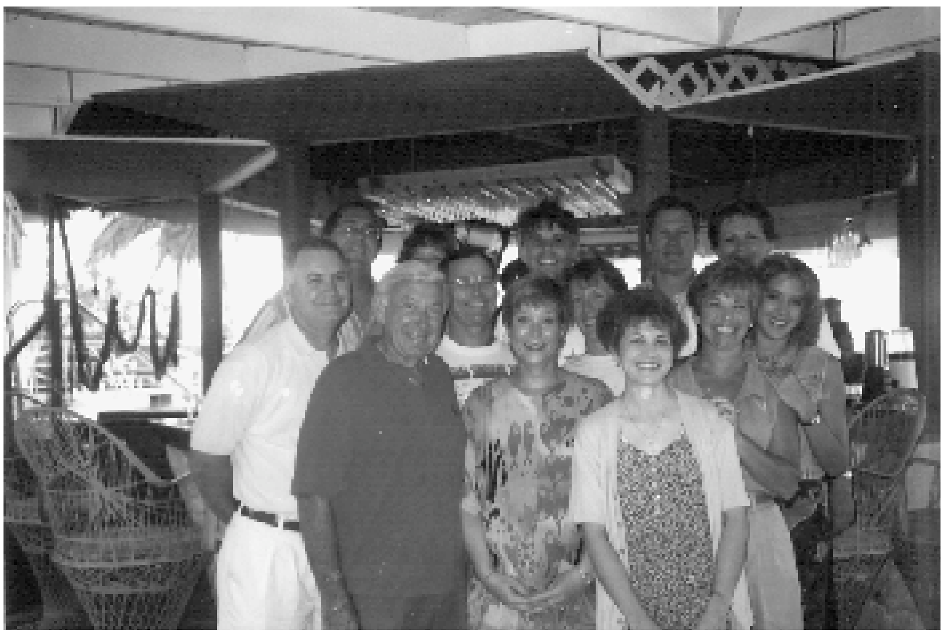
VELOCITY VIEWS

Volume 7

Velocity Bahamas Fly-in



Happy Velocitites gather under the thatched-roof beachfront bar at Coconut Cove for some pre-dinner cheer! Left to right: Jack Keen, Mark Ewart, Tom Chimento, Nancy Ewart, Dale Ingram, Pam Chimento, Rick Lavoie, Judy Lavoie, Helen Keen, Jim Woody, Sylvia Ingram, Pam Woody, and Krista Keen. Fuzz the bartender is slaving behind the group mixing up some of his famous Bahamian special drinks!

The second annual Velocity Bahamas Fly-in saw many Velocitites relaxing and enjoying life on the beach at Coconut Cove, George Town, Exuma. Flying, snorkeling, beaching, swimming, lazy afternoon naps, fishing, good food and drink, shopping – and, most of all, great companionship – top the list of activities for the long weekend event. Everyone loved being spoiled by our hosts (and fellow Velocity builders) Pam and Tom Chimento.

Here is the bottom line: Everyone that has been to this fly-in has already agreed to book again for 1997. That sounds like 100% satisfaction, which is a direct reflection on Pam and Tom Chimento! Everyone at the resort makes you feel special. The beautiful rooms are very clean, comfortable, and filled with Pam's special "homey" touches. You feel like you are a guest in a beautiful private beachfront home.

We departed from Sebastian

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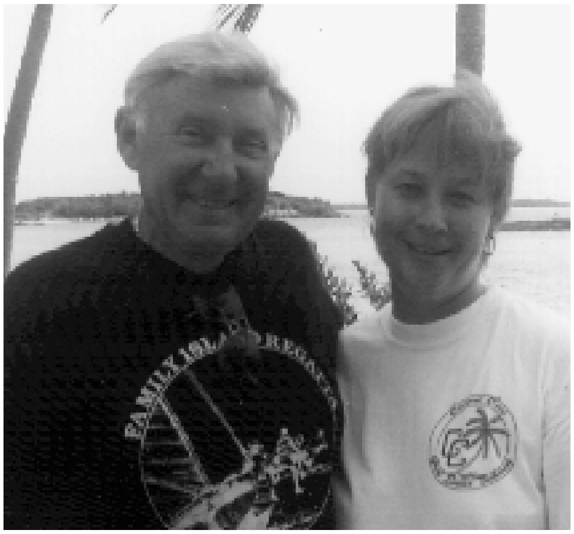


Left photo: Our kind and gracious hosts Tom and Pam Chimento. Not only are they building a Velocity 173 RG, but a new home is also in the works!

Right photo: Who is that rasta man??? Could that be the Velocity builder and famous attorney from Florida, Mark D. Ewart? It didn't take Mark very long to unwind from city ways and adjust to the laid back ways of Bahamas island living. Question is, will he show up in court this way?

Velocity Bahamas Fly-in

Continued from page 1

about 7:30 am and formed up with Jim Woody's Velocity airborne over Vero Beach. Jim had flown down from Wyoming, but needed to fuel up early that morning. We joined into a flight of three with Mark and Nancy Ewart over Staniel Cay in the Northern chain of the Exuma islands. At that point we flew low to enjoy the beautiful views of white sandy beaches, coral reefs, & blue and aqua colored waters. The water is so clear that you can see stingrays swimming in the ocean. For me, flying in the Bahamas is the best part! The flight from Sebastian was just over two hours long. We were at Coconut Cove Hotel by 11:15 am. Pam and Tom took us over to see their new home under construction and then took us to a" locals" lunch spot. We then headed back to Coconut Cove to check into our rooms and meet up with other Velocitites who flew into Exuma International commercially.

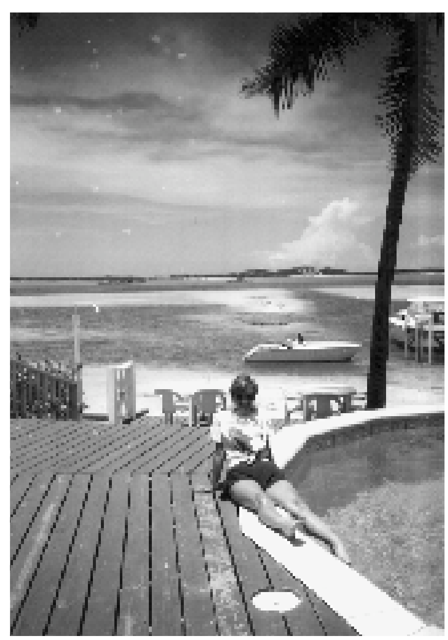
Upon check-in we found a chilled bottle of champagne in our rooms. We grabbed the bottle and met on the beach for a champagne toast. That was the moment I started to unwind and feel like I was really in the islands. By some of the photos, you can see that we all did a lot of unwinding!

The pictures tell the story. Hope to see you there next year!

Rick L

Three Velocitys clearing customs at the Exuma International Airport: Right to left are N907ME (Mark and Nancy Ewart's Velocity RG), N919JW (Jim and Pam Woody's Velocity RG), and N81VA (factory Velocity flown by Rick & Judy Lavoie). The three Velocities flew over together and landed in sequence. A local person in Moss Town looked up and reported "some star-wars type fighters were invading the island". The airport is in great condition and the people are all very friendly and helpful. One of the best airstrips in all the Bahamas!

"Pepsi no Coke...cheeseburger cheeseburger chip." Samurai breakfast chef (Rick Lavoie) urges guest (Sylvia Ingram) to hurry up and order or he will commit hara-kiri!



The sun deck, pool and bar are right on the beach, shaded by lots of palm trees.

Book soon for '97 Bahamas Fly-in
The Early Bird Gets the Worm (or best rooms)

Attention all Velocitites. Half of the rooms at Coconut Cove are already booked for 1997's Third Annual Velocity Bahamas Fly-in. The early bird gets the worm, so book soon. Coconut Cove has ten rooms. Once these are booked, Pam will book the overflow to the resort next door. Back issues contain all the info (room types, etc.). If you give me or Pam a call, a brochure will be mailed to you. Tom and Pam give Velocitites a 20% discount! Also, if this is your first trip to the Bahamas, you will need to get prior permission to fly your experimental aircraft there. I have a form letter all made up which includes a list of items you will need to fax them. It's no big deal! Just do it early!

The dates for 1997's event are May 16th (Friday) through May 20th (Tuesday). Feel free to alter the arrival or departure date to fit your needs. All Velocity builders, pilots and wanabees are welcome! If you plan on going, be sure to call me to get on my list. Also you must call Coconut Cove to book your room (Pam or Tom at 1-809-336-2659).

Rick

Life is so-oo-o tough! Dr. Dale Ingram (Velocity wanabee) enjoys his complimentary champagne on the beachfront deck.

A little bow riding on the way to a reef for some snorkeling. Our host Pam goes out of her way to coordinate a variety of activities for us Velocitites. She will set up trips for diving, snorkeling, & fishing, and provides transportation for shopping and dining out to various restaurants on the island. If you like to be spoiled, this is the place to be!

Views from the West

Greetings once again everybody, from all of us here at Velocity West. We now are four strong, twice as big "square footage-wise" when compared to when we started last September – and busier than ever thought imaginable. Just take a look at the picture I took from the balcony of the hangar (see page 4)! That's four Velocitys under construction and good ol' N131MM desperately trying to stay dust-free (fat chance!).

One of the Velocitys you see is the 173 FG we are building to replace N131MM as the demo airplane at Velocity West; another is a 173 RG that John Kiss is building and the remaining two are projects being worked on by builders in our facility with our assistance. More about that later. If you look real close you'll see one of those folks, Mr. Ralph Pierce of Garden City, Idaho, bent over in the bottom of his fuselage, taking a good look at that speed brake hinge point just one more time (hopefully!). Ralph has graciously written an accompanying article on his experiences with us, which, hopefully, will give you a builder's perspective of what is available from the "Service Center" side of the business here at Velocity West.

Speaking of the Service Center, I'll let that be the first of several topics I will be discussing in this column:

SERVICE CENTER: As I mentioned previously, since we started last September we have doubled our usable hangar floor space. This increase in space has given us the opportunity to invite builders into our facility to work on their projects under the "watchful" eyes of Velocity employees working here at Velocity West. The intent of the program is not to help them build their entire project but rather to help them get "off the ground." Ideally, we would prefer the length of stay to be around 30 days, with a maximum of 60, giving the builders ample time to learn most every "trick" we know and at the same time get a whole lot done on their airplanes. We strictly provide assistance and expect the builder to be totally involved. Hopefully, when the builder leaves our facility, he or she has a good foundation built (both physically and mentally) to continue the work at their own facility, at a somewhat quicker pace than normally would be expected. It's our goal to install a level of confidence within each of our client/builders that will help ensure a completed and safe project, and, just as important, a friendship that will endure for many years to come.

The details on the service center are pretty straightforward. Velocity rents you space for a rate of $400 a month and charges a shop rate of $30 per hour for assistance. The space rent entitles you to the use of all our equipment, a place to store and work on your entire kit, electricity and water for a motorhome you might bring

along, a place for that motorhome and access to the hangar any time. The charge for the assistance has a maximum limit of four hours a day and it is expected that number would get to one to two hours per day in very short order, if our past experiences hold steady.

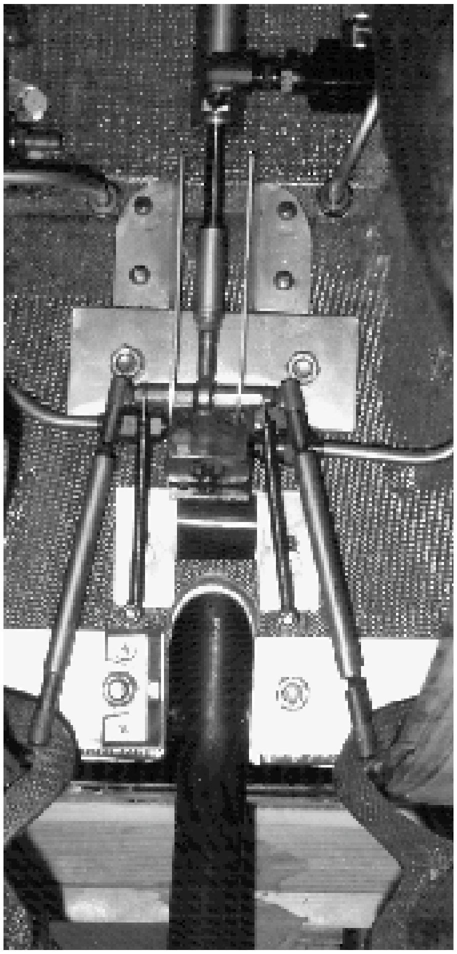
If anyone is interested in the program, feel free to contact any of us here at Velocity West for a more detailed explanation of the opportunity.

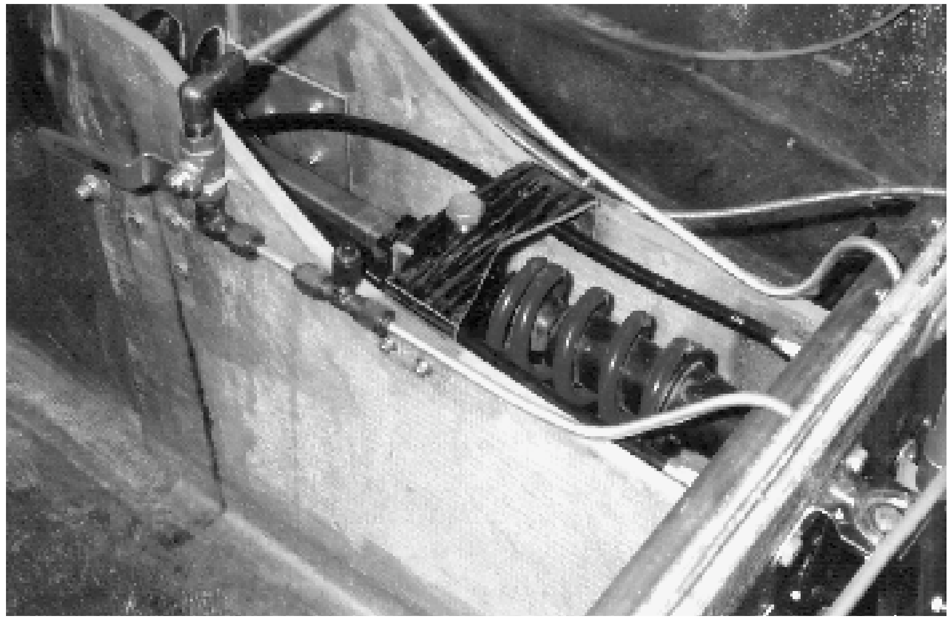
SHIMMY DAMPER: After using a modified version of the original Velocity shimmy damper on N131MM for over a year and a half--with great success, I might add--Velocity has decided to modify what is made available in the kits we ship out, to essentially what I have been testing (and flying) for some time now. Although what was made available for nose wheel shimmy damping in the past was quite adequate, the new system makes improvements in the areas of steering, adjustment capability and a greater tolerance for an "out-of-adjustment" condition. The photo to the right shows the final arrangement as it is configured on N131MM. One feature we have changed as of approximately three months ago (and many landings ago, I might add) is the elimination of the castellated nut and cotter pin at the base of the nose gear. That particular nut style has been replaced with a "nylock" styled jam nut. It has been traditional for many years that nylock type nuts are not used at locations that see a twisting motion, which, of course, this portion of the gear certainly does. This tradition goes back many years, while at the same time the technology of the nylon locking systems has improved dramatically. This one-and-one-quarter inch nylon locking jam nut takes one big wrench to put on, and with over 50 landings under "its belt," my own hasn't budged. The big, big advantage of the nylon locking arrangement is you suddenly get a totally linear adjustment capability, eliminating the struggle of trying to "line up that little 'ol hole with the little castels so the little cotton-pickin' cotter pin will go in."

To retrofit an existing system takes some machining on the aluminum nose wheel fork and the addition of approximately eight to ten new parts. Assembly is quite simple once you get the machining done and all the parts in hand. Once installed, the adjustment is a "piece of cake." The cost for the system, when done as a "retrofit," is $150. It is required that you ship only your nose wheel fork to either Velocity in Florida or California for reworking. We will do the machining, package the remaining parts and send the entire bundle back to you. Again, feel free to contact either the home office or Velocity West for further information.

RG SYSTEM MODIFICATIONS: One of our builders utilizing our "Service Center" feature at Velocity West is also allowing us to "experiment" with his RG system and hydraulics (lucky guy!). Basically we have made experimental modifications affecting three areas: 1) reducing the closure rate of the nose gear doors; 2) a new location for the nose gear doors sequence valve; and 3) an over-shoot limiter at the over-center point for the nose gear system.

The accompanying two photos of this particular nose gear system show what we have been up to. If you look real close, you'll see in one of the pictures that we have relocated the sequence valve to in-front of the canard bulkhead. In this position, the sequence valve is activated by the nose gear strut itself, just above where the strut bends on its downward path to the fork. Be forewarned here! With most RG installations, the strut tends to bounce at this location before things come to a complete halt in the full up-and-locked position. As a result, a physical "stop" or limiter must be configured to disallow the gear leg to travel "in the bounce" past the point where you want the sequence valve to be ultimately activated. It takes a bit of adjusting to get it just right, but the advantages of this position for the sequence valve, at least initially, appear to far outweigh the disadvantages. Please remember not to forget that limiter, though. If you don't, that expensive little valve may just end up in your lap, in a state rendering it unusable. [*Editor's Note: Once Mark has test flown these RG Modifications, if the results are good, the factory will issue KPCs to change the manual. If parts are needed, they will be manufactured at the factory and become part of new kits shipped, and available to current kit builders for a nominal charge.*]





Speaking of limiters, we have also configured a limiter of sorts just in front and on top of the nose gear system shock assembly. We have used this arrangement on N131MM for some time now with good success. Our latest arrangement is slightly modified, but essentially the same. The dark object in front and above the shock spring is what I'm talking about (refer to the accompanying photo). This is shown for a non-Elite version, but something similar could easily be configured for the Elite version. Basically this bracket of sorts replaces the piece of aluminum that was in this position and used as a safety feature. We made this particular bracket out of a combination of BID and uni-directional carbon fiber and secured it with four AN3 bolts and locknuts to the adjoining side panels. Finally, a one-half inch bolt was tapped into the top of the bracket, a locking nut placed on the bottom side, with the entire assembly becoming an adjusting point. To adjust, the gear system is allowed to operate down and come to rest at the correct over-center location , per the manual. Next, the one-half inch bolt is adjusted "down" to just touch the top of the shock assembly head, the locking nut then secures everything, thus allowing the entire over-center assembly to not "over-shoot" its position when the nose gear is lowered and the system goes over-center. (You may have to read that last few sentences several times to get the point!) Again, the BID/carbon fiber bracket is tapped to accept the one-half inch all-threaded bolt and the locknut (or jam nut in this case) is located on the underside of the bracket assembly. Finally, we configured a little "shelf" on the bracket to hold the nose gear "up" micro-switch, which never gets damaged due to an over-shoot of the assembly with one of those hard landings that may occur every now and then. On N131MM, we made the bracket assembly out of steel. Since I'm not a

very good welder, we decided to make the new one from composite materials. This device certainly isn't necessary, but has made my RG life a little better!

Finally, the last feature we have been experimenting with is the rate of closure for the nose gear doors. In most cases, the action of the sequence valve, which ultimately allows hydraulic fluid to reach the nose gear door hydraulic cylinder, has an action so fast, the gear door tends to slam shut! One of our builders (unfortunately I don't know who) indicated to Duane that he was experimenting with a flow control valve to regulate the flow of hydraulic fluid coming through the sequence valve when it was activated. Duane gave me the part number and asked that I give it a try. The manufacturer is Deltrol Fluid Products. The P/N is EF20S Flow Control Valve-1/4 [Berry Bearing Company in Clinton IA, 319-243-6672 cost about $34].

In our case we mounted the flow control valve on the outlet side of the sequence valve just prior to where the hydraulic line enters the nose gear door cylinder. In one of the accompanying pictures you can see it just left of the right brake master cylinder (looking from the front!).

Initial tests are favorable. Indeed the rate of closure can be regulated to something that is smooth and gentle. Bottom line is that it just looks better operating and doesn't make everybody duck for cover when doing a gear retract test!

My only reluctance is the control valve itself. While it does the job, it is rather heavy and of considerable size. Maybe something could be found that is a bit smaller in scale and will still get the performance we need.

FUSELAGE SADDLES: As I have mentioned in the past, we are now making available a set of fuselage saddles to our builders to help in leveling the lower fuselage during the initial bulkhead installation. If you look at the picture of the new 173 under construction you will see one still "stuck" (actually bondo'd) near the rear of the fuselage. The set comes as a pair, one for the front and one for the rear of the lower fuselage. They are essentially "pre-leveled" so only minor adjustments (shimming) is required once they are placed on a sawhorse. Our experience with them has shown that even with moderate abuse to the fuselage, levelness seems to remain constant. For more information, contact Nancy at Velocity West. We sell them for $70 plus shipping.

In addition to everything else that has been going on lately, we managed to attend three fly-in's during the month of May. Two were in L.A and the other at Watsonville, California, near San Francisco. The accompanying photo was taken at one of the shows in L.A. Nancy and I are in there somewhere! It's not us everyone is enthralled with, but rather that new promo video we had continuously running!

Mark & Nancy Machado

Velocity Kudos

I have just completed the most rewarding and productive three week vacation of my life! I spent the past 22 days at Velocity West, learning how to build composite aircraft under the tutelage of Mark Machado, Velocity West Manager. I cannot say enough about Mark's skills, both as a builder and as an instructor. He impressed upon me the importance of precision and doing things right. As an instructor, he is very patient and took the time to answer my every question.

I fell in love with my Velocity at Oshkosh '95, and upon hearing about the opening of Velocity West, my wife, Pat (who had not been to Oshkosh) and I flew our Cardinal to Lincoln in November '95 for an orientation flight. As a retired Air Force fighter pilot, the Velocity handles great! Mark's wife, Nancy, stayed with Pat during the flight and must have said the right things - Pat was in love with the Velocity by the time we landed.

As Pat is disabled, the Elite option makes the Velocity one of the very few home builts accessible. (I

by Duane & Scott Swing

Franklin Engine

In the last issue I talked about all the frustration I had getting the Franklin up to power. With the carburetor we have accomplished this goal. Idle is still like a full blown dragster ready to explode off the starting gate, but, certainly livable. It is my understanding a cam change by Franklin sometime in the future will solve this problem. With a 60 lb. CS aluminum prop (as used on all other 220 Franklin installations) the idle is more like a loping and not a problem. Cruising, on the other hand, is pure music to my ear. This is a very smooooth running engine, folks.

We have re-designed the plenum cooling chamber about 8 or 9 times and now can achieve about a maximum temperature difference of 20 degrees or so between cylinders without using any inner cylinder baffles. One problem with the Franklin is the rather low maximum CHT of 392 degrees F. The plenum keeps the temps well below this level. Oil temperature has also been difficult to keep below max. as it too is much lower than the Lycoming (230 vs. 250). We will probably add an inexpensive "Earls" oil cooler in the engine compartment to take care of this.

With the present 3 bladed propeller, I can out-climb 81VA and 82VA by almost 2 to 1. I have seen a steady 2000 feet per minute on a 90 degree day. I can also see 3200 RPM flat out. (This is not so good) On the plus side is great climb and reasonable speed (170 kts indicated) at 2600 RPM, 16" MP at 2500 feet altitude. On the minus side is the fact that, other than take-off and climb, I can overspeed the engine at will. I have tried a higher pitch prop and have seen 190 kts indicated at 2650 RPM (28" MP) wide open. (Remember, Franklin rates this engine at about 215/220 HP at 2800 rpm) The take-off distance and climb performance was terrible, however, and the prop was sent back for more work.

Our fuel flow gauge is presently on the fritz and I have no clue as to fuel flow. Franklin manual would lead me to believe a 75% cruise power setting should yield about a 10 1/2 to 11 GPH. Expect cruise speeds to be roughly 1/2 the power difference between a 200 HP Lyc. and the Franklin at 75% power.
75% power on a Lycoming = 150 hp
75% power on a Franklin = 165 hp
1/2 of 15 HP = 7 MPH estimated

IVO Prop

We are waiting eagerly the arrival of an IVO pilot adjustable electric prop. By the time you read this, we should have some basic news on this combination. For those of you who don't know about the IVO prop, this is a carbon 3 bladed prop we have tried, with less than encouraging results, on the Lycoming IO 360 engine. The base problem is the short pulse duration of a 4 cylinder engine. The Franklin doesn't have this problem. I spoke to a 260 HP 6 cylinder Lycoming air boat user of his prop and he has had no problem in over 200 hrs. of operation. If this prop works OK, we will stock for immediate shipment. Price will be $1960 for the pilot adjustable and an additional $340 for the constant speed controller (available as an add on in about 6 months).

RG Safety Squat Switch

'Want a safety switch to prevent gear retraction while at taxi speeds? Call Martin for details of this pressure switch that is installed between the pitot tube and the airspeed indicator. The gear will not go up until you have achieved a certain forward speed. This type of switch is usually called a "squat" switch on RG's with the oleo type struts. A pressure switch is used on the Mooney for the same purpose but is a very expensive switch. This one will cost you $43.00.

Engine "Shock Cooling"

Flying American Airlines from Florida to Sacramento CA to visit our Service Center in Lincoln is about as boring a trip as one could imagine. Perhaps driving would be worse, but dodging an oncoming, out-of-control Mack truck does add a little excitement to any trip. In any case, getting up to speed about aviation things is an end result of this otherwise waste of time.

One of my favorite authors is Kas Thomas who contains, in his brain, more engine knowledge than just about any living human I know.

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still have to figure a way to get her wheelchair in the rear seat area! Any suggestions?) We ordered our kit – a Velocity 173 RG Elite. I had some concern as a neophyte home builder, whose only experience with fiberglass was 25 years ago with a boat. (It was a lousy experience - the boat didn't sink, but looked like it should have.) I wanted to build the best Velocity possible! So when Nancy called about a month before our kit was to be delivered (April '96) and discussed the possibility of starting a hands-on training program at Velocity West, I jumped at the opportunity. We had our kit delivered to Lincoln.

Boise, Idaho, is a little over 500 miles from Lincoln, California, but a friend and I pulled a 26-foot trailer on May 1st and parked it right next to the Velocity West hangar. For the next 22 days I had access to our Velocity 7 days a week, 24 hours a day and managed to put in 211 hours of work. I feel that I have received a great jump-start and now I just have to keep it running.

Thanks again to Mark and Nancy for all the help as well as the super hospitality!

Ralph A. Pierce, Garden City, Idaho
Velocity 173 RG Elite

A recent article on "shock cooling" was of special interest as I have many times pondered whether this was more myth than truth. In one of my previous lives I was a trouble shooter for an airline piston engine overhaul shop in Dallas TX, and had reason to speak to very knowledgeable engine specialists who felt there was no such thing as "shock cooling". In any case, I have condensed Kas's comments for you to ponder.

"I don't think anybody has a patent on the question of what shock cooling does to aircraft engines. I know of no fleet studies, for example, on the subject. I know of no pilot who went up and did this and this to the engine and then when landed found cracks that weren't there before.

My gut tells me that shock cooling, while bound to induce dimensional changes in the engine, is probably not a great contributor to cylinder cracking. We know it induces dimensional changes, because, for example, valve sticking has been induced in some engines by sudden power reductions.

Its a big jump to go from that to saying you can make a cylinder head crack just by pulling the throttle back too quickly. Bob Hoover has not experienced any problem with cylinder head cracking on his Shrike, despite his rather odd predisposition to feather both engines while on a red-line dive.

It is rather interesting that oil plays almost as big a role in cooling your engine as does air. Throttle placement doesn't have nearly as direct an effect on CHT as you might think. In plane English, CHT depends on the cube root (roughly) of the cooling airflow pressure drop. That is, cutting an engine's power by half (but leaving airspeed constant, such as in a descent) results in a CHT drop of only 10% or so, or about 80 degrees F. Is this kind of CHT drop capable of trashing a set of cylinders? I doubt it. In an experiment by John Schwaner, John once took a cylinder that was heated to several hundred degrees in an oven and dunked it in a bucket of cold solvent. The abruptly cooled cylinder was then examined, and no cracks could be found.

Every pilot flies through rain at one time or another, and rain should be a very effective coolant (more so than mere air, certainly), yet no one, as far as I can determine, ascribes cylinder damage to rain.

If shock cooling were a definite hazard, your engine should fall apart when you bring the mixture into idle cutoff at the end of a flight. CHT's fall at a rate of 100 degrees F per minute or more in the first seconds of shutdown - triple the rate that starts the typical "shock cooling" annunciator blinking.

Also consider that although most pilots would be horrified to move the throttle from full-open to fully closed in the space of ten seconds, the reverse of that is what we do on every takeoff.

Maybe the safest course of action is just to keep the keys in your pocket and never start the engine. If you're worried about shock cooling, that's the only reasonable course of action. As for myself, I intend to go fly."

...Condensed from Kas Thomas article in *General Aviation News and Flyer.*

IFR Certification

We are often asked "What do I need to do to certify my airplane for IFR flight?" The answer to this question, obviously, can be found in the various FAR's, primarily under part 91.

I'll try to condense for you the information you need from the FAR's. If you need more concise information, refer to the applicable part 91. I'll also not get into any discussion on Cat II equipment requirements, nor special equipment that might be required under special conditions.

The equipment required under IFR rules requires that you first meet the VFR requirements. This is found in 91.205. Specifically, you will need an airspeed indicator, altimeter, magnetic compass, tachometer, oil pressure gauge, oil temperature gauge, manifold pressure gauge (if turbo charged and /or constant speed prop), fuel quantity indicator, and landing gear position indicator (if RG). We must also have a safety belt for each occupant 2 years of age or older, and shoulder harness for each front seat. An ELT will also be required. We must also comply with night VFR rules 91.205 (c). This includes approved position lights, approved strobe system, and an adequate source of electrical power.

For IFR instrumentation, we must add: Two way communication systems and navigational equipment appropriate to the ground facilities to be used (more about this later), gyro rate of turn and slip/skid indicator (turn and bank), sensitive altimeter (most of you wouldn't even know what a non sensitive altimeter looks like), a clock displaying hours, minutes, and seconds (sweep-second hand or digital), artificial horizon and directional gyro.

Almost, without exception, all modern airway flying would dictate the need for a mode A transponder with an altitude encoder; this then makes our transponder a mode C. This is covered in detail under 91.215. To keep all your equipment properly calibrated you must conform to part 91.411. This requires a static pressure check by a licensed radio shop each 24 calendar months with appropriate log book entries. This would include your transponder and encoder, as defined under part 91.413.

To find out what the pilot (owner) must do to keep all the above legal we must look at 91.417. In essence, log book entries of any equipment changes that are required for IFR; if you replace an altimeter, for example, a log book entry is required and a NEW static test as indicated under 91.411 be done. All your VOR(s) will also have to be calibrated within 30 days of an IFR flight per 91.171. If using a single VOR, a test signal or designated checkpoint must be used with a plus/minus 4 degree error. With dual VORs, a maximum variation between the two is 4 degrees. The information must be logged, giving date, place, bearing error, and your signature. There are also ways to calibrate a VOR using an airway and a fixed spot on the ground. See 91.171 if interested.

One could probably look at 100 general aviation IFR certified airplanes that are regularly flying IFR and not find more than half that meet the requirements as specified under 91.417 and 91.171. Nevertheless these are the rules and if you intend to fly IFR, you should abide by them.

As to the two way communication and navigation equipment appropriate to the ground facilities. The airplane I got my IFR rating in was a legal IFR equipped Piper Arrow. It had a single nav/comm (KX 170B) and NOTHING else. No glide slope, no 3lt marker, no autopilot, nothing. How is this possible? All the required approaches were either VORs or Localizers, with one VOR being used to cross check for the final approach fix (FAF) and the final path to the landing. Lots of knob twisting going on here. My ADF approaches were all done in a simulator and were not required on the actual flight test.

What would I feel appropriate for x-country IFR flying? 2 comm's, one VOR with GS, a 3 light marker beacon and a VFR GPS. The VFR GPS is, of course, not an IFR approved piece of gear but nice to have to report to center your distance from the next VOR, or position reports if asked. If I were using airports that required an ADF (the only approach available) then I'd either go with the ADF or more likely an IFR approved GPS. A wing level autopilot with coupling, would also be high on my list to minimize pilot workload, and a handheld comm/nav radio for extreme emergencies.

That's it. Give it some thought.

Duane

Oshkosh Dinner

Please call the factory to RSVP for the annual dinner at Oshkosh.
Here is the info:
Friday August 2, 1996
6:00 pm for cocktails
7:00 pm for dinner
Hilton (Regalla A Room)
$16.00 each for adults
$8.00 each for 3-10 year olds

Safety Corner

Accident & Incident Reports, Maintenance & Service Difficulties

Many of you have heard about the Canadian pilot (not builder) who was killed on May 3rd while flying a Velocity RG aircraft. Although all the details are not yet in, I can report a couple of disturbing comments made to me by the CAA of Canada. I can only assume at this time that the airplane was built correctly and flown within the CG limitations. What I can also correctly state is that the plane was being flown without the vortilons on the wings and the pilot was doing a number of aerobatic maneuvers on the flight proceeding this crash. We also know that the airplane apparently entered a deep stall at a fairly low altitude, some say at about 1000 feet. The CAA also talked to a person who claimed that the son of the pilot told him that his dad was indeed doing some aerobatic flying in the Velocity, and had tried a hammerhead on the flight prior to the one in which he lost his life. In case you are not familiar with a hammerhead stall, what this means is that the airplane was pointed straight up until airspeed drops to "0" and then full rudder applied to pivot the airplane on one wing tip until pointing straight down. Once airspeed is reached, a pull out to level is executed. The problem with this is that the Velocity doesn't have a rudder behind the propeller blast as in a conventional airplane and a tail slide is sure to result. A fall-off into a deep stall is certainly possible. This could well be the reason this pilot got himself into such a terrible condition. It was also noticed by ground observers, that the pilot was advancing and retarding the throttle in an attempt to recover. Scott flew up to Canada to look at the airplane to try to determine if any evidence existed to suggest a failure of some critical component. Nothing conclusive could be found.

The question now becomes: What if I should somehow find myself in an unintentional deep stall, is there anything I can do to recover? The answer is yes. If you have an RG model, the first thing to do is drop the gear. This not only adds low CG drag, that by itself would probably pitch the airplane out of the deep stall, but also would provide additional structure between you and the ground to absorb landing loads. Next and most important, would be to add full throttle, full nose down elevator and WAIT. We all know that from a standing start on a paved runway, it takes 10 seconds or so to accelerate to takeoff speed. The same would apply in the air. Leave the power UP and elevator in the full nose DOWN position until the canard starts to fly. A review of the Velocity deep stall testing video shows a 1200' loss of altitude and a 12 second period of time for recovery, based on full nose down elevator and full power application (fixed gear airplane).

If you are concerned that a nose up attitude and speed bleed to "0" is a common occurrence, let me assure you this just doesn't happen unintentionally. I have flown over 7000 hours in all conceivable weather in just about every single and light twin and it has never ever happened to me. Not even close. I would guess that if we totaled the flying time of everyone who reads this letter, it would exceed 300,000 hours. I would also guess that not one of you have ever had an unintentional hammerhead to "0" airspeed. Nuff said.

MORE ACCIDENT NEWS

I got a call from a California builder about the TV news coverage he had just seen of a Florida Velocity accident. I couldn't believe TV cov-

Continued on page 10

Safety Corner

Continued from page 9

erage in California on a Florida airplane accident. In any event, Moses Ezekiel was departing his home airport in Hollywood Florida and experienced a partial or complete engine failure. He had just cleared the airport boundary and his attempt to turn back to the airport failed and he hit the tile roof of a home about a block from the airport. The main gear was ripped from the airplane and the plane nosed over and struck the ground and spun around ending in the street. Thank the Lord, Moses suffered no broken bones and no facial damage. He had a major concussion when his head was slammed against the side of the airplane. I visited him in the hospital about a week after the accident and he didn't remember anything about the crash. He was, however, alert and able to get around on his own. A full recovery is anticipated.

The FAA and NTSB were going to conduct tests on the engine to determine why it lost power. Fuel does not seem to be a factor as there was plenty of fuel in the airplane. We will let you know what happened, if and when we get the info.

To you, Moses, we hope your recovery is going well and your enthusiasm for flying has not changed.

We, here at Velocity, are often ask if we would come out and fly one of our customer airplanes for the first flight. This is, of course, to determine if anything is wrong with the plane and what should be done to correct whatever it is that is wrong. There is no way, short of a complete airplane inspection, to be sure everything is safe for this first flight. Even then, there is a certain unknown that causes the heart to beat a little faster. We can never know for sure that errors have been made in the construction that the builder may not want to test himself, or whether he just doesn't feel qualified to do the initial test flying himself. A case in point involves a Velocity that had a total of five builders over the course of completion. I was asked to do the first flight to see if all was OK. Each time I came to fly the airplane some preflight inspection uncovered something that needed to be corrected prior to flight. On one trip the engine dumped over 5 quarts of oil onto the firewall and into the ducts flooding the rear seat area. This, because an oil line fitting was moved and the plug was not inserted into the remaining hole. The owner had told me he had completed the taxi tests before I arrived. Obviously, the oil line was moved after his taxi tests. On another trip I discovered the bolts holding the outboard counter weight arms to the elevator torque tubes were not installed. This could cause the elevators to jam or go into a flutter if not corrected prior to flight. On another trip, I found the toe-in to be, in fact, a toe-out, and the airplane could not be taxied at any speed above about 30 kts. All these things on an airplane that was "ready" for the first flight.

What, then, should the "official" factory position be? Should we agree to "first flights"? This is a question I need your help in answering. I spoke to Mr. Goetz of Lancair and he told me the factory has done first flights on over 200 customer built aircraft. He also told me he has had 6 engine failures on these first flights. He feels that his ability to bring the airplane down safely, saving the airplane in most cases, and his ability to determine corrective action needed for most all first flight problems, has saved Lancair customers many hours of work and perhaps a few lives.

Should we offer the same type service? Do you think this is necessary? Will you use it if the cost is within reason? I would think that airfare or other transportation costs, lodging and food as needed and a daily fee of $150.00 to cover my modest salary would be "reasonable". What do you think? Some sort of a liability waiver would be needed and, if you have insurance coverage, a call to your carrier adding the pilot.

Let me know if you think we should do this.

Duane

Service Caution:
Affects: All Velocitys
One builder noted that his main tire toe-in changed to a toe-out condition after the plane was finished and moved around. His toe-in went from 1" in to 2" out. Perhaps it would be better to start with 2" toe-in for each tire when building.

Service Caution:
Affects: All Velocities
Manual Section: 3.3.4

When you are taxiing for take off on a windy day there is something you need to consider. Since the rudders are only spring loaded to the neutral position, they can be forced by the wind to deploy on their own. Depending on the hook up of the rudder cable, it may be able to loop around the horn, causing the rudder to be stuck out. You can simulate this by pushing the rudder to the outer position and letting go. The rudder should go back to its neutral position. If it seems to hang up, you can put a small tie wrap behind the cable thimble to keep the thimble from swinging around. In the internal setup, you can use an AN 111 cable bushing and bolt the cable onto the belcrank. This keeps it from binding in any position.

Service Note:
All planes

SECTION 10.2.5 If your roll trim string or rope seems to slip real easy, you can purchase different string at your local hardware store that is used in window blinds. It is a little softer and seems to work better.

Oshkosh: Velocity Forum

Friday August 2nd
11:30 am to 12:45 pm
Tent 3

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.

NOTICE: Missing a page in your new manual?
Affects: All standard wings
Check to see if your manual is missing page 4-21 & 4-22 (page on canard elevators). If so, call us and we will send it out to you right away.

KPC 013
Affects: All RG's
Manual Section: 6.2.2
Date of Change: 10 May, 1996

Delete the following: "You'll have to cut and file the linkage until you get it to just barely put pressure on the shock. You won't see movement in the shock but you will feel it."

KPC 014
Affects: All FG's
Manual Section: 9.2.2
Date of Change: 10 May, 1996

Change the first three sentences of paragraph four to read: "To confirm this position, set the fuselage on the main gear stubs and support the plane so it is level in both directions. Insert the gear (without the fork) so it rests on the shop floor. (Note: On the 173, space the end of the gear 9/16" above the floor. This is due to the larger tires.)
The dimensions for the 3/8" bolt shown in Figure 9-9 should be as follows:
-approx. 2-1/4" from aft side of layups on canard bulkhead to center of bolt.
-the dimension from the fuselage floor to the center of the bolt is as follows:
7-13/16" for a std.
8-3/8" for a 173

The aluminum captivator plate in Figure 9-9 should be tapped 1/4-20 to accept the allen screws

Change the size of the two plies of Triax in Figure 9-10 from 9" x 13" to 10" x 13".

KPC 015
Affects: All Velocitys
Manual Section: 10.2
Date of Change: 10 May, 1996

Change the dimension from the front keel flange to the pilot side plywood hardpoint to 16.0".

Change the dimension for the gas spring hardpoint in the keel (RG's only) to 17.0".

Both of the above hardpoints are premarked on the keel at the proper locations.

KPC 016
Affects: All FG's
Manual Section: Chapter 10-Keel Stiffening Layups(10.2.8 or 10.3.6)
Date of Change: 10 May, 1996

The two plies of Triax that go inside the keel should be 10" tall x 13" wide.

KPC 017
Affects: All Elites
Manual Section: 14.5 or 14.6
Date of Change: 05 June, 1996

Change the paragraph concerning the template to: "Copy the paper template labeled "Strake Slice Template" you received with your kit to a thin piece of plywood veneer or stiff cardboard. Place the "L.E. Point" of the template at the 30" mark, aligning the back edges of the template with the door cut line above and below the strake. Some trimming of the template may be required for your particular installation to get a good fit. Use a marker to mark this cut line. This gives you a straight cut through the strake.

KPC 018
Affects: All RG's
Manual Section: 6.2.1
Date of Change: 22 May, 1996

The nose gas spring should be mounted with the body up. It mounts on the outboard side of the overcenter linkage. Turn the shaft around so that it can be mounted in the keel.

KPC 019
Affects: All Elites
Manual Section: 10.1.2
Date of Change: 05 June, 1996

The first paragraph mentions that it is optional to reinstall the Forward Keel Access Hole. This is true on the Non-Elite, but the Elite must have the cover reinstalled. It is a part of the structure that stiffens the fuselage.

KPC 020
Affects: All RG's
Manual Section: 9.6.3
Date of Change: 05 June, 1996

The Hydraulic Plumbing Schematic has an error in the nomenclature. The tee fitting that goes through the left side of the canard bulkhead should be labeled as an AN804-4D, not as an AN824-4D.

KPC 021
Affects: All Velocitys
Manual Section: Chapter 18
Date of Change: 15 June, 1996

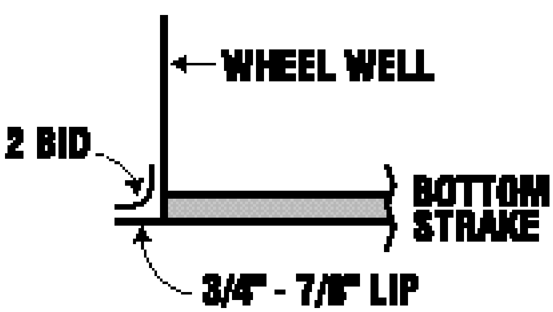
Manuals before this date mention nothing about the placement of the canard counterweight covers. These are molded parts that prevent ice buildup on the counterweights. They are placed just in front of the counterweight well in the canard. Position them just far enough forward to clear the counterweight as it moves through its motion. See the drawing below:

KPC 022
Affects: All Velocitys
Manual Section: 4.5
Date of Change: 15 June, 1996

The screws that hold the counterweight arms onto the elevator torque tube screw into a 10-32 tapped hole. Install these with removable Loctite to ensure that they do not loosen in service.

KPC 023
Affects: All RG's
Manual Section: 14.3
Date of Change: 15 June, 1996

Before fitting the wheel well you are instructed to cut the inner skin and foam of the strake 3/4" to 7/8" outside the hole for the tire. When fitting the wheel well, ensure that it goes down all the way to the outer skin of the strake. Do not set it on top of the foam. See the drawing below:



KPC 024
Affects: All RG's
Manual Section: 9.6.2
Date of Change: 15 June, 1996

Assemble the hose fittings to the hose as follows:

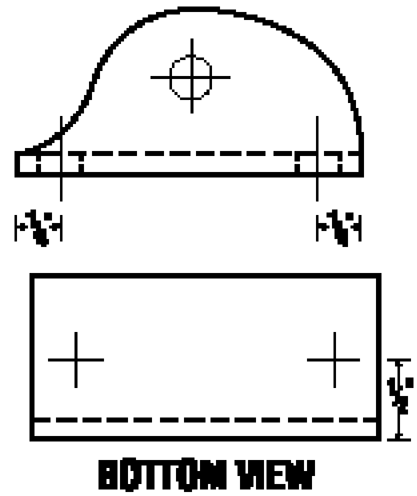
Find a piece of wood 2" x 2" x 4" long. Drill a hole the size of the hose lengthwise through the wood. Cut the block in half down through the hole that you drilled to make to blocks that are 1" x 2"x 4" long with a half hole along the side of the block. This will be your clamping block to hold the hose while you are putting the end on it. Clamp the hose in the block in a vise with just enough sticking out for the collar to fit on. Lubricate the hose with oil or hydraulic fluid and screw the collar on counter clockwise until it either bottoms out in the hose or the hose starts to twist. Too much twisting can damage the hose. Now lubricate the inside piece of the fitting, insert it into the hose, and screw it all the way in clockwise.

KPC 025
Affects: All RG's
Manual Section: Chapter 9
Date of Change: 15 June, 1996

Remember to test the main gear overcenter linkage locking arm for proper operation. Make sure no binding occurs that could cause it to jam. Follow this procedure: With the aircraft on jacks, put the gear switch in the "up" position. As soon as the nose gear starts up, pull the breaker to stop the pump. This will load the cables while the main linkage is still locked. By hand move the locking arm up and down to check for smooth operation. Some filing of the slot on the arm may be necessary to achieve smoothness. After doing this, do a full retraction test to verify that it works properly.

KPC 026
Affects: All RG's
Manual Section: 6.3
Date of Change: 15 June, 1996

The template shown for the aluminum angles that attach the nose gear hydraulic cylinder to the floor, neglects to show where the 2 holes (in each angle) are positioned for attachment to the floor. The drawing above right shows where they should be:



KPC 027
Affects: Elite
Manual Section: 11.4.2
Date of Change: 15 June, 1996

A couple of builders have mentioned that they didn't understand the extra bulkhead that you add that ties the carbon beam into the strake. The original cut out in your fuselage into the strake area didn't go all the way to the beam since the beam was not installed. After the beam is installed, the cut out needs to be brought forward all the way to the beam. Then the bulkhead extends flush with the rear edge of the beam into the strake.

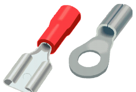
KPC 028
Affects: Elite
Manual Section: 10.1.4
Date of Change: 15 June, 1996

In the plans it was mentioned that it is very important to get the keel lined up in the middle of the fuselage (equal distance from keel to side of fuselage). If you do not do this, it will result in the seats not fitting within the confines of the area.

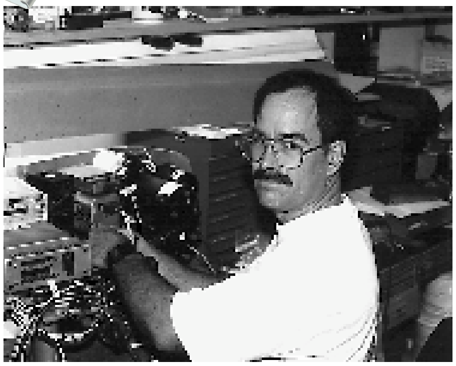
Bonnie Needs Photos!

Please send me one photo of you and your completed Velocity. We want to make a display case with Velocity aircraft and pilots. Please put your name on the back of the photo and mail to:
Velocity, Inc.
200 W Airport Dr
Sebastian FL 32958

Short Circuit



by Martin Hadley



Electrical 101

Using a Volt/Ohm meter is an extremely valuable tool in troubleshooting an electrical circuit. It becomes even more valuable when you understand exactly what you are looking at! Let's look at the following electrical problem.

You turn your nav lights on and the right wing light does not illuminate. You replace the bulb thinking that the bulb is burnt out, but it still does not light up. So you get your volt meter out and to your amazement, you find that you have the proper voltage to your light. Being an above average trouble shooter, you decide to make sure you have a good ground to the light. Now you are convinced the bulb just is not making good contact because you have both good voltage and a good ground. Fiddling with the socket does no good. What can the problem be?

Let's take a quick overview of electricity first. I know, I know. You've tried to understand it before and just can't. I can teach you in five minutes. Honest.

For argument sake, electricity IS exactly like water, ONLY with different words. Instead of water...electrons; instead of gallons per minute...amps; instead of hose...wire; and instead of pressure (P.S.I.)...voltage. Let's say we can get a maximum of 3 gallons per minute of water through a given hose at 12 P.S.I. Now, just change the words; we can get a maximum of 3 amps through a given wire at 12 volts. If you understand the statement about water, you have to understand the statement about electricity. There is virtually no difference in what you are saying, only one is about water, the other about electricity.

If I change anything in the either sentence, something else will change. For instance, if I use a smaller hose/wire, then I won't be able to get as much water(gals.) /electrons (amps) through it at 12 PSI/Volts. Conversely, if I use a larger hose /wire, I can get more gals/amps through it at 12 PSI/Volts.

If I change my PSI/Volts to a higher value without increasing my hose/wire size, I can increase my gallons per minute/amps until my hose/wire will burst/burn up.

Let's look at our nav light problem in those terms. If you have sufficient pressure/volts in a line, you probably have a gals per minute/ amps starvation problem. If you have low pressure/volts, you know that something is restricting or resisting the pressure/volts in the line.

Both problems require a good visual inspection of all joints or connections, hose or wire. Our electrical problem would indicate a poor or corroded electrical connection, be it crimped or soldered. If you check the voltage while the bulb is plugged in, you will find it will be low. If you check a pipe (wire) that has a restriction in it for pressure (volts), and you cap it off first, your pressure (volts) will read OK. Once the water (electrons) starts to flow in the pipe (wire) again, the pressure (volts) will drop because you don't have the volume of water (GPH (amps)) entering the pipe (wire) needed to keep the pressure (volts) up. If you check the wire with no electrons flowing (i.e. the bulb not in), it might check OK. As soon as you plug the bulb in, electrons start to flow again, but there is not enough to keep the 'pressure' (voltage) up to keep the bulb lit!

In most every aircraft D.C. circuit you need good voltage (usually +12Volts or greater) and little or no resistance to ground (-) (usually .5 ohm or less) for a circuit to work properly. If you have both of these...check for poor or corroded connections.

A quick primer on Diodes

Most every experimental aircraft electrical system is powered by direct current voltage, or D.C. volts. The most common electronic components used in a D.C. circuit are resistors, diodes, relays, switches, and incandescent light bulbs. Of these, only one is normally "polar conscious", or sensitive as to which end gets hooked to power (voltage) or ground. That is the diode. I have never seen a resistor, a switch, or an incandescent light that was polar conscious. Rarely one might find a relay that is.

A diode is used to effectively 'block' electrons (or current) from flowing one direction, but allowing current to flow in the opposite direction, much as a check valve blocks the flow of fluid in one direction. There are three basic types of diodes:

1) The power diode. This diode is characterized by its larger size and its ability to handle higher amounts of current. One might see these used in a dual battery isolator commonly found on a recreational vehicle with dual batteries.

2) The signal diode. This diode is normally much smaller than the power diode, and is commonly used in electronic equipment. It has the ability to act as a check valve, but can also be manufactured so different types of diodes will switch open and closed at different speeds. This application would generally be limited to A.C. (or alternating current) circuits utilizing very high rates of change in direction of current. An R.F. (or radio frequency) circuit could use a signal diode for certain applications. Generally, the 1N4001 thru 1N4004 diode is most commonly used in aircraft D.C. circuits as 'check valves'.

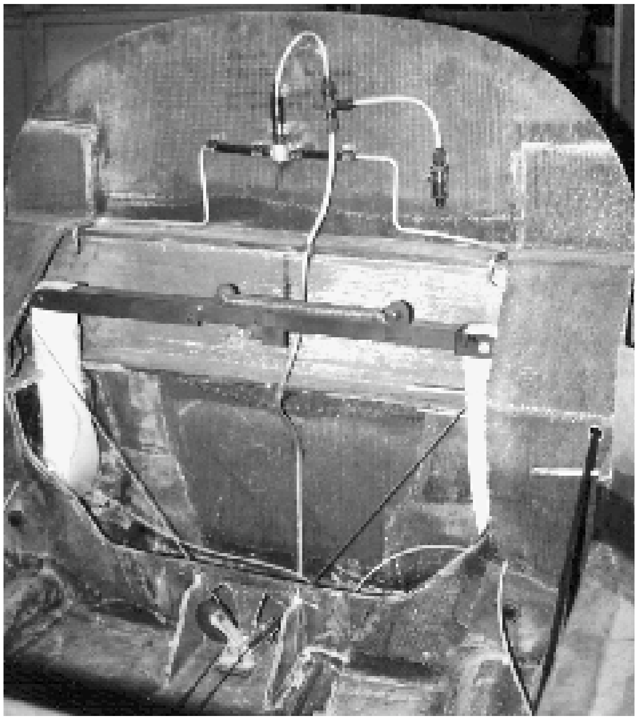
3) The L.E.D., or Light Emitting Diode. This diode is usually found on the instrument panel being used as a warning, or annunciator light.

Connecting diodes to a D.C. circuit has been standardized to prevent short circuits. The power diode typically has a metal case that goes to the low side (the side of the circuit

Continued on page 19

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.



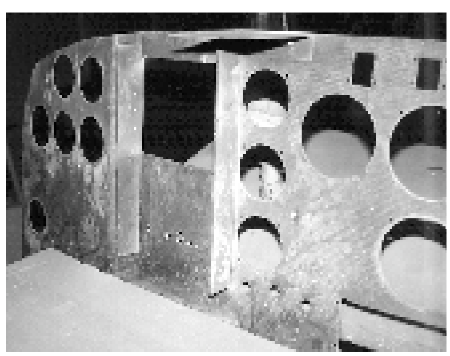
From Hugh Hyde, Houston Texas

Fuel air vent system check valve

While visiting the home of a friend who is building a Defiant, I noticed two check valves in the back of his cabin. He added these check valves (which let air in from inside the cabin, but does not let it out) to his separate tank vent systems as a precaution against icing or other obstruction of the vent line inlet. It looked like a good idea to me, particularly with one air inlet to provide venting to the entire system (see volume 5 of *Velocity Views*), so I added the check valve as shown in the photograph above (Spruce# 10630).

Avionics Panel

After carefully measuring the panel for avionics, I soon came to the conclusion that installation on the canted panel was impossible regardless of the number l have seen. I called Martin Hadley who gave me the following instructions. Obtain two one inch wide aluminum bars of 3/16 thickness. Attach one bar flush to the outside of the cant of the inside of the panel, drill through from the outside of the panel (#34 bit). countersink the panel and tap the bar for 6-32 flush screw Use as many as you feel are necessary. Cut the screws to flush with inside of bar. The second bar attaches to the flat part of the panel and is a little more involved. Drill holes through the 3/16 edge (drill press, please), place the bar against the panel in place and backdrill through the panel. Countersink, tap, etc. as done on first bar. Before the final installation, drill and tap holes for attachment of the "boxes" for your avionics. Bondo and sand over screw heads on panel. Sounds complicated, but if I can do it, anyone can.



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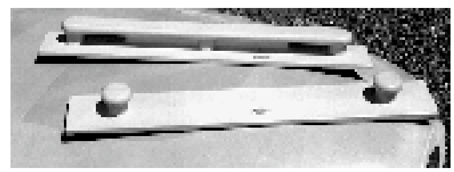
From Rick Lavoie, St. Augustine Florida

Two Neat Tools

While visiting my friend Jacques' Lancair project, I noticed a couple of tools that I could use. The first one is an "Aluminum Rotary Knife". The big advantage is that with this knife,

wet cutting transfer layups is now a breeze. Between use, just drop the entire tool in some acetone. No disassembly is required (unless you want to change the blade). I went to my local cabinet store and picked up a couple scrap pieces of "Corian". This makes an excellent cutting surface and also cleans easily.



The second tool was a nice set of sanding boards. I had already made one, but I was so impressed with this new board, that I bought one.

If you want either of these, contact Michael Custard at 904-642-1001. His address is 1736 St. Johns Bluff Rd, Jacksonville FL 32246. He sells the rotary knife for $35 and the Boards for $45 each. Mike is a Lancair builder and has other neat things that he sells (like hinge and latch access doors).

X-wind Landing Tip

While on my Bahamas trip, I had the pleasure of going flying with Jim Woody and Tom Chimento one day. The purpose of the joy ride was to let Tom take the stick of the factory demo, since he is building a 173 RG and had never flown a Velocity before. We had a nice flight and, when it was time to land, Tom turned the stick back over to me. I made a terrible landing. Jim Woody was in the back seat and told me that I should not deploy the speed brake with any type of cross wind. In fact, Jim said he rarely uses the speed brake. The aerodynamics were such that the speed brake troughs enough air to greatly reduce the effectiveness of the ailerons while in ground effect. We took off again and made two more landings without the speed brake. Big difference! Thanks for the lesson, Jim. By the way, Jim has one of the earliest kits flying and is one of our most experienced Velocity pilots. He flew to the Bahamas all the way from Wyoming.

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From Joe Mistretta, Albuquerque NM

I finished my Standard RG in August of 1995. I finished flying off my 40 hours on March 8, 1996, so on March 14th, I started out from Albuquerque to Sebastian.

Besides some weather in Little Rock were I had to stay on top until Tallahassee, the trip was very pleasant. When I landed at Sebastian, following some parachutors to the ground (watch for them if you go to Sebastian), I was surprised at the reception I received by all the staff at Velocity. I arrived at Velocity on March 15th which was a Friday, so Duane and Scott gave everyone the afternoon off to just set around and talk to me. At least that's the way I remember it happening.

Seriously, Scott isn't going to like me writing this letter anyway, but I would like to thank him for taking time out of his busy schedule to inspect my aircraft and even turning a wrench. Also I'd liked to thank the entire staff at Velocity for their hospitality. They all are a great bunch.

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From Jim Agnew, Tampa Florida

Aligning the Gear Bulkhead

You must locate the aft side of the GEAR BULKHEAD 7 1/4" in front of the ENGINE BULKHEAD and parallel to it. Try this easy to insure proper location. Get some 1/2" wood dowel or other small hard wood and cut 4 pieces exactly 7 1/4" long (tip - cut a little long and sand to length) and you want the ends to be parallel. Lay the GEAR BULKHEAD face down and attach the end of one piece of wood to the bulkhead by standing it upright and using hot glue around the outside Do Not put hot glue between the end of the wood and the bulkhead since this will increase the length.

The 4 pieces of wood are placed centered on the diagonal Triax layup on the ends of the bulkhead. One about 2" down from the top and one about 2" up from the bottom on each end. You then place the other ends against the ENGINE BULKHEAD and hot glue around them. Your Gear Bulkhead is now exactly spaced and held in place so you can now put your "finger radius" of microballoon each side of the bulkhead. Make sure that all 4 wooden pieces are flush against the engine bulkhead. Remove the wood spacers after the microballoon hardens.

Straight Tape Glassing

Try an old trick used by alarm installers to install the foil tape in a straight line. You need rectangular blocks of hard wood or plastic in the following sizes 2 " tapes - 1" x 2", 3" tapes - 1 1/2" x 2 1/2", 4" tapes - 2" x 3" you get the idea. Drill a 1/2" hole in the center of the blocks and ROUND the corners of the blocks. To mark a line parallel to say a bulkhead where you are going to use 2" tape with 1" on the bulkhead and 1" on the other surface, take the 1 x 2" block, place the long side against the bulkhead, hook your finger in the hole, hold your marker against the outside of the block and surface to be marked, and drag the block along the bulkhead. Presto, nice parallel lines for reference when installing the tapes.

Cutting the Cowling

I sawed off the lower cowling which was not that hard, however, I found it much easier to start at the edge and work your way around the cut line by slipping a 1" long piece of 1" x 1" x 1/8" aluminum angle along behind the cut to warp the cowling away from the cut. Doing this the cowling would spring down as you cut thru the material above the flange and made it much easier to tell that you had cut thru. This will help to prevent your cutting thru the flange.

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From Travis Young, Gainesville Florida

It's Time to Get Connected

How would you like to be able to find out about when and where the next Oshkosh dinner is without leaving your house or calling the factory? 'Ever wonder what you might have to do to install a high frequency antenna in one of our planes? And what kind of pitfalls have other builders run into while putting on the top strakes? Well, you can get all this information and much, much more without ever leaving your house or calling the factory, through the use of the Internet.

Getting connected to the Internet can be a pretty complicated task, and there are many books you can buy on how to do this, but the easiest, no-brainer way is by just using CompuServe, America On Line, or the Microsoft Network (for Windows 95 users). These companies, for a monthly fee, provide you with software, a few hours of access to the Internet, and the ability to create your own homepage. You can call CompuServe at 800-848-8990, America On Line at 800-827-3338, or click on the Microsoft Network icon on your Windows 95 desktop.

Now that you are connected, what can you do? For starters, drop by the Velocity homepage at http://www.atlantic.net/travisy. Here you can find information ranging from general sales propaganda, upcoming fly-ins and open houses, all the way to two years worth of builder conversations. You will end up spending a few hours browsing through these pages, as they are quite extensive, so make sure you did all your chores first to keep your other half happy.

Then, if you want to become an active participant in these builder discussions, you can join the Velocity Reflector group. This group is a collection of builders (and only builders) who send e-mail when they have a question or comment for all the other members in the group to see and respond to. For the most part, builder support is not handled through this group (ie: if you cut through the spar, you need to call the factory), but if you have an idea and want to bounce it off other builders, this is the place. Send Frank Brock an email at FrankB@eapi.com to join.

On the homepage is a list of other airplane related sites for you to go exploring once you have had your fill of the Velocity homepage. This list includes many interesting builder and general aviation related links for you to spend even more time exploring, including AvWeb, Boeing, and the EAA.

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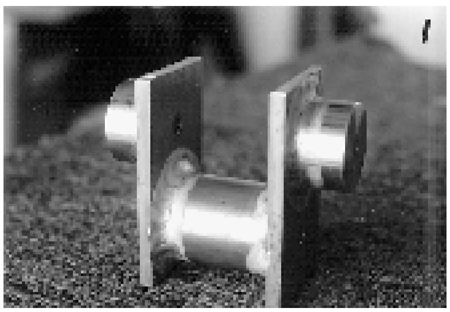
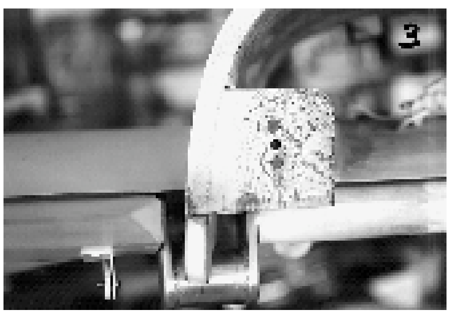
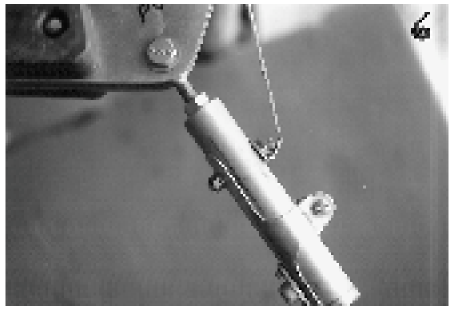
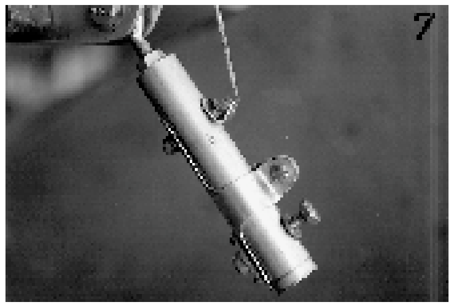
From Byron McKean, Payson, Arizona



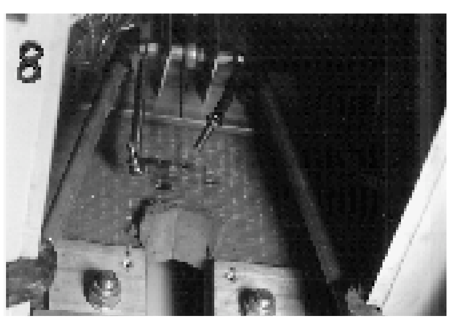


The above photos show how l handled the elevator torque tube situation. It fits well and seals well and the canard is easy to remove. If more information is desired let me know.



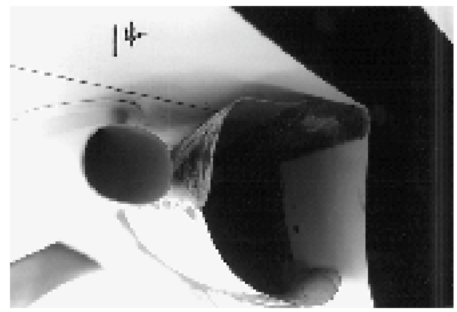


The above photos show two things. First, the string on the tab holds the elevator push rod up slightly so when the canard is lowered onto the fuselage it won't hang up on anything. The string remains permanent and does not interfere. Second, the aluminum strap holds a nut plate so a wrench is not needed on the bottom to hold the nut when installing the attach bolt. I have nutplates on all five canard attach bolts so I alone can install the canard from inside the cockpit. I use a block and tackle arrangement in my hangar that allows me to remove or reinstall the canard by myself in less than ten minutes plus the canard is hoisted above my head and out of the way. Of course, all attach bolts must be the proper length when using nut plates!



The above photo and the one at the top of the next column show how I have reduced greatly the cold

air coming into the cockpit through the nose gear leg opening. The flaps were made using thin baffling material. The blanket material from commercial print shops. This could be part of the kit.



The above photo shows how the greatly enlarged air intake scoops that finally did bring the CHT down to a livable level. Later I will rebuild them to a better and more streamlined shape. I lost about eight knots using these. l have re-baffled several times with every new idea but with little improvement so l am still baffled!

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From Dave Black, Woodbridge, Virginia

Cap Strips

In the plans, the top strake skin is mated to the fuel tank bulkheads and bottom strake via what we call the toothpaste method. It is quick and easy, but we were concerned about its structural integrity and fuel tank sealing.

Compared to the plans method, cap strips offer several advantages: Stronger ribs and webs due to the I-beam tops; greater bonding area; less resin required on close-out; and less ooze of wasted resin. We followed the plans right up to the moment where the strake halves would be mated. At this point, the baffles have been trimmed to fit the top strake reasonably well, with no more than a 1/4" gap.

Put two layers of duct tape (for spacing) plus one layer of clear tape (for release) on the top strake where it contacts the baffles, bulkheads and fuselage. Using normal lay-up methods, apply 2-fine-BID x 2" wide to the release tape. Goop micro-balloon onto the tops of the baffles and bulkheads as in the plans. Mate the halves and let cure.

When cured, carefully remove the top strake. The 2-BID should be stuck to the micro-balloon on the top of the baffles and bulkheads. This cap strip now conforms exactly to the shape of the top strake. Using a Dremel tool or such, make a neat radius in the micro-balloon under the cap strips. Again using 2-fine-BID x 2" wide, tie the undersides of the cap strips to the sides of the baffles and bulkheads. Let cure. Trim the cap strips to a neat 1-inch width.

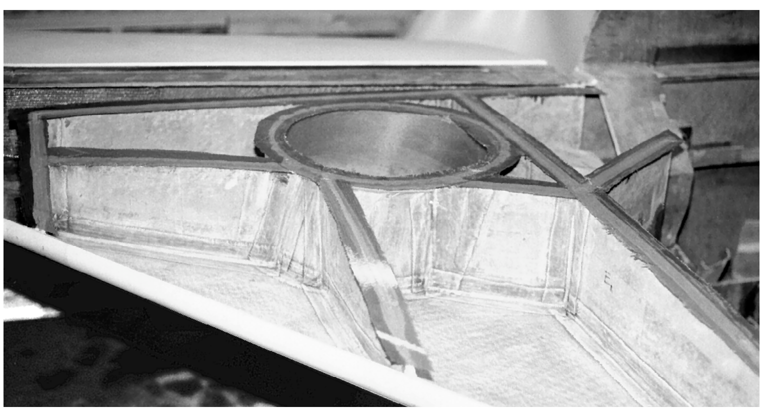
All that remains is to mate the top skin for real. Make sure you have removed the release tape, then sand and wet all the mating surfaces on the top skin and cap strips. Put the skin in place and let cure. That should be one very strong strake!

Dave Black pressure-tests the main fuel tanks

Scott Brown duct-tapes top strake in preparation for lay-up of the 2 BID

Testing Fuel Tanks

We had taken such extreme care to build "perfect" fuel tanks, we thought it unnecessary to pressure-test them. Still, common sense dictated otherwise. But how could we do it? We did not yet have our altimeter, and we certainly did not want to risk damaging it or the tanks. Our solution proved simple, cheap, and effective.



Freshly cured cap strips as they appear when the strake top is removed

We bought several "helium-quality" party balloons and a five-foot length of 1/4" plastic tubing. For each main tank, using a rubber-band we tied a balloon to the fuel drain line. Then our plastic tubing allowed us to blow into the tank through the vent line (inflating the balloon) and then to seal off the tank.

Finish-sanding Completed cap strips

Initial tests were disappointing. The balloons deflated in less than two minutes, indicating leaks equivalent to 1/8" holes. Now what?

To find the leaks, we used both the soap-bubble and the stethoscope methods. For bubbles, we put a teaspoon of dish washing liquid in a squirt-bottle filled with water. The stethoscope method consisted of sticking the plastic tubing in our ear, then using the other end to "sniff" for the leak.

Both leak-detection methods worked very well, and each had its advantages. The bubbles gave us excellent visual reference on the leak. But between the rear of the tank and the spar where it was very difficult to see, the stethoscope proved best. We were able to discover even the tiniest leaks.

All that remained now was to fill them. Put a fairly goopy resin/cabosil mix on each of the leaks. Use that plastic hose to apply suction (by mouth) to the tank. You need suck for only about 30 seconds. Sucking for too long will pull the resin right on through into the tank, leaving the leak open. After you have sucked the resin through once or twice, you learn when to stop. Remove excess resin from the outside. Let cure and repeat the process until all leaks have been filled. That's all there is to it.

Both of our tank leaks turned out to be in tight corners. But don't overlook the fuel caps as a source of leaks as well. The center shaft leaked on both of ours. There was also some leakage around the ring gasket. If we had it to do over, we would have used better fuel caps. Nevertheless, when we had finished, our tank pressurization balloons remained inflated after two weeks. Mission accomplished!

Peel Ply

Recently we spoke with two builders who were not familiar with the benefits of Peel-Ply. It is a thin fabric used as a top coat when doing fiberglass lay-ups. It soaks up excess resin to lighten the aircraft while strengthening the bond, and smoothes down loose fiberglass strands to eliminate "meat-hooks." It produces a silky surface texture on the cured fiberglass, reducing considerably the amount of sanding required between lay-ups.

To use Peel-Ply, do your lay-ups in the normal way, then apply a single layer on top and let cure. Once cured, remove the Peel-Ply! (Leaving Peel-Ply between laminations can have catastrophic consequences.) It peels off easily, leaving a nice, satin-smooth finish.

A few months back, Spruce temporarily discontinued carrying the thin Peel-Ply. This sent us into a minor panic, as we use it on nearly everything, and the thick kind is both harder to work with and more expensive. So we took a sample to the local fabric store to see if they had anything like it. The saleslady immediately recognized it and took us to their selection of Dacron Liner fabric. It looks, feels, (and works) like exactly the same stuff! Even better, liner fabric comes in various colors -- an important safety feature since it could be less easily forgotten in a lay-up.

Model Names

Am I the only one confused by Velocity model names? In conventional usage, any parameter not otherwise specified is assumed to be the original style (Short Wing, Fixed Gear, Clam Door). But if someone speaks of a Velocity RG, can you really be certain they mean Short Wing and a Clam Door? Can the absence of a description really BE a description? Also, the term Standard has been used to specify either Short Wing or Clam Door, and Velocity itself has been used to mean Short Wing. So instead of clarifying, these terms can actually contribute to misunderstanding.

To properly describe a Velocity model, three questions must be answered: Short Wing or 173? Fixed Gear or RG? and Clam Door or Elite? To do so in a acceptable way, each feature might be assigned a specific letter, number or word. For instance:

187 = Short wing
F = Fixed gear
C = Clam door
173 = 173 wing
RG = RG
Elite = Elite

Under this scheme, the factory demonstrators are a Velocity 173RG Elite and a Velocity 187FC. I leave it to Velocity to officially name the Short Wing and Clam Door, but you get the idea. Each full model name would always contain all three elements. (By the way, 187 and 173 are the cruise speeds of the RG versions, in knots)

Using a standardized system such as this, we could all communicate more accurately. But more important, if KPCs targeted one of the six categories above, builders could quickly identify ones which are applicable to their specific aircraft.

Editor's Note Regarding Dave Black's input on Model Names

The current system for Velocity model identification is as follows:

Wing Type	**Fuselage**	**Gear**	**Model Name**
Standard	Standard	Fixed	Velocity
Standard	Elite	Fixed	Velocity Elite
Standard	Standard	Retractable	Velocity RG
Standard	Elite	Retractable	Velocity RG Elite
173	Standard	Fixed	Velocity 173
173	Elite	Fixed	Velocity 173 Elite
173	Standard	Retractable	Velocity 173 RG
173	Elite	Retractable	Velocity 173 RG Elite

Personally, I like the current system and have no problem identifying the KPCs. All the promotional brochures and builder materials (construction & flight manuals, etc.) are now geared to this system. If you do not like the above system, please let me or Duane know. Thanks, Rick

Oil Drop Tests

Has anyone done "Oil-Drop" tests on the Velocity? Essentially it's a poor-man's wind-tunnel. Place drops of dirty oil along the fuselage or wing where you wish to know how the air flows in that area. Then fly for 10 or 20 minutes. It produces drip-lines aligned with the relative wind, and easily identifies turbulent airflow which creates drag.

Oil-Drop tests should be invaluable in determining placement and orientation of air scoops, vents, and pitot tubes. It can even aid in fine-tuning your engine cowl, producing a speedier airplane. Trouble is, oil-drop testing can not be done until the plane is flying.

The Central States Newsletter often features photos showing the results of these tests on Long-Ezes. But I've never seen them done on a Velocity. If you have done or are willing to do such tests, please share photos of the results through *Velocity Views*.

Pennies for Balance

On page GGG-01/1-10 the manual suggests using pennies to balance measured weights of resin and hardener. This is a clever idea except for one flaw. Starting in 1983, US pennies have been made of aluminum, and it takes approximately 9 aluminum pennies to balance 7 coppers (1982 and earlier: 3.28 grams; 1983 and later: 2.57 grams). Thus if you are using the "penny balance" method, it is essential that all pennies be of the same flavor.

Throttle / Mixture cables

We selected Cablecraft throttle and mixture cables because of their excellent construction quality and extremely smooth operation. Cables include the micro-adjust feature, which allow you to push and pull for coarse adjustment, or twist for fine adjustment. I saw a demonstration at Sun-N-Fun where the cables were virtually tied in knots, but still operated smoothly. They are available off-the-shelf in lengths to six feet, special-order above that. Custom lengths are no problem, however, and we had ours in three weeks. The throttle is model 565-550-AG-146; mixture is 565-550-BG-146, where 146 is the distance in inches from the instrument panel to the throttle or mixture lever on the engine. Call Gary Wagner at Cablecraft: (206) 475-1080.

Antenna Solution

We continue to receive calls from builders with transmit/receive problems. This tends to confirm our suspicion that there are quite a few poor antennas installed in glass airplanes. This is a shame, as glass airplanes potentially provide a better environment for antennas than aluminum. It is so much easier to install good antennas from the start than to fix the problems later. We spent well over 200 hours testing solutions and then installing the fix. Our advice: Spend the $50 or $120 for Sportcraft or AAE antennas, or build Larry Coen's antenna (volume 5, page 14). All are fine antennas. But whatever you do, SWR test your antennas before you glass them permanently in place. In the next issue we'll show how we finally solved our antenna problems, and the results we obtained.

As always, you may phone me at (703)590-2221 or e-mail at asterisk@crosslink.net .

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Short Circuit

by Martin Hadley

Continued from page 13

that normally shows no voltage, or a lower voltage (hence *low side*), and a post that goes to the high side (the side of the circuit that has the higher voltage reading - *high side*). The signal diode typically has a cylindrical case of ceramic, plastic, or glass, with a 'ring' painted on one end. The end with the 'ring' goes to the *high side* and the other end goes to the *low side*. The L.E.D. typically has one lead coming out of it that is longer than the other. The longest lead goes to the *high side*, the shorter one to the *low side*.

All diodes have a voltage and current rating. Make sure you get the right diode for the job.

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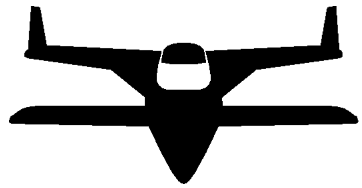

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