



# Arion Hangar Talk

The “Lightning” Newsletter

## December 2008 - Volume 1, Issue 11



### Anthony Morrison’s – “Lightning of the Month”

Please submit a photo of your Lightning for future “Lightning of the Month” consideration.

The goal of the newsletter remains **to get the word out** on happenings at Arion Aircraft, and **to give a voice** to Lightning builders and flyers. To be successful we will need the inputs from all of you in order to meet that goal. So it is not only a way for the factory to provide Lightning news, but it is your newsletter as well, and, as such, its success will depend on you getting involved to spread the word and to help other builders and / or flyers with their project airplanes. So think of this newsletter as an “exchange of information publication”. Send your inputs directly to me at: [N1BZRICH@AOL.COM](mailto:N1BZRICH@AOL.COM).

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**And now, the rest of the news.**

## Lead Stories:



I hope everyone had a great Thanksgiving and that this December issue is the start of a fun holiday season for all of you. This month we once again have two “Lead Stories” – both by Lightning personnel that have written in our newsletter before. First, as promised in the November issue, is “Bear” Bryant’s final installment of his build experience in Tennessee. I think we all owe Paul a big “thank you” for the time and effort he took to give us a day by day account of his experience. I have included some of the many photos that Paul sent. Second is a write-up by Katie Bosman on what it is like to be a lady test pilot. I know you will enjoy reading both of their stories.

## The Build – Part Two: By Paul “Bear” Bryant

It had been approximately 3 weeks since I left Shelbyville. The first week of the builder assist program was excellent! A lot was certainly accomplished, but a lot remained. During the first week you decide on your paint scheme, panel layout and interior pattern and colors, so there’s a lot more than just doing a lot of fabrication and assembly. Even though I had pretty much decided upon the paint scheme and panel layout, the folks at Arion have a talented support team to help you fine-tune your decision. So after three weeks at home, I was looking forward to seeing the airplane painted for the first time. Although I had a pretty solid layout and color scheme, I had given Nick some artistic freedom if he thought it necessary, so I really didn’t know what the new “jet” would look like.

The design and coloring turned out to be exactly what I had hoped for. After five or ten minutes checking it out though, I was right back into the thick of it. After all, I still had a lot of work to do to keep on schedule and couldn’t keep admiring the paint all day long. So it’s the start of week two...And now we get to listen to my music! Go Kenny Loggins....

### Week 2, Day one. Am I still removing Gel-coat?

#### **Firewall - Marked and Drilled holes for the following: 2 hours**

- Throttle
- Choke
- Cabin Heat
- Brake Line
- Carb Heat
- Starter Solenoid
- Fuel Pump
- Regulator/Rectifier
- Cabin Heat Mixer Box
- Wire Pass Through
- Fuel Pass through

#### **Installed the following: 3 hours**

- Nut plates for regulator/rectifier and starter solenoid
- Fuel pump
- Cabin Heat Mixer Box
- Brake reservoir
- Battery Support
- Air box
- Fabricated and installed cabin heat cable bracket



**Instrument Pod: 3 hours**

- Marked location of fuselage side supports
- Marked and drilled mount holes for vents
- Marked and cut out holes for vents
- Fabricated gas strut brackets
- Installed gas strut brackets
- Filled in voids around gas strut brackets
- Sanded instrument pod
- Primed instrument pod

**Tail: 1 hour**

- Installed VOR antenna

**Fuselage: 3 Hours**

- Marked and cut out mid elevator bell crank hole
- Installed mid-elevator bell crank
- Drilled and installed Camloc receptacles
- Drilled and installed nut plates (cowling)
- Glued in NACA scoops (Fresh air)



This was another jam packed day. The most creative part of the day was to fabricate the gas strut brackets; install them into the instrument pod and make them look professional. You could spend 5 minutes or 5 hours on these guys, I spent somewhere in between and they turned out great.

Learning note of the day: When you want to paint something black, don't prime it orange!

.....

**Week two; day two.** So let me get this right: If I step on the right brake, the plane is supposed to go right?

The Arion team has a daily checklist for items needing to get accomplished for that particular day. It's a great tool because it really keeps you focused and is a good barometer to see if you are on track to the build. However, there is absolutely no pressure to hurry! The team makes sure you do it right every step of the way. Day two was a focus on the fuselage and firewall forward....oh and the brake lines.

**Tail: 4 hours**

- Installed elevators
- Installed elevator bell crank
- Hooked up trim servo wires
- Fabricated rear tie down support
- Installed rear tie down support hooked up trim servo push rod to trim tab

**Fuselage: 3 hours**

- Drilled mounting holes for instrument pod
- Painted instrument pod
- Ran brake lines
- Installed flap torque tube
- Installed flap motor
- Cut elevator push/pull tube
- Installed elevator rod end bearings
- Installed instrument Pod side mounts



**Firewall Fwd: 5 hours**

- Installed battery support
- Installed battery strap
- Installed battery top keeper
- Fabricated gascolater bracket

- Installed gascolater bracket
- Installed gascolater
- Fabricated fuel flow monitor plate
- Installed fuel flow monitor plate
- Installed fuel pressure sending unit
- Plumbed:
  - Pass through to boost pump
  - Boost pump to gascolater
  - Gascolater to fuel flow
  - Fuel flow to mechanical pump
  - Mechanical Pump to fuel pressure
  - Fuel pressure to carb
- Fabricated throttle arm extension

I wanted to have a rear tie down, so I fabricated a bracket and installed an “eye” bolt. Needed to make sure it would not interfere with the rudder. It turned out to be a nice touch.

Learning note of the day: Don’t believe everything you read!

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**Week two, day three.** Among other things, today was a focus on fabricating the fuel console. Take a piece of raw aluminum, measure it, cut it, bend it, drill holes in it-first time through-Perfect!

***Firewall Forward: 4 hours***

- Fabricated Ground cables
- Installed Ground cables
- Fabricated power (battery) cables
- Installed battery cables
- Hooked up starter cable
- Installed starter solenoid
- Installed regulator/rectifier
- Hooked up alternator wires
- Hooked up regulator/rectifier ground wire
- Hooked up regulator/rectifier charging wire
- Installed CHT probes
- Installed EGT Probes



***Fuselage: (6 hours)***

- Installed Com antenna
- Installed Transponder Antenna
- Installed Strobe pack
- Fabricated fuel console
- Fabricated Fuel console mounting plates
- Installed Fuel console mounting plates
- Installed ground strap

Learning note of the day: When installing antennas, it’s good to know which are installed vertically and which ones go horizontally.

\*\*\*\*\*

**Week two, Day 4.** Hold on to your hat! Pretty busy day, but another great day, especially with the arrival of the instrument panel. It truly is a nice layout and the wiring bundles were superb!

**Fuselage and firewall forward: 9 hours**

- Installed magnometer mount
- Installed ELT mount
- Fabricated ELT antenna mount bracket/ground plane
- Installed ELT buzzer
- Installed Ground buss
- Installed fuel line to firewall pass through
- Installed canopy tip up arms
- Installed controls label onto instrument pod
- Drilled out pod to correct sizes for control cables
- Installed instrument pod
- Installed fresh air vents in instrument pod
- Prepped and painted interior canopy frame
- Marked oil drain
- Installed SCAT hose to fresh air vents
- Installed all control cables in instrument pod
- Instrument panel arrived and checked out



Learning note of the day: If at first you don't succeed, get a barrel sander.

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**Week two, Day five.** Still on track for the week, but needed to get a couple of critical things accomplished before I headed back south. Wings arrived yesterday from paint...too cool! Once again, I left some artistic freedom with Nick.

**Fuselage, firewall forward and canopy: 9 hours**

- Removed spray lat from canopy
- Drilled angle of incidence nut plates
- Installed angle of incidence nut plates
- Installed Nav/Strobe lights
- Installed current sensor wire to EIS
- Installed instrument panel
- Trimmed panel to fit pod
- Ran wire to appropriate areas of plane
- Cut and fit baggage floor supports
- Installed baggage floor support to seat back; others ready to install but must wait until elevator push/pull tube is installed and wires run to aft section of plane
- Terminated control cables (throttle, choke, etc.)



Learning note of the day: removing spray lat from the canopy requires 3 beers!

Another superb week...and yes Virginia there's more gel coat to remove!

\*\*\*\*\*

Having to get back to work, I had to plan my third week of build during the first week in November. The Arion team is very accommodating and works around your schedule. So another two weeks had to go by before I could get back to my build project. I was pretty excited about getting back to Shelbyville for the third week since this is the week the plane comes to completion and all your hard work is rewarded by the start of the engine, the taxi, the receipt of your airworthy certificate and, of course, the first flight!



**Week three, Day one.** The clock is ticking; put the do not disturb sign out; play some music-remove more gel coat!

**Firewall: 3 hours**

- Measured and fabricated oil cooling duct
- Installed engine baffle seals
- Installed lower cowling
- Made cut out for exhaust pipe

**Canopy: 2 hours**

- Installed Canopy to canopy hinges
- Installed canopy gas springs
- Measured and installed canopy open/close latch

**Fuselage: 3 Hours**

- Measured and cut seat frames
- Measured and cut center console module
- Fed wiring through spar box
- Installed fuel console



**Wings: 4 hours**

- Measured and cut out hole for taxi and landing lights
- Fabricated landing and taxi light tabs
- Installed landing and taxi lights
- Measured and cut out hole for Pitot tube
- Installed Pitot/static tube
- Installed fuel sending units

Learning note of the day: Cutting metal on the jig saw creates heat!

\*\*\*\*\*

**Week three, Day two.** Focus today is to get the rudder cables, elevator push/pull tubes and aileron rods installed. No the wings are not attached yet either. It was pretty tricky to get the nuts and bolts to the Aileron rods as the access holes are small. You certainly have to have some patience here. I also wanted to have two lights for map reading at night, so two were fabricated out of aluminum and attached with Velcro. They attached very nicely to the rear area carpet and the low profile has the light near the canopy latch and behind the pilot and co-pilot's head. Since they are attached with Velcro, they can be repositioned or removed easily. Definitely a nice touch.

**Tail: 2 hours**

- Installed rudder
- Installed rudder cables
- Installed elevator push/pull tube

**Wings: 4 hours**

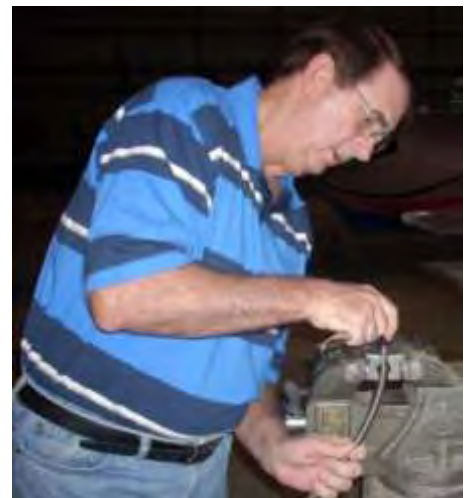
- Installed aileron rods to aileron bell crank
- Set aileron travel to 3 1/2 in
- Installed ailerons
- Installed fuel drain sumps

**Fuselage: 2 1/2 hours**

- Installed canopy latch
- Installed canopy seal
- Fabricated one map light bracket

**Firewall Fwd: 3 hours**

- Fabricated and installed oil cooler support bracket
- Installed oil recovery bottle



Learning note of the day: Make sure you have a heavy magnet to retrieve nuts and bolts....

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**Week three, day three.** Definitely a crucial day. Need to tie all the loose ends (read wiring), get the wings attached, get the flaps attached, get seat belts installed, and install the stick grips.

**Firewall Forward: 2 hours**

Prepped and installed Oil cooler cables and unit  
Oil Pan air vent tube fabricated and installed

**Fuselage: 4 hours**

Installed ELT antenna  
Installed elevator push from stick to bell crank  
Grip sticks installed  
Prepped and installed seat frames  
Attached seat belts to fuselage

**Wings: 2 hours**

Installed aileron push/pull tubes  
Attached wings to fuselage  
Installed flaps



Learning note of the day: You're never ever really done removing gel-coat. Where's my mask?

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**Week 3, day four.** Ok, today is the day we prep for the DAR. Let's see, I need documentation, registration, Log books, placards, "N" numbers for the plane and lettering for the fuel tanks. What, we need to weigh the plane too!

**Final Assembly and Prep for DAR: 8 hours**

Prep for DAR inspection  
Toe in the main landing gear  
Weigh the plane  
Load fuel  
Start the engine  
Check instrumentation  
Check position lighting and strobes  
Check brakes  
Taxi



Today was certainly a memorable event. All the hard labor and effort put into the build was certainly exciting as we cranked over the engine for the first time. To hear it



come to life and see all the systems in the green was unforgettable. Nick and I did a short taxi and brought N82PB back to the hangar ready for the DAR inspection. About an hour later N82PB received its airworthy certificate!

Rain delayed the first flight on Friday, but N82PB had its first flight on November 10, 2008-straight and level; all systems in the green!



Thanks for letting me share this experience with you. The builder assist program at Arion is unsurpassed. Nick, Mark and Mike are committed to helping the builder complete a strong, safe, and reliable airplane build. They provide the right amount of technical expertise and share their recent build experiences with you so that you learn a great deal and you know your airplane inside and out.

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Disclaimer: No humans were injured during the build of this aircraft, there were no pieces left over, and Gel-coat is not something you wear.

Fly safely!

**Bear**  
**N82PB**

## **Life as a Lady Lightning Test Pilot: by Katie Bosman**

### **My Lightning Transition**

As a Middle Tennessee flight instructor, I've landed dozens of times in Shelbyville over the past four years and always had a bit of a fascination for the high-wing Jabirus and their slippery-looking cousins. I didn't know what the low-wing "mini-Lancairs" were or how they flew, but they looked like something fast, maneuverable, and beyond my capabilities. After all, even though I soloed in a taildragger, most of my 900 flight hours have been in trainers. Worse yet, I've spent most of the last two years in the right seat watching students do all the flying. So when I walked into the Jabiru office, handed **Pete Krotje** my resume, and heard him say "Great! You can start flying the Lightning next week," I broke into a cold sweat. My first thought was to say "Don't you want me to start in something easy to fly like a Jabiru?" But something about **Pete's** quiet, steady gaze just compels a person to shut up and say "OK." (Now I know better anyway. Jabirus may look like trainers, but they're...well...different.)

My first flight with **Nick** in the demo was a thrill and an eye-opener. While the Lightning was more agile than anything I've ever flown, I was sure that I could indeed fly it, but I also knew that I had to knock 2 years' worth of rust and dust off my stick-and-rudder skills. I had no idea my feet were so sleepy until I did



my first stall in the Lightning...sure it's docile, if the ball is centered! Your feet get no rest flying this airplane when in slow flight. Without rudder in slow flight, turns are sloppy; unlike many of the trainers I've flown, you really see the nose slew around when you don't use it. Climb performance suffers without the right amount of rudder to counteract the torque of the Jabiru engine. And then there are landings. Three hours or so were spent with **Nick** telling me "right rudder, right rudder" in ground effect. Finally, one day he said "Ok, too much right rudder," and I got the idea shortly afterward. When he put the long wing tips on the demo just before my final transition lesson, the deal was sealed...suddenly I was in love with the airplane.

My transition training felt like my pre-solo days all over again. I practiced with **Nick** for several days over the course of two weeks. Some lessons went well, and some were mediocre. One was downright ugly. But the struggle was good for me. It reminded me that all those little things pilots read about and instructors preach about are true. Many trainers ("spam-cans?") are designed to dampen the effects of lazy feet, the tendency to over-control, and inattentiveness to aircraft attitude. It's easy and almost OK to be lazy in a draggy, sloppy trainer. On the other hand, Lightnings, like many homebuilts, are designed to perform. The Lightning is a great little airplane that demands nothing extraordinary from its pilot, just some basic respect for the principles of aerodynamics. Crisply coordinated turns and smooth landings in a Lightning are satisfying experiences... especially when the control movements required to be smooth become second nature. The skills I've learned at Arion are not brand-new, but flying the Lightning and Esqual has refined the stick-and-rudder skills I've always had to a level that I've never experienced before. It's a great feeling!



Above is **Katie** in one of her offices – in this case, the Lightning Demo.

## News from the Factory:

Over the last several months there has been lots of activity at the Lightning factory, but probably some of the most interesting work they have been doing will begin to take fruition during this month – December 2008. **Nick** and the Lightning team have been working towards developing a test plan that will allow them to show that the Lightning meets ASTM standards as a Special Light Sport Aircraft (SLSA). If any of you have been involved in aircraft certification in the past, I am sure you understand the enormous task that is represented by this goal. Some of the flight tests have already been completed (see last month's newsletter to view some of the performance graphs), but many hours of work, both on the ground and in the air, still remain.

You may wonder why Arion would want to develop a SLSA Lightning. Actually, there are probably several reasons, but I can think of two very important ones. First, a large percentage of Lightning customers to date have wanted to build an experimental amateur built (EAB) Lightning that meets light sport standards. And second, until the new FAA 51% experimental regulation is released we really don't know if the current Lightning kit will meet EAB requirements. So instead of getting caught "up the creek" without a kit to sell, the Lightning team is once again being proactive as they have done so many times in the past when they have updated the current Lightning kit.

So why is it important to build a SLSA Lightning? First off, what is a SLSA? A Special Light Sport Aircraft is a “turnkey” ready to fly airplane that meets light sport standards. You pay your money and you have a complete store bought airplane. In reality, Arion does not really intend to sell “store bought” complete Lightnings (like they do with the Jabiru aircraft) but the way the light sport rule is written, once a company builds at least one SLSA they can then sell kit versions of that airplane that are not limited to the 51% rule. These Experimental Light Sport Aircraft (ELSA) kits can be more than 51% complete (maybe even up to 99%) and they can still be registered when they are completed. So you see, by building at least one SLSA Lightning, a kit Lightning can continue to be sold, but it will have to be built (and equipped) like the original SLSA Lightning that was approved and certified. Arion will use the one SLSA that they build as a Light Sport Demo aircraft. The current plan is to start building this SLSA during this month, with the goal of having it certified to ASTM standards by the time Sun-N-Fun rolls around. Is this an ambitious goal? Yes it is, but I have every confidence that the Lightning team can pull it off and you can bet it will be the best looking, best flying, and safest Light Sport on the market.



### **Lightning SLSA Testing Update:**

For some interesting reading, below are some of **Nick's** recent correspondences to me about the ongoing test towards the goal of an ASTM compliant SLSA Lightning.

Buz, I will begin modifying the demo today; here is my initial data on the elevator mod.

**N324AL – Demo:** Empty 860, pilot 200, bags 10, fuel 22 gallons or 132lbs, AUW 1202lbs, CG 32.4". The stick force pull required to maintain a 2 G turn @ 125 mph IAS was 3 lbs.

**N233AL – Prototype:** Empty 891, pilot 200, bags 0, fuel 20 gallons or 120lbs, AUW 1223 lbs, CG 35.1". The stick force pull required to maintain a 2 G turn @ 125 mph IAS was 4.5 lbs.

This was using a digital scale on the stick to get the pull force value. I would assume this is a good indication of stick force per G. However I am not interested in that; the fact that the stick pull or force is higher with an aircraft with a further aft CG is the important part. I believe this is a worthwhile change if someone wanted higher stick pressure especially with the longer tips to match the stick forces in roll and pitch. **Nick**

The message above and the initial data it covers were before the latest mod that **Nick** did to the elevator aerodynamic counter balance. Below is **Nick's** write up on how the elevator mod changed the pitch forces.

Buz, I flew the demo on a quick flight this morning. The change has helped, although I am not sure how much since I have not used the scale yet - but I can feel a difference. It seems to have initially increased the pressures more in the prototype and that may be just because of the more aft CG and the fact that it was so light in the first place. Also the prototype pitch geometry is rigged slightly different so I am going to change that this afternoon. I guess the important part is all the little changes adding up to an overall better feel for a light sport aircraft. Also as a nice added benefit is the elimination of the “dead spot” in the center of the pitch control. ....thoughts? **Nick**

We have just completed flight testing on a modification to the elevator balance. With the development of the SLSA Lightning and the mission of the aircraft changing slightly, a need to make a change to the pitch forces required was noted. With the standard wing the roll to pitch force was well harmonized at maneuvering speed and below. With the addition of the long wing tips the roll forces increased but the

pitch stayed the same. This resulted in a somewhat unbalanced feel on the stick. There are two options; either lighten the ailerons, or heavy up the pitch. While the first seems better to get a nice light stick, the overall mission of the aircraft with the long wing tip is going to be light sport. So with this in mind the thought of making the pitch heavier to harmonize the controls was the better option. We have removed the aerodynamic balance from the elevator completely. The resulting change has increased the stick pull required by a good amount. In our 2008 Demo with the aerodynamic counter balance installed, the stick force required to pull 1g was 2.5 lbs. This was measured with a digital scale on the stick in flight. With the counter balance removed the stick pull required in the same situation was 4.75 lbs. This with the longer wing now provides a good feel between both roll and pitch (more harmonized), and I feel this is better for most pilots. An additional side benefit is the elimination of the “soft” spot in the center of pitch. Anyone with a lot of time in a Lightning may have noticed a small spot in about the middle 1” of pitch throw on the stick where it was “soft” or “dead”. That is now gone. This is not to say with a short wing that the pitch would too be heavy if one made the modification as well. I think that it would still have good stick feel. I have updated the builder’s manual online to incorporate this change - it is in section #19 on balance modification. Those of you asking if the roll can be lighten up to match the light pitch feel with the balances, well still working on that but should have a solution in due time.



Arion is still compiling data for the future SLSA Lightning and working out tail balancing forces for pitch stability calculation. If anyone is interested, the horizontal tail airfoil is a standard NACA 0012 with max thickness @ 32% - close enough to consider it a standard unmodified 0012 since normally max thickness is considered to be 30%. The vertical stab is actually NACA0013, or 1% thicker.

More to follow, so stay tuned.

## Lightning Sales Update:

**Mark Stauffer**, Production Manager at Arion Aircraft, wrote to me that as of this past November a total of 74 Lightning serial numbers have been “sold”. Since serial numbers 2 and 13 were skipped, and 3 airframes had the “heavy fuselages” that never left the building, and another one was destroyed in a hangar accident when a “runaway” Bonanza came through the Lightning hangar wall, that means a total of **68 kits had been delivered as of November 2008**. Note, two additional Lightning kits have been “sold” but have not been delivered yet. Those two are the “factory Special Light Sport Aircraft” (SLSA) Lightning that is scheduled to be built at the Shelbyville factory in December, and a Lightning kit sold to **Carl and Pat Beatrice** of New Hampshire.

Also, as of this November, the **34<sup>th</sup> Lightning has now flown**. Since 68 kits have been delivered in the past 2 ½ years and 34 have flown, that represents an incredible **50% completion rate**. I know of no other aircraft kit manufacturer that can come anywhere close to matching that accomplishment. Of course the key to such a high completion rate is the “builder’s assist” programs that Arion offers in Shelbyville and at several of their dealers, but that 50% completion rate in the short time that they have been in business is amazing. Next year will probably result in several Lightnings built “at home” taking to

the air to help increase this fantastic statistic. Overall, the entire Lightning story is a big success. From its humble beginnings at an EAA chapter meeting, to the design and fabrication efforts of the initial Lightning team, and now to the sales and operational flying success of the kit Lightning, it's a very impressive accomplishment. But rest assured, the Lightning team will not rest on their laurels. Watch for even more improvements in the current kit and development of the SLSA Lightning in the near future. After the first ASTM compliant SLSA Lightning is flying, the decision will then be made as to whether an Experimental Light Sport Aircraft (ELSA) Lightning kit will be made available. If the Lightning team decides to go ahead with an ELSA Lightning kit, it can be greater than 51% complete, but it will have to be built to match the original ASTM compliant SLSA Lightning.

## News from the Dealers:

**Five first flights** reported in this issue. Send your congratulations to all the new Lightning builders and flyers.

### Two from Australia:

Hi Buzz, Photo of Builder Assist aircraft # 58 first flown by owner **Peter Mitchell** of Busselton, Western Australia on **October 27th 2008**. Paint highlights still to be added. Flew off 25 hour test period and left for home (1550 miles away) on 1st November and received half way report today - "flying beautifully and engine running beautifully too". Client extremely impressed with aircraft's performance - another happy customer!!

Regards

Dennis & Angela Borchardt  
Lightning Aircraft Australia





Hi Buzz,

Another Lightning takes to the skies in Australia on 8 November 2008. Kit No 30, built by **Peter Disher**, registered as VH-PD1,  
Regards, Dennis.

Dennis & Angela Borchardt  
Lightning Aircraft Australia



**Pete Disher's** Lightning was the 32<sup>nd</sup> one to fly. Photos above are of his beautiful Lightning – VH-PD1.



## One from Shelbyville:

And the 33<sup>rd</sup> Lightning to fly was **Paul “Bear” Bryant’s, N82PB**. **Nick** made the first flight in Shelbyville. It was an uneventful 30 minute flight – all systems in the green and she flew straight and level. Below are some photos taken of the final inspection and just before, during, and after the first flight.



Above on the right is “absolute proof” in the form of an actual photo, that “man” has indeed landed on the moon. It was Nick in “Bear’s” newly completed Lightning. And you thought you had an interesting job.



## One from Green Landings:

I received the following from **Ryan** on 11 November 2008.

**Green Landings** had another successful first flight of an Arion Lightning. This aircraft was built by **Gary Winkler**. The first flight went without a hitch! The plane flew perfectly level and had no tendencies to fly out of rig at all.

Ryan Gross

Green Landings Flight Center, Inc



These photos show Gary's beautiful interior and the trim tab intergerated into the elevator. Nice job!



## One from Arizona:

On 13 November is received a message from **Walt Mefford** that his Lightning had made its first flight at Greg Hobb's facility. Walt's kit was #55 and his registration is N881WP.



The bright yellow Lightning is **Walt's** new "jet". The photo on the lower left is **Greg's** "Air Force". Starting on the lower left and going clockwise, it shows **Greg's** Lightning and his Esqual, **Fred Peters'** Lightning, **Bill Fisher's** Lightning, **Walt Mendenhol's** Lightning, and **Walt Mefford's** Lightning. Great photo.



## Current Lightning Dealers:

Arion Lightning, LLC, contact Nick Otterback, Shelbyville, TN, 931-680-1781, [www.flylightning.net](http://www.flylightning.net)

Lightning Southwest, Greg Hobbs, Marana, AZ, 520-405-6868,

Green Landings Flight Center, Ryan Gross, Hedgesville, WV, 304-754-6010, [www.greenlandings.com](http://www.greenlandings.com)

Lightning North Central, Tom Hoffman, Neenah, WI, 920-836-2318

Sport Plane Dynamics, Ed Ricks, Glendale, AZ, 623-695-9040

Lightning Australia, Dennis Borchardt, Kingston SE, South Australia, 08-8767-2145

Lightning Brazil – Cimaer Ltda, Claudio Nunes, Brazil CEP 24 900-000, 21-2637-3605, 21-9451-9700

## News from Builders and Flyers:

**Pete Disher's** first flight in Australia is mentioned above, but below is some more information from him along with some additional photos that he sent before his actual first flight:

**Pete** has this to say: The aircraft is now finished and C of A issued. I feel I'm lucky, the inspector I had only gave me a 25 hrs fly off and a 50nm radius from TRE. Also, I was finally talked into changing my pitch trim, taking out the spring system and cutting the tab and servo into the elevator. I'm really happy with it and it works well.

I will be doing some transition training with **Anthony M** in Morwell before making my first flight.

**And on 9 November 2008 I received the following from Pete:**

We are all extremely excited here on our first flight of 45 minutes. She just flew straight on climb, on cruise and on decent - almost hands off. I don't think there is much to do on trim if anything at all; she just flew itself. I'm just one happy "chappy". Hopefully I'll come back to earth this week and I'll get the wheel pants on and a little bit of work on the engine tuning and away we go.

It certainly is a rewarding experience building a Lightning.

Thanks again,

**Pete D**  
VH-PDI



Below are some more of **Pete's** photos showing how he mounted the pitch trim servo motor and how he mounted the trim tab into the elevator. Great innovation and workmanship – as we always see on **Pete's** Lightning.





This next message and article was written by **Carl Beatrice**.

Buz- The following is a summary of our experience meeting you and the folks at Shelbyville. Is it something you might want to use in your Newsletter? We wish you all the best and look forward to seeing you again. God Bless and travel safe.

In my over 50 years of flying I've flown many types of aircraft from the J 3 cub to the 767-ER. My wife Pat also has about 50 years of flying. Together we've enjoyed flying to many wonderful places or just to go up for a local relaxing flight. Now, both of us are at age 75 and we've been planning to transition to a light sport aircraft. Almost nine years ago we built an RV6A that we now own and enjoy very much. But now we feel its time to move on to light sport.

In the last 1 1/2 to 2 years we've been reading up and looking at many light sports. We've flown about a dozen different LSA's and for one or more reasons, we weren't happy with them. They just didn't ring our bell. Then in July 2008 at Oshkosh AIRVENTURE, while walking around I spotted the Lightning on display. It immediately lit some lights. I met with and talked to the great folks from Shelbyville and this is also where I met and talked with Buz Rich. He's one super guy, friendly, full of knowledge and very down to earth. He gave me a lot of useful information on the Lightning. However, Arion was not giving demo rides at OSH. So in mid September Pat and I went to SYI and spent several days with the wonderful Jabiru/Lightning people. Everyone from **Pete**, the rest of the staff, and Buz were most cordial and helpful. Here we got our demo rides in both the Jabiru and the Lightning. We're now hooked, but it wasn't an easy decision between the Jabiru and the Lightning. After much thought and discussion we chose the Lightning. So on September 19 2008, we signed and paid a deposit. We're really looking forward to building it under their builder assist program, and I just know we'll get much enjoyment and pleasure from both building and flying our new airplane. And enjoying our new friends!



**Pat and Carl Beatrice are both pilots from New Hampshire and have a Lightning kit on order.**

## **Jabiru Engine Seminar: by Pat Beatrice**

**Nick Otterback** and **Mark Stauffer** were the instructors for the seminar and it was both informative and interesting. They gave us a lot of information in a short time. **Nick** said I was the first woman to attend the engine seminar. Maybe now some other women will be interested in attending the seminar. (Editor's note – I think Linda Mathias was the first lady to attend the engine seminar.)

The seminar started with lunch (subs, followed by introductions). The group was varied and included a retired Air Force jet fighter pilot, two retired airline pilots, a gentleman from Kenya, South Africa, several Jabiru owners and dealers, and a doctor. Several were future Lightning builders.

Not long ago I was unfamiliar with Jabiru engines and aircraft. Now that I have participated in the seminar and rebuilding of the engine I have a better appreciation of the construction and quality of operation.

Friday we listened and had “hands on” time with the individual parts and how they work.

Saturday was a long day and started with coffee and donuts. (You can see I like to eat.) We started with a crank shaft, connecting rods and pistons intact. We installed the cylinder barrels, cylinder heads and valves, the push rods, alternator and fly wheel. Some of the parts were easier to install than others, but taking turns we “got ,er done”. Saturday night we were treated by Arion Aircraft at the Bell Buckle Café for good food, country music, and socializing.

Sunday morning we finished rebuilding the engine. Then **Nick** and **Mark** gave us more information about maintaining our engines. Next we moved over to two Lightnings and learned how to torque head bolts and adjust valves on the Jabiru engine. When class time was over we each received a certificate.

Altogether, it was an incredible experience and well worth the time. If you have the time I recommend you attend the seminar.



Below is a photo of **Jim Langley** doing the other “flying” thing he enjoys when not flying his beautiful Lightning. At the next annual Lightning fly-in at Shelbyville, I have suggested that the folks that fly RC aircraft should put on a flight demonstration and contest for us. Jim thinks that would be a good idea and has challenged anyone to an RC combat contest – last one flying wins. Nick, do you accept the challenge? Wow, that should be fun to watch. I volunteer to be a judge.



Here is a photo of Jim flying a low level high alpha knife edge in a photo shoot for FLY RC magazine.

## **Upcoming Events:**

**Next Jabiru Engine Seminar, 9 to 11 January 2009 at SYI.**

**US Sport Aviation Expo, 22 to 25 January, 2009 at Sebring Airport**

**Sun-N-Fun, 21 to 26 April 2009 at Lakeland, Florida.**

Arion Lightning will be in Booth LD005.

**Virginia Regional Festival of Flight, 30 to 31 May 2009.**

**Oshkosh AIRVENTURE, 27 July to 2 August 2009.**

**The 2009 Lightning Fly-In will probably be 25-27 September at SYI.**



## **Lightning Skunk Works:**

Here is another top secret project that Nick is working on. Many of you know that he and Dana own two Corvettes and a Mini Cooper. Well the current Lightning design is very much similar to the lines of a Corvette. Therefore, Nick thought it would be good to also have a Lightning that is designed similar to the lines of a Mini Cooper. Below is what he came up with:





**The all new Mini Cooper inspired “Mini Lightning”.**

## **Technical Tips:**

**Lynn Nelsen** has two technical tips for us this month. His first tip (along with some “how to” direction from **Nick**) provides a modification on how to easily keep the main gear tires properly inflated without having to remove the wheel pants each time you need to air up the tires. I will also add some comments on what has worked well for me on N31BZ.

Everyone knows how important proper tire inflation is. First it provides the longest tire wear and secondly, the proper main gear tire inflation provides at least some defense against the dreaded “round gear leg” shimmy. Most Lightning flyers have found that a higher tire pressure (like 35 psi) seems to promote shimmy, while a lower pressure (I use 28 psi) seems to dampen it somewhat.

As to tire life, I just recently replaced the main gear tires on N31BZ at just over 500 hours of flight time. These tires were the original relatively inexpensive 500 x 5s that I installed when I built the aircraft. The treads were almost gone after about three years of use and probably somewhere between 1500 and 2000 landings (including numerous transition training flights). I had reversed the tires on the wheels at about 250 hours to keep the tire wear uniform, but by keeping them properly inflated I was able to get what I consider great service from a set of inexpensive aircraft tires. When I did replace them this past month, I bought Goodyear Flight Special II tires with a 6 ply rating, so I should be good for at least another 500 hours. One other thing, I also replaced the inexpensive inner tubes with new ones that are advertised to provide max air retention. These “Leakguard” inner tubes are made of a proprietary butyl rubber compound and are advertised to reduce air seepage. I put these inner tubes on my 1940 J3 Cub Sport two years ago and have not had to add any air since that time. When I did the annual on the Cub in September the tires still had the same psi that I had aired them up to when I installed them. I hope the new tires and tubes on N31BZ are half as good and I will be very pleased. Now on to **Lynn’s** tech tip.

Hey Buz: I am not too good at writing stuff up, but I am going to include what Nick sent me. I saw/had an immediate problem with tire pressure adjustment, which I hope I have under control now. I will attach pictures of what I did. Please keep up the great work.

I used 1 1/8" grommet with a 23/32 hole and put a 3/4" plastic plug in the hole (purchased at Lowe's as Nick recommended). A 1" hole saw was just a smidgeon too big, and a 7/8 was definitely too small. I did not have a 15/16, so I used the 1". (Below is Nick's message to Lynn.)

Lynn, With the pants off (aircraft wheel pants, not the mechanic's pants, ;-)) and the aircraft on a floor you can write on. Make a mark on the floor that is in line with the axel for reference. With the inflation valve level with the axel make a reference mark on the floor, and measure from the floor up to the valve and note this distance. Install the rear part of the pant. Using the mark for the valve put a square on it and against the pant, measure up the distance you had. Make a mark. Drill a 1" hole here using a hole saw. Than go to Lowe's and get a 1" rubber grommet and plug to put in the hole. They do have plastic ones you could paint but the grommet is easier to deal with. You will also need to go to the auto parts store and get a short air valve extension to keep in the plane.

Nick Otterback, Arion Aircraft, LLC

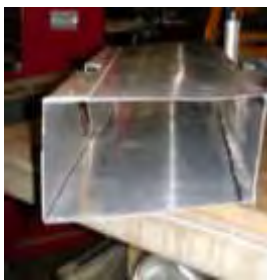


The above photos show Nick and Lynn's tech tip on installing access holes in the main gear wheel pants to help in keeping the tires properly inflated.



**Lynn's** next technical tip is on how he fabricated and installed a map case in the instrument panel of N13LN. Below are Lynn's words and some photos of his work:

Installation of a Map case in the instrument panel of N13LN was thought to be a great idea. However, as the build of N13LN took place, we found out that a full size (6 3/8 X 3 3/8 X 11) box would not fit due to the hinge on the canopy. Unfortunately, or fortunately, depending on how you look at it, the 6 3/8 X 3 3/8 hole had been put in the instrument panel. I took some measurements, and it appeared that a map sized case (5 1/2 X 11) would go in at an angle. Unfortunately, I did not lower the canopy (In fact it was not even installed) when I checked the fit. When I went to make the case, the canopy was installed, and I had to cut out some of the left hand side of the Map Case. I ended up making it 6 1/8 X 3 3/8 X 14 and installing it at an angle. This still allows plenty of room for the maps, and allows the canopy hinge to clear the case. Certainly not the original intent, but it does the job, and does not look too bad. I still have to repaint the hinge after everything dries, but the box is installed, and is functional. **Lynn.**



## **Other Items:**

### **FAA RE-OPENS COMMENT PERIOD ON PROPOSED 51% RULE POLICY CHANGES:**

Anyone who did not submit comments to the FAA's proposed changes to interpretation and enforcement of the "51% Rule" will have another opportunity to do so following recent action by the FAA. Citing the inadvertent removal of reference materials for several days during a previous comment period, the FAA announced it will accept further comments until **December 15, 2008**. These reference materials and other related documents are located on the FAA website.

[http://www.eaaonline.org/lis.cfm?tid=2641495768&trk=yes&r=155611186&sid=5194121&m=601640&u=ExAA&s=http://www.eaa.org/news/2008/2008-10-31\\_comments.asp](http://www.eaaonline.org/lis.cfm?tid=2641495768&trk=yes&r=155611186&sid=5194121&m=601640&u=ExAA&s=http://www.eaa.org/news/2008/2008-10-31_comments.asp)

## Other, Other Items:

Next is a continuation of last month's article on what to do if you have an engine failure in flight due to fuel starvation. First, a quick review of last month's suggestions and then I will cover some other thoughts on how to successfully deal with this situation.

As with any in-flight emergency or unplanned situation, the first and most important thing is to **maintain aircraft control**, or more succinctly put, **fly the airplane**. After that, if you have the time, you can **analyze the situation** and then **take the appropriate actions**. Below are some thoughts on analyzing the engine failure situation and taking appropriate actions.

Note: If an engine failure can be "fixed" in flight, it will be by "correcting" at least one of the three things an engine needs to develop power: **fuel, air and ignition**. Of course, we are talking about fuel problems here, so below are some thoughts on in-flight fuel problems.

Aircraft with multiple fuel tanks (like the Lightning) should have "**check fuel**" high on the engine restart checklist that you develop for your aircraft. Also, since the Lightning is a low wing airplane, you should **NEVER** (as a standard procedure) have both tanks selected at the same time if your airplane has that capability. Doing so opens the possibility that you will "flame out" with fuel still on board when one tank runs low on fuel. Why? Well, what is easier for the fuel pump to "suck" – fuel in a tank or air in an empty tank?

Remember, historically, most engine failures result from fuel starvation (running the selected fuel tank dry) or fuel exhaustion (running all tanks dry). Obviously, running the selected tank dry while you still have fuel in another tank is the lesser of the two problems. If you ran the selected tank dry, for whatever reason, just select the other tank and hope the engine restarts. If you actually have fuel exhaustion your problem is much worse: your preflight and in-flight planning "sucks" and you just became a glider pilot. Maybe this situation is something to write about in another newsletter; but for now, we will cover the fuel starvation situation.

It's not uncommon in some aircraft types for a delay in restarting the engine when a tank is run completely dry and the selector valve then moved to another, fueled tank. What about the Jabiru 3300 engine that we all know and love? Does it start right away? What are the indications that it is being fuel starved?

When I was in phase one testing on N31BZ, I needed to run each tank completely dry in-flight (not on the same flight) in order to accurately calibrate the fuel sending units. Note, N31BZ has the old style float type gauges, not the capacitance type that the Lightning kit uses. In the past, I have intentionally run fuel tanks dry on purpose when flying my Bonanza on long cross countries. By doing so, I know exactly how much fuel I have on board and thus how long I can continue to safely fly. When a wing tank in the Bonanza would start to run dry, the old reliable Continental would "talk to me" by starting to miss, making it pretty obvious I needed to switch tanks. I would then select the other tank and within a few seconds, the engine would be happy again, and running just as smoothly as a 6 cylinder aircraft engine will run.

Let me add here, that I am a firm believer that an airplane will talk to you if you are in tune with the airplane. With the exception of battle damage, I can seriously say that every in flight emergency that I have experienced, the airplane has given me a hint that something was amiss. You just need to listen to the airplane or engine.

Now back to running a tank dry when flying with a Jabiru 3300 engine. The first time I ran a tank dry in N31BZ I was expecting to hear the engine start to miss a little, then I would switch tanks and have the engine resume its smooth operation. Well, that is not exactly what happened. One moment it was running smoothly and the next moment, complete silence. No engine noise at all, no missing at all, just complete silence. When that Jabiru runs out of fuel it stops. Even though I was expecting it, that instant

silence was a startling moment. The prop was still wind milling and the instant I switched tanks it started again, but it was still an exciting moment.

Since then, I have run a tank dry again on several occasions, and have found that the airplane and engine actually were talking to me. I just was too new to the systems on board to notice what they were saying. Here is what I have since learned. N31BZ has fuel flow installed and this is the key to the airplane and engine talking to me. Just before the Jabiru engine actually quits due to fuel starvation, the fuel flow indications will increase because air in the fuel line causes the fuel transducer to turn faster and this keys the red warning light to come on. If you happen to be looking at the fuel flow indicator you will see a large increase, again due to the fuel flow transducer turning faster. If you immediately change tanks when you see these indications, the Jabiru engine will not miss a beat. You will have run a tank completely dry and will have avoided that “heart stopping” silence when the engine actually quits.

I have mentioned how much I like my fuel flow function in the past because it lets me really accurately plan and fly cross country flights. Well, this is another reason why I highly recommend this feature. It is easy to install, and when you have it calibrated, you will know exactly how much fuel you have on board at any time, and how much flying time you have left at the power setting you are currently using. All in all, it is a great feature to add to your aircraft.

## Final Thoughts:



It looks like the pastor of this church may personally know some of us.

Blue Skies,

*Buz Rich*

[N1BZRICH@AOL.COM](mailto:N1BZRICH@AOL.COM) (Contact me directly for newsletter inputs – I need your help to keep this newsletter both interesting and informative.)