Vancouver).

1/4 Share in 1956 Piper Tripacer hangared HIO. 3100TTAE, 1050SMOH. KT76A Txpdr w/ Mode C, 4 place Sigtronics intercom, VAL com, Apollo Loran. Cleveland wheels/brakes, Peterson Autogas STC. Estimated flying expenses of \$65/month fixed costs including hangar, insurance, annual. \$25/hr for fuel, oil, engine reserve. \$4000. Call Steve, 324-8131 or email steven.l.harris@tek.com

RV-6A Tail, Wings & Tools for sale. Tail finished, wings partially finished. Includes heated pitot tube (plumbed & installed), electric elevator trim kit (not installed), all tools, including Avery Master Build kit. Wing kit has the latest improvements, including pre-punched skins and prefabricated aileron & flap stiffeners. Excellent craftsmanship -- local builders Norm Rainey or Dick Zander have seen it and commented on the exceptional workmanship. Will sell all for \$8600 (my cost) Ron Gray 360-254-1501

Hangar/builder space available. EAA Chapter 105 Hangar at Twin Oaks Airpark. Builder space Includes the use of a large custom-built moveable builder's work table. \$60/month for space to build, or \$120/month to hangar a plane. Rion Bourgeois 579-8800w, 646-8763h.

Wanted: Apollo FlyBuddy GPS. *For Sale:* Electronics International 4 channel EGT w/probes. Don Wentz 696-7185

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O-320 D2G 2024 SMOH by Western Cylinder Overhaul, Inc. Hollow crank, can be modified to C/S prop. Chrome cylinders using 1qt in 14 hrs. Will fit RV-4, -6, -6A. \$5500.00. Dave or Bill (503) 829-6379.

Duckworks Landing Lights. Retro-fittable, light, easy installation. Kits start at \$69 (discount for Ptltd RVators). Don Wentz, 503-696-7185 for info.

Hot tip! The low fuel level warning switches offered by Aircraft Spruce for \$35.80 can be purchased from the Madison Co. for \$22.00. They are model # M7700. Their phone number is (202) 488-4477. Chris Brooks (internet)



The aircraft Carrier "USS Twin Oaks" -- Photo Randall Henderson



"Home Wing" Newsletter Subscription/Renewal

Please fill out and mail to **Randall Henderson, 7233 SW Benz Park Court, Portland OR 97225-3201**, along with \$10 for renewals or new subscriptions. If you are renewing, you only need to give your name, date, payment method, and any other information that has changed.

Name _____	Spouse's Name _____
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Paid \$ _____ (\$10/yr) Check <input type="checkbox"/> Cash <input type="checkbox"/> Date ____	E-mail Address _____
Project (RV-3, 4, 6, 6A) _____	Comments? _____

Progress:

Tail : in progress Finished

Wings: in progress Finished

Fuselage in progress Finished

Finish: in progress Finished (i.e. Flying)