VELOCITY VIEWS
Volume 31

BUGS, BUGS... THOSE GOSH DARN BUGS!

By Bill Huene

Test pilot Mack Murphree and builder/owner Bill Huene are both happy after a successful first flight

IT IS SPRING. As I look at the wafts of midges buzzing like clouds in the wind, I laugh at the game we shall play. Since the very beginning, as far as I can remember, I have disliked, despised, and hated bugs. They have endeavored to sting, bite, annoy my ear canal for days after a millisecond interval, traveled down my airway on a most crucial inhale resulting in convulsions and teary eyes, leave stains on the carpet from the over-enthused opportunity to squash an infidel, cause countless cursing from failed attempts of removal from my freshly washed vehicle, land in uncured epoxy, and blessing me with footprints and deposits of their wings on fresh paint. Today I have my vengeance. For today, of all days, I have found the cure to thwart my nemesis. It has not been a simple process for me to discover this cure.

It has been three years of diligent and constant work. My wife, as supportive as anyone could ever be, was always there, helping, sanding, and not complaining about the hours and financial outpouring. She understands the emotion and tears of joy as we experienced the most emotional day of my life.

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In this issue

Bugs

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Early in the afternoon, Friday April 19th, Mack Murphree arrived at my home, unbeknownst of the discovery to befall me. With tools in hand and a diligent checklist, we checked, reviewed, and discussed all areas of the project. We decided that the early hours of the following morning would be the test of the years of perseverance and my capabilities as a would-be craftsman.

It was a long night for me. I was exhausted from the final tweaking and exposure of my project. This was my project's final exam. Everything was centered on one last prayer, push of the throttle and a very, very deep breath. Needless to say the anticipation of the following morning, as thick as I have ever experienced, did not tend to allow a real good restful period despite being physically drained. As the sun arose, I realized this would be an all or none day. I got Mack some coffee and something to eat, surveyed the itinerary and opened the hangar doors. With a slow and deliberate push, I looked at Mack and was comforted by such a kind and talented individual. Nothing can express the camaraderie when the test pilot trusts my hard work after his inspection.

With the shout of 'CLEAR PROP!' the roar of the IO-540 angle valve, and a torrent of prop blast, Mack began his taxi. Due to the graciousness of Doug Shell, I jumped into his beautiful Velocity to fly chase. The next event, as the aircraft rotated and flew, was the second biggest thrill of my life; watching the gear come down and Mack calling 'two in the green' with a perfect rotation on landing was the biggest.

After returning my project to home and dubbing my project an airplane instead of a kit, that is when I learned of my cure. My airplane had killed bugs, lots of them, all over every leading surface. With every one I wash off, I realize and remember, this was done while flying… flying the airplane I built.

Who knows how long my enthusiasm will last for my cure, but I chuckle and smile every time I call out 'Experimental 4BL taking the active!' as a new game has begun, and I am going to win, sometimes more than others, but I will win at a very, very fast pace.

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by Duane Swing

True Air Speed

As most of you know, all aircraft manufacturers use true air speed at various % of power to let you know just how fast their airplanes will go. Almost all the flight data and calculations are made with an airframe that is free from all unwanted drag, including, in most cases, removal of all antennas, and stripped of all but essential instruments. Further, most will select an engine or engines that are dyno tested to produce maximum horsepower. The results are what you see in the sales information and are used to determine maximum endurance.

I get at least two to three calls a month from pilots who just don't understand how true airspeed is determined and have a very sketchy idea of how this relates to indicated airspeed. I know that all of us were well versed on the use of the E6-B computer back – how many years ago – and have forgotten all we knew about its use. In some cases, we never understood it in the first place. Many of our pilots simply use what they see on the GPS as the true airspeed of their airplanes and will make a run at a specific cardinal heading and reverse this and then average the results. Can we due this and achieve the same results obtained by the big aircraft manufacturers? How do we determine if we are getting 50%, 65% or 75% power? At what altitude do we make the test?

The first thing we need to do is determine at what altitude we need to fly to achieve maximum speed for the power settings we are going to use. If you normally fly at 75%, then let's determine the altitude where your engine will achieve this power with full throttle. Please don't use the procedure that 75% power is a throttle position 3/4 of the way between idle and wide open. Some of you will laugh at this but I have heard this comment more than once. Your engine will develop 75% power with a wide-open throttle when the density altitude is approximately 7,500 feet. I say approximately because the induction system of your airplane may not ram as much air into the fuel servo as some other systems, and, in addition, to make the numbers work correctly, you must set the barometric pressure in your altimeter to 29.92 inches. The indicated altitude will seldom be the same as the density altitude due to temperature. Let's look at the old trusty E6-B and determine what the density altitude will be if the temperature at 7,500 feet is 75 degrees f. (24 degrees c) and it happens to be a perfect 29.92 inches day. As it turns out, under these conditions, your density altitude will be way up to almost 10,000 feet. There is no way you will get 75% or even 65% power at this altitude. If we assume the temperature will remain constant at 24 degrees c, then flying at 5000 feet indicated altitude will give us approximately a 7500 foot density altitude. With your throttle in the wide-open position (75% power) and leaned to best power (150 degrees above peak EGT) allow the airplane to completely stabilize and make note of the GPS reading. (Note: we are not talking about indicated airspeed here.) This will be your true airspeed in a no wind condition. It would be seldom when a no wind condition exists so perhaps if we turn 180 degrees and fly the opposite direction and then average the GPS speed we can find the true airspeed. Wrong! You can get close if you pick an early morning flight when the winds are really light but almost always the average will be below the actual true air speed. There are formulas for this but let me give you an extreme example to prove this point. Let's say you have an airplane that has a normal cruise speed of 100 knots and you depart on a 100 nautical mile one way, round robin flight with a beginning tail wind of 100 knots. Certainly the first 100 miles will be covered in about 30 minutes. (100 knot airplane plus a 100 knot tailwind = 200 knots groundspeed for a 100 knot trip = 30 minutes) Now let's turn around and head back. 100 knot airplane into a 100 knot headwind = 0 groundspeed. How can we ever compute our actual ground speed, or true air speed, when we will never get back to where we started? As you can see, any wind, even a cross wind, will always result in a two way average ground speed less than true air speed. Can we do a three way or a four way check and get better results? No, the only way is to use a computer formula which I gave to you in a previous *Views* or just simply ignore it all and get as close as we can. If we do enough checks on our GPS, in a light wind condition, then we will be close enough for real world flying. If we want to see how fast our airplane is at 65% power, the procedure is not to just reduce the throttle to an indicated fuel flow equal to what it should be for a 65% power setting. The procedure is to determine at what altitude do we need to climb to and retain the full throttle position so that a 65% of rated power can be seen. In a couple paragraphs below I will show you how to determine 65% power easily. For now let's just say we are looking for about 130 horsepower (65% of 200 horsepower). The Lycoming manual will show a fuel burn at 65% power of approximately 9.3 gallons per hour at peak EGT. If you simply leave your throttle wide open and climb to approximately 8,500 density altitude and lean to peak EGT, you will see a fuel burn less than you did at 7,500 feet. If this fuel burn is in the 9.3 gph range, you are getting about 65% power and represents the fastest the airplane will go at this power setting and the range will be somewhat greater than what we seen at 75% power. This exercise can

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be continued at even higher altitudes until, at some point, the airplane is less efficient and will actually reduce your range. On high wing loaded airplanes this is very noticeable. The Aerostar, which has a wing area about the same as a Cessna 172 and weighs almost 3 times as much, is most efficient at about 60% power flying at about 9000 feet. Flying at a higher altitude, which would produce less power, will actually reduce the range. The drag produced by the Aerostar at the higher "nose up" position to fly at the reduced power settings creates this dilemma.

Now let's review how fuel flow, indicated airspeed and true airspeed is affected by density altitude. I can't tell you how many of our customers are totally confused by this situation. Let's establish the ground rules here. First, we are not flying a turbocharged or supercharged engine. What we have is your average aircraft engine. This engine will only develop 100% power at sea level and on a "standard" day. How many of you remember what a "standard" day is? As we climb, the engine, due to the thinner air as we climb, will develop less and less power. Once we reach a density altitude of about 7500 feet, we will now have, at full throttle, about 75% power. Let's say at this point our indicated air speed is 175 knots. If we factor into this number the effect of outside air temperature (24 degree c) this 175 knot indicated (assuming our airspeed in calibrated) will result in a true airspeed of 196 knots. If we have a no wind condition, our GPS should agree with this number. The 196 knots is found by using the old E6-B computer and setting the pressure altitude under the outside air temperature and reading the true airspeed under the indicated airspeed. At this point let me point out a widely held misconception. True airspeed is not what VNE (maximum structural speed) is all about. This is the 200 knots we use as a red line on our airplanes. VNE is "indicated" air speed (corrected for installation error). This is the speed that the airplane is actually moving through the air mass and, as you can see in this example, is 175 knots – far lower than the 200 knot VNE, even though we are truing at 196 knots. A Lear Jet flying at 40,000 feet and getting a true airspeed of 400 knots is actually only indicating on his airspeed indicator about 180 knots.

What happens now if we climb to 15000 feet and the outside air temperature lowers to 10 degrees c? (50 degrees f) We are still assuming a barometric pressure of 29.92. One thing for sure, we will not go as fast as before because the engine will now only develop perhaps 45% of the power it had at sea level. If our indicated air speed is now 140 knots, using the E6-B we find our "true speed" to be 185 knots. In a no wind condition, this will agree with the GPS.

Now let me give you one other tip on determining the % of power. On most aircraft engines that are leaned for cruise, the gallons of fuel flow X 14 will give us the actual horsepower. Let's assume you are flying the IO360 200 horsepower Lycoming that will show in the manual a 10.7 gallon per hour fuel flow at 75% power. Using the 10.7 X 14 = 150 horsepower, which is exactly 75% of the 200 horsepower, this engine develops at sea level. As an example, if you are cruising at 7500 indicated altitude, wide open throttle (about 22 inches of manifold pressure) and 2400 RPM, and you have leaned to peak EGT (Lycoming recommended for economy cruise) and note a fuel flow of 9 gallons per hour, simply multiply the 9 X 14 for a horsepower of 126. This works out to approximately 63 % power. You can now assume the density altitude is much higher than the 7500 feet you're flying. It is also not hard to understand from this what happens if you're in Colorado at an airport that is at 6,000 foot elevation. At an outside air temperature of 85 degrees f, the density altitude is whopping 9,000+ feet. At this altitude, you're not going to get more than about 60% power out of your engine and the wings will not develop as much lift due to the thinner air. I have a computer that I have had for over 30 years that indicates it will take almost 5 times more runway to get airborne than it does at sea level. That is making an assumption you will get off the ground at all. A Cessna 172 at gross would probably not make it, nor would a lot of other airplanes. It is not unusual at all for the airlines to suspend flights from Phoenix when the temperatures elevate to a pre-determined amount in the summer even though this airport is only 1400 feet above sea level.

None of what I have said to this point takes into consideration the humidity. The higher the humidity, the less dense the air resulting in a loss in performance. It makes the engine less powerful and decreases wing lift. This is something that is not used by us small airplane pilots to measure performance of our airplanes but does have a negative effect if all other things are the same. This was observed on our Q2 where Scott could easily see a 5 knot increase in true airspeed comparing the desert dry air in Mojave CA to what we had in Dayton OH.

What's Happening to the Twin Velocity?

Our original plan was to use the brand new 8 cylinder Jabaru engines that develop 200 horsepower for take-off and 180 horsepower continuous. We were told we could expect the engines by December 2001. The delivery slipped to February, then March, then we were told we could expect a core only engine (not runable) at the conclusion of Sun-N-Fun. This was to make our engine mount, cowlings, exhaust system, fuel system etc. The major problem here was that they said we must return the engine in 30 days because they had another customer who needed it for the same thing. Needless to say we told them to send the engine to the other customer and we will take another look when they have an engine we can put in our standard airplane and "check it out." As of

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this date, we still don't know when we will have an engine we can keep and use. Due to this, we have refocused our attention on a replacement for our present demo aircraft. This airplane is a 1999 model and does not incorporate all the newest changes to our XL series. The twin is on the back burner until we complete this new demo airplane and by then we can either use the Jabaru or the newest and greatest turbine engine, the ATP. (Affordable Turbine Power) This is nothing more then the old Solar engine used in ground power plants and in the tail of many jets as an auxiliary power unit. ATP went to work on the fuel system and combustion chamber and came out with a pulse type; atomized spray injector system using ceramic coated parts and have (allegedly) reduced the fuel consumption to about the same as a piston engine of the same horsepower. We are doing everything possible to get them to have an independent company do a dyno/torque/fuel flow analysis on the engine to verify the claim. If we can get proof, we will put two of them on the twin and give it a go. The 200 horse version will weigh an unbelievable 120 lbs. with the prop reduction unit and will sell for approximately $27,000. In the ground power version, Solar claimed the engine would run continuous without stopping for 40,000 hours. ATP also claims they are working on a 400 horse version with a weight of less than 150 lbs. including prop reduction unit. As I have said to many of you in the past, don't plan on building a Velocity around these engines until they have proven themselves in service and the claims can be substantiated. Build with a proven power plant and convert later if this is the way you want to go.

New Products

We are working on an upscale version of the SUV and it will evolve into 2 different airplanes. SUV 2 door fixed gear with yokes, SUV 2 door RG with yokes. We will no longer make the SUV with the single door. We are estimating a price increase on the fixed gear from $25,500 to $27,500 and the RG version will sell for $33,500. Check out our web site for proposed prices on all other models.

We are replacing our fleet of demo airplanes with a new 2 door SUV with fixed gear and our XL RG with the new Continental 310 horse IO 550 engine. We are also looking at a carbon 3 bladed propeller that is reported to decrease take-off distances and increase cruise due to the thinner blades made possible with carbon. We will do our best to have these airplanes at Sun-N-Fun 2003.

Western Service Center

Loran Swensen from San Diego CA will be opening up a new Velocity Sales and Service Center West by the time you read this. Loran has sent two of his CFI's to us for training and his IA mechanic for learning the maintenance and building process. He has already started building two XL at his facilities on Brown Field just east of the city. We also sent the SUV out west to help in demo flights and checkouts for the yoke type airplane. This will soon be supplemented by an XL RG for demos. Address and phone numbers as follows:

Velocity Sales and Service West
7060-A Curran Street
San Diego, CA 92154
Phone 619-710-2407
Fax 619-710-2473

Velocity Service Center Inc.

We are constantly making changes to our Service Center procedures and policies to better handle our customers. In speaking to a couple of our competitors who also use the Service Center concept, I discovered something that is being promoted and after talking to the FAA is perfectly legal. This is the procedure whereby a builder would come to our Center and work with one of our technicians for a specific length of time and build the airframe. Engine, wiring, instrument panel, interior, finish work and painting can be done by someone other than the builder and still fall within the 51% rule. Since anyone can legally do these things, why not offer a builder plan where these things can be done in the absence of the builder, in our Service Center. This is, after all, what is being done by our competitors.

Here is how the plan would work: Builder will purchase a fast build version of the Velocity and spend six to eight weeks here at the Service Center building his airframe. This will be a 6 day a week/8 hour a day program for a total of 350 hours minimum. One of our technicians will also spend the same amount of time working with this builder. After the eight weeks the airframe will be complete and he can go home while we do the rest. The cost of the program will be $20,000 for the first eight weeks and $30,000 for the completion. Completion is to first flight and includes engine installation, wiring of airframe, wiring of instrument panel, installation of panel into airframe, installation of night lighting and strobes, finish work on airframe and interior completion. Just about everything with the exception of the final painting. There will be no facilities charge and no additional labor charges unless the customer requests something out of the ordinary. We will also offer a complete aircraft flight test program up to flying off the required 25 hour restriction. If the customer should request being present and helping in the completion process, the cost will be adjusted accordingly.

We will limit this program to just one customer at a time until we can tweak it and see how it goes. We will also continue with the present "pay as you go" program.

Insurance Stuff

We continue to "suffer" through the effects that the 9-11 tragedy and the aftershock this has created. A couple days ago the insurance agency that handles our fire/theft/liability insurance on our

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buildings called to let us know they were canceling the insurance immediately because we were located "near" an airport. Does this make any sense? The reasoning was that a terrorist could fly an airplane into our buildings causing lots of $ damage and loss of life. Isn't it stupid for an insurance company to assume that just because we are "near" an airport that we are a greater target than the Wal Mart, which is just 2 miles away? Go figure. For us, it has resulted in a much higher insurance premium than we were paying in the past even though we have never had a claim in over 10 years.

Those of you, who have had a need to renew or are trying to secure insurance, are facing the same problem, much higher premiums or not being able to get the insurance at all. Believe me when I tell you your not alone. There are still insurance carriers willing to work with us on insurance but be prepared to pay more for less. Also be prepared to have your airplane inspected and plan on spending some time here for a proper checkout. A review of the qualified inspectors and flight training CFI's can be found on page 13.
If your looking for insurance try:
John Allen at Falcon Insurance
Phone 1-800-880-4545
Pam Lineberry at AUA Inc.
Phone 1-800-727-3823
Kevin Gruys at Aircraft & Marine
Phone 1-800-747-1124

They're Back

Nathan Rigaud and Mike Snyder have returned to Velocity. After these two very qualified individuals departed for several months, we were fortunate that they decided to return. There were a lot of reasons for their departure and just as many for their return but whatever the reasons, we are all pleased that they're back. If you need to schedule flight training, give Nathan a call. If it is aircraft work you need, Mike is your man.

Are You Ready For Branson

This may be your last chance to make reservations for the BIG fly-in at Branson MO. We want as many of you as possible to attend and need to know who you are. Please contact Lynn or Sue Elsner who is organizing this event at:
402-826-5493 or
lynsuelsner@webtv.net
and let them know you are coming and if you desire to help with some of the organization or work. We need your confirmation that you will be there so we can plan on food and events. Review the last Velocity Views Newsletter (volume 30) for the room blocks we have set aside for you and be sure and make your own reservations now. There are several who have already made plans to stay additional days to see more shows. Join Sue & Lynn Elsner, Rick & Judy Lavoie and Bonnie and myself (along with others) who have made the decision to "stick around" for a while longer. All the details are posted to a special page on the factory's website. Go to:
velocityaircraft.com
There is a link for the Branson Fly-in on the home page.

Open House

The open house scheduled for August has been postponed. We are evaluating the needs of our customers and will probably re-structure our open houses and make them more of a two to three day hands on workshop. Our initial plans are to have two of these a year. This will be a Velocity specific workshop for those who want to get some real OJT in how we build our airplanes. Details have not been worked out yet but there will be a charge for this workshop with a credit for those who purchase a Velocity. Any comments from you would be appreciated as we look into this new venture. Our open house program will probably be a once a year, three-day fly-in or drive-in event with all kinds of activities planned. Any ideas?

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by Scott Swing

FG Nose Gear & Speed Brake Installation

Each issue I try to explain a different way of doing something or at least a different explanation. This time I will discuss the installation of the Nose Gear (FG) and also the Speed Brake.

For the fixed nose gear installation, I tend to do a few things differently than the manual since it works for me.

1. When I get ready to mount the captivator mechanism in the keel (plate and two angles) I let the airplane down onto the gear so that there is a small amount of load on the shock.
2. Using a vise grip, I will fasten one of the aluminum angles to the plate and slide it in place behind the gear down near the bottom of the keel were it goes. I will then adjust the angle so that the plate is fairly square to the gear yet the angle is up against the side of the keel. When satisfied it is pulled out and lock more secure together and the holes are drilled and tapped while it is clamped together. I then install the allen head screws into the plate and set the combination back down in the hole with the other angle clamped to the other side. Adjust the plate until it looks right and gently pull the combination out. If it is moving when you pull it out you can mark it while it is in place so you can line it back up once it is out. Repeat the drilling and taping of the captivator combination then you are ready to install the whole thing.
3. To install this thing correctly, you really need a right angle drill so you can reach into the hole. This right

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angle drill can have a 3/16" drill bit in the end of it but any size will do. What ever that size is, you will be drilling holes in your aluminum angles the same size. Mark four spots (2 per side) on the sides of the angles that are up against the keel. Make sure they will not interfere with the screws that are already in place. They should be centered up and down on the aluminum angle as well and the forward hole should be aft of the forward screw already installed. After the holes are drilled, put the captivator down into the hole up against the gear and secure it there the best you can. It may be kind of tight so that will help you. When in place, drill from inside out, one of the pre-drilled hole in the aluminum through the keel. If you can't get all the way through, just get it started. If you only got it started, you will remove the captivator and drill the hole on through. Slide the captivator back in place and temporarily put a 3/16" bolt through the hole to keep it from moving. Go to the next hole and repeat the process until they are all drilled out. Then pull one bolt out and drill from the outside in with a 1/4" drill bit for the actually bolts you will be locking it in with. Got it? It takes a little longer to do it this way but at least you know exactly where the bolts are going to go through.

4. It goes without saying that you want the pivot (where the fork slides on) to be perpendicular with the airplane when it is level. This will insure no pulling right or left when taxiing the aircraft. This would have been adjusted before the bushings where glued in.

Speed brake:

Lately I have changed things around a little with the speed brake and I think it makes it easier to install.

1. After the speed brake has been cut from the fuselage, I clean up both the hole and the speed brake. I then will do the tapering of the speed brake as shown in the plans. Extra tapering will not hurt anything.

2. Mark the hinge positions and the hard point position in the speed brake. I usually will mark the hinge position in the fuselage or speed brake then transfer the marks to the other with the speed brake back up in position. This saves time as well as insures that the hinge pockets will line up correctly. Do the normal lay-up in these locations as shown in the plans. After cure, knife trim, saw or sand the edges so that they are flush with the hole and edge of the speed brake. Notch the pads in the fuselage as shown in the plans in preparation for the installation of the hinges. Using a short piece of aluminum I beam or something straight, fasten the hinges to it at the same width as your notches in the fuselage. I usually use only two holes in each hinge to hold it to the straight edge and that is usually with 3/32" clecos. You can use 1/8" clecos as well. Slide the hinges in place and let the hinges rotate down 90 degrees. This allows you to see if your notches are deep enough. You can always notch the speed brake a little if you need to later. When satisfied, drill down through the fuselage and cleco the hinges to the fuselage. Again I usually start with two per hinge. Remove the straight edge and slide the speed brake up into place centered in the hole. Drill through the hinges down through the speed brake and secure with clecos. Rotate the speed brake to confirm good operation. At this point, you can drill and tap the holes in the hinges but make sure when you are done that you remove the hinges and drill out the holes in the fuselage and speed brake to 3/16" so the screws are free. You may have to sand the front of the speed brake some to get it to clear. Allow room for one layer of bid on each edge. When satisfied, you can do the edge finishing of both the speed brake and hole in the fuselage. You may want to do one at a time and check the fit each time.

3. At this point I just duct tape the whole speed brake and sand the area around the speed brake in preparation for the triax lay-up over the top. I then use washers (you only need two per hinge) between the hinge and the fuselage to offset the speed brake up a little. I then secure that aft end of the speed brake with tongue depressors and some hot glue at the same offset. Then I cut the largest piece of triax about 1" or 2" bigger front to back so that it covers the hinge holes as well.

4. The thing I like about this method is that it is easier to get the fit of the speed brake just right and you save the step of covering up the hinge holes later.

Other stuff...Fuel tanks:

Something came up the other day here at the shop concerning the fuel tanks. Several customers have talked to me on the phone about the coating to the fuel tank under the fuel tank baffles and bulkheads. I had mentioned that I had never done that thinking that if you seal the edge good why would you need to seal under them. I personally have never had a problem with that but just recently we had a problem with a tank, some of which could have been caused by not coating under the baffles or bulkheads. We are still scratching our heads but it looks like we have air getting to the outer bottom skin of the tank. How you ask? We are not sure but we think there are two or three problems at work here. The baffles and bulkheads have lots of porosity in them. There is simply not enough epoxy in the glass. There was not enough time between coats of Jeffco, which can leave pinholes uncovered. During assembly, the top may have pushed some of the sealing bead back on the rear bulkhead. Add to these the lack of coating under the baffles and bulkheads and you help the chances of having a leak. Any one of these things probably wouldn't hurt you but when all occur, it can be frustrating. Since this happened under supervision here in the shop, it helps us understand more of what a customer goes through. In any case, follow the plans in coating under the baffles and bulkheads since this may prevent some headaches after the fact.

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Builder Hints & Information

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Gear legs:
On fixed gear airplanes that have come in with a slightly melted lower end, we have been doing something to fix them that can help any of you in the same boat. After you have removed the brakes system and the axles, you can evaluate the gear. If it is only a slight bend we won't bother trying to straighten it out. We make 4 plates - 3" wide x 6" tall out of .060 4130 steel sheet. Put them in place and cut them to match the gear leg so they don't interfere with the brake system. We also will bend the tops to contour to the gear if necessary. Drill the holes for the axle. Adjust the plate with washers to get toe in and camber. Sand the plates and bond them on with adhesive with some bolts in place to hold toe in and camber. After cure, we add two AN3 bolts near the top of the plates, offset a little; to lock the plate above the old melted area. This actually works well to insulate the gear so that never happens again and also strengthens the bottom of the gear. This worked so well that we did the same thing to our trainer for prevention. If the gear is bent quite a bit, we will heat it up, bend it back, sand any damaged glass and wrap with a couple layers of Carbon BID before the plates are added. On an RG you could do the same, but you would probably have to machine a little off the axle (mounting pad) to match the thickness increase on the outside of the gear. This would depend on how the tires retract into their wells. You could only do this on the Matco axles since they have 1/8" excess.

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First European meeting of Velocity Builders

Pictured to the right, Alfons Hubmann of Switzerland (HB-YHV), Wilhelm Maul of Germany (D-EAVI), and Frederic Villard of France (F-PVIL) meet at the St. Gallen Airport in Switzerland. Their next meeting is to be held in Maastricht NL in mid-June. Contact is: alfons@hubmann.ch

Reflections Part II

by Duane Swing

When I left you last time (volume 30) I had just sold a turbo Bellanca that was giving me fits flying in any visible moisture due to static electricity build-up. It was also decided to get rid of the Aztec and replace it with a new Beachcraft Dutchess. This airplane was very easy to fly and the trailing beam landing gear made greaser landing a norm. It too suffered from being rather slow for a twin.

In September 79, I see an entry for Skybolt N8036L. This was my first actual homebuilt and was built with my two business partners in the back garage of our office building. In case your memory is failing, the Skybolt is a large version of a Pitts and was fully aerobatic. It took the three of us three years and 3000 man-hours to build. I always chuckle when one of our builders make an issue of our builders manual. With the Skybolt there were no fast build options and the building plans consisted of about a half dozen scaled down plans and another half dozen written instructions. Nothing at all about engine installation, nothing on electrical work, nothing on covering the wood and steel structure, nothing on finishing and nothing on how to fly this tail dragger lunch eater. I flew the airplane around the Dayton Ohio area trying to get the 25-hour restrictions flown off. In early winter, this is not easy in Ohio. Low ceilings, nasty weather, rain, light snow and the constant COLD. By the first of December 1979 I got impatient and told my office staff that I was going to get lost and not expect me back for a week or so. I took off in the early morning with the temperatures about 30 degrees and headed south. By the time I got to Greenville SC I couldn't move I was sooo cold. (Remember it is a two-seat open cockpit bi-plane). After an overnight thawing I proceeded to Florida and flew the Skybolt every day. By the time I returned to Dayton the weather had turned nasty and I finished the trip in a cold 35-degree drizzle. I was wet to the bone and colder than I ever remember. I flew this airplane for a couple more years and taught myself all that aerobatic stuff. I remember an early bi-annual where the local small airport chief flight instructor pulled me aside and suggested I take his new flight instructor in the Skybolt for my bi-annual. I knew immediately what he wanted me to do. Through the intercom, he suggested I do a 360 degree turn. My idea of a 360 was a little different than his and I heard him groan as we completed the loop. He really stepped over the top when he suggested a steep turn. My idea was a steep turn from the inverted position and that ended my bi-annual. He agreed to clean up the side of the airplane where his lunch was plastered.

To Be Concluded in Volume 32

My apologies... I wish I could find a way to fit the rest of this great article in this issue. Duane's story concludes next quarter!

Safety Corner

Accident & Incident Reports, Maintenance & Service Difficulties

Safety Caution
Engine Fuel Lines

We had a few customers that used an aluminum line from the mechanical fuel pump to the fuel servo on the Lycoming engines. This looks really nice but according to a technical advisor at Lycoming, it is not an approved method. There are two reasons for this. One reason is the chance of work hardening of the aluminum caused by vibration and the second is heat. They recommend that you use the stainless flex lines with Fire sleeve.

Safety Caution
Fuel Vent Lines

In the retract aircraft with the sump tank against the firewall, the sump tank vent (those using an AN fitting) comes out in the center forward edge at the top, right under the forward edge of the spar. Several of our customers have been coming out forward of the tank looping back toward the spar and up to the vent manifold. Normally this would be okay since during the gear operation the action of the linkage does not interfere with the aluminum vent line. The problem with that set up is that if one of the gear cables would break, the linkage would lean over against the line preventing the gear leg with the broken cable from falling. This would work on that vent line and could break it off. This would then cause mass flooding of the compartment, which would not be good. To cure the problem, a 90-degree fitting can replace the other one and the line can run over to where the feed line runs in, turn up and run to the manifold. Look at your set up and make sure that if a cable breaks, it would not cause a problem with a fuel or vent line.

Service Warning
RG Gusset Welds

This has been mentioned before but those with Retract aircraft need to inspect the gusset welds on their nose gears. We have had a few cracked welds found in the field and although no complete failures have occurred because of this, it must be addressed. Also worth mentioning are the bushing installations in the keel for the retract aircraft. We have had a few aircraft bushings come loose after a hard landing or a shimmy. Some have just cleaned things up and reinstalled them but we have come up with a different method of installing those bushings that not only makes the installation a bit stronger, it is much more adjustable. Basically it involves a combination of plates and bushings and doesn't rely only on the glue for strength. I believe we supply the kits with them now. If you would like to switch to this method, you can call Natalie here at Velocity.

Service Warning
DOT 5 Brake Fluid

DOT 5.1 Brake Fluid Warning
George Happ recently telephoned from MATCO Mfg. to relate two field reports where MATCO customers had installed DOT 5.1 brake fluid, which resulted in a rapid deterioration of the seals in the brake system. In George's words, "Dot 5.1 would be death to a system designed for DOT 5." The following is an excerpt from Happ's message to Velocity, Inc.

"DOT 3, DOT 4 and DOT 5.1 brake fluids are glycol based compounds that are compatible with one another. DOT 5 brake fluid is silicone based and should never be mixed with DOT 3, DOT 4 or DOT 5.1. DOT 3, DOT 4 and DOT 5.1 fluids may damage paint surfaces and DOT 3 and DOT 4 have lower boiling temperatures than DOT 5 (DOT 5.1 has the same boiling point as DOT 5). Furthermore, DOT 3, DOT 4 and DOT 5.1 fluids are 'hygroscopic', which means they absorb moisture from the air. This causes the fluid to turn dark, indicating that it is time for the brake fluid to be replaced. DOT 5 fluid will not damage paint, has a boiling temperature in excess of 500 degrees F., and is not hygroscopic … (It) doesn't seem to make very much sense from a specification standpoint that the two fluids DOT 5 and DOT 5.1 would be so incompatible and have such a similar designation."

Service Notice
Franklin Engines

Do NOT remove that Franklin Engine Oil Line that goes to your fuel pump!

Dave Lincoln called me and told me some things about his Franklin engine that may be helpful to others with the Franklin. Dave found some problems in his accessory case dealing with worn out bearings and shafts etc... The reason for this, he thinks, relates to him removing the fuel pump and other parts (a hose that runs from the tee fitting to the fuel pump housing) that is used to help lubricate the inside of the accessory case. He was told by a local Franklin expert that he didn't need this hose or whatever but he now think otherwise. If anyone has installed two electric fuel pumps and removed not just the mechanical pump but also that oil line, they may have a similar problem.

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Renewal Discount?
See the last page of this issue for details...

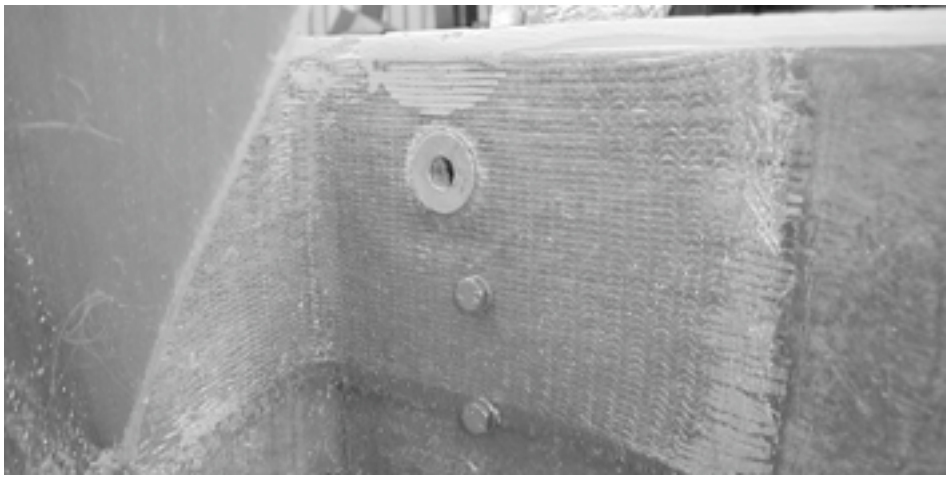
A&P Talk

by Brendan O'Riordan, CFII, A&P

It's Amazing what S##t Flies

Some of you may think this is a little harsh for a title of an article but you have to see some of the pictures in order to understand where I am coming from. For years now we have been writing articles on good building practices. In this article we will show you some of the bad building practices that we have seen on airplanes. The reason for doing this is not to single particular builders out but rather to give the rest of the Velocity family an idea of what is not acceptable. The builders of the few airplanes that I took these pictures from really did not understand why what they had done was really wrong.

The first picture (top photo to the right) is of a Canard Bushing installation. Section 15.1.2 in the manual describes how to install Triax reinforcements from the fuselage to the canard bulkhead and how to install the bushings into the bulkhead. The first thing you may notice in the picture is the hole that was cut for the canard bushing to sit in was cut too large. The next thing you will notice is that there was barely any Microglass used to hold the bushing in. The last thing that was wrong with this installation was that none of the Triax reinforcement lay-ups were done on either side of the canard bulkhead. This airplane was already 2 years old before we saw it and had at least 80 flight hours on it.



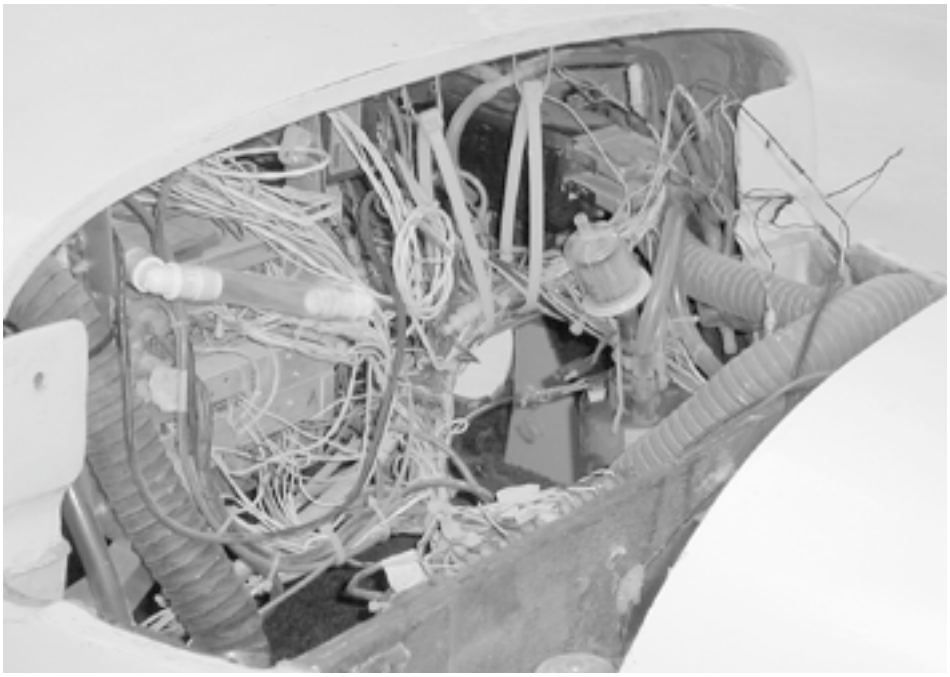
Continued from previous page

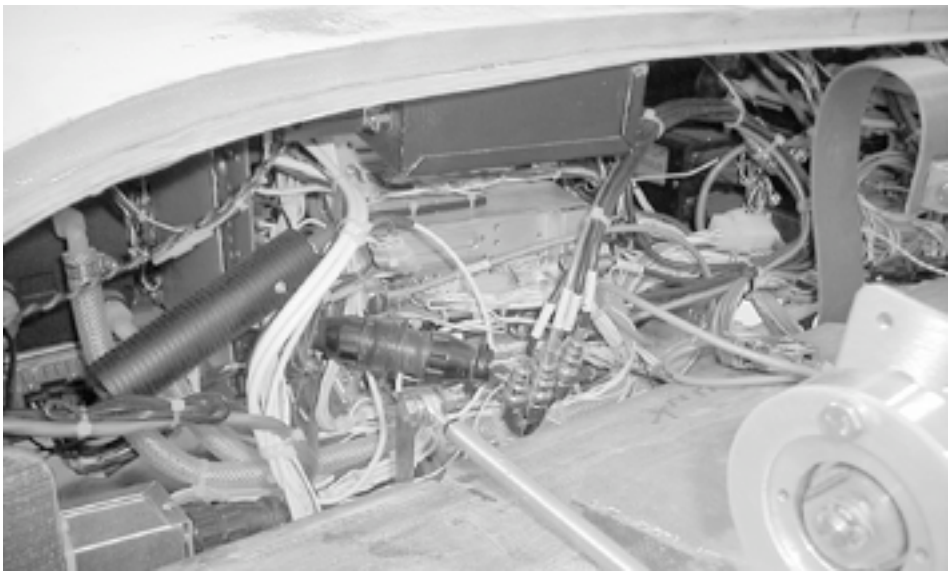
Who is to say how long this airplane could have gone before it got into real trouble. Picture 2 (second photo on the same page) is an example of how the installation should look when it is completed.

The third picture (third photo on the page) shows an aileron hinge attachment. Section 2.3.8 of the Velocity manual shows the assembly of the aileron hinge to the aileron. According to this section you attach each 6-inch hinge to the aileron using 5 rivets and Alphapoxy Microglass. Figure 2-37 shows clearly the spacing used for the rivets in the aileron hinge. The 5 wood screws that this builder decided to put into his hinges are definitely not part of the installation. None of the rivets used in the installation made it into the aileron. You may also notice the paint stick that he used as a spacer between the hinge and the aileron. The wood stick was cracked and dried out and starting to come apart. I didn't have an aileron off an airplane when I was writing this so I took a picture of a properly done rudder hinge (bottom photo on the page). The only difference is the number of rivets and the spacing.

Section 2.3.9 in the manual shows a builder how to balance their ailerons. If you look on the leading edge of the aileron in picture 3 (third photo) you will notice a line of weights. The blob you see in the front of the weights is silicone. Some of these weights were just about ready to fall off. It would be a shame to have one of your counterweights fall off and go right through your propeller. If counterweights are needed to balance your aileron you want to bond the weights down and put at least one layer of glass over them to secure them in place.

The fifth picture (top right) is of the back of an instrument panel. The first thing that may come to mind is a rat's nest. I am guessing that this





panel was wired one wire at a time. Can you imagine going back to this panel after the fact and trying to fix a broken wire or try to fix a radio that isn't working properly? What we try to do is keep wiring as neat as we possibly can and label both ends of each wire so when you have to come back and do some maintenance you can do so with out too much trouble. (see photo above)

The seventh picture (next page top photo) we have is fuel plumbing from the main tanks and wiring in the back of an airplane. The hose used for the plumbing was stretched tight between their two attached points. This is putting constant pressure on them. As you start flying these lines bounce up and down and continue to put pressure on these lines. Rubber fuel tubing will dry out as it ages. In this installation as the tubing aged it would have hardened and cracked from the excessive movement. This particular installation also has the wiring for the strobes and the fuel pump wrapped around the fuel lines. Just as you would do behind your panel keep the wires neat and tidy and if possible route the wires away from you fuel lines. There are some instances especially in a Velocity where you will have wiring and fuel lines by each other. If you tie wrap wiring to a fuel line make sure that the fuel

Continued on next page

Continued from previous page

line has some insulation wrapped around it between the tie wrap. I like to use hose slit up the side and wrapped up the tubing. The eigth picture (second photo to the right) is of the same airplane after we fixed the problem. You will also notice that we installed a sump tank in this airplane. The original system had flexible lines that ran all the way up to a fuel selector on the passenger's side of the keel and then back to the engine.

Looking at all these pictures one thing to keep in mind is that at one time these airplanes were at least inspected by the FAA and passed the initial inspection. It is always a good idea to have someone who has experience double check your work. It is policy here at Velocity that no matter who works on an airplane we have someone else check over the work before the airplane is flown. One other thing to take from this is that a job that is done right looks well. You notice that the pictures of the airplanes that had problems to fix "jumped out " at you. They didn't look right. If the work you are doing on your own airplane doesn't look "Right" take a second look and maybe have someone else take a look at it for you as well.

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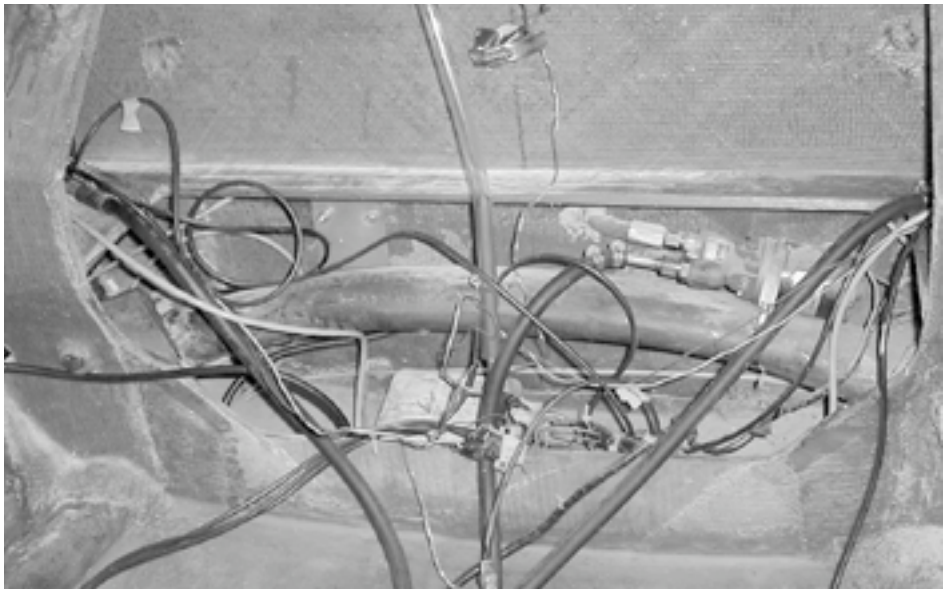

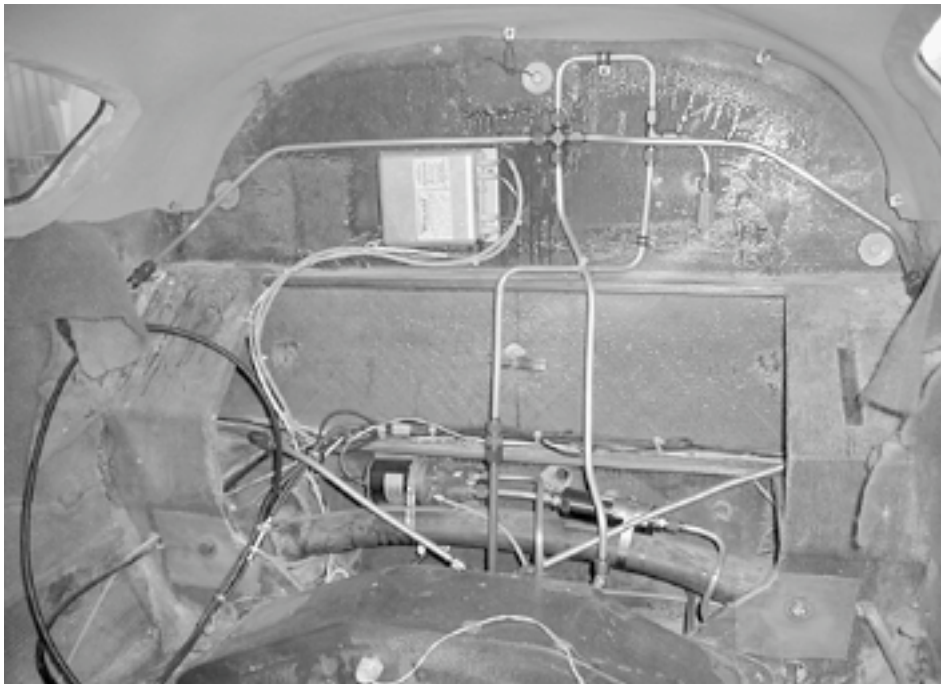

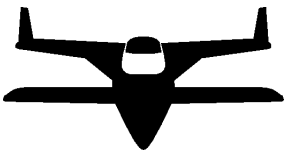

The Velocity Branson Fly-in October 11-13, 2002

Last Call... Have you Signed up yet?

We have set up a special page on the factory's website with the latest information about Branson activities, the fly-in schedule, lodging choices, and how to sign up. Go to velocityaircraft.com and click on the link located on the home page for the Branson Fly-in. You can also refer back to a detailed article on page 1 of Velocity Views volume 30 (your last issue).

Check velocityaircraft.com for up-to-date details

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CFI Notams

by Nathan Rigaud, CFII

Current or Proficient

Which one of these do you think you fall under?

• Current: you have the minimum FAR requirements.

• Proficient: you are highly competent and skilled with your flying.

Here at Velocity, we require you to have at least 10 hours of flight time in the past 90 days in order to come to the factory for our checkout. We know some builders do not have the time or money to build and fly at the same time. Keep in mind that when the project that you are building is coming to an end, maybe it is time to think about getting proficient again. Yes, that's right, I said Proficient.

The FAR's requires you to have a flight review every two years and 3 takeoffs and landings the previous 90 days to remain current. Being current will keep you from breaking the FAR's, but being proficient will keep you from breaking your airplane.

We do not expect you to fly the Velocity perfect the first time. However we do expect you to demonstrate basic private pilot skills and be able to fly a pattern in a cross-wind or no wind situation that looks like a rectangular pattern.

The FAA Practical Test Standards for the private pilot covers all the maneuvers needed to pass the private pilot check ride. You should be able to complete all the items to these PTS standards. We go through the same basic maneuvers used in the private PTS, steep turns, stalls, slow flight, emergency procedures, etc. This gives us a pretty good clue if you have been training or just flying around in circles.

A proficient pilot is a person that flies on a regular basis and is always training and or striving for that perfect flight.

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August 3rd
Open House
will not be held...
See Factory News on page 6 for the details...

Flight Check!
Be Safe!

Velocity Service Center Inc. offers flight training for builders/pilots to safely learn how to transition into flying a Velocity. Get a **Flight Check Out** prior to your first flight! Flight training is available from:

• Nathan Rigaud, CFII
• Brendan O'Riordan, CFII
• Scott Baker,CFII

The following Flight Instructors have also been approved by Avemco Insurance:

• Sam DaSilva - Seminole FL 727-595-6384
• Mike Gunvordahl - Burke SD 605-775-2952
• Mack Murphree - Dayton NV 775-246-9364
• Manny Lewis - Scotia NY 518-399-8614

Don't take a chance, get checked out prior to your first flight. Please note that you should be current in some other type of aircraft prior to your Velocity check out. The purpose of the "flight check" program is to transition you from flying other aircraft types (like a Cessna) to a canard pusher (Velocity).

Factory Authorized Insurance Inspectors
Please make note of these individuals:

Name - Location Home Phone / Work Phone

Brian Gallagher - Murrieta CA 909-461-9990 / 909-696-0160
Barry Gibbons - Palmdale CA 661-273-7398
Don Pearsall - Owasso OK 918-272-5551 / 918-474-2610
Mike Pollock - Sachse TX 972-530-8400 / 972-728-2725
Glenn Babcock - Tampa FL 813-677-2543 / 813-604-2637
Wes Rose - Grand Rapids MI 616-772-7235 / 616-530-0255
Jean Prudhomme - Boca Raton FL 954-559-4988
Mack Murphree - Dayton NV 775-246-9364
Gary Stull - Tampa FL 813-949-1297
(Gary is an airline employee and can travel inexpensively)

Kit Plans Changes "KPCs"

by Scott Swing

Note: Check the date at the bottom of your page. If it matches the "Date of Change" shown in the KPC, your manual has already been corrected.

KPC 152
Affects all XLFG and planes with large wheel pant option
Manual section 18.2
Date of change/addition 6-01-02

New Wheel Pants for Large tires

The wheel pants come to you in front and back halves for both mains and the nose tire. There is no right and left pants, they are the same. You also should have the front gear fairing and the left and right main wheel pant to gear fairings.

Before you attach your axles, you will need to slide your wheel pant to gear fairings into position on the gear leg.

Install your axles and your aluminum plates that go on the inboard side of the gear. You should have 2 long aluminum plates about 2" X 12"X 1/8". These are used to attach the inboard side of the pant to the leg. Install these plates close to level, onto the backing plates with 10-32 screws and lock nuts. You will notice from the pictures that the backing plate is wide enough to allow these screw to attach for and aft of the gear leg. Holes were drilled into the plates to clear the upper axle nuts and washers.

Trim the wheel pants on their template marks. Trial fit the pants to the gear starting with the aft section first since this is the section that must have the cut out for the gear. With the airplane sitting level, adjust the wheel pant to also sit level and inline with the slipstream left to right.

When satisfied with the alignment, zee-bend the strap brackets to fit the contour of the wheel pant and determine the length of the outboard axle stand-off. Secure the stand-off in the axle with adhesive. After cure, drill through the axle cotter pin hole to further secure it when the axle nut is in place.

Re-fit the aft portion of the pant and locate the standoff hole. Drill two attach holes to aft side of the attach bracket and cleco in place. The aft section of the pant should be secure at this point. Fit the forward side of the main pant to match the aft section. Drill and cleco the two halves together with 3" spacing.

Locate and drill through the wheel pant and forward part of the bracket as you did with the aft section. Maintain 1/2" to 3/4" tire clearance all around.

Fabricate and install some NACA cooling ducts on the inside forward section just in front of the brake. We do this by marking the shape of the scoop on the wheel pant then cutting the three sides. Bend the scoop in about 1/2 to 3/4" and secure with a spacer while you make some sides. You can heat the front of the scoop so that it will take a set and not spring back. Glass over the sides with a couple of bid on the inside of the wheel pant and your done. Slide down the upper cuff to fit the wheel pant and glass into place onto the gear leg. Make sure you give this cuff some clearance to the pant or it will rub all the paint off where it touches.

Nose Pant

The first thing you will do is fabricate the front attach bracket out of the 1/8" aluminum strap that came with the kit. It extends approx. 1 1/2" above the fork and bends forward and down slightly to about 110 degrees. Once the position is located, drill and tap 2 10-32 holes in the casting and screw the bracket in place with 2 #10 NAS screws and lock washers.

Fit the front half to the nose gear. The center of the nose strut hole is approx. 1" forward of the part line. When satisfied, drill and cleco the forward section of the pant to the front bracket. All three attachments for the nose pant will be in this forward section.

Level the pant and locate the side attach holes with 3/16" hole. You may want to temporarily stick the rear section in place to find level on the front section. This would be a good time to reinforce the three attach positions. Add 3 layers of bid 6" X 6" over the sides and 3 layers of bid 4" X 4" in the front. Open the holes after cure.

The forward attach bracket and pant should now be drilled out to 3/16" and an anchor nut attached to the bottom of the bracket. You should know how to do this by now.

Attach the forward section of pant at all three locations using the aluminum spacers and long bolts on the sides. Fit and trim the aft section to fit the front then drill and cleco with approx. 3" spacing. Provide adequate tire clearance

NOTE: You can find pictures of this on line at www.velocityaircraft.com

We will be doing this section in manual format so keep in touch if you are

affected and you will be able to get a copy or download one.

KPC 153
Affects all planes with the pre-molded NACA scoop for the engine cooling system.
Manual section 18.1.3
Date of change 6-01-02

Your fuselage top comes with indentations in it for the installation of the pre-molded NACA scoops. If you do not have the indentations, refer to a supplement, which is sent out that allows you to make scoops using the fuselage as the bottoms. You will not use the pre-molded sections.

KPCs

Continued from previous page

You have a right and left scoop. If you lay the scoops on top of the fuselage in the area of indentation, you will see the right from the left. Using them as a guide, cut your holes out in the fuselage approx. 5/8" from the edge of the indention creating a flange for the scoop to lay into. At the back, you will be cutting all the way to the offset. Since the scoop will end up sliding back through a hole in the firewall, you must consider that as you cut the hole out in the fuselage. At the front of the hole in the fuselage, leave about 4" to 5". That area will be tapered to allow the scoop to fit all the way down into flange. This is done to lessen the amount of drop off inside the fuselage to the scoop when you go to glass the inside of the fuselage to the scoop.

After you have cut the hole in the fuselage, you must also cut a hole through the firewall. Again, using the scoop as a guide, cut a hole that will allow the scoop to protrude through the firewall flush with the aft face. This will require notching the rear section of the flange on the scoop to allow the back end to come through. As you cut the hole in the firewall, leave a little material at the top just to keep it stiff. We used to leave about 1/4" but found later that 1/8" to 3/16" was plenty. As you fit the scoop down into position you will have to file the 4" of material left at the front of the hole in the fuselage so your scoop will fit down flat in it's indentation. Also, you will trim the perimeter of your scoop to allow it to fit down into the indentation in the fuselage. When satisfied with the fit, cleco into position.

Remove the scoop and sand the underside of the flange where it will mate to the fuselage as well as the sides where it will be glassed inside the fuselage. Sand the mating surface on the fuselage. Also sand the inside of the fuselage and firewall where the scoop will be glassed in. Clean it all up and mix up some adhesive with a little cabosil in it and bond the scoop in around flange and firewall and cleco into position.

After cure, remove the clecos and sand the area around the flange. At the firewall, radius the three side of the outlet as it dumps into the engine compartment. Remove about 1" of primer on the aft end of the scoop near the firewall. I use 3 layers of 3 oz cloth to glass the back side of the scoop to the aft side of the firewall but you can also us 1 layer of BID. The problem is the BID needs a little bigger radius than the 3 oz cloth.

Inside the fuselage, you will glass the scoop to the firewall and fuselage top with two BID overlapping each surface by 1 1/2" or so. Micro radius the corners first.

On the outside surface of the top fuselage, you can just use your finishing epoxy (velocipoxy) with micro to fill in the small gaps between the scoop flange and the indentation in the fuselage. If you ended up with a poor fit and you don't think you had a good amount of flange glued on, you can sand about 1/2"each side of the joint, down to glass, then glass with one layer of BID 1" wide. Then you can finish this area after it cures.

NOTE: Pictures and drawings to follow.

KPC 154
Affects all aircraft
Manual section 8.2
Date of change (Addition) 6-01-02

There was some question as to whether you need to tape glass the outer edge of the slanted foam bulkhead (goes from the top of the spar to the top of the gear bulkhead) to the fuselage. Although it is not specifically mentioned in the plans, the answer is yes. You would treat it just like any other bulkhead in that you would glass both sides with two BID. I usually install the spar but will hold off glassing it to the firewall on top until I have the slanted foam bulkhead in place (top of spar to the top of the gear bulkhead). Just before you do all of the triax lay-ups from the firewall down the slope and on down to the floor on the front side of the gear bulkhead, you can do the tape glassing of the spar to the firewall, down the slope of the slanted bulkhead to the side of the fuselage, and on around the forward side of the gear bulkhead to the floor. You will probably need to put duct tape under the slanted bulkhead to keep the micro radius from dropping through. Under the slanted bulkhead on a fixed gear, you can cut the fuselage away right up against the rear fuel bulkhead. This gives you more access behind the fuel tank for fixing a leak or bolting the wing on. Then you can tape glass the underside as well. On the RG, you shouldn't have anything to cut off; all you need to do is tape glass to the wall of the fuselage.

KPC 155
Affects all aircraft with pre-molded gear boxes
Manual section 8.1.2
Date of change: 6-01-02

In March of 1999 we had KPC 100 which Simply says "Although you do not need to bond the back of the spar to the firewall, you should bond the spar down to the box with structural adhesive or a flox epoxy mixture". If you check newsletter 18 you will see it in there. This change was made to the FBF-01 fast build fuselage supplement to the manual. I have since found out that some customers, at least recently, did not get the supplement. You should put this note in your manual. When we install the spars, we cut the hole in the fuselage oversize so we can slide the spar through a little high and forward and set it down on the adhesive that was put on the top of the boxes. We even put about a 3" stripe of adhesive on the spar so when we slide it up against the firewall it will bond the outboard edges of the spar to the firewall. If you haven't put anything down under the spar, let me know and I will tell you how to add some after the fact.

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Production News

by Scott Baker

Outlook Promising for MATCO Compound Brakes

Velocity was so "wanting" of a well-designed, heavy-duty brake system for the Velocity XL, that we rushed to market MATCO's prototype version of its "323 Compound" wheel and brake. Problems were encountered on the prototype brakes. We discovered that after 6 months of use and approximately 400 landings that the brakes had a problem in shedding brake dust, which then clogged the moving mechanisms and ultimately caused the brake parts to overheat and warp. George Happ and the MATCO team were quick to examine the problem and arrive at a solution. The "323 Compound" has been redesigned to improve the removal of brake dust from the previously affected areas – and so far, the results have been impressive. A Velocity XL owner in California has been field-testing this new version of the "323 Compound" and reports consistent landing rolls of less than 1,000 feet with the aircraft at near gross. By the way, after months of field-testing both the prototype and improved versions of the Compound brakes with a phenolic pad placed between the axle and the gear leg, there has been virtually no heat transfer from the brakes to the fiberglass main gear legs. Temperature sensitive indicator tape was installed on two XL aircraft running the "Compound" brakes and gear leg temperatures have yet to exceed 120 degrees.

There are several bits of news to share involving the production department.

Personnel

Daren Johnson, our shop foreman for many years has recently left Velocity and has relocated along with his family to the eastern shore of Maryland. This is certainly a big move and when asked, "Why Maryland?", Daren replied that he yearned for a more quite lifestyle in an area "like Sebastian used to be 10 years ago". Johnson has family ties in Maryland. We wish Daren all the best.

Stepping into the production supervisor spot is 7-year Velocity veteran, Lambert Kneifel (above photo). Lambert is familiar with all aspects of Velocity manufacturing – and has helped train new workers to work with mold and mold less parts production. We are happy to have Lambert and the experience he brings to the job.

Velocity, Inc. welcomes master machinist Bob Goatley (above photo). Goatley teams up with Alan King to machine and weld the dozens of unique, aircraft quality metal parts that are supplied with Velocity aircraft kits. Welcome Bob!

2-Door SUV

What's this …an aircraft being built in the manufacturing building? With Velocity Service Center staff members up to their "eyeballs in alligators", the factory production team is working on the construction of Velocity's newest demonstrator and model, a 2-Door SUV. The goal is to have the aircraft ready for flight-testing during August.

Production members are voicing their appreciation for this opportunity to learn where and how "all those parts go together". Our people are also gaining an appreciation of what is important and what is not, vis-à-vis parts quality and dimensions. This information is certain to carry over and improve the quality of the parts that we build.

The 2-Door SUV will feature a cut-down center keel, dual control yokes, and a center throttle quadrant. The aircraft will be powered by a 200-horse power, Lycoming IO-360 engine by Don George Aircraft. We plan to test a new 4-blade, composite, electric governed constant speed propeller made by Aerotek 2000 (a New Zealand company). Velocity, Inc. has been granted exclusive selling rights of Aerotek pusher propellers in the United States – and while the costs are still being analyzed, we hope to sell the propeller and controller in the neighborhood of $6,000. This model propeller is suitable for all Lycoming 4-cylinder engines and the Franklin 350 cubic inch 6-cylinder engine. The panel will feature an IFR avionics stack from UPS Aviation Technologies. We plan to use a digital single-axis autopilot from TruTrak. Velocity, Inc. is an authorized dealer for TruTrak digital autopilots – visit TruTrak on the web at www.trutrakflightsystems.com - and call us for the latest in pricing information.

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Visit the Factory's Official Web Site:
velocityaircraft.com

Builders Forum

Builders Forum is full of tips, information and letters ("material") supplied to *Velocity Views* Newsletter from individuals that are Velocity builders (or want to be builders). It is provided as "**USE AT YOUR OWN RISK**" material. Neither Velocity Inc. (The Velocity Factory) nor *Velocity Views* Newsletter (Lavoie Graphics & Rick Lavoie) have endorsed this material, and disclaim any liability for the use of this material. Individuals who use this material for the operation, maintenance, or construction of their homebuilt aircraft do so at their own discretion and at their own risk. Any variance from the builders manual is high risk.

Tom's Technical Tips

From Tom Wright, Sommerset PA

I find that building anything is a series of assembly and disassembly steps. It seems to proceed like this: make the part, see how it fits, temporarily fasten the part in place, determine how to make it fit better and what to do to it next, unfasten and remove, go modify it and try again until it is acceptable. To be able to assemble and disassemble quickly we sometimes use "CECOS" but they are not always the best tool, especially if there are nuts, bolts, and nut plates involved. So to that end I have found a very quick and inexpensive device that allows assembly of a nut plated part without using your good aircraft-quality screws and bolts. Go to your local hardware store and find thumb screws one inch long, with fine threads in each size you will be using, i.e. 8-32, 1/4-28, 10-32. Also get knurled thumb nuts in the same threads and hex nuts all in fine thread. For those of you who don't know about threads, there are two types of threads that are used on fasteners: national course (nc) and national fine (nf). Aircraft bolts, nuts, nut plates are fine. The two thread types are not interchangeable with each other. Continuing at the hardware store, purchase a dozen or so thumb screws, thumb nuts and regular hex nuts, and a can of red spray paint. Since these are all temporary fasting devices that we don't want to leave in our completed plane, we will spray everything red so we don't forget to remove. Install the thumb nut onto the thumb screw now when you have to attach something to a nut plate. For example, on an aileron hinge, simply place the screw through the hole and turn into the nut plate until it gets tight, then turn the thumb nut tight against the skin drawing the nut plate tight against the underside and through, holding the part in place. The red nuts can be used anyplace in place of your aircraft nuts; they spin on easily with fingers and are easily removable, for temporary fitting purposes. If you can't find this hardware at a local hardware store, try a really big international company Mc Master Carr, Cleveland, Ohio – they have everything man has ever invented.

Again at the hardware store, usually in the paint department, you can find sanding blocks that are made of spongy foam with abrasive surfaces of various roughness/grits. These are excellent to use for sanding and forming various concave edges, etc. For straight surfaces I use 3M adhesive-backed paper for use on air boards: obtain a good straight piece of 1x3x12 and screw another 1x3x12 right down center to form a "T". Countersink the screws, then use the adhesive-backed paper on the flat surface (it glues itself). Use whatever grit you want. When finished, remove the paper in one piece with a putty knife. Cut in half to make two pieces 3" x 6". Fold each piece in half with the sticky backs against themselves. Now you have good pieces of really tough sandpaper that will not wrinkle when you're trying to use it. It's rigid enough to get into thin, tight areas like the door gap space and make a good sand line.

To save one complete cure-sand-fill cycle, here's a trick I've been using for years. After the parts have been laminated and partially cured, apply your micro fill (the glass on the part must be stiff enough that it does not distort from the application of the filler) and squeegee. Another way to fill glassed surfaces is to sprinkle micro powder directly onto the glassed surface while it is still wet. The micro will soak up the excess wet epoxy. It becomes a thin film of filler that chemically bonds to the glass. Spread it very thin, only enough to fill the small valleys in the glass. Let cure then sand as you would ordinarily do finish.

Thomas J. Wright is the co-owner of Advanced Composite Technologies and has been custom building aircraft since 1982. The company employees six full-time staff members. They are responsible for building over 30 aircraft of various types, currently completing their eighth Velocity.

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Terra Radio Repairs

From Rick Lavoie, St Augustine FL

I had a bad display with one of my Terra Com radios. My local avionics shop made me aware that there is a company that bought out the Terra inventory and provides repair service for Terra. I know that many Velocity builders already own Terra avionics in their panel and need this information for future service or replacement:

Free Flight Systems
3700 Interstate 35
Waco TX 76706
Phone: 254-662-0000
freeflightsystems.com

Service was friendly, professional and timely. My com radio now works like new! I'm glad I found them...

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Go to: velocityaircraft.com click on "Builders Page" link

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Our error, your gain on this FADEC equipped engine. We have one too many engines on the way and need to get rid of one. This engine has the FADEC (Fully Automated Digital Electronic Control) that eliminates the mixture control and magnetos and automatically provides the exacdt amount of fuel and ignition advance for the power selected. Ready to ship from the factory to you by the time you read this. Our regular price with a three year warrantee is $45,750. We will include our engine install package free as your incentive. This is a savings of over $3800. (Price does not include freight and Florida Sales Tax, if applicable).

Contact Scott Baker at Velocity for details.

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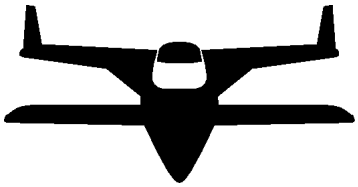

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http://lavoiegraphics.com/velocityrg

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Builders HOT LINE

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Delivery Dates	
Quarter:	**Mailed by:**
1st	January 15th
2nd	April 15th
3rd	July 15th
4th	October 15th

Submission Deadlines	
Quarter:	**Mail Date:**
1st	December 1st
2nd	March 1st
3rd	June 1st
4th	September 1st

Listed below are **4 options** for submitting your text. Do not type your text in all caps. Please send us **photos** and drawings too!

1) Send it on a 3-1/2" disk, a CD, or a Zip 100. This saves us from re-typing all that text. Don't format your text, just give us raw text, with no underlining, bold, or any other type of formats.

2) **E-Mail** your text file to me: rick@lavoiegraphics.com and please don't type in all caps.

3) If you don't have access to a computer, then we can scan in your **typed** page.

4) If you **print neatly** so we can read it clearly, we'll type it on our computer for you!

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