THE **RV**ATOR

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THE HOBBS METER

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Chris and Joan Cox, in their new RV-7, aloft near their home in British Columbia.

Photo by Shona Hirota Best



REVAMPING AN RV-4

SCOTT RISAN

I was flying back from Enterprise, Oregon with my wife, Cynth, after spending a lovely weekend weed-whacking miles of driveway ditch on my in-law's small ranch. There are things that I would have rather been doing but if you've ever been to Enterprise, you know that, no matter what you are doing, the scenery can make it pleasurable. It's truly a beautiful place – and at least getting there was easy. The RV-4 knocks more than five hours off what would be a seven-hour drive! That's what RV's are all about!

Back to the flight...Westbound, just south of Pendleton, Oregon, movement on the panel catches my eye. I glance down to see the attitude indicator doing the SDTs (Sean D. Tuckers). A quick glance outside...yep, things look straight and level. Check the back seat... Cynth is sleeping, no cookies being tossed ...whew! Vacuum gauge reads 4.5".... must be the gyro. It had been acting up for about a year, usually after a loop or two (or three) but always stabilized and was back to normal by the next flight. Not this time. It died what looked to be an agonizing death, spinning and rattling for 200 miles and finally settling in a nearly inverted position after landing at home.

Now I had a decision to make. I could spend several hundred dollars replacing a gyro that I almost never use or undertake that 'panel overhaul' I had been contemplating for several years. I chose to take on the panel overhaul (mainly because it involved a new GPS...TOYS! Gotta' love em!).

I honestly didn't have a layout, or even any specific avionics, in mind. Eleven years ago, when I was building, I lived on the wet and foggy Oregon coast, so I outfitted the RV-4 with a non-redundant IFR panel thinking that I would be using the plane for occasional instrument flying. Well, 'occasional' turned out to be 'never' in 600 hours of flight time. I knew that I had a lot of weight sitting in my existing panel that I didn't need for the type of flying I do and I had a nagging desire to get rid of it. Ten years of flying different RVs here at Van's has impressed on me how even a little weight can make a difference in how an RV handles. Less is better when it comes to improving performance and handling. Van has been trying to 'beat' that into every RV builder's head for 35 years! Trust me...he's right!

I started tearing everything out of the panel, labeling every wire so I'd know where it belonged. I quit labeling after about three wires as it became evident that most of the wiring would be going away or need rerouting. I then moved to the engine and firewall where I pulled the vacuum pump, filter and regulator. Next was the sub-panel between the pilot's legs. Both the RMI engine monitor and transponder (currently in the subpanel) would be moved to the panel proper so the subpanel would be removed permanently. This turned out to be one of the biggest improvements of the whole project. With the sub-panel installed, battery replacement was a 4-hour job! Without it, maybe 15 minutes!



I put everything that wasn't going to go back into the panel in a box and weighed it. Fourteen pounds! Wow. I went inside and ate a couple bowls of ice cream...heck, I could afford it!

By this time, I had a big mess in the hangar. I was a

little embarrassed about how much useless weight I'd been hauling around in my plane. Nonetheless, I started looking at what else I could pull out to save weight. Over the ten years that the plane had been flying, I had made a fair number of changes. I pulled out unused wiring, coax, antennae (plural), fuel line, heater controllers, circuit breakers, dropped screws and nuts, dirt, a half of a granola bar that I dropped in the stick well about 6 years ago...still edible! (Just kidding). Anyway, you get the idea. If it hadn't been used in the last year, it came out.

I added the new pile to the 14 lb. box and came up with a grand total of 29 lbs. How could that be? None of that stuff weighed that much! Ah, lesson number one: "It all adds up." Lesson number two: "Every ounce counts." Lesson number three: "Be realistic about what you <u>need</u> in your plane."

My RV-4 was now pretty much 'gutted'. Every in-



spection panel was off the plane and the cockpit and baggage floors had been removed to get at unused wiring (and the granola bar). This was a good time to do a very thorough inspection. With that completed, I cleaned and vacuumed those areas that hadn't seen daylight for 10 years and buttoned it back up.

I ended up selling quite a few of the items I had removed from the panel. This helped fund the AvMap and new intercom that I had decided on during the tear down.

Making a new panel was a simple task. I didn't want to have to duplicate the screw holes for the forward deck skin so I used the original panel flange. I cut all but the perimeter of the original panel away and then drilled and clecoed a new panel blank to the original. With that done, I cut away the lower part of the original

panel leaving only the flange with the nutplates attached to it. I riveted this to the new panel blank and test fit it. Perfect! This did leave an extra .063 'shim' of old panel between the new panel and the flange but it was worth it to me not to have to duplicate the holes. A true 'weight purist' would have drilled that shim off.

What did I reinstall in the new panel? Here's a list:

- KT 76A transponder (original panel)
- RMI engine monitor and Micro Encoder (original panel)
- SL60 GPS/Com w/360 Map (original panel)
- PS Engineering stereo intercom (new)
- AvMap EKP-IV (new)
- TruTrak Digitrak and Altrak (original panel)
- Swing out backpacking compass (w/compass correction card, of course...new)

Even on an RV-4 panel, I still have room! Empty weight was reduced by more than 26 lbs and the panel is even more functional for the kind of flying that I do.

I'd estimate that I spent 20-30 hrs on this project. Was it worth it? You bet! Every pound is either one more pound of useful load or another notch up on the 'sweet handling' scale. The new AvMap is great and I <u>love</u> not worrying about replacing the battery anymore. I especially like knowing that I'm not hauling around dead weight.

For those of you who are still building, the best advice that I can give you is this: Think hard and be honest about how you will <u>really</u> use your RV when it's done. Equip it for the mission and add no more.

You don't want to ever have a box like my box!



FLUSHING IN THE COCKPIT

AMIT DAGAN

No, I don't mean making blue ice that falls from the sky! I am talking about the other type of flush, as in smooooth.

I wanted a flush map box door in my panel. The following implements this idea in a way which is simple, requires no extra support for the door in the open position, and looks nice. The latch I used is also quite nifty and pretty cheap (did I say nothing protrudes?). Read the entire directions carefully before cutting any metal!

Order Van's very useful map box kit, part# MAP BOX KIT.

Mark the compartment's opening on the instrument panel according to the directions. You will cut the opening to slightly larger dimensions in a moment, but you still want to mark the opening according to directions to start with. Note that some modification to the deck structure behind the panel may be required, depending on the RV model and canopy style.



Cut the material for the door to different dimensions than the plans: You want the width of the door to be slightly smaller than the size of the opening you marked on the instrument panel, about 1/16" narrower to allow for paint, and the height should be a little <u>larger</u>. For a sanity check, you'll be making the door approximately



6.25 inches wide by 4 inches high. Don't cut anything before you complete reading these instructions and understand what's going to happen next.

Make the hole in the instrument panel larger than in the plans, in the downwards direction, paralleling the original mark of the bottom of the hole. At this point the door material should just fit inside the opening, so it is a good idea to use the door material as a template to trace the hole you are cutting in the panel. Measure twice – cut once.

Cut off the bottom flange of the bottom half of the



box. It will not be used in this installation. Just trim it so that the bottom of the box is flat with no sign of the flange that you just cut off.

Prepare the door hinge. The length of the hinge is not critical but I suggest leaving it longer than the width of the door. This will help in achieving a nice flush fit of the door in the closed position.

Drill and dimple for riveting one half of the hinge to the map box bottom: The hinge goes ON THE OUT-



SIDE of the box (outside surface of the box's floor), with flush rivets (flush factory head goes INSIDE the box), so that the floor of the box is smooth. Make sure



you are riveting this half of the hinge close to where you removed the flange in step 5 above, so that when the door is closed it is flush with the instrument panel.

The other half of the hinge is riveted to the door, on the bottom of the "IN" side, but the hinge itself will actually be below the bottom side.

Make sure you orient the hinge so that the flange of the hinge is towards the bottom of the door (when the door is closed), and the hinge pin is towards the upper end of the door (see diagram below).

Alternate the rivets along the length of the hinge between the two halves of the hinge, so that when the door is in the open position (and the two halves are the closest to each other), the shop heads do not interfere with each other. In the open position, the door stays perpendicular to the plane of the instrument panel because it is stopped by the two hinge halves.

You will machine countersink the hinge half which attaches to the box bottom (which gets dimpled), and leave the other half drilled (the door gets machine countersunk).

Proceed with the rest of the installation per plans: rivet the two halves of the box together (good luck setting the flush rivets way in there on the inside of the box... no shame using pop-rivets here ;)

and the box to the panel. The hinge pin can be inserted from the side after the box is riveted to the panel, or may be divided into two halves and inserted from the center, similar to the manner in which the flap hinge pin is inserted. I see no reason to ever having to remove the door, but that is up to the individual builder.

Use any kind of latch you like for the door (I used a push-push McMaster p/n <u>10825A28</u>). A magnetic latch would work also, but you might want to consider carefully before placing any magnetic material in the vicinity of the compass.

There you have it. The nifty part about this installation is that the door supports itself in the open position – no further support or stop is needed.

MIKE LOEHLE

474,850

LOEHLE AERO COATINGS ON RV AIRCRAFT

Last year, Van noted that Loehle WonderFil had done a good job of filling the pinholes in the composite parts on his personal RV-10 - a job that can be tedious and frustrating. If you've been around homebuilt airplanes, you'll recognize the Loehle Mike and his wife Sandy name. have been in business for many years, providing kits for wood-andfabric airplanes. As an adjunct to that business, Mike has made himself an expert in the formulation and application of paint. Loehle now offers a complete line of paint, from fillers to top coats.

Based on Van's good experience and the Loehle's reputation, I asked Mike Loehle for an RVator article about his paint system. My timing was good...Mike had just finished painting a showpiece RV-10 in his Tennessee shop. However, I hadn't reckoned on Mike's enthusiasm. Most of the time, getting articles out of people is like lifting a bus with a helicopter. Mike sent me fifteen pages, 30 photographs and promised more if I needed it! So, what follows is a significantly shortened version. Although Mike included material on painting aluminum and steel, I've included just his description of painting composite parts.

I started mixing various chemicals together way back in 1981, attempting to create a shiny, chemical resistant coating for use on my ultralights. Over the years, I have worked with nitrates, butyrates, lacquers, vinyls, enamels, urethanes and even latex paint chemicals. My main goal was to create the most flexible, easiest to apply, coatings available. Our current process has been developed over a LONG period of time.



Basic Steps

In a nutshell, here's the process:

1. Wash and prepare all parts for application of Loehle Filler/UV Blocker (primer).

- 2. Apply Loehle Wonder-Fil on composite parts.
- 3. Apply Loehle Filler/UV Blocker surface primer.
- 4. Apply Loehle Color Top Coating.
- 5. Apply Loehle Clear Top Coating.

It sounds simple enough and it really is if taken one step at a time, but there are details that will make a big difference in just "painting something" or winding up with a finely crafted paint job.

Composite Parts

First, all composite parts should be trimmed and fit to the aircraft. This includes any necessary lay-ups or glass repairs. AFTER the part is properly fitted, it should be washed in hot, sudsy water to remove any mold releases, wax, oil or dirt. Detergents such as Simple Green and Dawn dish soap work well...just don't use a soap that has hand lotion mixed into it! Wash before sanding so contaminants are not spread around.

Like most in the industry, Van's composite parts are supplied unprimed. The parts must be sanded to remove the shiny finish so filler and primer will properly adhere. We prefer dry sanding so we don't introduce moisture into open pinhole areas. (Be sure to wear a properly fitted dust mask.) We scuff the surface with sandpaper grit ranging from 150 to 220. The white paper we use and supply is designed for dry use. Black wet/dry paper will clog quickly when dry sanding.

What Are Pinholes?

A pinhole is really just an area that was starved for resin when the part was produced. The glass cloth is dry and will soak up any liquid that enters the pinhole. These tiny holes have a slight lip that forces paint or primer to flow around the rim. Sanding will remove the lip and allow primer to flow down into the pinhole, where the dry fiberglass cloth will keep on soaking up the primer, re-opening the hole until the cloth is totally saturated and the hole finally fills. This may take many



coats of primer - frustrating, to say the least.

Loehle Wonder-Fil is just the ticket for pinholes. It simply plugs the hole so primer will not continue to flow "forever" into the dry cloth. It mixes with any primer, paint or even clear coatings. When cured, the primer and the Wonder-Fil are permanently bonded together.

After sanding a part, remove the sanding dust with dry compressed air and Surface Cleaner. Wonder-Fil is applied in a circular motion using a paper towel, soft cloth or applicator sponge to force it into the pinholes. Allow to dry until you see a whitish haze on the part's surface and then wipe off the surface residue with a clean paper towel or soft cloth, leaving the dried Wonder-Fil showing as white specks in the pinholes. You will be amazed how many pinholes you see!

Moving On to Primer

The part is now ready for our Filler/UV Blocker. This comes in either Black or White and is designed to fill or build up thickness quickly. We use Black Filler/ UV Blocker first on composite parts and will use the White later (before spraying color). The initial spray coat of Black Filler/UV Blocker will help fill the weave of the composite fabric and block UV radiation (sunlight) that can destroy a part's strength over time.

Our Filler/UV Blockers are formulated to spray on in one single pass of a spray gun...not several light cross coats as thinner paint coatings normally require. They dry to a semi-gloss to glossy finish and have special sanding agents to allow the coating to be flexible, yet not clog sandpaper. When they are dry sanded, the shine disappears on smooth areas and blemishes show up readily as still glossy.

Seven Temperature Range Thinner Choices

All the components of our paint system -- Filler/UV Blockers, Color Top Coats and even our Clear Coats -use the same thinners, so there is little chance that the chemicals will react with each other and cause adhesion problems. These thinners come in seven different temperature ranges from 50° to 115° to allow the paint to flow out properly. All our chemicals are designed to be applied in homebuilder's workshops and air dry. The first coat of the Black Filler/UV Blocker can be sanded in 5 to 10 minutes if our super fast drying Accelerated Thinner is used. Normally one does not usually need to sand that soon, but the option is there.

Suit Up for Safety

You must use proper skin, lung and eye protection. Good coveralls, gloves and a proper charcoal cartridge type respirator are the minimum. A fresh air respirator is even better. Many professionals do not wear eye protection, but they should. Goggles with tear-off plastic sheets are available.

Getting Ready to Spray

Before spraying, blow off the part with clean compressed air. Be careful to not get the air nozzle so close to the surface that it blows out the Wonder-Fil. Do not use surface cleaner because it will remove the Wonder-Fil. Most professional painters use tack rags at this point. It's a good way to remove stubborn dust.

We use spray guns with tips sizes of 1.7 to 1.8 to apply the first spray coat of Black Filler/UV Blocker. The first coat should be tested on a clean piece of cardboard or masking paper taped to the wall. I like the spray fan to be slightly under the widest fan pattern. The air pressure used to apply the Filler/UV Blocker is 6 to 9 psi at the cap for HVLP guns and 25 to 45 psi for HVLP and siphon feed guns. Remember that when you narrow down the fan spray pattern, paint is being applied to a tighter area and runs can quickly show up. In primer especially, you just sand them away.

Spraying A Coat of Black Filler/UV Blocker

After setting up your spray gun, spray one full coat of the Black onto the part surface. Move the gun slowly enough to completely cover as you go. Too fast and the paint will be thin. Too slow and, you guessed it ...



runs. Just a little practice and you'll see.

Allow the part to dry well before you start to sand it. This time can vary from 5 minutes to an hour or so depending on the temperature of your shop and which thinner you chose. Setting the part into direct sunlight will speed up the drying. If the white dry sandpaper gums up, the primer is still a little "too green." I sand the part with dry 150 grit open coat sandpaper to see how many blemishes and pinholes are left. I normally use a 6" orbital "DA" sander, but the parts can be sanded by hand equally well – it's just slower. Remember to use a dust mask and think ahead about where all the sanding dust will go. A small bench outside is handy and keeps your spray area cleaner, and helps keep peace at home!

The shiny vs. flat areas of the sanded Filler/UV Blockers let you find problem areas in the earliest stages of the painting process. The blems will show up



immediately. You can fill any missed pinholes with Wonder-Fil. Large areas can be filled with epoxy or polyester body fillers. In my experience the polyesters work well and are much faster to sand.

Once the blems are filled, you can apply another Black coat and repeat the process. Wonder-Fil can be used at any step of painting — all the way through clear coat. Remember, Wonder-Fil turns whatever color you are spraying – even clear. You know it is mixing with the paint when you see it go from white to invisible!

Repeat the priming/sanding process until you have the totally smooth, flat-looking, sanded part. It doesn't get better than that.

Applying White Filler/UV Blocker

The smoothly sanded part can now have the final priming coat of our White Filler/UV Blocker applied. If your plane is a dark color, you can skip the White but because most bright colors really "pop" over a white base, so I lay down the White all over before painting most colors. Spray it on with our single coat method or several lighter coats. After sanding the White with 400 grit dry sandpaper, the part is almost ready for color.

A maroon or gray Scotchbrite type nylon pad is used right before color is applied to remove all shiny areas. This helps assure proper paint adhesion. I've done numerous test panels over the years without scuff sanding prior to the next coat of paint with very few peeling problems, but I still recommend you scuff any surface being painted.



colors get by with a tack coat and a single full wet coat... require others more. Some metallics are best put on with many lighter coats. When applying additional trim colors to a previously painted color, let the paint dry enough to scuff sand and not leave tape marks. Tape marks will disap-

Applying Color

Sand the White Filler/UV Blocker lightly with 400 grit sandpaper and follow it up with a maroon or gray Scotchbrite type pad to remove shiny areas. This light scuffing allows you to do a final inspection of areas before you go to the color stage. Any problems can be sanded and that particular area re-primed with White as needed. There is no reason to apply a new coat of White over the good surface areas. Simply lightly sand to blend the touch-up area into the other area and you're ready for color.

Our Color Top Coat is then applied over the sanded White Filler/UV Blocker. We can supply virtually any modern color – even the hot ones like metallics etc. It's easiest if folks supply us with a chip of color they like or a paint number from another brand of paint. All our Color Top Coats are fuel and chemical resistant.

I use an HVLP spray gun with a 1.4 to 1.5 size tip for spraying on our Color Top Coats. The mixing ratio is 8:4:1:1. This is 8 parts color, 4 parts Universal Thinner, 1 part Color Top Coat Catalyst and 1 part Flexible Additive. Air supply is between 8 to 10 psi at the cap for HVLP guns and 45 to 60 psi for HVLP and siphon feed guns. Our Black and White Filler/UV Blocker and our Clear Top Coats do not require the addition of Flexible Additive to them as it is already factory mixed in for you. Color, however, requires the flex to be added. Pre-packaging color with flex additives would severely limit our color choices.

The spraying technique is different for applying the Color Top Coat. Colors, ours included, will run easier so spray on a "tack coat" and allow it to tack up. This means we want it to be able to be touched lightly without getting any on our finger. This can be checked by touching an area that has been masked up. This tack coat is essential when spraying metallics, as the flakes will move around if you don't use tack coats. Also, a good tack coat will help prevent paint from bleeding under masking tape. This is especially helpful when you apply additional trim stripes, flames, and other type artwork. The Color Top Coat will take longer to dry than our Filler/UV Blockers and Clear Top Coats. Try to keep down dust, during this process.

Follow up the tack coat with a single heavier coat in the opposite direction. I prefer to allow this coat to flash off somewhat before I apply a third coat. Some pear by lightly sanding before clear coating.

Since our colors are durable, it is easy to sand out dust or other blemishes prior to clear coating. We even have a cool tool that will shave off runs — you guessed it; we call it a Run Shaver. I lightly sand the shine off of our Color Top Coat to get it well prepped for the final Clear Top Coat. I wet or dry sand lightly and follow it up with a gray Scotchbrite pad. I am particularly easy on the very edges of sheet metal joints. It's easy to remove edges on RV wings when sanding them. I normally use the nylon pad to do this.

I will lightly sand the edges of trim stripes with 400 to 600 grit sandpaper to remove the slightly raised edges left by the use of masking tapes. (The thin light green type plastic tape is not as thick as the blue type, but one must be careful using it as it will stretch easily. When it stretches, it will narrow down and mess up straight paint lines. The thin green is used for things like the flames seen on street rods and motorcycles. Most airplane painting is better with the more durable, thicker blue tape.) Once all is painted in color and scuff sanded, the final Clear Top Coat is next.

Clear Top Coat

Our colors will dry so shiny that I have trouble convincing some builders to apply the clear coat. I say wait until you see it with the clear! The Clear Top Coat is formulated to be applied in as few coats as possible. This "thick" property allows one to apply less coats to get proper mil thickness. It is also designed to flash faster than usual, so that dirt and bugs will be less apt to be trapped. Some painters like to put on a good bit of clear and let the slower setting catalyst or thinners to flow out the paint droplets to reduce orange peel. I generally find that a slight orange peel (like most factory painted cars) is better than runs! Dirt, dust, runs and even orange peel can be removed simply by sanding and buffing with various grades of sandpaper and polishing compounds. It's pretty easy to do with our clear coatings -- once you see how well it works, you'll probably want your whole RV buffed!

Invitation – Starter Kit

If you want to try our process, quart starter kits are available, or just literature to study call 931-857-3419 or email paint@loehle.com and Sandy Loehle will help you with your questions, a starter kit, a free quote for materials (or us painting your plane).

IN THE SHOP

BOLT PLACEMENT

We recently received a call from an EAA Technical Counselor who was concerned about a problem he'd seen on more than one RV.

When builders had mounted the vertical stabilizer, they'd drilled the 3/16" holes for the upper mounting bolts through the stab and the F-812B (712B/912B... depending on which airplane you're building), they had placed the holes too far outboard, resulting in reduced edge distance on either the vertical stab or the attach angle or both.

We looked at the drawings and believe we see what's happening:

If you look carefully at the vertical stab drawing you can see that these holes are centered inboard of the vertical line of rivets that attaches the vertical stab channel and vertical stab doubler. You'd expect that, because the bolts are a larger diameter than the rivets.

However, when it comes time to attach the vertical stab — months or years after the vertical stab was built — that detail is long forgotten. Builders tend to center up the bolt holes on the rivet line. It's only when the drill breaks through on the far side that the builder realizes that it's too far outboard on the attach angle.

If this happens, it is usually possible to make a new, longer, attach angle and match drill it to the parts.

If the holes are too close to the edge of the vertical stab, there may be no practical repair.









Above: Doug Reeves' RV-3 tail kit arrived inscribed with good wishes... and other things. Left: Tate Reeves took this photo of his dad, hard at work on another airplane. Love the flowers.

Well, we've got to blame somebody. RV-7 builder **Dar***rell Reiley* started the whole idea, so we'll blame it on him.

On Thursday, October 16, Darrell posted to Doug Reeves' website <u>www.vansairforce.</u> <u>net</u>, suggesting that, since Doug had been making public noises about

building an RV-3, and that Doug and his website had been instrumental in the success of many RV builders, it would be a nice gesture if said builders chipped in.

This was the rough equivalent of putting a torch to a trail of gunpowder. We got wind of the scheme on Friday morning, when builders started calling, wanting to contribute. By 9 a.m. Scott Risan had established a builders number for Doug's new ride, and the office staff had been briefed on how to handle the calls. By about noon, the empennage kit was paid for. We kept our mouths shut, and the phone kept ringing. A few days later, a rather dazed and very grateful Doug had a very good start on a wing kit as well. Who knows where this will end...I'm reminded of the airplanes built during the war, rolling off the assembly line covered with hundreds of signatures of people who contributed to their purchase and construction.

RV builders sure are a generous bunch. By the way, Van's could use a new hydropress. We'll set up an account...



Polen Special



Remember the airplane on top of the column from the third issue?

Recently we received a note: "I am the builderowner of the aircraft on page 8 of the Third issue. From the day I first saw the Polen Special at Oshkosh in 1973, I've wanted an all-metal retractable-gear airplane (yeah, the Polen Special did that to a lot of us, and still does. It was at Oshkosh in 2008 — still a heartstopper). Now I have one. It also has wheel doors. Would I do it again, knowing what I know now? NO! I built an RV-8QB in 8 months...this airplane took five years. The wrinkled photo you printed was in my shirt pocket when I sent the payment for my RV-12, so I put it in the envelope." **Paul Lefever**, Farmington, MO.



Alert reader **Tom Weiduwilt** sent us this ad. We were set up next to the Tango folks at AirVenture, but we didn't realize their airplane could do *that*! Talk about green. Mow your taxiway and fly your airplane on the leavin's!

BRINGING THE RV-12 TO THE PEOPLE VAN

In the last issue, I philosophized a bit on the need to reach outside of present general aviation (GA) circles to attract new people to aviation. I listed several qualities of the RV-12 that I felt would make it a good tool for doing this. Following are more thoughts.

We see some attempts to market light airplanes to those outside of the typical aviation markets. It was intended that Light Sport airplanes should appeal to the general public. Some "airtour" type shows had been held a couple of years ago where different models of LSAs were on display at purpose organized airport venues. I am not aware that any really significant segment of the public was reached by these exhibits. (We didn't have a marketable LSA at the time, and did not attend any of these) We now see airplanes like the Icon Amphibian being developed, at considerable expense, with the expressed intent of marketing outside of traditional aviation circles. We hope these efforts will succeed.

There is perhaps another means of spreading the word to the general public, other than expensive mass marketing strategies. That is an aggressive "word of mouth" promotion carried out by a number of true believers. Where do we find such a cadre of disciples? Van's Air Force, of course. The Van's family grew to its prominence through this grass roots approach rather than through high dollar advertising promotion. It has brought many, who otherwise probably wouldn't have, into the fold of homebuilding and flying exciting personal aircraft. Is it now time to use our numbers, dedication, and enthusiasm to reach outside of the airport crowd and bring in new pilots and builders? Obviously, I think so, and I think it is quite possible that we are uniquely positioned to do so.

I think that the RV-12 is the right bait for the hook.

Some possible non-airport promotional venues might include:

- •Shows and exhibits featuring vehicles such as Boats, specialty autos, off-road vehicles and RVsmotorhomes. (See SALEM RV SHOW, below)
- •Shopping mall displays.
- •Talks and presentations given to special interest, civic, and fraternal clubs and organizations.
- •School and extracurricular youth groups and activities. Talks and presentations, possibly leading to establishment of aircraft building projects.

I have given talks to chapters of the Rotary, model airplane clubs, etc in the past. Usually this comprised a slide or Powerpoint presentation, a talk, and a little time for Q & A. With an RV-12 on a trailer, any parking lot can become an outdoor aircraft display area, an oppor-



tunity for a more hands-on exposure. This should really add interest to these kinds of talks. Seeing an airplane outside of its airport environment always draws attention, and one with trailering versatility should be even more attractive.

I have never gone looking for opportunities to give talks to special interest and service organizations such as those above mentioned. I would imagine that many such groups are in search of interesting speakers and topics. A lot of GA exposure should be available through a little research to locate such groups in your areas.

Airplanes have been built as High School projects for many years. Some groups with on-going programs are:

- Centers for Airway Science, Portland, OR.
- Port Townsend (WA) Air Museum.
- Build-A-Plane Foundation, Riverside, CA.

These all have websites. Give them a look. More discussion next time.

SALEM RV SHOW

We recently had the opportunity to exhibit our red RV-12 at a four-day RV expo in Salem, OR. We were fortunate in that the exhibit management saw our presence as a promotional draw. An "RV" aircraft at an RV "Motor Home" show; how quaint! The fortunate coincidence of our model designation probably worked to our advantage in gaining their attention. The RV-12's easily removable wings made trailering to the non-airport site practical, even though we have not yet developed a type-specific trailer for it.

We eagerly anticipated this show as an opportunity to test this unconventional marketing opportunity. Just how successful it was will not be known immediately. Obviously, there were not hordes of people rushing forward with fistfuls of money. A survey of Van's personnel who manned the four-day display was generally encouraging. A surprising number of the people who stopped by were pilots or inactive pilots. Some others were merely curious, and some were curious enough to be considered potential builder/pilots. As might be expected, many had questions regarding pilot training. This was an opportunity to promote the Sport Pilot licensing and training; less expensive and intense than traditional Private Pilot training.

Our collective conclusion is that this form of marketing exposure to non-aviation people shows real potential. If nothing else, it is an opportunity to showcase the accessibility and affordability of lower-end GA. The LSA class RV-12 is probably a near perfect tool to do this because of its low cost, good performance, trainer friendliness, trailerablity, etc.

How do you effectively display an RV-12 to catch public interest? Just parking the airplane on the display floor may not be enough. Many people probably know so little about light aircraft that they would hardly notice it sitting there. What sort of banners with appealing buzz words or slogans would gain their attention? Would a running video help?

I think that many people might be curious, but might also feel intimidated by their lack of knowledge about airplanes. How could the aircraft be displayed to make more people comfortable about approaching it and asking questions? We've been marketing kit aircraft for 35 years, and our numbers indicate that we know how to communicate with pilots. Successfully reaching nonpilots will probably require a somewhat different approach. Yes, good honest business practices will still be central to success, but how do you get their attention, and hold it long enough to get anywhere near a order form?

During the quiet moments of the show, a thought occurred to me: Obviously, one show does not create a revolution for general aviation. However, hundreds of shows across the nation just might be able to plant the seeds for at least a mini-revolution. If airplanes were exhibited at 400 such exhibits per year, and just one aircraft sold per exhibit, the national <u>LSA sales figure</u> would double!

We're working on a marketing strategy with the thought of an outline or guide for others to use.

Summation: Yes, the above represents a lot of random, half-baked ideas, and optimism. But we've got to start somewhere. How many of you would consider, with the help of a few of your building/flying buddies, displaying your RV-12 at venues such as the RV Show mentioned above? Or, to other civic and school groups? It seems that a big part of sport flying is finding something to do with the airplane once it's built. Where can we go for a \$100 hamburger? Where's the next fly-in where we can go to "talk airplanes" again?

Give it some thought. I will continue this column in future issues, and would like some input, positive or negative.

E-mail me at Engineering2@vansaircraft.com

RV-12 PROGRESS

KEN SCOTT

We began shipping RV-12 fuselage kits in early October. The first ones went to the usual suspects, like Jim Cone and Mitch Lock. From photos posted by Jim and others on vansairforce.net, it's apparent that the fuselage, like the wing, assembles very quickly.

There were a couple of minor glitches. The first builders to run into them, Michael Tea and Jim, notified us of some hole pattern problems in the firewall. Revised parts were being manufactured by the end of the week. These will be sent out to the twenty or so builders who received incorrect parts, and included in kits shipped thereafter. The value of the feedback loop proved again!

In late October, RV-12 Empennage kits are going through trial runs in the crating department where we're learning how to get all the bits and pieces in a box in way the protects them enroute. Like the RV-10, the RV-12 empennage kit includes the fuselage tail-cone kit. Should we call it an "empecone" kit....? Nah. Terrible word.



We will be sending out order forms and letters to current RV-12 builders in advance of taking orders. These will be sent the first week of November. For the first two weeks, priority will be given to those who have an RV-12 Wing or Fuselage Kit in hand. After that, orders will be processed in the order received regardless of customer build status.

Next in line will be the Finish kit, which will include the canopy, cowl and engine mount. It also includes the fuel tank, landing gear legs, wheels, brakes and tires. Seat cushions, seat belts, a wiring harness, and parts of the control system will be there too. On the RV-12, builders can fit the cowl without the engine installed.

After that, we'll see the Avionics kit and the Firewall Forward kit. And after *that,* we'll start seeing flying, customer-built RV-12s.

We can't wait.

51% RULE UPDATE

The comment period has ended for the FAA proposed changes to the implementation of the 51% rule. The FAA received over 1500 comment letters, which is a very high number. For less controversial proposals the FAA usually receives fewer than a couple dozen comments. So: well done, people!

As a member of the ARC committee, I received a CD with copies of all of the letters. These were supplied on the condition of confidentiality, so I am not at liberty to share any specifics. However, from the number to times that "RVs" were referred to by respondents, it is obvious that Van's builders weighed heavily among the respondents.

One theme was particularly prevalent throughout the comments: the FAA should enforce existing rules against excessive commercial assistance (pro-building) rather than adding rules, complexity and restrictions on all homebuilders. While this is true, we all know that this is easier said than done, and it is almost a cop-out to suggest this as a simple solution. For some, it could be interpreted as saying: "catch us if you can".

The FAA is in the process of re-convening the ARC, presumably for the purpose of including EAA and Industry members in considering the effect of the "comments" on the final implementation of the rules. (This final meeting is now scheduled for sometime in early 2009). So, it will be some time after that before the FAA puts into effect their new policy. It is my feeling that we could make the FAA more comfortable with the concept of enforcing the "no pro-building" rule if we could suggest way that the industry and the public (you builders) might help them in this enforcement. Probuilders have proven to be very innovative in "getting around" the rules, with sham "partnerships" and such. This sort of thing makes it difficult for the FAA to prosecute an otherwise clear case of pro-building. If we are serious about asking the FAA to solve their problem by "enforcement", rather than adding restrictive regulations which will impact the rest of us, then we may need to put forth effort to help them. Other than suggesting that knowledgeable builders become "informants". I'm not sure what can be done. We can probably be the most effective by applying peer pressure to discourage probuilding. As more of us understand the FAA 51% rule, how it came to be and the difficulty (impossibility?) of altering its commercial limits, we can be pro-active in working with the FAA for the overall benefit of the EAB movement.

If you have thoughts on this subject, please e-mail them to me. I will carefully study these and use these suggestions, as appropriate, during the upcoming meeting in Washington D.C.

MORE THOUGHTS

We, the respondents, have universally asked the FAA to enforce the existing rule. What is Pro-

Building? I'll bet that when this term is mentioned, most of you immediately think of builtfor-hire high-end turbine powered and pressurized homebuilts. True, it is probably this

class of aircraft that drew unfavorable FAA attention and led to the current 51% rule review. But, if we look closely at our recommendations that the FAA enforce this rule, it will mean that action could be taken against anyone complicit in a circumvention of the rule. We probably all know of someone who has been involved in pro-building of RVs on a limited scale; a one-man shop or even a part time venture. In the strict sense, it's still pro-building. Those pro-builders are not necessarily at risk. The crime is that of making false statements; signifying that the aircraft was built solely for education and recreation. It might be the "john" who is at greater risk. The greater threat to the pro-builder might be that of losing business because the "johns" are frightened away by fear of prosecution.

VAN

Consider this scenario: An addicted builder constructs a number of Experimental Amateur-Built (EAB) aircraft over a period of years. As soon as he finishes one he starts another. Somewhere in the process he sells his previous aircraft and finishes the next. This cycle goes on for years. When this builder signifies on the affidavit that HE constructed the aircraft, he is unquestionably truthful in that he personally built that aircraft. No one would consider him to be a Pro-Builder. However, the second half of the affidavit statement is that this aircraft was "constructed solely for EDUCA-TION AND RECREATION". This person in all probability had intended to sell the airplane in the short term; a year or so. Is he subject to prosecution for falsifying the affidavit? Should he be? How strictly do we want the FAA to enforce that policy? Can we have it both ways; prosecute some of the offenders but not others?

I know that many of us would hate to see 51% rule enforcement so strict that it curtails some of the borderline pro-building of which we are aware. There are a lot of really talented builders involved, and we'd hate to see this resource go to waste. These builders are not likely to join the Cessna workforce so that their talent and productivity can be legitimized. Is there a middle ground, and if so, where is it?

A POSSIBLE (PARTIAL) SOLUTION

Primary Category Kits (PCK) were briefly discussed during the ARC meeting process. However, since this category of aircraft are not EAB and are not subject to the 51% rule, they were not considered in proposed changes to the 51% rule. By way of a quick review, the Primary Category was created back in 1993 as a means of simplified certification for simple low-end aircraft. Some of the limits are: 2700 lbs. gross, 61 Kt. Stall, Single engine, 4 seat max., Non-pressurized, etc. For various reasons, only a few aircraft have been certificated in the Primary Category. However, the Primary Category KIT is a sub-division which has unrealized potential. If all available aircraft kits were Primary Category gualified, the 51% rule would be a non-issue.

Benefits: A kit could be built with an unlimited amount of commercial assistance, and could even be 100% pro-built. This could eliminate all of the concern about policing the above-complicated policies that limit commercial assistance in the construction of EAB aircraft. Pro-built shops could crank out any number or aircraft, and the mom-and-pop builder assistance shops would not have to operate under a veil of uncertainty.

Limitations: Aside from the size and configuration limits of Primary Category, another requirement is that the aircraft must be built to the certificated standard and configuration. No changes! Just like the identical Cessna 172s that come off the line, other than cockpit options, a Primary Category Kit aircraft could not be altered in the manner that EAB aircraft are. From the kit supplier's perspective, the PCK would require more complete design, testing, and documentation than is typical for most EAB kits.

One of the most serious limitations of the PCK as a solution to the 51% rule commercial abuse problem is that the high end EAB aircraft could not qualify as PCK because they are too heavy, pressurized, or otherwise outside of PCK limits. It would require new legislation (difficult to impossible) to permit 51% plus commercial assistance.

Regardless of the final form of the FAA changes to the 51% rule, it won't result in a perfect world. PCK aircraft probably need to be seriously considered in the long term. The vast majority of currently available kit aircraft would qualify for inclusion in PCK based on configuration parameters. (Some qualify under the limits of E-LSA, or Part 103 Ultralight. As such, they are already exempt from the 51% rule regarding commercial assistance.)



The American Institute of Aeronautics and Astronautics recently awarded their prestigious 2008 Aircraft Design Award.

The name on the award is Richard VanGrunsven — but according to Van it really belongs to the entire engineering

Here they are:

Back row: Mike Schwartz, Ken Krueger, Van, Rian Johnson, Mike Ekstrand.

Kneeling: Phil Rivall, Amber Petersen, Mike Vollbrecht.





Project status: Active again, after many periods of inactivity.

Reasons for Delay: Too many to mention, but I'll try.

R&D Priorities. The RV-11 has always been a spare time personal project, not a Van's Aircraft project.

- Personal Priorities. My late spring, summer, and early fall months seem to be devoted to gardening, yardwork, and soaring priorities. Then, about three years ago I got the bright idea that I needed an RV-10 of my own. Thus, an RV-10 QB kit occupied my shop at the same time as a group from EAA Chapt. 105 were working to restore the "Little GeeBee" for the NAS Museum. That set the RV-11 back about two years.
- Uncertain Market. There has never been a demonstrated market for motor gliders or self-launch sailplane kits. Back in the 60s and 70s sailplane kits were quite popular, but eventually the influx of high performance fiberglass sailplanes from Europe (affordable at the time) created a continuing supply of affordable used sailplanes of comparable or greater performance than the best kit sailplanes. A number of motorized sailplane designs appeared over the years, but they were either too difficult to build, gave unsatisfactory performance, or were too expensive. Several kit sailplanes (European origin) remain available, but are high priced compared with used sailplanes.
- •Market Survey Results. I have long felt that the primary market for a motor glider kit would be power pilots. I have more recently come to the realization (conclusion, assumption) that a very small percentage of power pilots would be interested. I now feel that the vast majority of power pilots, perhaps 90% or more, are primarily "point A to point B" pilots; more interested in navigational gadgets and glass panels than in flying simply for the fun and challenge. This, if true, greatly limits the potential market for a motor glider kit.

When I wrote a series of features in the *RVator* about eight years ago, my purpose was to educate as much as it was to run a market survey. I knew that most RV builders were power pilots with little involvement in or knowledge of sailplanes and soaring. To get a meaningful response, I felt that I needed to give them a basic idea of what soaring is, and the basic design requirements for a glider capable of reasonable sport soaring. I believe that I did a good job of this, enough so that theses articles were later reprinted in the Sailplane Homebuilders Association newsletter.

I have received a number of responses to my articles over the years. About a third of the respondents indicated that they accepted my premise, and were genuinely interested in an RV-11 if it could meet the performance parameters outlined. Others simply said that they were interested.

However, nearly half expressed an interest and then went on to describe what they thought the design parameters should be -- construction materials, number of seats, etc. Most of these people ignored my reasoning and made suggestions that made it obvious that they'd never built an airplane – or even really thought about the basics of what makes airplanes perform.

I was probably very naïve for even thinking that a survey would be of value, but it is a bit annoying when respondents completely ignore the premise, and the knowledge and experience it represents. They probably had a negative impact on the project.

I have put a ridiculous number of hours in the building of the RV-11. This is partially because it is a totally new airplane with features that I have not had to contend with in prior designs. Another reason is that I undertook the construction after a rather basic design process. I told myself that I'd figure out the details as I progressed. Unfortunately I rediscovered the old adage about "designing yourself into a corner". When details are not properly addressed in advance, they can become very difficult to accommodate when they rear their ugly heads.

This is particularly apparent in the cockpit, where there just isn't enough space. The basic length and width dimensions are OK, but I cut cockpit depth to a minimum to minimize drag. By the time I fitted all of the controls, space for a semi-retracted wheel, wheel retract mechanism, etc., it is a bit cozy. Each of these features had to be designed, and re-designed to function adequately and not interfere with something else. I've experienced this before, but I have never needed to fit so many things in such a small space.

OK, enough of my excuses and complaining. I am again working on the RV-11 POC with the intent of finishing it this winter. To those of you who were, or are seriously interested in this concept, I apologize for stringing you along for so many years. While I would still like to offer a kit for a soaring quality motor glider someday, don't hold your breath. Remember, the POC aircraft is just that, and any possible kit would require much more design effort and a new kit prototype. For those of you intrigued by the concept of soaring flight, I suggest that you visit SSA. org and locate a soaring school or club in your area. Take some lessons or maybe get an add-on rating. Try to get some time in an advanced trainer with an L/D of 30 or better so that you can appreciate what true soaring is all about. Training in a Schweizer 2-33 is not too much better than flying a T-Craft with the engine off. I exaggerate, but the higher performance is where the real fun is.

Meanwhile, stay tuned. I still feel that the concept I am pursuing is valid. Maybe something will eventually filter into the marketplace.