

# Hangar Talk

## The “Lightning” Newsletter

Volume 4, Number 5  
May, 2011



Wrote Nick Otterback to the editor in a recent email: *“Attached is a photo of me [on the left] handing over the keys to Mr Mike Le Trello from the St Louis area. N713ML is his shiny new LS-1, a twin to our Demo plane [see last page of this issue]. Mike may be offering some light sport training in that area in his LS-1. Also Mike is a classic aircraft restoration expert, with several WW2 L birds to his credit.*”

## Contents

Introduction, p. 2  
Geoff Eather, Building at Shelbyville (March 2011), p. 2  
Nick Otterback, Airflow Splitter for the Lightning, p. 7  
Carl Beatrice, Flight to Mount Washington, p. 9  
Company Contacts and Dealers, p. 12  
Photo of LS-1 “twins,” p.

## Introduction

*This issue features reports on Lightning building and flying, and the constructive spirit of experimental aviation in action.*

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## Building at Shelbyville (March 2011)

Geoff Eather  
Kit 127, Australia

Some might question my sanity for deciding to build at Shelbyville. You see, I live in Newcastle Australia, some 20,000 Klm from Arion. It took 19 hours on an aeroplane for a total travel time of about 25 hours just to get there. Two weeks before the trip I was in London, I then spent a week in Australia before heading to the US. You can probably imagine the jet lag involved. I was basically on autopilot for at least the first day.



In fact so badly was I jet lagged that I managed a rather nasty injury to my left thumb while using the vice (don't ask) on the first day! Ron, my chief building instructor must have thought I was a real tosser!!

Being a typical male (and a doctor - diabetes specialist), I just wrapped the thumb in a bandage from the First Aid Cabinet and continued to work. After 36 hours it was clear that this wound was never going to heal by itself ( it was gaping about a  $\frac{1}{4}$  inch and  $\frac{3}{4}$  inch long), so off I went to the local primary care physician to get some stitches. This itself caused considerable anxiety as I was about to experience the US health system, which doesn't exactly have a good reputation in Australia with respect to cost, especially if not insured. I really thought I would be up for mega dollars.

The nurse practitioner was unbelievably efficient. She correctly refused to stitch the wound (despite my gentle persuasion) as it was more than 12 hours old. Soooo ... she expertly wrapped it with Steri strips and off I went to continue work. End result was good, two weeks later and you can hardly see the scar. And how much did it cost? A mere \$40. Still can't believe it!

So why do the build in Shelbyville? There were four good reasons.

Firstly, and the main reason was that my youngest daughter lives in Seattle with her American husband. I thought a quick visit there would be in order as she had just become pregnant with her first child. After I had arranged the trip, however, she decided to return to Australia for a holiday, just when I was due in Shelbyville. So much for good reason number one.

Secondly, I really wanted to get this project done quickly. The boys at Arion were talking about paint after one week, some further assembly in week two and flying at the end of week three. Whilst I knew this could not be true (could it?) it still seemed worth a shot. The main reason for wanting the build completed quickly was my previous build experience with a Zenair Zodiac 601XL. This aircraft was started in December 2007 and finished in September 2009, just before “upgrades” were mandated by the FAA. Eighteen months later, after tearing down a beautifully painted aircraft it is now almost ready to fly. The whole upgrade process was not a pleasant experience (for me). It was an enormous amount of work and there was much discussion on the Matronics email list about the wisdom of the upgrades. This discussion became so vitriolic at times with personal attacks on fellow builders that in the end I decided to sell the aircraft and really didn’t want to spend another three years building.

Thirdly, I wanted the expertise, experience and assistance of the “factory.”



Fourthly, was that I hoped there would be other aircraft in various stages of construction that I could look at, take pictures and get ideas. I was not disappointed as there were several finished and flying aircraft but also one that was in week two of the assembly process. This belonged to Jack Gonzenbach of Heart of America Aviation, LLC and was being built as a demonstrator. I was able to follow each step of the construction and was most impressed with the attention to detail. This will be a truly beautiful aircraft and I can only hope mine will be half as good.

So how did the week go? Were my expectations met? Well ... read on.

The first day proceeded at a blistering pace despite my injury. Two full-time assistants – yeah OK. I had two full time “technicians” who knew exactly where everything went and in what sequence things needed to be done in order to achieve maximum efficiency. There were templates for just about everything (even small things like hinges) so very little thinking and measuring needed to be done. I was given various tasks to keep me occupied and by the end of the day one a considerable amount was achieved.



I won't bore you with details of the next three days but just give an overview. The three of us (Ron, Donney and myself) worked the four, ten-hour days and completed ALL the basic structure. Day five was spent finishing up some small things and packaging for the trip to Australia. The only things left to do are the paint, avionics, engine and go fast gear. I have done a Jabiru engine install and avionics before on the Zodiac so this shouldn't take me too long. In fact the majority of the avionics will be

done while awaiting delivery of the kit to Australia. I actually managed to bring the dashboard home as hand luggage! This actually turned out to be another reason (in retrospect) for building at Shelbyville. I was able to observe a complete panel build on Jack's demonstrator.



If you look through my build manual I have ticked just about every box and picture as completed!

So is it possible to complete the build AND fly in three weeks? Probably but you do need to leave a few days for the paint to dry after the assembly of the basic parts in week one.

Would I recommend the experience – yes.

Was it worth the cost (\$3500 for the week) – for me, yes.

So who do I thank?

Mark, of course, and Mike, who kept everything moving and the paperwork in order. Ron and Donney who did the majority of the work on my plane. Jason and Terry who were assisting Jack, but always had time to explain things to me. And Lamont for giving me ideas for the panel.

# Airflow Splitter for the Lightning

Nick Otterback

Thank you Bill Browns

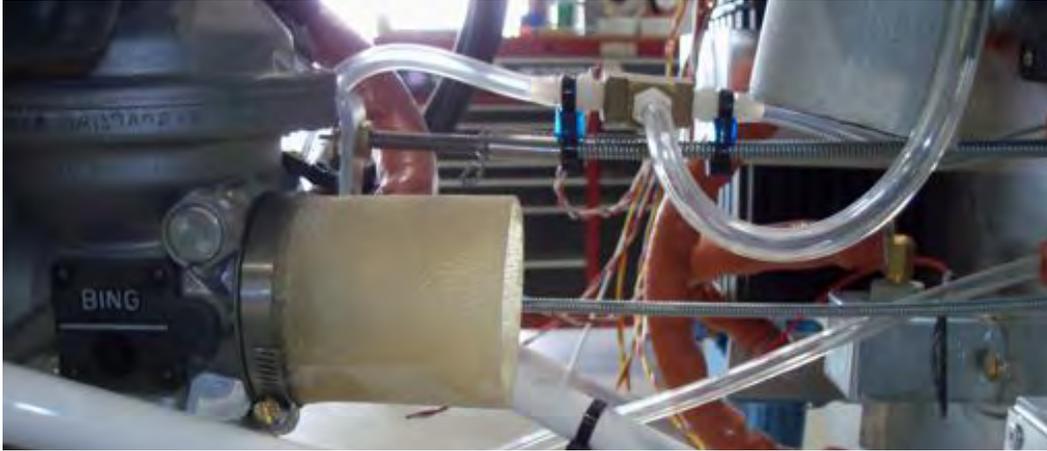
This has been a group effort, which was started and driven by Bill Browns of Illinois. You will have to read back a few newsletters to see the first mention of a splitter in the scat hose. This article describes what I think is the solution for evening out the fuel distribution and producing a better balance in EGTs.

The last splitter designed by Bill was a four-way or x-type splitter. The picture below illustrates this part, the one on the left a prototype for testing, the one on the right a production version.



These, like the units before them, were designed to fit in the airbox outlet tube. This provided some evening of the fuel but not the greatest. These have been sent out to a few dealers and builders to give a go. We have all had the same results with the airbox placement.

One item done a little differently here in Shelbyville is the installation of a fiberglass tube on the carb. The Jabiru engine manual suggests the need for this, a smooth bore tube at the carb for attaching the scat hose. This eliminates any problems with the scat hose collapsing on the carb sense ports at the throat.



Since our results were just ok with the splitter in the airbox, I thought that maybe the splitter should be placed in this tube for better results because the air would have no chance to tumble before reaching the fuel pickup, or at least very little. So into the tube the splitter went, the pointed end of the splitter facing the carb.



On previous flights without the splitter we had a very broad spread in EGTs at wide open throttle (WOT). Our low EGT was about 1050F, while the highest was a bit over 1400F. By playing with the throttle we could get them within about 100 degrees in cruise. I say “play” because you had to find the optimum RPM where everything worked out. However, this usually wasn’t at 2850RPM but instead something below, which gave a slower cruise speed.

Our plane is N326AL, a LS-1 equipped with a Sensenich WC60ZK57G prop, which allows about 2800RPM on takeoff roll, 2880 in climb, and just above 3200RPM flat out. The point to the description is to show a properly pitched aircraft, which is

essential in getting the Bing carb to work correctly. See some of the previous carb tech talks from Pete in earlier newsletters.

Anyway, with the splitter now installed, like a + sign, it was time to fly. WOW, what an improvement in the temps. Now at WOT in climb I was seeing a low EGT of about 1180 and a high of about 1250, with the rest fitting somewhere in between. I also picked up 20RPM!

We were now able to cruise at 2850RPM with EGTS within 60 degrees of each other, a dramatic improvement over the previous flight of the day with no splitter. The engine seemed to run smoother and the fuel flow was reading slightly lower than before.

I have been in contact with several of the other pilots trying out the splitter, and all are getting near the same results. We also have had the same results here in several other Lightnings with the splitter installed, two in different configurations than ours. We have sent the CAD drawings of the tube up to Specialty welding and will be getting those made. This will be a standard installation on the LS-1s and can be shipped out for kits as well.

I want to thank Bill Browns for his hard work on the project. He has been driving the effort, using his time and money to develop the splitter. This wasn't anything we asked for. Bill saw something that needed improvement and worked out a solution. That is what experimental aviation is all about. See if you can find that kind of innovation on a certified plane.

## Flight to Mount Washington

Carl Beatrice

Lightning #77, N767CP

Saturday, April 09, 2011 was a sparkling clear day with light winds. My friend Al Saucier and I decided to fly over the White Mountains of New Hampshire. The air was crystal clear deep blue skies and smooth air all altitudes.

We headed north out of Sanford, Maine (KSFM) with a great panoramic view of the Atlantic Ocean off to our right, a clear view of Lake Winnepesaukee to our left and the White Mountains looming up ahead. Many of the mountains were still draped with snow, and Lake Winnepesaukee still had a very solid covering of ice. (Its been a long cold and snowy winter here in New England.)

Even from fifty miles away, Mt. Washington was very prominent and majestic. It's noted to be the highest mountain east of the Mississippi, at 6,280 feet above sea level and with some of the strongest winds ever recorded at the summit (231 mph).

We were in a gradual cruise climb as we proceeded north, and Mt. Washington appeared even more beautiful with the morning sun shining on it. The winds were light on this day, from the west at 31kts, so we climbed up to 6,500 feet and flew around the summit a few times (see photos).



There is a weather station at the summit that is manned 24/7. In the winter the only means to get to the summit and back down is to hike or, like the weather people, use an Artic Cat. On the summit there is a restaurant, a gift shop and an observation deck for the nicer weather.



For the warmer weather, there is a road to drive up, and, on the west side, there also is the cog railway on which you can ride. Or there is a variety of hiking trails, which can be a bit challenging in the winter.

On Memorial Day, a group of us used to hike up to Tuckermans Ravine on a trail that is about 45 degrees steep. We'd sit on a large rock and watch the younger people ski down the ravine. If anyone ever took a fall they'd slide and tumble for what seemed like forever. There is no lift at the ravine and one year we found 50 feet of snow cover remaining from winter.

This day was quite a gift to Al and me, as more often than not the winds are quite strong and gusty or the top is shrouded with clouds.

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*Arion Lightning LS-1 “Twins”*