

# VELOCITY VIEWS

Volume 18

## Fontana's Beautiful Velocity XL RG



*"N747DF is one of the nicest Velocities that I have seen!" commented many folks at the recent factory open house..*

IT ALL STARTED IN 1990, when we moved from Switzerland to Spain, and reformed a old Spanish house and I had made the garage a little bit bigger (4 cars), so that I would be able to construct a plane. After that I looked around for a kit. In 1994 I went to the U.S. and visited Lancair in Oregon, Cirrus near Chicago and Velocity at Sebastian. From the beginning it was clear, it must be a 4 seater. After that, I started to talk with the Spanish FAA. First problem: Not more than 180 HP; second problem: I was Swiss (not in the EU) and not allowed to register a kit in Spain. The only possibility will be a Swiss registration. For this, I would have to import the assembled kit to Switzerland with a lot of taxes again,

and in Switzerland the assembled kit will not be accepted as a Experimental! One other possibility would be an N-registration in Europe, bringing the fully assembled kit to Frankfurt (Germany), which is about 2000 miles, on a truck (more customs and taxes), for U.S. FAA inspection... and the first flight could be only done with prior approval by the German FAA. In Germany, it is only possible to register a two-seater. In Switzerland, the FAA would ask you for a lot of papers, about the calculations of the kit from the manufacturer, before you get the Experimental Registration by the Swiss FAA. With all these problems and the Atlantic Ocean between me and the factory,

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## Fontana's XL RG

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the kit, the shipment, phone calls, faxes... all add to the cost. My wife and I went again to the U.S. in June 1997 for two weeks. We flew with a rented Cessna 172 to Sebastian and visited Velocity again. Here we got a ride with Scott in the brand new XL/RG. After that, we flew back to St. Augustine with the rented Cessna 172, and all of you can imagine the feeling of the pilot after the flight in the Velocity XL/RG from the factory. I thought it over for three nights and we made the decision to buy the Velocity XL/RG kit, but only if the construction and the registration could be made in the U.S., and if we could get a hangar close to Sebastian, so that we'd get the support from the factory without any big expenses for shipment or phone, etc.... I had to find a hangar, my English was not very good, and I had not a lot of experience in composites. From now on, everything went very fast: what we call really "JUST ON TIME"!

I had to get a U.S. work permit! This is not easy. We had created "Pansky International Inc." for business in the U.S. so I got an L1-Visa with work permit for ONE year. With the help of Duane and Scott from Velocity, I got in touch with Liz and Phil Corso for builder assistance, in September, 1997. My hope was that they had space in their hangar



*Francesco and Ariane Fontana with N747DF*



*Phil Corso's custom made nose wheel "rock guard"*

for me to build my kit. So in the beginning of October 1997 we had the first parts in Phil Corso's hangar and started with the assembly of the Velocity fast build kit, our Velocity XL/RG - N747DF.

With the help of Liz and Phil Corso, I got all the knowledge and much more about composites and our Velocity. Phil told me step by step what we must do and what we needed to order, so that we got the assembly of the kit "JUST ON TIME". In December 1997 I ordered the engine, an IO-540 with 260 HP, from Don George, Orlando, exactly as recommended by Velocity. I meet Larry Holland from Treasure Coast

Avionics and we started with the panel. In the beginning, I had very futuristic ideas... and then I came back to earth. I could not just stay constructing the kit, I had to fly. With my experience of about 1100 hours of gliding and 800 hours of single engine only VFR, I decided to get the U.S. IFR - Rating. With John Yanaros at Ft. Pierce I learned a lot and I was glad to have him as my instructor. Time went on, and, with the engine from Don George's, the three blade constant speed propeller from MT (Germany), all the instruments from Treasure Coast Avionics, we started the engine for the first

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## Fontana's Velocity

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time in June 1998. On 16th June 1998 our Velocity XL-RG / N747DF passed FAA inspection. Now all was ready to fly!! Here we get the only big problem during the whole construction of our Velocity, the insurance with AVEMCO! But that is another story and would take more time than this construction story. In the end, we took Parrish - O'Neill, Mount Veron, Ohio, and on the 10th of August 1998, in the morning, Scott Swing from Velocity made the first flight. It was great to see our Velocity XL-RG / N747DF going in the air for the first time. After an hour he landed and we christened the Velocity on the name of ARIANE II with champagne. (Ariane I is my glider in Switzerland). I will never forget this 10th of August 1998, because in the morning, I got my medical, after, the first flight of our Velocity and at 4pm I passed my IFR check flight. After minor adjustments on the rudders and the trim I made my first flight with Scott Swing on 11th of August 1998. On August 12th 1998 my one year L1-Visa ran out, so I had to go back to Switzerland, to get a prolongation of 2 years for the U.S. L1-Visa. On September 9th 1998 I got back to the U.S. with the prolongation of the L1-Visa for 2 years. I had made about 10 landings with Scott and my really first SOLO flight was on 11th of September 1998. Since then, I have flown about 80 hours and it flies great. We had some minor problems with the avionics, but Larry Holland from Treasure Coast Avionics resolved them in short time. Phil Corso helped me to resolve minor problems with the rudder, trim, engine instruments and the tow-in. After all that, the plane went to the paint shop and, with an error from the paint manufacturer, it come out in sweet red, like the "Pink PANTHER" from the TV, so we had to do it again.

Now some highlights of our Velocity:  
IO-540 / 260 HP with slick magneto

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# Mike and Dennis Knutson's First Flight: Velocity RG

**V**ELOCITY N 747 DK, A STANDARD RG was built by the father and son team of Dennis and Michael Knutson. Overall construction time, less painting and final interior, was just a little over four years. Dennis flew the first test flight on May 26, 1998. The flight was for the most part uneventful and the aircraft operated normally with good flight characteristics except for one minor event. Just after rotation on the initial test flight the glare shield fell off covering the instrument panel and wedging itself on his flying hand. Just what any test pilot needs for his first flight, a partial panel and having to deal with loose equipment in the cockpit. After replacing the glare shield the remainder of the flight went smoothly. Oil temperatures and Cylinder Temps were all well within normal operating ranges. We feel that this is partly due to the fact that a secondary oil cooler has been installed in the left wing similar to a Franklin engine installation. The cooler is inset into the left inboard wing cove with its air inlet under the wing. Warm air from the unit is vented through the bottom of the engine cowling.

Before the first flight, we encountered several problems with our overhauled ("0" timed) Lycoming IO-360-A3B6D. Our problems initially started with a stuck fuel distributor (spider) and continued with significant oil fowling of the plugs, requiring us to clean them

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*Father and son team of Dennis and Michael Knutson, happy after their May 26, 1998 first flight.*



*Knutson's beautiful Velocity RG sitting pretty in January 1999, after final paint*

## Fontana's Velocity XL

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and ElectroAir ignition, with 3 blade MT - constant speed prop, 92 gal. fuel tank, empty weight 1690 lb., Century 2000 Autopilot, VM-1000 (Vision Microsystems) Engine Monitoring system, Full IFR equipped (2 COM, 1 NAV, DME, Apollo GX-50 GPS, PMA-6000MS Audio-Panel, clock, ELT, and CD-

### Player

With Phil Corso we have made many little changes on the plane, and reported them to the factory, so that all customers will profit from that. Today, I must say, we have done all this work, but I would do it again for a Velocity XL-RG. First of all, I thank my wife Ariane for all the patience, the work and the encouragement she gave me for this project, then Liz and Phil Corso for the good work and

assistance they give me in all this time, the Swing's with the whole staff from Velocity, with their good recommendations, Don George for this superb engine, Larry Holland from Treasure Coast Avionics for the nice panel, and all the guys who supported me in any way on this project.

*Ariane and Francesco Fontana*

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## Knutson's First Flight

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almost every hour of run time. The last and the most frustrating were several ignition problems. We have the dreaded dual mag (the "D" in A3B6D) model engine and had early on decided to replace it and use a Jeff Rose electronic ignition system and a new single mag. After installing a Slick mag in the case where the dual unit had once been we discovered that the unit with its impulse coupling was not going to be able to be properly timed. After many long hours in the hangar trying to decide what we could do, the decision was made to overhaul the original magneto and reinstall it on the engine. I should point out at this time that we were not sure that we could get the original back in. The dual mag on this type engine is considerably taller than a single mag in the same spot making the top of the unit nearly hit the engine bulkhead. With some help we eventually found a way around the problem. This setup works OK but we still wonder what the initial problem was with the Single Slick unit. If anyone can enlighten us please call (407) 779-1487.

Our instrument package was purchased from Velocity with a Terra radio set. Martin Hadley provided the wiring harness and so far we have had no problems with the Terra units using the imbedded antennas and toroids as was originally described in the manual.

To date we have 60 hours flying time with only minor additional problems. We finally got the airplane painted so we could take the picture and the final interior work is nearly completed.

*Mike and Dennis Knutson*

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**140  
Velocitys are  
Flying out of  
435  
Kits Sold**

## Bob Caton's Velocity 173 RG Elite



*Bob Caton proudly stands behind N797BC*

**I** RECEIVED MY VELOCITY 173 RG ELITE KIT SEPTEMBER 5, 1996, and at that time there were not very many Velocitys under construction on the West Coast.

I spent about one month converting my garage into a workshop. Pegboards were placed on the walls and as I inventoried the hardware, each individual item or packet was hung for easy access.

I am not a novice in the field of composite construction. I built a Long-Ez in 1986 and that experience helped on my Velocity project.

Velocity 797BC took me eighteen months to build, with a little help from Dynamic Wing. I followed the

construction manual pretty much to the letter. I only deviated from the manual when it was called for in the "KPC" section of *Velocity Views* or in areas of cosmetics. I never liked the protruding outside door handles, so I changed them to a flush fit. I liked the way the XL's engine cowling is finished off at the aft end so I made mine a "look-alike."

Velocity 797BC, at this writing, has thirty-three hours logged, but, by the time you read this, that time will probably be doubled.

With a 200 HP Lycoming engine turning an Ivo Magnum Prop, at 24

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## Caton's Velocity

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squared, the indicated airspeed is showing 180 mph at 3000 ft. Since I removed the elevator cuffs, the stall speeds are at 63 mph. The stalls are much more evident now. Before the cuffs were removed, I could hardly feel any pitch-buck that is associated with stalls.

I like the electric Ivoprop magnum's performance for the most part, but I wasn't satisfied with the short period of time before the brushes wore out. I fabricated a nylon brush holder with brass receptacles to house larger brushes and weaker springs. It's been working flawlessly since the factory one was replaced. I just didn't like the idea of changing brushes between oil changes, or, worse yet, being on a cross country and having them go bad. I'll bet Rick Lavoie will go along with my rationale.

I've had the same problems that some other builders have written about in previous editions of *Velocity Views*. Probably the worst one is the high oil temperature that is now indicating 205°. I've had a couple of wires break, and fuel tank leaks and bent ears on the over center linkage of the main gear after a hard landing. The pilot's side door gently raised to full open one day when I was turning base. These problems have all been addressed and corrected and now I can get down to some serious flying.

Before I wrap up, I'd like to say that the Velocity company is filled with good people. Duane and Scott Swing were always receptive of my calls for assistance or clarification and never left me feeling short-changed. Mark and Nancy Machado of Velocity West are really dedicated people and are a tremendous asset to Velocity Inc. I can honestly say that I not only came out of this endeavor with a great airplane, but also with some special friends.

After reading this I realize there is a glaring absence of information I haven't mentioned. I have a wife and her name is Billie. We have been married for 44 years. Billie spent

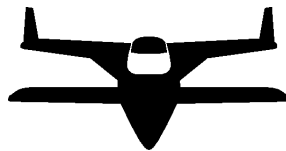


*Bob Caton takes his grandson Brandon for a ride in his new Velocity*

many hours helping me. She was never too busy with her hobbies that "Help" brought her response, "I'm coming." I'm the envy of every male in our local EAA Chapter (75 members strong) in which she is also a member. I'm a lucky man. If there is a story in this I'd tell every builder or

prospective builder to do everything to include your wife or girlfriend in the project. Friends are made at meetings and were else is there a greater environment to include your better half.

*Bob Caton of Port Townsend WA*



## May 1st Factory Open House Workshop Schedule

**Saturday May 1, 1999** - Factory's quarterly open house in Sebastian Florida (X26)

- |         |  |
|---------|--|
| 9:00am  | Coffee and donuts  |
| 10:00am | Workshop: "Hands on" building tips and Velocity construction techniques. |
| Noon    | Lunch  |
| 1:00pm  | Workshop: Building Q&A with the Swings                                   |
| 3:00pm  | Demo rides in the XL   |

Please be sure to call the factory and **RSVP!** Friday arrivals can book a room at the Sand Dollar Motel (800-226-4546) here in Sebastian. When you call us to RSVP, let us know when you plan on arriving so we can make arrangements for transportation, etc.





## Back Issues Velocity Views Newsletter Articles

We receive several calls a week from builders who will ask a question that has already been answered in previous *Velocity Views*. I also see many of you requesting information from other builders on the internet "Reflector" that have been addressed in previous *Views* editions.

I have personally spent a lot of my time looking up some of the articles while the caller is on the line because he either doesn't have the issue handy, doesn't have the issue at all, or just doesn't want to take the time to look up the article for himself. I have asked Rick Lavoie to update the *Views* Index and post a notice in this issue as to how to obtain it (refer to page 9). Keep it in a handy place so you can look up a previous article and not ask me to do it for you. If you don't have all the *Views*, now is a good time to contact Rick and request any previous volumes you need.

There are also numerous safety issues we have addressed in the *Views* in the past that many of you builders are not aware of. This is because either you have forgotten what they were, you were early in your building when the article was written, or your subscription started after the articles were published. It just doesn't make good sense for us to take the time to research and re-write all the articles from the past. It does, however, make good sense for you to get and read the old *Views* to make sure there isn't something important that you would otherwise miss.

## SUV (Sport Utility Velocity) N101VA

We have began again the process of bring this new model to completion. Between Scott and myself, we seem to only average about 2 to 3 hours a day. The phone never seems

to quit and the e-mail (I hate computers) averages about 15 to 20 messages a day that need answering. 90% of the e-mail is from prospective new purchasers who sometimes will fill a page with questions. One in particular a couple days ago took me at least 45 minutes to answer. After I had completed my answer, I noticed he was from Melbourne, Florida. A local call.

We have completed the new twin NACA duct air inlet cooling system to the engine that places the ducts on the upper aft fuselage starting about 2" in front of the cowl and the point of the NACA about 14" in front of this. This allows a direct path for the cooling air into the plenum. If it works OK we will probably try it on the XL. We hope to gain another 6 to 8 knots of speed over the existing under wing scoops. The seats are installed along with the instrument panel and the control yokes are in place. The placement of the yokes feels very comfortable and the view of all the primary instruments have not been violated. The cockpit seems much wider without the 5" keel that normally separates the two front seats. The elevator system has all been worked out and we have a little over 7" travel with the yokes. We have also worked out about 95% of the aileron system but have not had the time to make the parts necessary to make it all work. Many of you are asking 'can any of these new things be fitted to my Velocity?' The answer is a qualified yes. Qualified in that our present time cannot be devoted to figuring out how to make these changes work in our other models. For some of you, you could figure it out yourself and just do it. For others, you wouldn't touch it with a 10 foot pole, nor should you, until all the plans are completed and enough testing done to satisfy the problems that always come up. Will we offer

some of these things as options in the future. Yes, we probably will but I really don't want to do it like we did the Elite doors. If you want it, just pay the price and we will send it to you. No refunds on parts you don't use from the original kit. No "special deals" on an instrument panel because you have to scrap the one you now have because all the holes are cut in the wrong place. I think you get the picture. As you already know, we are using a Lycoming IO320 160 HP engine. It is our intention to run the engine at 2800 RPM for takeoff giving us another 10 horsepower or so. We will be doing all our testing using an electric M-T 3 bladed constant speed propeller. It is my desire to re-fit the airplane with an IVO electric prop and compare performance numbers. I know many of you have already turned your nose up at the thought of using the IVO, but at least give me the chance of proving that the IVO will work if properly maintained. It is the cost difference between the IVO and the M-T that drives me to keep on trying. If I can prove it will work, it is a lot easier to justify a \$2,000.00 IVO electric prop than a \$10,000 M-T electric prop. We will try to have this airplane ready for Sun-N-Fun, but realistically, it's a long shot. We just need more time.

## OSHKOSH

In the last newsletter, I ask for you to let me know if you intend to fly into Oshkosh for the '99 convention. This was so a special area could be established for canard type airplanes and enough space allocated to take care of us all. So far, only one of you has responded. Does this mean that we will see only one Velocity at Oshkosh? I don't think so but where are you? Send me an e-mail, or a fax, or call me, or send me a letter, or send me a postcard, or stop in and tell me, or something. If you "think" you will be there, this is enough for me, even if weather, an unfinished airplane, mechanical problems, etc. prevent your attendance. Don't let the Oshkosh "traffic" be a factor. We have flown into Oshkosh many,

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## Factory News

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many times and it is, in most cases, easier than just about any other control field arrival. No two way communication needed, just follow instructions and wag your wings when your type airplane is called out. Fly at the higher of the two altitudes used because there is almost no traffic at this higher / faster altitude. Follow the airplane ahead of you right down to touchdown and follow signals you get from ground personnel positioned all along the runway and taxi ways all the way to the tie down area. Nothing could be any easier than that. Arrive early in the day if coming early in the fly-in week to assure a parking spot. If necessary, get on the horn and tell the controllers that you are a show plane. This sometimes will allow you to get in when the Cessnas have to go someplace else.

### SUN - N - FUN

As I write this there is much pressure to get out in the shop and work on the SUV. We hope desperately that we will be able to get this airplane over to Lakeland. No promises however. Remember the Velocity Annual Dinner on Monday, April 12th. Also we will be having a forum on Wednesday, April 14th, 9:00 AM tent 7. Sun-N-Fun is even easier to get into than Oshkosh. It is much easier than driving in on a Sunday morning. Again no radio calls by the pilots are necessary just follow ATIS instructions and follow the leader. Expect at some point to have someone who isn't following instructions to cut you off. Just smile and keep trucking. Transportation will be provided to those who fly in for the Dinner on Monday evening.

### SEBASTIAN OPEN HOUSE WORKSHOP

Sixty-five of you made your way to Sebastian for the February 6th open house. A record 10 Velocities flew in for this open house and provided much needed additional contact for those who have not yet completed their airplanes or were here



*Scott Swing demonstrates a glassing technique during a workshop at the February factory open house.*

just to see what was going on. I really appreciate those of you who made the extra effort to fly in. I hope that our next open house on **May 1st** will be as well attended. The thrust of the next workshop will be the hands-on portion. We will probably devote at least four hours to this vital aspect of building as many of you have asked for more of this. The balance of the time will be devoted to questions and answers and good old fashioned camaraderie. I hope many of you who are flying your Velocities will take the time to fly in if for no other reason than to give our new builders hope. All of our previous attendees said how great it was to be able to talk to actual builders and not just hear it from the Swings. Kind of puts us in our place, don't you think?!

### DALLAS TEXAS FLY-IN

Milton Mersky sent me a letter the other day asking if he and his co-builders of their Velocity could host a fly-in near Dallas on October 22nd, 23rd, and 24th. I said yes and he can count on Velocity to be an official sponsor of this event. The present plan is to use their home airport as the gathering point. They are based at the McKinney Texas airport (TKI) and have a single 7000 foot runway. This is about 20 miles or so north of Dallas. It is of vital importance that

they be able to reserve rooms and eating places far in advance of the event. It is also important that a minimum of 20 rooms be reserved and 50 reservations be made at the eating places to insure the best prices. **ARE YOU UP TO THE CHALLENGE?** Please, please, please, let us here at Velocity know as soon as possible if you will be able to attend. (Fly, drive, walk, bicycle, or ride your horse, we don't care.) Stables provided for the horses.

Many activities are planned along with perhaps a shopping trip for the women to the famous Galleria Mall in North Dallas. If you haven't been there you are in for a treat.

Velocity will underwrite some of the expenses to keep your costs as low as we possibly can. We don't have an official dollar figure yet but it "will be affordable".

Will you join us for this event? We need all your support.

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**Sign up for the  
Factory's May 1st  
Open House / Workshops  
Sebastian, Florida  
See page 6 for details**



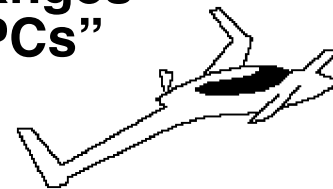


*Duane Swing running a workshop on Lycoming engine maintenance at the Factory's February Quarterly Open House*



*Jeff Driscoll demonstrates interior installation techniques during a workshop at the last open house.*

## Kit Plans Changes "KPCs"



*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 095**

Affects: All RG aircraft  
Manual Section: 6.2.1  
Date of change: March, 99

Figure 6-12 shows the nose gear hydraulic cylinder attached to the brackets one the floor with bolt, washer, and nut. There are actually 4 washers in this installation, one on each side of the bracket and one on each side of the tab of the cylinder inside the bracket. It is okay if you do not have those washers but if you are doing the installation now, use them.

### **KPC 096**

Affects: All RG aircraft  
Manual Section: 9.4.3  
Date of change: March, 99

Figures 9-22, 9-24 does not show the proper bolt, washer and nut layout for the attachment of the cylinder to the brackets. It is the same as the nose cylinder as mentioned above in KPC 095

### **KPC 097**

Affects: All XLRG aircraft  
Manual Section: 9.2.2 (Page 9-11)  
Date of change: March, 99

Top paragraph should read, "When the gear is all the way up, the raised area of the gear should touch the bottom of the transverse bulkhead". The engine mount will not interfere with it.

*KPCs continued on next page*

### **Index of Velocity Views Articles**

Available via the Internet as a PDF file

Go to: <http://lavoiegraphics.com>

At the home page, click on "Velocity Views Newsletter", then click on "Download Files", then you will need to read the directions for downloading and using a PDF file to obtain "Index of Articles: vvindex.pdf" Hundreds of people have successfully downloaded this file, so if you are having a problem, re-read the directions!

## KPCs

*Continued from previous page*

### KPC 098

Affects: All Elite and XL RGS

Manual section: 6.2.4

Date of change: March, 99

Top paragraph of page 6-12 about the Gas Spring. The gas spring is not adjustable and will push the over-center linkage way past neutral when the hydraulic cylinder is not attached. On assembly, the gas spring must be attached first and then pushed down to connect the hydraulic cylinder.

Figure 6-18: AN970-5 Washer should be AN970-6 Washer. That special nut has a 3/8" OD. The -5 washer will not fit.

### KPC 099

Affects: All Fast build fuselages

Manual section: 5.1.2

Date of change: March, 99

The measurements to the instrument panel are from the "nose bolt hole". In the earlier fast builds, the fuselage is glassed together and finished and there is no flange or bolt hole. This bolt hole was 1" forward of the nose so the measurement to the panel would be reduced by 1". Obviously you may have to reduce it more if you are measuring to the inside of the fuselage that is hard to get to and has been glassed.

### KPC 100

Affects: All Fast build fuselages or XL

Manual section: 8.1 (FBF-01 fast build fuselage section)

Date of change: March, 99

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.

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**Sign up for the  
Velocity April 12th  
Sun-n-Fun Dinner  
Lakeland, Florida  
See Vol 17, Page 22**



# Safety Corner

**Accident & Incident Reports,  
Maintenance & Service Difficulties**

## Service Warning

### BEARING ATTACH

We sent out an AD note on the Elite and XL models regarding the front aileron torque tube bearing attachment. This is the bearing that supports the tube that runs from the front of the keel to the rear of the keel and your control stick is bolted to. We had an incident where the bearing pulled through the counter-sink screws that hold this bearing into the aluminum bearing support bracket. (In most kits we used round head screws) Normally this would not be possible as the only loads this bearing and support will see are those imposed by pulling the control stick back beyond the elevator trim setting. In the above case, however, after the elevator had bottomed out at the maximum 26 degree down position, the stick could still be pulled back more and all the additional aft movement of the stick was trying to pull the bearing from the aluminum mounting bracket. Remember, once the elevator has bottomed out (usually as a result of the counterweights reaching their limits) any further aft movement of the control stick will be trying to pull the bearing out of the aluminum bracket or the bracket itself will flex aft with this additional movement.

The solution is fairly simple:

- 1) If the bearing and support bracket have not been installed, remove the bearing from the aluminum bracket and reverse the bearing in the bracket so the bearing flange is on the forward face of the aluminum bracket (in the installed position). If the attach screws are the flush type, replace them with standard round head 10/32's. When the support bracket is installed to the keel, move it 1/8" further forward than the plans call for to compensate for the new bearing location.
- 2) If the support bracket and

bearing are already installed, check to see if you have the proper round head screws. This can usually be checked by using a mirror and looking down and forward through the control stick hole in the keel. If so, leave everything else alone. Your done except for step 4 and 5.

- 3) If the support bracket and bearing are already installed and you see the flush type screws holding the bearing into the bracket, replace the flush screws with the round head screws. You will probably have to remove the canard to get to the screws for replacement. It isn't easy but it can be done.

- 4) Make sure that there is a mechanical stop at the aft edge of the keel cut out. This is the hole you cut that the control stick extends through and can only be adjusted after the canard/elevator installation is complete. With the control stick in the full aft position (with the molded hand grip installed) check for 26 degrees down elevator and at this point the control stick should just be touching the hole cutout. Allow enough extra room for any cover plate or carpet that might be wrapped around the hole. If you have excess room behind the stick at this point, make an aluminum plate and attach to the keel to prevent the stick from moving much beyond where the elevator has reached the 26 degree down position.

- 5) For double insurance, check the space between the torque tube and the "rear" bearing. (As you recall, the steel bellcrank goes through this bearing and into the aluminum torque tube). Make a spacer to fill any gap you may have between this aluminum torque tube and the bearing face. The result is that you now will share any aft load you may have on the front bearing with the rear bearing.

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# Construction Notes

by Scott Swing

Those of you who have the fast build fuselages for the XL-RG and have not cut the bottom of your gear off for the brake system, and have not cut the holes in your strakes or have not installed them, need to check the center of your axle position from the bottom of the gear. This dimension should be approximately 3.5". Both sides should be within 1/2" of each other. If they are not, let us know and we will tell you what to do.

We sent someone one half of a Franklin exhaust system and they were supposed to return the other. We are still missing this half. Please check and see if you have this part and return it as soon as possible.

There have been some questions as to when the gear bushings are permanently installed. The plans clearly show them installed after all the major triax lay-ups have been done. Evidently, the video shows it done differently, but in any case, you need to wait. Check chapter 9 for clarification.

Many have asked where we mount the heated pitot tube on the XL. The center of the rear edge of the pitot tube is 3 1/4" directly below the bottom of the concentric torque tube. We also use a 2" piece of streamline tubing that will stick out of the fuselage about 1". This puts the center of the pitot tube about 3" from the side of the fuselage.



All Matco brake system equipped aircraft should look at the location of the master cylinder attachment to the rudder pedal. Measuring from the cross tube (tube that goes side to side over the keel) the hole should be about 2-5/16" down. I have seen some of them with the old dimension for the Cleveland. This new hole gives you more fluid displacement quicker. The Matcos have 3 pistons compared to a single piston on the Cleveland. It also makes the push rod line up better. There are other ways to get more braking effect but the main concern is to not bottom out the pedal. You can also drill a new hole in the slider tube, move the cross bolt to the new hole which will contact the block earlier. A little adjustment in this area can be done by sliding some 1/4" nuts over the bolt that goes across to gain you about 1/8". If you are having any trouble with your brakes let us know and we can help you trouble shoot it.

## ANOTHER HORROR STORY

One of our professional builders just called me to ask if Velocity could, perhaps, send a tape measure with our kits. He said he just started work on a partially built Velocity and found the gear (fixed gear) offset 1 1/2" to the right and the carry through spar offset 1 1/2" to the left. I know 99% of you don't need to hear this, it's the other 1% who do. We just don't need these kinds of errors. It doesn't take nearly as much time to make something right the first time as it takes to re-make it right the second time. The old saying, "measure twice and cut once" certainly applies to building an airplane. I know from first hand experience that occasionally we will make a mistake. Be willing to bite the bullet and make the correction rather than doing nothing about it.

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**Safety First**  
**Get a factory check out**  
**prior to your 1st Flight!**

# Training for your First Flight

by Brendan O'Riordan



This is the first opportunity I have had to introduce myself to all the Velocity Builders. I have been with the company now for 4 months. One of the jobs I have here at Velocity is flying with builders who are nearing completion and preparing them for their first flights in their own Velocities. There are a few things that I would like to share with you so that when you are getting ready to step into your plane for its first flights and you visit us here at the factory to get some training we can make your time with us more productive.

First, I would like to see that you become current in whatever type of airplane you have been flying before you come to the factory. I understand that you have spent years working on your plane and did not have a lot of free time to just go fly for fun. I know you all understand that canard aircraft have some little quirks that are different than what you will find in conventional airplanes. It is enough of a challenge for a pilot who is current to transition to this airplane. If possible get some time in a high performance airplane so you will be able to transition easily to the speed of the plane. You can imagine that someone who is current in a Cub may be a little behind the airplane when they first try the Velocity.

Next, I would like for builders to get a check-out when they are within 2 months of completion. The reason

*Continued on next page*





# Views from the West

By Mark & Nancy Machado

This past week and weekend, our entire staff here at Velocity West, along with the help of some good friends and family, moved our little company from a rented 4500 sq. ft. hangar, to our own, brand new, 6400 sq. ft. hangar/office complex. Do we sound proud.....or what?

Our new facility is just down the street from where we were before, still on the grounds of the Lincoln Municipal Airport in Lincoln, California. Our new address is 1850 Flightline Drive, Lincoln, California 95648. All telephone/fax numbers and e-mail addresses remain the same.

This new facility should significantly improve our capability to not only market the Velocity product line, but also provide a much

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## First Flight Training

*Continued from previous page*

for this is that I don't feel comfortable giving someone a checkout when they might not fly their own airplane for 1-2 years. Safety has been a concern in the Experimental Aircraft Industry and we here at Velocity feel it is our number one concern. If you receive a checkout just before your airplane is ready your skills will be fresh and you will be ready to make your first flights with confidence. Too many accidents occur within the first few hours of flying a new airplane because the pilot hasn't prepared him or herself.

When you get ready to get a check-out give us about 2 to 3 week notice so we can schedule you. Most check-outs can be done in one day but plan on two just in case. In the event that two days aren't enough we will keep on going until I feel you are ready. I have had the opportunity to meet a lot of you at the open houses and at the fly-ins and I am looking forward to seeing more of you this summer.

•••••

improved venue to support the builders of Velocity aircraft in the Western region.

We welcome all those who would like to visit us in our new digs. Along these lines, we have set a date for our 2nd Annual Velocity West Fly-in. The big event will be June 12th, 1999! Naturally it'll be in our new facility. If last year's event was any kind of sign, we're expecting a "really big show." Look for the full page flyer/advertisement on the fly-in elsewhere in this edition of the Velocity Views. Really do hope to see you there!

Last quarter we had hoped to start a feature of this column that would include some comments from our resident CFI at Velocity West, Mr. Scott Baker. Something misfired, so we're going to try again!

*<Editors note: I (Rick Lavoie) lost Scott's file for the last issue! Sorry...>*

Scott has been with our company for over a year now and has become quite proficient in flying our brand of airplanes. Not only has he been flying our local demo plane (an Elite LW) a great deal, but during the past year has had the opportunity to fly the XL prototype from Lincoln to Oshkosh and then from Oshkosh on down to Sebastian. Much of the trip from Oshkosh to Florida was in IFR conditions, so he has had the opportunity to experience an extended flight in a Velocity under instrument conditions as well.

Scott is an excellent teacher. Just ask Nancy...he's teaching her how to fly! Along these lines, Scott has volunteered to write a series of articles on the flight characteristics of our Velocitys. Hopefully we'll be able to attach one of his articles to each of our quarterly "Views from the West" columns for the next year or so. This first article is about our infamous rudders. I like it and hope you do too!

Until next quarter, remember, it's not necessary to be perfect in our building...but precise is nice!

## Velocity and the Rudder

by Scott Baker, CFI-I

Have you noticed how visiting pilots will sometimes slip into the pilot's chair, slide the seat to a forward position and then proceed to rest both feet high upon the rudder pedals ala Cessna and Piper aircraft? It's a sure bet that our guest is new to Velocity aircraft and will have much to learn regarding the flight characteristics of the aircraft vis-à-vis the rudder ... I know I did!

Learning comes through experience ... and when transitioning to the Velocity the problem most pilots face is not so much learning when to use rudder – but when to refrain from using rudder. Previously learned habits die hard and unfortunately, many pilots induce undesirable and sometimes dangerous flight responses through their misuse of the rudder controls. Let's explore why this is so and take note of what new habits you can develop to make flying the Velocity more safe and enjoyable.

The Velocity rudder system is different from "conventional" aircraft in both design and performance. In most aircraft the rudder pedals are interconnected. Pushing down on one rudder pedal causes a corresponding movement in the opposite (upward) direction of the other. Most pilots are quick to note that the rudder pedals in the Velocity operate independent from each other, meaning they are not interconnected. What they fail to notice is that much of the sensory feedback with respect to rudder deployment is gone. Push one rudder pedal in the Velocity and the other remains motionless. Cessna and Piper pilots learn to rest both feet on the rudder pedals in their aircraft to get a "feel" for the rudder position. Transferring this habit to the Velocity invites a common mistake – the unintentional deployment of one (or both!) rudder(s) in flight.

Some Helpful Hints:

Get in the habit of whenever possible, keeping your feet off of the rudder

*Continued on next page*

## Scott Baker, CFI-I

*Continued from previous page*

der pedals. Adjust your seat position in such a way that you must stretch your legs to achieve full rudder travel. Place the ball (rather than the arch) of your foot on the rudder pedal. When applying rudder, try using a leg motion like you would when working the brake pedal in a car, i.e. keep your foot on the floor until rudder is needed – apply rudder – return your foot to the floor.

Perhaps the most comfortable and admired flying quality of the Velocity during cruise is that smooth, coordinated turns can be made using aileron (stick) control without the use of rudder. The aircraft is so easy to fly in cruise that I've heard it said from "experienced" pilots that rudder is not needed in the Velocity, except during taxi. If this is your perception, then you're missing out on some important elements of aircraft control, especially during slow flight (speeds below 95 KIAS).

Today's writing serves as an introduction to future articles that will discuss the proper use, common mistakes and helpful hints regarding rudder control of the Velocity during:

- Ground Handling and Taxi
- Takeoff and Initial Climb Out
- Cruise Climb, Cruise, Cruise Descent
- Slow Flight and Pattern Operations
- Short Final, Round Out and Landing
- Emergency Procedures Requiring Rudders

Remember that a good pilot is always learning!

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**Sign up for the  
Second Annual  
Velocity West Fly-in  
June 12th  
Lincoln CA  
See page 15 for details**

# Short Circuit



by Martin Hadley



One of the areas that I receive several questions about is the panel spaces to be avoided or concerned with with regards to panel depth and other space restrictions. With the Velocity panel we are afforded a large amount of panel space compared to many other aircraft. However, there are some areas in which the available space behind the panel does limit our choices of what will be seen on the face of the panel!

Starting from the left side of the panel, there are two areas that require the most attention. For those of you that are using push / pull cables in your panel, do not place them too far outboard in the panel. The rigid portions of the cables behind the panel, and sometimes the cabling itself, will press against the inside of the fuselage and cause the handles and extended shafts to not be perpendicular to the panel. While this may seem to be a small price to pay for an extra 1/2" of space, consider this...

We have all been use to pushing our engine and prop control cables straight in and straight out, regardless of push / pull arrangement or lever control. If our controls come out at an angle, we no longer have that straight in effort to operate them, we also have to include some lateral motion as well. During normal flight conditions this would not be an insurmountable task to master. There would, almost inevitably, always be some amount of tangible load applied to the shaft as it was slid in and out that would eventually cause a warping of the shaft, making it harder and harder to operate smoothly as time goes by. Another factor is

that the mounting hole location in the fiberglass panel would always be under unnecessary stress. In an emergency situation a rapid forcing action on an extended control lever may actually result in overstressing the mounting hole causing it to break. I would imagine it to be a bit difficult to fly your airplane while having to use both hands to operate a throttle control cable that has broken out of the instrument panel!

I have found that by placing the vertical centerline for the control cables at 2 1/2" inboard of the lower left corner of the panel places the rigid shafts behind the panel right next to the fuselage where they can be properly secured to the fuselage. It is important to secure them at the closest point for two reasons, First, it helps reduce any side to side play you might experience with your controls. Second, it helps keep the flex portions of the cables from flopping around loose next to your legs!

The first 2" of each side, the upper left and right hand corners of the panel, and across the top of the panel, are areas restricted to SHORT instruments because of the flaring in of the fuselage in these areas. Clocks, warning horns, or low profile engine gauges are prime candidates for the sides and upper corner areas. The top 1 1/2" of the entire panel is limited to units with a maximum depth of 5" - 6". This may vary slightly with the vertical orientation of your panel, where it is located fore and aft with respect to the keel, and the angle at which you install it. It should be installed at zero degrees tilt when the aircraft is in level flight.

The lower 2" of the radio stack is limited to radios with a maximum depth of less than 12". With the advent of the offset torque tube for the elevators, this is not as critical as the older models, but there should be ample clearance between the back of your radio stack, its associated wiring, and any movable objects behind them, even if that movement is limited to rotation. What we are concerned with is long term chaffing. Those with the Century 2000 autopilot are encouraged to place your

*Continued on next page*

## Short Circuit

*Continued from previous page*

transponder under the autopilot if you have a "full" stack of radios going from top to bottom.

The only other area that presents some concern is the lower right hand side of the panel where most of you will place an in dash stereo. Your stereo should be as short as possible (under 6") and more often than not you will find that you will still have to "dig in" to the side of the inner fuselage to accommodate the rear outboard corner of the unit. I have gotten to where I actually try to place the unit so that I have to "dig in" the fuselage a bit. It makes for a perfect rear support point! (Do use care as to not go through the outer skin!)

Virtually all of the rest of the panel is unrestricted to dimension limitations. It is usually best to have your panel in place with the equipment installed before you locate your elevator trim spring assemble. Placing your Strike Finder next to your radio stack and then finding out it prevents you from full trim operation is more than a bit frustrating! If you already have your trim spring assembly installed, determine the amount of "behind the panel" space available to you before you place a piece of equipment there.

One good rule of thumb that is almost never adhered to in the experimental market (at least by my observations) is that there should be at minimum, 3/4" between anything that is movable and something stationary. I would have to admit that I have also been unable to comply with that rule in all situations. It is, none the less, a worthy goal to try and obtain, especially since we are dealing with a new airplane.

These are the guidelines that I use on the Velocity panel. To date they have proved to be safe numbers to work with. If your panel is tilted for some reason, located farther forward or aft from what is recommended, then you should physically measure the amount of depth you have at any given point to insure enough space to install all those goodies that you want too!

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## Angle of Attack

*by Elbie Mendenhall*

This is "Food for Thought"

Part 1 of 2

*This Article is provided to flying groups for discussions on safe flying, Please copy if desired for your aviation group. This article has been modified for the Velocity owners group and is from a talk I gave at a Kitplanes / Aircraft Spruce Homebuilt Aircraft Builder's Conference, Aurora, OR in 1966, and currently give at various EAA meetings in the NW.*

I am not a professional writer, I'm a pilot and flight instructor, and have over 25,000 hours in aircraft from the Pitts Special to the Boeing 767, and about 140 different makes and models in-between. Where I talk about a "STALL" for the Velocity & Canard type aircraft I mean the "nose bob" where you can no longer hold the nose up.

This article is to make you think, and if you don't know the answers to some of the questions, its time to dig into some aviation books and learn! Answer these questions: Your life may depend on the answers!

Will your aircraft always stall at the same indicated airspeed?

If your aircraft stalls at 65 IAS, will maintaining at least 75 IAS always keep you safe?

Will a change in Gross Weight change the indicated stall speed of your aircraft?

Will an increase in "G" Load increase the indicated stalling speed of your aircraft?

Will the altitude affect the indicated stall speed of your aircraft?

Could you find the exact change in indicated airspeed to keep you safe in all of the above questions, assuming you had a precise question using your aircraft owner's manual? How can you insure your indicated airspeed is accurate?

Did you know the answers without "CHEATING?"

IF NOT IT IS TIME FOR A REVIEW!

See your CFI

REALLY THINK NOW

Will an aircraft always stall at the same angle of attack?

If your aircraft stalls at an angle of attack of 16 degrees, will maintaining an angle of attack of not more than 15 degrees always keep you safe from stalling?

Will a change in Gross Weight change the stalling angle of your aircraft?

Will an increase in "G" Load increase the stalling angle of your aircraft?

Will the Altitude affect the stalling angle of your aircraft?

Can you insure your angle of attack indicator is correct?

Is it possible to find out the correct angles for your aircraft?

Do you know the Angle of Attack needed to keep you safe in the above cases?

Now compare the first group or questions with the last group of questions.

Which would you prefer to trust your life with?

Airspeed or Angle of Attack?

Do you really think your aircraft is immune from a Stall / Spin Type Accident?

Readers, if you have any questions, E-mail or write, I'll answer in the next Velocity Views issue.

Elbie H. Mendenhall ATP CE-500; B-737; DC-9  
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Look for part 2 in Volume 19

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Call the factory to get your name on our list. Please do this today so we can move ahead for planning purposes. See page 8 for more info!



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Number in your party attending dinner: Adults \_\_\_\_ Child \_\_\_\_ (dinner at 6 p.m. sharp)

VISA/MasterCard Number \_\_\_\_\_ Exp. \_\_\_\_\_

# 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.

## CANARD MOUNTING

From Al Gietzen, Vista, CA  
ALVentures@msn.com

The procedure for mounting the canard given in the manual leaves some blanks as to how the canard and mounting points are going to end up properly aligned. Here's one way to do it that results in exact alignment.

After making the canard cutout in the fuselage sides down to the top of the canard bulkhead, set the canard in place and fine tune the alignment (centered, level, incidence, tips equidistant from the ends of the CS spar). Since this will usually be done before the reinforcing triax from the canard bulkhead to fuselage is installed, space the mounting tabs away from the bulkhead with two thickness' of stirring sticks (a.k.a., tongue depressors).

Since there is likely to be some mismatch between the canard bulkhead and the canard, align it so at least one of the tabs is against the bulkhead (plus the two sticks), and at least one side flush with the top of the bulkhead. When it's all lined up, remove the canard and put some microglass in the "saddle" on the fuselage sides; put release tape on the canard and set firmly in place. Double check alignment. You might also at this time like to use some micro to form a nice fillet between the underside of the canard and the fuselage. Once this saddle has cured your canard alignment is set by just setting it in. Before removing the canard, mark (or drill) the 1/4" pilot holes for the mounting bushings centered in the holes on canard mounting tabs.

With the top of the fuselage on, triax reinforcements installed and trimmed to the canard saddle, drill

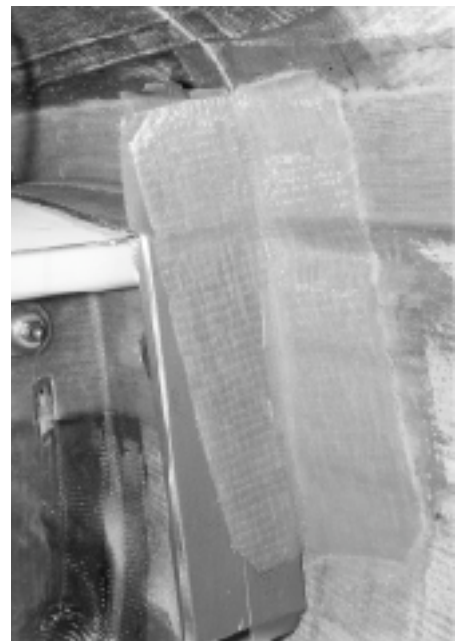
out the 1" holes for the canard mounting bushings. Sand the microglass "saddles" and finish with one ply of fine BID. Put the canard in place and insure that the bolts will go through the mounting tabs and bushings. Also note if any wide area washers are needed to shim between one of the tabs and the bulkhead. Remove the canard and ream out the holes as necessary.

In order to get the bushings exactly aligned with the canard sitting nicely aligned in its "saddle"; put the microglass bushing in just flush with the front side of the canard bulkhead, making sure that any space around the bushings in the bulkhead is filled with microglass. Put the canard in place; get any washers needed between the tab and bushing into place, and put the bolts through (being careful, of course, to not push the bushings out). Put the nuts on (with suitable spacers if your using the lock nuts) and snug them up. This will pull the bushings against and square with the tabs (and/or washers). Let it cure. You'll want to do this before putting the "doghouse" on, especially if you don't have the RBH.

Rather than grind down the bushings to be flush at the back of the bulkhead, you can sand one side of the wide area washer and fill any space between the washer and bulkhead with microglass; bonding the washer in place. Be careful not to get microglass between the washer and the bushing. You can do the same for any spacer washers needed in front of the bulkhead. Use the bolts to hold them snugly in place while the micro cures. This gives good bearing area on the bulkhead and you don't have to handle any washers when removing and installing the canard.

For the torque mounts at the

back of the canard, lay up the triax tabs onto the canard as described in the manual. Let them cure. Now put the canard in place and slip the bolts in the mounting bushings to insure alignment. Working from inside the fuselage (sorry, the panel can't be in to do this) bondo in a couple of 10" long pieces of 1 x 4 below and flush with the back of the triax tabs on the canard. This can be done easily by clamping a small piece of plywood (or similar flat stock) to the tab and to the piece of board to hold it in place while putting on the bondo. Tape off the board and tab so you can do the prescribed layups right onto the back of tabs and onto the fuselage (see photo 1). Let cure, drill



for the 1/4" mounting bolts, and shape the tabs (see photo 2).

Now all the mounting points will match up exactly. No spacers, no play, no stress due to misalignment.

Speaking of stress; there has been some discussion about whether the canard should rest against the top of the bulkhead or there should be



some space. The stress distribution will be quite different in the two cases; but we can only guess what they are since, to my knowledge, no stress distribution analysis has been done. My guess, based on past experience in stress analysis is as follows:

If the canard is spaced above the bulkhead (supported at the fuselage sides and the tabs) the canard is acting more like a simple beam and the bending stresses carry through the central portion of the canard. This would likely give the lowest stress level in the canard; however the disadvantage is that the bending of the loaded canard causes the tabs to want to move outward. This results in side loading as well as the vertical loading on the tabs, with resulting concentrated and potentially high stresses around the tabs.

If the canard is fitted against the top of the bulkhead, each side acts more as a cantilevered beam. This results in some higher stress in the canard near the fuselage, but keeps the stresses in the tabs limited to the vertical loading, and therefore lower.

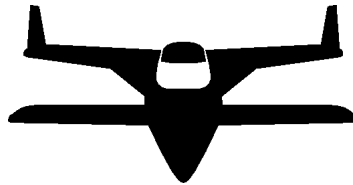
Which is better? I'll opt for the canard flush onto the bulkhead. We have to hope that canard and supports are sufficiently over-designed that either way is OK since I'm sure planes are being built both ways and

some degrees in between. These are cyclic stress and the resulting fatigue in the materials (if any) may not show up for a long time. Just be sure that your periodic inspections check for any signs of cracking or delaminating around the tabs and inboard areas of the canard.

.....

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Ralph Robertson

### Velocity Elite RG Kit For Sale

Help! I've grown out of my four-seater (wife pregnant with triplets!)

Partial assembly includes: Canard with elevators mounted, wings, winglets (not yet attached to wings).

All of the above is primed and nearly ready for paint.

Also built:

bulkheads, nose gear assembly, hydraulic pump and all hydraulic lines, keel with control systems and hydraulic systems in place, seat hard points, brake master cylinders, rudder pedals, and wire ducts. Options purchased include concentric elevator tubes (already attached), and landing light.

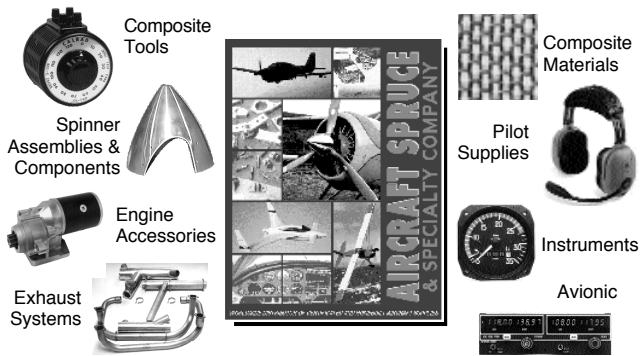
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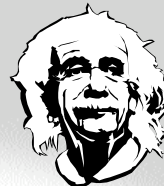
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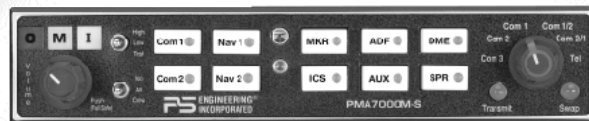
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Some things that you can do to help Velocity Views:

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When you renew late, you cause me all sorts of extra work, as I now need to process each late renewal by hand. Next year, there will be a **\$5 late charge fee** for renewals that come in after December 31, 1999.

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**We need your input for this newsletter!**

- **Builder Forum Input**
- **First Flight Photos**
- **First Flight Stories**
- **Velocity Flying Adventures**
- **Velocity Fly-in Suggestions**

Send your photos / stories to Rick Lavoie for the next newsletter!

**Factory Information**

**Velocity Inc.**

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### Delivery Dates

<b>Quarter:</b>	<b>Mailed by:</b>
1st	January 15th
2nd	April 15th
3rd	July 15th
4th	October 15th

### Submission Deadlines

<b>Quarter:</b>	<b>Mail Date:</b>
1st	December 1st
2nd	March 1st
3rd	June 1st
4th	September 1st

Listed below are **4 options** for submitting your text. Please send us **photos** and drawings too!

1) Send it on a **3-1/2" computer disk** (Mac or DOS). 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. We also can take Zip100.

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

Note: If you need your photos & materials returned, please include a self addressed envelop.

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