

# VELOCITY VIEWS

Volume 36

## Flying the North Atlantic

by Denis E Wood



After Crossing the North Atlantic in their Velocity 173RG, Denis Wood and Jack Berkin enjoy the moment at Blackpool England

IN NOVEMBER 2002 OUR VELOCITY WAS READY FOR ITS INSPECTION BY AN F.A.A INSPECTOR, THIS INVOLVED A DETAILED SCRUTINY OF THE AIRFRAME – ENGINE INSTALLATION and particularly all the flying control runs and throttle pitch and mixture controls.

After much form filling and questions relating to wt. and balance calculations permission was granted to fly our aeroplane. As is standard practice with experimental aircraft we had to fly a minimum of 40 hours within a radius of 50 n.miles from the home airfield, when this was successfully completed we were permitted to fly anywhere we wished.

The Velocity behaved beautifully, the hours mounted steadily – attention was paid to cooling the engine in the climb – at a high angle of attack after take off the airflow to the two naca scoops on the top of the fuselage are partially blanked off and various methods were tried to resolve the problem. The engine temperatures are now controlled well within the Lycoming recommended limits and after nearly 100 hours of test flying we were ready to fly the Atlantic.

We left Sebastian in Florida on 30th of June 2003 at lunchtime and flew non – stop to Wright Brothers

*Continued on the next page*

## In this issue

- Flying the Atlantic .....1**  
*Velocity builders Denis Wood & Jack Berkin cross the North Atlantic*
- Factory KPCs .....6**  
*Kit plans changes to keep your manual up-to-date*
- Builder Hints & Info .....6**  
*Tips from Scott Swing*
- Factory News .....7**  
*Newsletter survey results, XL-5, engine stuff, Delta Hawk diesel, static system calibration, Williamsburg, & more*
- Safety Corner .....11**  
*Accident & Incident Reports and Maintenance Service Difficulties*
- Maintenance Notes .....12**  
*RG System Tips*
- A&P Talk .....13**  
*It's amazing what s##t flies part 3*
- Electric Buzz .....15**  
*Avionics & electrical tips*
- CFI Notams .....16**  
*Engine limitations*
- Production News .....16**  
*MT prop limitations on Lycoming engines, rudder peddle assembly*
- Builder Forum .....18**  
*Tips, information & letters*
- Buy Sell or Trade .....19**

## Flying the Atlantic

*Continued from previous page*

Field in Dayton Ohio. The 830 n. mile flight took 5 hrs 10 mins, bad weather was encountered around Atlanta Georgia due to the remains of hurricane "Bill" but the excellent "flight following" radar service steered us around the worst of the weather, as we approached Dayton the weather improved and we landed in calm winds 10 miles south of the city centre.

The organization responsible for co-ordinating the celebrations concerned with the 100th anniversary of the Wright Brothers 1st flight on December the 17th 1903 asked us if we would demonstrate our Velocity over the stadium in the centre of town for 30 mins while 15000 people were gathering for the opening ceremony.

We took off from the Wright Brothers field and headed for the centre of town and proceeded to fly steep turns and figures of eight at 1000 ft above the stadium to show the Velocity concept – the canard front wing – the rear engine – all features which the Wrights incorporated in their original 1903 Flyer. The assembled company included the mayor of Dayton and members of the Wright family but the biggest applause was reserved for astronauts John Glenn and the first man on the moon Neil Armstrong.

Next morning the 4th of July President George Bush was due to arrive at 1100 hrs to join the celebrations and to open an additional new wing to the amazing Paterson Air Force Base museum, and as we had a long days flying ahead we departed Dayton at 0900hrs before the local airspace was closed to air traffic for security reasons.

We flew North East across the Northern tip of Pennsylvania close to the southern shores of Lake Erie – past the great Niagara Falls across New York State and Lake Ontario to Montreal ( Dorval Airport ) in Canada. Here we were met by two charming lady customs officers who stamped our passports and granted us permission to fly anywhere we



*Crossing the tundra in Northern Canada*

wished in Canada.

We re-fueled – filed our flight plan and took off still heading North East up the great St. Lawrence sea-way towards Sept Isles in Quebec. So far the weather had been kind – light winds and clear skies, but the forecast for Sept Isles was not good and any attempts at getting updates on the latest actuals proved in vain – apparently the computers were "down"

At last when contact was made with Sept Isles tower we were faced with a cloud base of 800 ft. As a V.O.R. letdown was our only option we attempted to stay beneath the weather over the sea. The MX 20 colour moving map on our superb U.P.S satellite navigation system clearly showed our position but after approximately 5 mins skimming the water at 200ft it became apparent that the area was covered in sea fog so we climbed back into the cloud over the land and were vectored for an approach to runway 09. It had been a long day but we were still on schedule.

The ground staff at Sept Isles were most helpful, as were all the Flight Briefing Offices we had visited throughout America. After a good nights rest dawn broke to sea fog over the bay and cloud on the surface over the land. On checking the weather on arrival at the airport the forecast was not good, we stayed until lunchtime hoping for an improvement but then decided to

call it a day as the forecast for the next day looked better. This gave us time to have another excellent sea food dinner at a local restaurant and as I recall quite a few beers !

Day 3 of our odyssey looked promising and we took off in sunshine with scattered cumulus clouds at 2500ft. The 290 n.mile flight to Goose Bay in Labrador crosses nothing but lakes and tundra, no roads – no houses or townships and certainly no airfields, but our faithful Lycoming engine continued to purr away, it seemed to favor the colder air mass after the high Florida temperatures.

We flew initially at 9000ft but as the cloud tops rose we decided to descend and remain in contact with the ground. At around the half way point we lost contact with all ground stations but a friendly Lady pilot offered to relay our position to Goose Bay and passed us the latest weather. This was not the best news in the world as the latest actual gave 8/8ths cloud cover at 500ft and 2 miles visibility in mist and rain.

It was decision time – we had adequate fuel reserves to return to Sept Isles where the weather was good or press on and meet our scheduled departure from Goose to Narsarsuaq in Greenland the next day. As I had practiced a number of I.L.S. approaches during our test flying in Florida I had confidence in our

*Continued on the next page*

## Flying the Atlantic

*Continued from previous page*

equipment coupled with my airline flying experience with British Airways where we had pioneered fog landings back in the 1970s a 500ft cloud base seemed O.K. Goose Bay radar vectored us to the I.L.S. on runway 08 and the last actual we received was a wind of 080/11kts and 8/8ths cloud at 400ft with the visibility remaining at 2 n. miles in mist and drizzle. Our faithful auto-pilot steered the vectors and on intercepting the glide path I lowered the undercarriage which settled our Velocity nicely on the 3 degree glide path with no change of power setting. The flashing runway strobe lights came into view at precisely 400ft and a happy landing was made. The good Lady pilot who had relayed our position en-route welcomed us on the radio with- Velocity N 173 RG nice to see you here.

It was mid-day and raining steadily so there was nothing to do but check in to the local hotel on the airport. Lunch was not catered for so we located the only bar nearby and consumed a number of beers until it was supper time. Supper involved ordering a pizza from outside as the hotel only provided breakfast.

When morning dawned it was still raining heavily with associated low cloud – our pick up was arranged for 0600hrs and by 0630hrs we had checked the weather and filed our I.F.R. flight plan for Narsarsuaq in Greenland. Then came the difficult task of donning our immersion suits by our aircraft in the pouring rain, we looked like the Michelin man in the well known advert! The suits are however a necessary precaution, as if ditching became a reality, without them life expectancy would be less than 10 minutes in the freezing temperatures of the North Atlantic.

Suitable clad we started the engine and taxied out to the holding point. Once airborne we entered cloud at 800ft and by 5000ft started to accumulate some ice. First the windscreen became opaque then ice



*GPS shows half way to Greenland... Nice panel guys!*

began to form on the leading edges of the canard and the wings. Thankfully we broke out around 6000ft between layers of cloud and elected to fly initially at 7000ft. We had lost 15kts of airspeed but gradually the ice began to break off, this was the good news, the bad news was that we were now experiencing a 40kt headwind.

At 150 n.miles from the coast we lost radio contact with Gander and as we were required to report our position every 5 degrees of longitude we requested any friendly airliner in the area to relay our position. First to answer was my old company a British Airways Speedbird 747, he also obtained the latest Greenland weather for us. We did not see much



*Getting closer to Greenland!*

of the Atlantic Ocean on this sector as we were flying between layers of cloud but when we did get a glimpse of the water we noted a number of icebergs dotted about. We were glad that we had battled to don our immersion suits!

Time passed rather slowly as we continued to experience 30kt headwinds, our true airspeed was 170kts leaned to 55% power we were using 10.2 U.S. gallons per hour. 50 miles from the coast of Greenland the weather started to improve and we could make out the huge ice cap leading down to numerous fiords which scattered the shore line. Our faithful satellite navigation system steered the way to a small island which marked the entry to the fiord which would lead us to the airfield. Blue West One as it was known during W.W.11 was a staging post for American military transport aircraft carrying supplies to Europe.

We entered the fiord in clear weather and began a slow descent, the runway was still 48 n.miles away and hidden from view by the high ground on either side of the fiord. As we passed the small town of Narsaq on the port side of the aircraft the ice-

*Continued on the next page*

## Flying the Atlantic

*Continued from previous page*

bergs became more numerous, the colour of the water surrounding the bergs was breathtaking, it was the purist pale blue imaginable.

Descending lower into the fiord below the level of the surrounding terrain we lost contact with the tower and the air became more turbulent, a foretaste of what was to come as the surface wind was increasing. We completed our descent and approach checks with the exception of the undercarriage which I would lower only when the runway came in sight. 42 miles from entering this wonderland the fiord splits into two, we take the left fork and within two minutes we see the runway away on our right, I select the undercarriage down. Normally this takes 12 seconds for the wheels to be down and locked as indicated by 2 green lights on the instrument panel. To our horror this time we had no green lights! Our thoughts raced, could the wheels have frozen up in the bays, we had never flown in sub zero temperatures before in the Velocity. it had to be something simple, by chance I looked down towards my feet and noticed that the dump valve lever which can be used in an emergency to lower the undercarriage had moved about an inch out of position, Without realizing it my feet now almost twice their normal size in my immersion suit, had moved the lever into a position where nothing worked!

I undid my shoulder straps to allow me to reach the offending lever, reset it and re selected the undercarriage. It was the longest 12 seconds of our lives but to our great relief 2 green lights appeared on the instrument panel, the wheels were down and locked. Had we have had to land on the aircrafts belly it would have been damaged beyond repair in such a remote area and 5 years of work would have been in vain. Without doubt that was the worst 2 minutes of my life.

The wind strength had increased to 18 gusting 26 kts, thankfully down the runway and a happy landing was



*Turning final approach into Narsarsuaq Greenland*

made without further incident. Because we had encountered headwinds all the way from Goose Bay the 680 n.miles had taken us 5hrs and 5minutes.

## GREENLAND

My friend Mogens Pind a helicopter pilot with Greenlandair was their to meet us on the tarmac, he helped me with the onward flight plan to Reykjavik in Iceland and obtained a comprehensive weather brief while Jack attended to the re-fueling and carried out the pre departure inspection.

In less than 2 hours we were on our way – the strong surface wind necessitated a take off uphill on runway 07, this is fairly unusual and required a steep turn to port at 100ft to avoid the high ground. We flew back down the fiord for 20 n.miles gaining height before turning left towards Christiansund, we elected to route South of the ice cap which was partially covered in cloud. The ride was choppy as we turned the corner as a result of the strong northerly winds coming off the ice cap, but at least we were in clear air and the view was stunning.

Once out over the ocean we set

course for Iceland, we were still experiencing a 30 kt headwind but the sea was visible most of the way. At 30 degrees West our colour moving map on the MX 20 became fully operational again, ( we lost all the topographical features for 1300 n.miles over the North Atlantic ) and we were now able to pan out and see the coast of Iceland which was a comforting sight.

As is so often the case Iceland was covered in cloud with the base around 1500ft in rain, Reykjavik radar vectored us to an ILS localiser approach for runway 13. It had been a long day, the 732 n.miles had taken us 5hrs 25 minutes due to headwinds. That day we had been airborne for a total time of 10hrs 30 minutes. It was good to relax in the hotel ( which is on the airport ) and exchange experiences with 2 other light aircraft crews.

Day 4 showed no improvement in the weather in Iceland but the forecast for Stornoway was good, so after completing the formalities we donned our immersion suits for the last leg of ocean flying. Careful attention was needed to report ones position at various points over the sea as

*Continued on the next page*

## Flying the Atlantic

*Continued from previous page*

specified in our flight plan. Fortunately our colour map was working perfectly so this did not present a problem.

As forecast the weather improved as we proceeded South and we were able to make out the Faroe Islands way out to the East. Gradually the Scottish Outer Hebrides came into view and contact was made with Stornoway tower. We cancelled our IFR flight plan and positioned visually for an approach to runway 19 in light winds, this is unusual for the Scottish Highlands – but we felt it was our turn for some decent weather.

We were met by a small group of press representatives and an elderly senior traffic officer who remembered me from 35 years ago when I spent 6 months flying the Highlands and Islands in a Vickers Viscount. At last we were able to take off our immersion suits for the last time – it was all downhill from here. We produced our passports, filled in a customs form and filed a flight plan for Blackpool, England.

The flight to Blackpool was made in good weather with wonderful views of the Lake District on the left and the coast of Northern Island away to the right. the 300 n.mile flight took 1hr 35 minutes and we positioned for a visual approach to runway 28. For the first time since Sept Isles in Quebec we had benefited from a tail wind.

It was all over but the shouting and we checked into a nearby hotel. We had covered 3600 n.miles in 5 days, (including one day we were grounded due weather ).

Next morning we were met on the tarmac, as we prepared to depart, by various people from the media and a full page article appeared in the Daily Mail the next day. Eventually we departed an hour late for our final leg to North Weald just 10 n.miles North East of London. This was our first VFR flight since leaving Montreal and it made a pleasant change flying at 1500 ft.

On arrival at North Weald (



*Den and Jack at Blackpool England*

which was a fighter base for both Hurricanes and Spitfires during W.W.2 ) we were once again met by the press – this time it was the London Television News. It seemed that they had a story. Perhaps it is unusual for 2 senior citizens to build an experimental aircraft and fly it home across the Atlantic. Anyway it was great to be home.

For the record, since leaving Sebastian in Florida we had flown a total of 4755 n.miles in 30 hours at an average ground speed of 158 kts ( this would have been close to 180 kts but for the headwinds we experienced across the North Atlantic ). We crossed 8 States and 3 Continents and used an average of 11 U.S. gallons an hour. During that time we used half a quart of oil. The 6 Cylinder I.O.540 Lycoming engine performed perfectly – a credit to Lycoming and the Don George Company who prepared the engine. A credit also to all the staff at Velocity who assisted in the engine installation and avionics package. The Velocity Company employs some very special people , from top to bottom, Jack and Neil join me in saying a big thank you to you all.

One final note – one day after arriving at North Weald we took our Velocity to the 3 day Popular Flying Association rally at Kemble, the

biggest annual flying event in Europe over 2000 visiting aircraft arrived. Our Velocity occupied pride of place in front of the Esso Exxon Mobile stand (see photos below). It was considered by many a star, and as an example of what can be achieved in the experimental home build department. Further shows are already planned for our Velocity.

God bless and safe flying to you all.

••••



*Den and Jack at England's largest rally the "PFA"*



# 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 159

Affects: All Long keel models (elite and XL)

Manual Section: 6.3.3

Date of Change: 9-01-03

When mounting the aileron control bracket, there are 4 bolts that hold it to the keel fin. For the rest of the bolts, the fiberglass keel fin must be opened up to let the bolt head protrude through. The bolt sizes listed are not long enough bolt through the fiberglass and the aluminum. I usually just use a small hole saw to open up the holes.

## KPC 160

Affects: All aircraft

Manual Section: 3.3.1

Date of Change: 9-01-03

Although all the lay-ups are listed, it is somewhat confusing. Section 3.3.4 mentions the extra 4 layers (2 top and 2 bottom) that get added at the end of the lay-up schedule. The labeling goes from A, B, C, D, to 1, 2, 3, and 4. So, we will incorporate these last lay-ups and clarify the description.

## KPC 161

Affects: All aircraft / Continental

Manual Section: 12.3.4

Date of Change: 9-01-03

Make sure you attach your plenum chamber to your cylinders front and back to keep the plenum from opening up under pressure. You can use a small amount of silicone or safety wire, to keep those close to the cylin-

ders. If you have a cooling problem anyway, you can extend the plenum to wrap around the cylinders a little further. We are trying to get the air to work harder.

## KPC 162

Affects: All Retract aircraft

Manual Section: 7.7.3

Date of Change: 9-01-03

The drawings are somewhat misleading as to where the upper attach bracket for the gear door is located. We will work on those drawings but the bracket goes after the bend on the section of gear door that covers the fuselage when retracted.

## KPC 163

Affects: All aircraft

Manual Section - end of chapter 6

Date of Change: 9-01-03

On the next to last page of the chapter there is a template of the canard airfoil. This template is used to set up your cut lines for cutting the fuselage away above the canard or what we call the "dog house". On the bottom of the template is a line labeled "Line up with leading edge of Canard Bulkhead". Move that line 3/8" forward on the template.

••••



*by Scott Swing*

## The craftsman

People ask me if I think they can build this aircraft. I used to say that anyone could build this aircraft and although that is still the case, it comes with more qualifications. These qualifications can be learned or they can be almost natural. Once in a great while, there are some who will never get it. I usually qualify

my response with a comment about how building an aircraft, especially a composite one, is more art than science. Someone who is handy and crafty would not have a problem. Someone who only figures thing out though reading and can't figure something out by looking at the parts or pictures or drawings or what ever, is going to have problems. If you always look for answers in the verbiage that you don't understand, you will never find it. You must look past that, at what's in front of you and say to yourself, what are we doing and how would I get there. The reason I say this is that we understand there are many ways to describe how to do something and maybe we didn't pick the best one so you need to work a little yourself to understand.

## Alternate engine

Engine installation on the Delta Hawk diesel? As far as we know, Delta Hawk is going to make an installation package for this engine. The problem is that the inverted engine will not have been tested with its new coolers and cooling system. We have the opportunity to do an installation here but it looks as though the test flying would not occur here. We will have to wait and see what develops.

## Service center update

We are very busy here at the service center with many projects in process. We are still working on the best way to structure things here. We remain very flexible but that is getting increasingly difficult because projects end up staying here for longer than we like. One thing that makes it difficult is that we have two fiberglass specialist, two engine and systems specialist, and two that float. All of us can do all of it so that works out okay but the speed at which things get done is compromised if the specialist is doing other than their specialty. In any case we continue to get aircraft out. Just

*Continued on the next page*

## Builder Hints & Info

*Continued from previous page*

recently Leo Luyt left and flew his aircraft back to Washington State. Leo did most of the work himself instead of having us help him get it done quickly. This was great for him since he quit his job to build the aircraft and had time to devote toward building it. He did a fine job, congratulations Leo! We have had several jobs come in that were partially finished and we were able to utilize Chad to finish the fast build portion before it moved over here. One recently came in with the bottom strakes on but without any of the door stuff done. This makes it harder for the doors to be installed. It is much easier to do the doors before the strakes are started. It is amazing to see the differences in quality of the projects that come in partially finished. Seldom do we see a project that is bad enough to require cutting things out and starting over. Most of it is just sloppy work. If you are in Florida for anything, it would be a good idea to come take a look as you are not going to see this many Velocitys in different stages of construction anywhere else.

On a different note, the service center location will be changing sometime during the first half of 2004. We have several options that we are looking at - moving our existing building, building a new one, or renting a location off airport and moving production so we can move to our other building. In any case we will be deciding what to do shortly.

••••

**Please  
Renew Today  
2004 Calendar Year  
Subscription to  
Velocity Views**

**A Renewal Discount is  
available. See the last page  
for details.**



*by Duane Swing*

## Velocity Views Survey

In the last Views, I ask for you to let me know how you felt about the Velocity Views. Should we continue as is or make changes? The results were somewhat mixed with over 90% saying just leave it alone. Two were only mildly concerned about the many pages devoted to the Williamsburg VA fly-in, while one was openly hostile about the number of pages in "every" issue devoted to what he called "Bull S---." He even reprinted his comments for the "Reflector". The reaction from those who commented about his "Reflector" posting were far more critical about him, and what he said, than about the Views. Several people indicate that we should have more pictures or drawings, especially when talking about a new way of doing things. Others have suggested more technical articles and more safety corner information, as this is extremely valuable to every Velocity builder/flyer. We will try harder to include more pictures and drawings and more technical stuff as time goes on. There was only a couple that thought the price too high for such a small publication. Remember, however, that those who may not subscribe and thus make no comment are probably the ones who think the price is an issue. Let me say here and now that we try very hard to keep the price as low as possible and to make everything that we consider important available to you.

We have had a few customers ask why we don't re-print builder tips as they are presented in the "Reflector?" We certainly would if they were made available as individual articles by each author to Rick Lavoie with permission to reprint. We do reserve the right to edit this information. If

someone out in the field finds he can change something on his airplane and make it work better, that is not a reason for us to suddenly endorse this change. We must test the things we endorse. There is just no other way for us to operate. The door gas strut change is just one example. One of our builders found a better way of doing it and after testing we agreed and it is now our standard.

Speaking of builder tips, I should point out that a lack of builder articles is one reason we devoted excess coverage to the Williamsburg fly-in. One of the major purposes of the Views was to provide space where our builders could share what they are doing. There was also the fact that those of us here have been extremely busy and have not had the time to devote to any lengthy articles. A safe guess is that we give up over \$1500 in billable revenue each issue by taking this time away from our customer's projects to write articles for the Views.

It is quite obvious that no matter what we do with the Views, we will not satisfy everyone. My major concern is about the 200 or so that have not renewed. I know from talking to some that it is the cost that has become the issue. For others it is just plain procrastination. If it were free, no one would care how much "fluff" that finds its way into the pages nor would anyone complain about the cost. Since we can't do it for free, or at least we don't believe we can, is there a less expensive way to do it without resorting to a computer only newsletter. The answer is a guarded yes. Remember, a large number of those who responded (over 50%) want a three-hole hard copy just as is now printed and could care less about those who don't. I have had a

*Continued on next page*

## Factory News

*Continued from previous page*

couple of our customers suggest ways that it could be done and I have passed these suggestions on to Rick Lavoie. Rick looked them over and found numerous reasons why it would be advisable not to pursue these avenues, at least not yet. One of the suggestions was to simply put everything on the web site in HTML or PDF format and charge a yearly fee to gain access with a password. This would eliminate the mailing cost and certainly the printing cost. One question remains; what would prevent one of our builders or even a non-builder from making this information available by sending it out on the "Reflector," or perhaps his own web site? Many would simply download this information and never have to pay anything for the work it would take to make it available. Why not then simply make it available on our web site for anyone to access at any time and charge nothing. We already spend the time writing the articles you read so why not? Builders who have no computer could drive over to the local library and get it off a computer. The cost to Velocity would be considerably higher as we would have to dedicate someone here to process the information, pay to have the information added to our web site, become an editor, along with assembling all the information into a format that makes sense. In addition, we would have to re-type our builder's contributions to keep some sort of continuity. Is there an issue with liability? Could we be sued because some of our builders could not access important information online? I know some of you computer guys out there will tell me all this is really easy using software and the internet, a process that is totally foreign to my old brain. Perhaps one of you who knows how easy it is will be willing to take this whole project on as a gift to all the rest of us. Until this happens, we will continue to look for ways it could be done and you will be the first to know if we can find a solution. Remember that any solution

needs to consider that we have a substantial number of builders that do not have or want the newsletter internet. They want a hard printed copy.

I have directed Rick Lavoie to send this issue of the Velocity Views to those builders that have allowed their subscription to lapse as a gift from Velocity Inc. Those of you who fit into this group, please carefully consider the merits of a subscription. Rick has made it easier by letting you subscribe for multiple future years at the discounted \$35 renewal rate, so forgetting to renew will be less of a problem. If in the future we change the way the newsletter is published (for example - we decide to publish it digitally on our website versus a hard printed copy), those that have pre-paid for future years will be protected (a refund or extension would be given).

Since this issue is the last for this year, a renewal for the 2004 year would be the perfect time. See the last page of any Velocity Views for renewal & subscription information. You can also renew online via the factory website "velocityaircraft.com" or at "lavoie-graphics.com" with Master Card, Visa, or PayPal.

### New Dash 5 XL RG

Last issue I discussed the problems we were having with both the FADEC controlled Continental 550 engine and the Blue Mountain EFIS system. Numerous changes were made in both systems including replacing the FADEC harness with what they called the "production" unit. Now, after over 40 hours of flying on the "new" system, I can say that, although not perfect, things are working quite well. Both the FADEC people and those from Blue Mountain want to come back and "tweak" the system. We are almost reluctant to allow anyone to touch something that is working as well as it is now. We are, however, going to change the spark towers one more time to better control the idle speed

and make the engine easier to start. Blue Mountain will be here next week to finalize the autopilot installation and make any adjustments necessary by flight-testing the system. Our pilots agree that it has taken some time to get use to not having any round instruments on the panel to look at. All the different forms of information are, for the most part, displayed in a digital format rather than a needle on a dial. The Blue Mountain contains so much more information that wasn't even possible before, that getting used to it has presented a challenge. All those who have flown in this airplane are just amazed at where aviation has come in just the last couple years.

As to the performance of the Dash 5, let me say that it has been outstanding. A recent trip from Sebastian to Arlington Washington and then back to Florida via Oshkosh resulted in an average fuel burn of just 13 gallons per hour. This computes to slightly less than 65% power. Average speeds have worked out to just under 200 knots. On one 1200 nm non-stop stretch, flying on oxygen at 15,500 feet most of the time, ground speed worked out to 220 knots with a true of almost 200 knots. By the time we were done with all the tweaking, I will guess a 75% cruise speed at 8,000 feet to be in the 210 knot range. When you consider this is over 20 knots faster than the latest Mooney Ovation2, using virtually the same engine, it is a fantastic achievement. The Mooney is a full 6" narrower than the Dash 5, has one less seat, has less leg room, especially in the rear seats and cost over three times as much. So what if you have to build the Velocity.

If the sale of the Dash 5 is any indication of what our customers want, then we have made the right airplane.

### Engine Stuff

Hardly a week goes by that someone will call about putting a turbine

*Continued on next page*



## Factory News

*Continued from previous page*

engine in our airplane. Most have never flown a turbine engine and are only asking the question due to the recent flood of kit aircraft that are offering a turbine engine as an option. Perhaps we are still living in the past for not looking seriously at such an option. There are certainly many good things that come from a turbine engine like lots of horsepower per pound of engine, the use of jet A fuel instead of 100 octanes, which is cheaper and more available in some countries and the idea that the turbine engine has a much higher reliability history than the piston engine. From our side of the coin we must consider two major drawbacks in the use of turbine power. The first is cost. We can't use the popular Walters engine due to the size. The best engine for our airplane would be the Allison 320 and 400 horsepower engine used in the Bell Jet Ranger. The problem here is that the engine, as it comes out of the Bell, does not have a reduction drive for the propeller. The engine itself is not all that expensive with an average price in the low \$20,000 range for a military overhauled 320. The problem is that the reduction drive normally used on this engine as it was used in a fixed wing aircraft, has very limited application. Prices, therefore, are more in the \$60,000 range and more. One of our builders modified a Lycoming turbine engine that came out of an agriculture aircraft and this installation looked good. The problem here is that this particular engine was not considered very reliable by the mechanics that maintained it for the ag operators. The second major factor is fuel consumption. The turbine engine will use approximately twice the fuel per horsepower than a piston engine. Where we now use about 15 gallons per hour at 75% on a 300 horse engine, the turbine would use about 30 gallons per hour for the same power. Part of the extra fuel needed is compensated by the lighter engine but the bottom line is that a turbine engine will cost you a lot more to operate than a piston engine.

It should be noted that there has only been a limited amount of research done on the reliability factor when comparing the turbine to the reciprocal engines. Lycoming and Robinson, using the Lycoming engine in the R22 helicopter, did the only study I am aware of. During a period of some five years, the total catastrophic failure rate of the Lycoming piston engine per operating hour was compared to the same failure rate of the Allison engine used in the Jet Ranger. As it turns out, the piston engine had a failure rate of half of that of the Allison. Is this possible? The Lycoming engine is operated at 80% power most of the time and the R22 helicopter is used primarily for training. On the other hand, experienced pilots who know how to treat their engines fly Jet Rangers. As it turns out, Robinson has an agreement with Lycoming that requires that the engines be replaced with new ones when they reach TBO. Therefore, the engine in the Robinson will never be a field overhauled, third generation engine. Is this the reason? I know of no actual studies that would compare failure rates of overhauled engines to new engines. Certainly the quality of overhaul would have a huge bearing on what we can expect out of an engine that has gone through this process. If you want to know the facts, it doesn't take much to qualify a worn out engine as a major overhaul. Put in a few new parts, retain worn parts that are within service limits and clean up the rest. Large overhaul shops like Don George or Mattituck or others, take the overhaul to the next level by replacing just about every wear item with a new part. In many cases a used part that measures to "new limit" tolerances will be used. Don't just assume that your Trade-A-Plane engine that is advertised as "O" SMOH (Since Major OverHaul) actually has gone through the same process as performed by a Mattituck as an example. Do your homework before you buy, not after.

Does this mean that Velocity will not

entertain the use of a turbine engine? Not at the present. We have too many piston projects in the wings to worry about a turbine. Perhaps when turbine engines can be made at a price similar to the piston engines and fuel consumption is equal, we will change our minds.

What about the availability of 100 low lead aviation fuel? Many of you have questioned the wisdom of spending \$40,000 or more for a new engine when there is the possibility the government will ban the use of leaded fuel altogether. This is certainly a possibility but don't think for a minute that the industry would do nothing about it. As a matter of fact, I had a conversation with a representative of Shell oil at Oshkosh and he said that Shell has already developed a 100 octane no lead aircraft fuel. He said it would be only slightly higher priced than the present leaded fuel. When ask why we haven't seen any on the market, he answered by stating the obvious, until Uncle Sam dictates the use of no lead, low lead will continue to be sold.

## Delta Hawk Diesel

Speaking of engines, did you know that a Velocity is now flying with a diesel engine? Doug Doers of Delta Hawk has gone where no one else has gone. He has actually built and flown his diesel powered airplane on Jet A fuel. Want to know more, look over their web site at [www.deltahawkengines.com](http://www.deltahawkengines.com) and see what he has done that Lycoming and Continental (complete with a \$9,000,000 grant from our government) could not do. Our hats are off to Doug, his wife and his crew for doing the impossible.

## Static System Calibration

I saw a simple way of determining the accuracy of your static system. Don't confuse this with the normal pressure check on the static system that is part of the IFR certification. We assume here that this has already

*Continued on next page*

## Factory News

*Continued from previous page*

been done and you just want to know if the static system as installed in the airplane will give you accurate readings when flying, not just on the ground. The information here is a condensed version of what was printed in Sport Aviation.

The process is quite simple. Set your altimeter at field elevation and go fly your airplane at 150 knots or so down the runway about 50 feet or so higher than the runway. This has to be an educated guess but should be based on a tree or some other reference that is of a known height. Now look at your altimeter and it should read field elevation plus 50 feet. If it does not, then you need to work on the static port. It would probably be a good idea to have someone else do the reading while you do the flying. Either glue a trip strip just in front of the static port opening (we use a 1/4" wide x 2" high piece of a tongue depressor), or one behind the static port. This thickness may have to be sanded thinner as necessary to achieve the best results. On the present position of the static port for the Velocity, we have always needed to position the trip strip in front of the hole(s) as close to the holes as you can get. As you can guess, this will also alter your indicated airspeed, but just as the altimeter, it should now be more accurate than before.

## Williamsburg Gathering

It is difficult to report on this fly-in due to the final date for submitting information to the Views was before the event and by the time you read this the event will be history. It is interesting to note, however, that the sign-up sheet shows a disappointing number of East Coast customers who we thought would attend. One of the reasons we chose Williamsburg was to satisfy our Eastern Seaboard builders/flyers by providing a location convenient to them. As of this writing, only five "Easterners" have committed to the event and two of them are the spon-

sors who live near Williamsburg. Perhaps the date being after school start-up was a factor. If not that, then what? I am really at a loss to explain why this and other events are so poorly attended. We will probably suspend any future fly-ins until we can put a handle on this.

## Have You Heard

Good news for the experimental aircraft bunch. The Bahamas Civil Aviation Department has just created a "special airworthiness certificate-experimental." This allows US and Canadian registered amateur-built aircraft to operate in the Bahamas without special permits. In the past, it required special permission and a signed authorization for you to fly your Velocity into the Bahamas. What you need now is a valid certificate of registration; compliance with your normal operating limitations; compliance with the standard Bahamas Civil Aviation Regulations and avoidance of large population centers except when directed by air traffic control or in an emergency.

## Congratulations For A Job Well Done

The cover story in this issue was written by Denis Wood, who along with the help of his partners completed their Velocity 173 RG at the Service Center. The airplane was built by Denis, Jack and Neil in Nice France and shipped by boat to Florida for final engine installation, wiring, interior, painting and instrument panel work. Their story goes far beyond the flight home. Only they could tell you of the frustration of building an experimental aircraft in a foreign country and the excess time and money required to complete such an undertaking. Denis was the first customer for the Renault diesel engine and spend many hours, days and even weeks working with them only to be disappointed in the final chapter by not being able to obtain one for installation in their Velocity. Since the airplane had already been built with the extra weight anticipated with the diesel, it

was a no brainer to install the Lycoming IO540 260 horsepower engine. Don George Engines of Orlando supplied Denis and partners with a great engine for such a venture.

All of us here at Velocity are extremely proud of what they have done and trust you enjoy reading about their trip.

This story makes a 30-minute flight to the Bahamas look like a walk in the park.

## I Did Nothing Wrong

We occasionally receive a phone call from one of our builders who insist he done everything right and still something bad happens. Nose wheel shimmy is a prime example. Probably no one out there will put as much time on a Velocity as we do and I can count the times on one hand where we have had a shimmy. It can almost always be traced to not adjusting the friction nut in a timely fashion. Remember, our trainer aircraft will see a landing every 10 minutes and I don't think it has ever had a shimmy even when used with untrained pilots. Our simple check is to pick up the nose and push the nose wheel with our foot. If we can just move it, it is about right. If it moves too easy, it needs adjusting, if you can't move it at all, it is too tight.

The melting of a main gear just above the axle is another example. No one wants to admit they might have inadvertently added pressure to the brakes while taxiing, or made all left turns while running around the airport. Why is it that almost never, will it happen to the same person the second time. Is his new gear leg just that much better, or has he learned not to "lean" on the brakes as much. In training a new Velocity pilot, I would place my toes on the back-side of the rudder pedals and feel them going down while in the early stages of taxi testing. This is a natural thing to do as your past flying was

*Continued on next page*



# Safety Corner

Accident & Incident Reports,  
Maintenance & Service Difficulties

## Franklin Mandatory Service Bulletin PZL-F/69/2002

Franklin has issued a mandatory service bulletin regarding excessive wear on the oil pump drive gear. This bulletin applies primarily to engines that have been overhauled and incorrect parts installed. It would also apply to engines that had field replaced camshafts or oil pump gears. If you are flying with an overhauled, or modified Franklin, you need to check this out

## Lycoming AD Notes

When you complete AS Form 8050-88 (affidavit of ownership) with the FAA there is a box that should be filled out showing your engine make, model and serial number. If this is left blank, the FAA will not be able to send you AD notes that might apply to your engine. We have one builder who came close to a total engine failure due to the oil pump

impeller AD note (AD 96-09-10) that was issued several months ago. In this case, the engine started losing oil pressure and landed with almost nothing showing on the gauge. I got a call from the owner complaining about some idiot mechanic who had installed an aluminum gear in the oil pump drive. As it turns out this is the gear specified by Lycoming and was later found to be subject to excessive wear and the AD note was issued to remove all aluminum impellers from the field. For some reason, this builder did not receive the AD note and thus found himself in a very dangerous situation. We have a "O" SMOH engine here ready for installation in a Velocity that also has an AD note (AD 2002-36-06) that applies to all overhauled IO540 engines regarding a cam gear retention bolt. The overhaul agent had no way of knowing if the bolt installed at overhaul was one that must be replaced due to an AD note that was issued after the overhaul was completed. In this case, we must remove

the rear case and inspect this bolt before we can install the engine in his airplane. It would not be a bad idea to visit your local A & P and asks for a list of AD notes on your particular engine. You might be surprised how long the list is.

Some of you really astute home-builders will remind me that AD notes do not have to be complied with, if the engine is considered an experimental engine by the airframe builder. Removing the data plate from the engine will automatically place this engine in the experimental category. This is true but why would anyone want to ignore an AD note just because he can?

## Safety Caution Inflight Door Opening

Rodney Brim had an emergency not long ago that warrants your committing to memory your reaction, as you don't have time to consult the owner's manual in such an event. It has to do with a door opening soon after takeoff. Rodney has an XL RG with the old style door struts (before we actually had a better idea) and had a door open just as he was retracting the gear. The door stayed on the airplane and acted like a huge rudder causing difficult flight control variations.

It is obvious we cannot duplicate in testing what Rodney found out in actual practice but it is important we learn from his experience and be prepared just in case.

The most important first step is to maintain a level attitude. DON'T turn away from the open door. This will cause a rapid roll that can only be stopped by complete opposite aileron, complete opposite rudder and down elevator. Be prepared to "dance" the rudder pedals if necessary to keep the airplane level. Make shallow turns INTO the open door if possible.

Rodney also suggested we add "fences" to the inboard side of the aileron cutout. We will be trying this to see how much stability this will add. Rodney also indicated a reduction in take-off using the fences.

## Factory News

*Continued from previous page*

done with pedals that all the pressure in the world would not move them until one foot added more pressure than the other. We have had customers call very upset and claim we made his gear legs while it was raining outside and the trapped moisture caused expansion when they got the least bit hot. We have never had to replace a gear leg in one of our airplanes due to heat melting. Even N81VA had the original gear when we retired this airplane after 17 flying years and over 2000 hours and most of those hours were as a trainer.

Let me say here that we have had enough people who have had problems with the nose and main gear that a change is needed. We are

going to try some different shimmy dampening methods for the nose gear and work on ways of preventing the heat damage to the main gear. We have already made three-sided aluminum "booties" that slip over the main gear and have totally eliminated the heat related problem. Could these be cast in aluminum to reduce the cost we have in machining them from a billet? It is something we will be looking into. Could a hardened steel rod be installed between the axle bolts and extending up to just above the brake disk? Could we make two steel plates that sandwich the lower portion of the gear legs to better dissipate the heat? These and other ideas will be tossed about and a trial will be made to see if any of them works.

•••

# Maintenance Notes

by Michael J. Snyder  
Private Pilot, A&P, IA



## RG System Hints

I would like to offer some hints on installation and operation of your RG system. The nose gear casting that you receive in your kit has some sharp edges. I would suggest you sand and polish all the edges to provide a 1/8" radius to eliminate any stress risers in the casting. Stress risers are microscopic flaws and cracks that are normally found on all rough castings. So by providing this 1/8" radius you eliminate any microscopic cracks on your fork. This operation can be done in about 1/2 to 1 hour's time. I would also recommend this to those who have flying airplanes. If you can devote more time you could sand out scratches and polish the entire fork for the "show-plane" look.

When finalizing your mechanical installation of your retract system pay careful attention to the lengths of the bolts you use. For example, the bolts used for attaching the over-center linkage to the gear leg. Make sure that the rotating parts are bearing on the shank of the bolt, not the threaded section. Refer to publication AC43.13-1B chapter 7 which all of you should have a copy of. In final assembly, lubricate all moving parts with engine oil. I use engine oil because it penetrates into

parts where needed and has more body than something like WD-40. After lubrication, have an assistant operate the gear and inspect to see that moving part, in transition, do not foul or rub any hoses, parts, etc.

Throughout the complete travel of the gear. Also check to see that free fall cycle operates smoothly and locks over center without any assistance.

•••

## Flight Check! Be Safe!

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

Flight training is available from:

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

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

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

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

## Factory Authorized Insurance Inspectors

Please make note of these individuals:

Name - Location Home Phone / Work Phone

Brian Gallagher - Murrieta CA 909-461-9990 / 909-696-0160

Barry Gibbons - Rosamond CA 661-273-7398

Don Pearsall - Owasso OK 918-272-5551 / 918-474-2610

Mike Pollock - Sachse TX 972-530-8400 / 972-728-2725

Glenn Babcock - Tampa FL 813-677-2543 / 813-604-2637

Wes Rose - Grand Rapids MI 616-772-7235 / 616-530-0255

Jean Prudhomme - Boca Raton FL 954-559-4988

Mack Murphree - Dayton NV 775-246-9364

Gary Stull - Tampa FL 813-949-1297

(Gary is an airline employee and can travel inexpensively)

Mike Watson - Mt. Vernon NY, 914-699-3915 / 201-476-8231

## A&P Talk

by Brendan O'Riordan, CFII, A&P



We have gotten such a positive response back from the "It's amazing what #\$\$%& flies" articles that I decided to show some of the things that we have seen on builders airplanes that we really liked.

The picture below shows the pilot side of an XLRG that already has its interior installed. You will notice the RG dump valve is located on this side of the keel as well as the fuel shutoff valve control. This allows easy access to both for the pilot but not the other passengers. Both the fuel shut off control and the dump valve are installed inside recessed areas so that it is harder to inadvertently hit them. The recess for the dump is a 90 degree pie wedge shape to allow for full travel of the dump valve. The plumbing used for this set up is the same as shown in the plans.



*Continued on the next page*



This is a picture of what one of our builders did for his wing bolt hole covers. First he started off with a circular piece of thin aluminum, about 2-1/2" in diameter for the top and about 4 inches for the bottom. He then recessed the filler around his wing bolt holes using his cutout as a template. The cutout had a 3/16" hole drilled in it that was countersunk. Next he made a small 3/4" wide strap from aluminum about 1/16" thick, drilled a 3/16" hole and mounted a 10-32 nut plate on it. The whole assembly is held together with a 10-32 stainless screw. Now the cover can be slid in the hole and with the screw tightened up you get a flush good looking cover that is easy and quick to remove.



I had a few pictures of things you shouldn't do and thought I should toss those in as well. This is a picture of a landing light installation. It is a wonder how this installation hadn't popped the circuit breaker. The hold down springs are touching both the positive and ground side of the bulb. It isn't a bad idea to insulate the hold down springs with a piece of tubing.

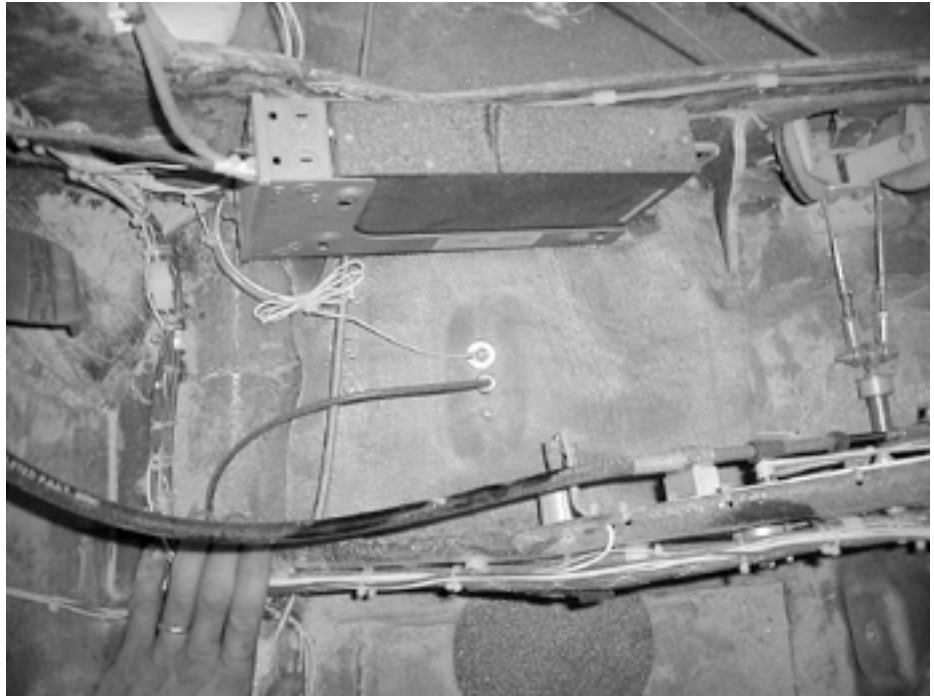
## A&P Talk

*Continued from previous page*

The picture to the right, is a little hard to make out. It is a picture of an antenna ground plane. The ground plane is made of household screen material that was just laid down in the back of the airplane and attached to the antenna. It probably works ok for now but a solidly mounted ground plane made out of a more durable piece of aluminum is probably a better way to go.

The picture below is of a nose compartment in an RG. Right above the piece of SCAT tubing is a nozzle for a fire retardant system. We have seen similar retardant systems that have been installed in airplanes that have nozzles installed behind the panel and also in the main gear compartment. The nozzle in this picture is hooked up to a Halon 1301 bottle. Halon is one of the preferred extinguishing agents used in cabin fires because it is not harmful to humans in concentrations up to 203 parts per volume. If you decide to install one of these systems remember that halon is heavier than air so make sure that the placement of the nozzles will not dump so much retardant into the cabin as to debilitate the pilot and passengers. I don't think this type of installation anywhere but in the engine compartment is a good idea in a Velocity.

••••



The picture below shows an improper installation of the braided hose ends. As you can see, the brass ferrell that is inserted around the Teflon inner sleeve of the hose has cut a chunk out of the Teflon. This is a result of the ferrell not being properly "seated" during installation. You can expect a sure leaker when subjected to hot 80 lb. oil pressure. When installing the brass ferrell it is important that you be able to see the entire inside of the Teflon tubing when looking down through the ferrell.



Visit  
the Factory's  
Official Web Site:  
**[velocityaircraft.com](http://velocityaircraft.com)**

The picture below shows a proper installation.



One idea I didn't have a picture of has to do with keel access panels. Some of our builders have installed marine access covers that screw in place. They are quick and easy to install, look good and remove quickly. These access covers come in a variety of sizes and colors from marine shops.

**Renew Your 2004 Year  
Subscription Today!**

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

# Electric Buzz...

by Wayne Lanza



In this issue of the 'Views' I'd like to hit on a sensitive subject regarding the real cost of electrical and avionics equipment. For some this will be a sanity check, others might be offended. We quote everything from radios to complete instrument panels every day. Most are taken with the expense of what they really wanted and are faced with the reality of what they can really afford. An absolute rock bottom panel with minimum VFR and the typical avionics will be in the low \$Teens. You can "Candy Store" your panel and easily get close to \$100K – why? A recent builder decided to be deliberate with his panel and for about \$40K had it stuffed with complete IFR instrumentation, full UPS stack, CD player, Stec30, etc... Not too bad considering that I have seen others that have exceeded \$50K for the same functions, they just wanted to spend more – I guess.

My point is this, we are in the business of selling you stuff and hey, it's your money spend all you want! On the other hand, we need to honestly stress the cost issues as part of the service. All too often we hear the same comments like "My friends tell me I need one of these" or "I saw a panel with this stuff in it" or what ever...

Who is paying for your equipment and how are you going to use it? Do you need a comprehensive IFR panel, how often do you fly IFR and in what conditions? The truth is that 85% of our flying is in VFR conditions; most of the IFR is for getting on top or down. Flying in 0-0, between the mountain peaks during a blizzard, at night is not a real condition. If you find yourself in this predicament, God help you! If this is your vision of some day flying IFR, go buy a Nintendo it's cheaper and a lot safer! Enough of that, (thanks for listening – I tend to ramble...).

Now the good part, how to save money. First of all don't buy stuff that you don't need. Set your budget and the functions you need, then try to make ends meet – on paper. Don't buy anything until late in your project, prices, features and technology change so fast that you will be kicking yourself down the road.

Remember that this is a light aircraft, studying those pictures of fighter jet panels is a nice hobby but not applicable when designing your Velocity panel. Don't buy used avionics unless they are of newer vintage and still being supported. An older KX155 might be a good deal, but you will get an even better deal on a full set of Terras. Gimme the King stuff any day, there's a reason for the Terras being so cheap... We have had excellent performance from the UPS-AT equipment, consider this line if you are buying new. It's the latest technology, low power and UPS is really good to deal with. We hope this stays the same now that Garmin has bought the AT line from UPS.

If you are leaning towards an EFIS as an instrumentation solution, I'd like to suggest that you try to fly the various systems before you plunk a deposit on one. There are many out there now and all have their claims, wait and see... The EFIS systems are either competitive with the classic mechanical instruments or are actually less money. On the other hand the certified EFIS equipment will probably cost as much as a new

engine – they are very pricey!

A well-endowed instrument panel is hard to resist, it is the jewel in the crown, the icing on the cake, and it makes for a most potent first impression. Not like an ugly old engine – whoops, engine? I had a builder rationalize to me that he had justified his \$55K panel because he had saved a lot of money by buying a good used engine (with no log books). He was assured that this was a perfect running engine; the log-books were simply lost. His point was this – Get the panel finished, interior done and rebuild the engine later, this is hard to argue with. Modifying an existing panel, especially the wiring is an expensive nightmare, while pulling an engine is relatively easy. The caveat here is that if you loose something on the panel the airplane still flies, the engine thing is much less forgiving.

A better but less impressive approach would be to spend the money on the engine and build an affordable panel that is configured for expansion. John Ward wanted to install an MX20 in his EliteRG but it was not in his immediate budget. I called the radio shop to discuss our options and was pleasantly surprised – the cost of the MX20 tray and pre wiring was only about \$250! Six months later John purchased his MX20, slid it into the tray and viola!

Another expensive mistake is to have your panel built by one of the high-end avionics shops. You will be quoted the same hourly rates but it seems to take them a lot more hours to do the job. Velocity has built complete panels and saved the customer anywhere from 25% - 50% for the same job.

We have our panels NC cut, professionally wired, tested and warranted, along with very nice paint and artwork. If you decide to wire your own, look into the Approach Systems wiring hub, it is money well spent.

*Continued on the next page*

## Electric Buzz

*Continued from previous page*

Other useful advice is to not buy imported instruments; to be kind is to call them junk. If you will be installing an autopilot, consider the TruTrak line first – great solid-state systems at great prices. Contact Velocity for a quote before you commit; talk with Scott Baker for equipment recommendations and pricing. I do most of the panel and artwork design plus support wiring. The NC work is done by Aircraft Shapes, they cut our parts using either a numerically controlled router or 85,000 PSI water jet, complex parts are done on a 5-axis NC milling center. Our complete avionics wiring and testing is done by Treasure Coast Avionics; they are Velocity specialists who understand how to properly wire the aircraft!

Fly Safe & hope to see you at the next open house, Wayne Lanza

....

## Production News

*by Scott Baker*



### MTV-12 and MTV-18 RPM Limitations on certain Lycoming engines

This note applies to Lycoming 0-360 and IO-360 engines without a counterweighted crankshaft. Mt-Propeller recommends against continuous operation of these propellers on non-counterweighted crankshaft Lycoming engines in the following rpm ranges:

Between 2250-2550 rpm and Continuous operation above 2650 rpm (Note: It is okay to operate at 2700 rpm during takeoff). Mt-Propeller understands that these limitations take away a lot of the practical value of a constant speed propeller – and they are working to find a way to narrow or eliminate these restrictions.

Operators of MTV-12 and MTV-18 propellers are encouraged to avoid continuous flight operations in the restrictive rpm ranges – and to visually inspect the blades at the hub to determine if excessive wear is present. An indicator of excess wear is grease marks. Mt-Propellers says that the harsh harmonics that are present in the non-counterweighted Lycoming engines will not lead to catastrophic blade failure – but rather, accelerated wear that (when wear is excessive) can easily be identified as a problem during a thorough preflight inspection.

Operators of MTV-12 and MTV-

*Continued on the next page*

## CFI Notams

*by Nathan Rigaud, CFII*



### Engine Limitations

To the right are the list of engine limitations for the popular engines we use in the Velocity. You will want to remember these numbers so your engine will last for years to come.

#### Continental IO-550-N:

Rated Maximum Takeoff Horsepower	310HP
Rated Maximum Continuous Horsepower	310HP
Rated Crank RPM	2700 rpm
Fuel	100LL
Fuel Flow	10 - 18 gph
Oil Grade	Multi Viscosity
Oil Sump Capacity	8 qts
Oil Pressure psi	
Normal Operation	30 - 60 psi
Minium	10 psi
Maximum	100 psi
Oil Temperature F	
Maximum	240 degrees
Takeoff Minimum	75 degrees
Cruise range	170 - 200 degrees
Cylinder Head Temperature F	
Maximum	460 degrees
Max. Operational temp.	420 degrees
Fuel Consumption gph	
75% cruise rich	17 gph
75% cruise lean	15 gph
65% cruise lean	13 gph



## Production News

*Continued from previous page*

18 propellers on non-counterweighted crankshaft engines are encouraged to consider the installation of a counterweighted crankshaft during engine overhaul or major service of the engine.

## Rudder Pedal/Toe Brake Assembly

Velocity recently designed an optional interconnected rudder pedal assembly with toe brakes – and having tested the system in the Velocity XL-RG-5 demonstrator – we have put the assembly into production with the intentions of making it available as an option by October

1st. Velocity, Inc. plans to keep the independent rudder pedal assembly as standard equipment for the time being.

The new rudder pedal assembly has interconnected pedals – the rudders themselves continue to operate independently (outward deflection only). The rudder pedal torque tube assembly is positioned in the same location as the standard rudder pedal assembly. There are major differences to the master brake cylinder equipment and placement. The new assembly features 4-master brake cylinders, which are mounted to the toe-brake pedals. The toe brakes are functional from both the pilot and copilot position. The system uses a small brake reservoir, which is mounted in the nose compartment area of the aircraft. Hydraulic fluid, rather than DOT5 fluid is used in the braking system. The “Nissan” NAPA brand master cylinders are discarded. Push-pull rods and a lever – part of the interconnection system – are mounted where the NAPA cylinders were once positioned. The interconnected rudder pedal and toe brake assembly simplifies flight transition into the Velocity. Full rudder deflection is possible during touchdown, rollout, and during the takeoff run without fear of dragging a brake.

The assembly is available as a factory option on new aircraft and also as a field retrofit. Installation of the new assembly takes less than one day. The cost is \$1000 (retrofit customers must return the standard rudder pedal assembly to the factory via prepaid freight). The NAPA cylinders are not returned.

We anticipate the demand for the interconnected rudder pedal assembly will “sell out” the first production run. Those who are interested in purchasing the new are asked to call Natalie (Velocity parts) at 772-589-1860.

••••

### Lycoming IO-360:

Rated Horsepower	200HP
Rated Crank RPM	2700 rpm
Fuel	100LL
Fuel Flow	8-18 gph
Oil Grade	30 to 50W or multi
Oil Pressure psi	
Normal Operation	55 to 95 psi
Normal Idle	25 psi
Maximum Allowable	115 psi
Oil Temperature, Fahrenheit	
Maximum Allowable	245 degrees
Takeoff Minimum	100 degrees
Cruise	160-225 degrees
Cylinder Head Temperature	
Normal Operation	150-400 degrees
Maximum	475 degrees
Fuel Consumption gph	
75% cruise rich	12.3 gph
75% cruise lean	10.5 gph
65% cruise lean	9.5 gph

### Lycoming IO-540:

Rated Maximum Takeoff Horsepower	260hp
Rated Crank RPM	2700 rpm
Fuel	100LL
Fuel Flow	8-24 gph
Oil Grade	30-50W or multi
Oil Pressure psi	
Normal Operation	60-90 psi
Normal Idle	25 psi
Maximum Allowable	100 psi
Oil Temperature, Fahrenheit	
Maximum Allowable	245 degrees
Takeoff Minimum	100 degrees
Cruise	160-225 degrees
Cylinder Head Temperature	
Normal Operation	150-435 degrees
Maximum	475 degrees
Fuel Consumption gph	
75% cruise rich	16.3 gph
75% cruise lean	14.5 gph
65% cruise lean	13.0 gph

# 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 Tom Wright, Advanced Composite Technologies, Somerset, PA.*

Here is an easy way of doing multiple bid layups. Determine by measuring the quantity needed in the particular area. Measure it in square feet. Lay 2 mil plastic down on table. Lay up your ply of bids right on top of the plastic. After all your layers of bid are wet out, lay another layer of plastic on top of your glass giving it a sandwich type appearance. Be sure to squeegee all extra epoxy and air out at this time. You can now cut bid tapes to any width at 45 degrees. The plastic holds it all together when handling. To apply, just remove the bottom ply of plastic like you would on self adhesive tape. Stick the side that you just removed the plastic from to a pre wet surface. Once your glass is stippled in place, you can remove the top ply of glass and peel ply. Be sure that when you are pulling the plastic off, you pull length wise. Peel ply should always be a little wider than the actual glass layup to prevent any sharpies along the edge of your glass-work.

Here is an easy way of doing a flox impression. When you do a flox impression, to keep the flox from sticking to the underside of the wing skin, you can do the following. Prepare your ribs to accept flox. We put a slight groove in the foam of the ribs next to the glass to be sure that it sticks well to the top of your ribs. Be sure that it is roughened. Mix your flox up to a thicker consistency. Apply flox to the top of all ribs being sure that it stands up. A trick that we use in our shop is to apply flox with a stick and wipe square with the top of your ribs. Next, Put some mixed flox into a sandwich bag. Cut a small amount out of the bottom corner of the bag and squeeze onto the top of the rib such as you would when deco-

rating a cake. Lay strips of peel ply over your flox. Next, lay strips of plastic over your peel ply. This prevents any flox from sticking to your top strake during the flox impression process. Place your top strake on in position now. Be sure that you do not set it down on top of your ribs until you have it close to position. This may take two people. Weigh in position and let cure at least 24 hours at 70 degrees. If you want to pretty up the edges of the flox once you take the top strake back off after cure, a file works great. The reason for a flox impression serves to fill the void between the top of the ribs to the underside of the top strake. This is especially important on all containing ribs. The peel ply serves two purposes. The first is to prevent sanding. The second, it allows easy visuality of where the flox hits the underside of the top strake, and where more is needed. You can even go one step further by flogging a prelam piece of glass onto the flox to built up a "T" which will allow a wider bonding area during permanent installation. We have made it a habit of doing this on the rib that runs horizontal with the spar. Once it the prelam is on, we reach under the under side and run two ply of glass up. This helps prevent a future leak back in the spar area. Take it from people who have had to deal with this problem. It is better to take a little time to prevent this possibility, than have to fix it later. Be sure that you remove all peel ply prior to final installation of top strake. To determine the height of flox that you will need, you can insert wire pins or finish nails into the foam of the ribs before beginning your flox impression. Set your top strake on and weigh down. Remove the top strake. You will now be able to see how much flox you will need. If, once you pressure test your tanks, you suspect

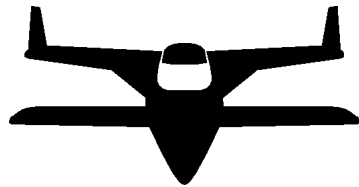
a leak, here is something you can do to find the exact spot. Sprinkle micro powder to the suspected location. Apply 1000 feet of pressure to your tanks and watch for the micro to spray out at the leaking area.

We use orange juice jugs cut off half way up, leaving the handle on to mix large amounts of epoxy or filler. You can also save your used laundry detergent containers. Just be sure to wash them out very well and let dry inside really well before use. The plastic strong and allows for easy mixing with a paint stir stick. You can use any food container as a mixing container. Various sizes for various applications. Just be sure that it has a smooth bottom for thorough mixing.

Here are some tips on making fiberglass tubes for airflow applications such as heater, carb, air ram, etc.. Laminate 3 - 4 ply of bid over either pvc pipe or aluminum tube. Be sure to either apply wax, pva release or duck tape to your tube first. We have already used cardboard tubes covered with duck tape. Lay your glass 180 degrees around the tube three times the length that you need. Let this cure. Cut in half down the length. Remove your tube. Place your glass back together and glass your seems. If you go with the cardboard idea, you can just soak the cardboard and glass in water after the glass has cured for about an hour. The cardboard falls apart leaving you a fiberglass tube. all methods listed in this corner in not the works of just one person. It is several people who have built these airplanes enough times to have the ability to see where an idea may make something easier, use it, and share it these ideas among each other. And now we want to share them with you, the average home-builder. We hope that these ideas and hints help your building process a little easier.

## Buy Sell or Trade

Velocity parts, tools, kits, flying  
Velocities: **Free** and exclusive  
to *Velocity Views* Subscribers.



Place **your ad** here... **FREE** to all current subscribers. Individuals selling parts, tools, kits, & flying Velocities. Your ad will run once per submission. See last page for deadlines. Please do not type text in all caps!

### Want to Buy 173 / LW Wings

Wanted pair of Velocity 173 wings.  
Contact Mike (702) 349-4382 or email at:  
mkhbear@lvcm.com

### For Sale New MT Prop

NEW MT 3-BLADE PROP for sale cheap!! Never used! Model: MTV-9-B/LD 178-102.  
Will sell for best offer and I'll throw in the spinner, bulkhead and bolts. Don't miss this deal!  
CO/(303) 475-2995  
Email:  
tmartino@troubleshooter.com

### Please Renew your 2004 Calendar Year Subscription Now

Send in your check today.  
A Renewal **Discount** is available. See the last page for details.

## Factory Information



### Velocity Inc. Factory & Home Office:

200 W Airport Rd  
Sebastian FL 32958 USA  
Ph: 772-589-1860  
Builders Hot Line:  
772-589-0309  
Fax: 772-589-1893

### Builders HOT LINE

Please remember that on weekends and after hours, we do not answer the 561-589-1860 phone number. Our unlisted builders hot line is 561-589-0309 and, if we are here, this is the only number we will answer.

Internet web site:  
<http://velocityaircraft.com>

### e-mail addresses:

DuaneS@velocityaircraft.com  
ScottS@velocityaircraft.com  
Bonnies@velocityaircraft.com  
ScottB@velocityaircraft.com  
BrendanO@velocityaircraft.com

### Builder assistance:

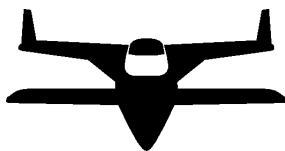
[support@velocityaircraft.com](mailto:support@velocityaircraft.com)

### Other e-mail addresses:

[kitsales@velocityaircraft.com](mailto:kitsales@velocityaircraft.com)  
[accounting@velocityaircraft.com](mailto:accounting@velocityaircraft.com)  
[parts@velocityaircraft.com](mailto:parts@velocityaircraft.com)

### Velocity Service Center Inc.:

[flighttraining@velocityaircraft.com](mailto:flighttraining@velocityaircraft.com)  
[demos@velocityaircraft.com](mailto:demos@velocityaircraft.com)  
[maintenance@velocityaircraft.com](mailto:maintenance@velocityaircraft.com)



## November 8, 2003 Factory Open House Workshop Schedule

**Saturday November 8, 2003** - Factory's quarterly open house in Sebastian Florida (X26)

9:00am	Coffee and donuts
10:00am	Workshop: TBA
Noon	Lunch
1:00pm	Workshop: Building Q&A
3:00pm	Demo rides in the XL

Please be sure to call the factory and RSVP! Friday arrivals can book a room at the Key West Inn at Captain Hiram's here in Sebastian. Call 800-833-0555 and mention Velocity to get a corporate rate. When you call the factory to RSVP, let us know when you plan on arriving so we can make arrangements for transportation, etc.

Check [velocityaircraft.com](http://velocityaircraft.com) for up-to-date details

### 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. Do not type your text in all caps. Please send us **photos** and drawings too!

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

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

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

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

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

*Velocity Views*  
is published **Quarterly** by:  
**Lavoie Graphics**  
26 Marshview Dr  
St. Augustine, FL 32080-5873  
Rick Lavoie, Editor  
Richard@lavoiegraphics.com

*Velocity Views* newsletter is published by Rick Lavoie / Lavoie Graphics as an agent for Velocity Inc. (the factory). Prior to printing, the factory reviews each volume published for accuracy.

*Velocity Views* newsletter material has been supplied voluntarily from the Velocity Factory, Builders, & Vendors. This material is printed for informational purposes only. Opinions expressed are those of the author. Lavoie Graphics & Rick Lavoie do not endorse and are not liable for the contents of such material. Use of this material is at your own risk. Any variance from the factory plans is a high risk endeavor. Any contemplated modifications should be reviewed and approved by Velocity Inc.

*Velocity Views* is a Trademark of Lavoie Graphics  
**Copyright** © 1994 - 2003 Lavoie Graphics All Rights Reserved.

No part may be reproduced or translated, stored in a database or retrieval system, or transmitted in any form by electronic, mechanical, photocopying, recording, or other means, except as expressly permitted by the publisher.

## Subscriptions

- **2004 Calendar Year Subscription** (Volumes 37-40): The annual cost is \$45.00 for mailing addresses within the United States. For all other mailing addresses, the cost is \$50.00 in US funds (covers Air Mail & special handling).

All subscriptions are sold on a calendar year basis. New subscribers joining mid year will be provided with back issues for that calendar year.

- **Back Issues** 1995 thru 2003 are available for sale at \$35.00 per calendar year in US funds.

Specify the year(s) you want when ordering back issues.

- You can also renew online at **lavoiegraphics.com** and pay with PayPal, Master Card, or Visa

- fax: 904-461-3146

- **Renewal Discount**

\$35.00 for renewals only if you mail a check to Rick Lavoie **by Dec 15th** and **pay by check** in US funds. Otherwise, you will be charged at the normal subscription rates of \$45 or \$50 (see above). Also, you can pre-pay as many future years as you choose at the \$35 rate.



FIRST CLASS

Rick Lavoie, Newsletter Editor  
26 Marshview Dr  
St. Augustine FL USA 32080-5873

FORWARD & ADDRESS SERVICE REQUESTED

