



Arion Hangar Talk

The “Lightning” Newsletter

February 2009 - Volume 2, Issue 2



Jim Langley’s N730AL – “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**.

Contents in this issue:

Page	Page
2 -Lead Story – Joe Cooper	14 – Upcoming Events -
8 -News from the Factory –	15 - Lightning Skunk Works –
11 -News from the Dealers –	15 – Technical Tips –
11 -Current Lightning Dealers -	17 - Other items –
11 -News from Builders and Flyers-	18 -Final thoughts –

And now, the rest of the news.

Lead Story:

*I think you will enjoy the February issue of the Lightning Newsletter for several reasons. First, the lead story this month is by one of the earlier Lightning builders, **Joe Cooper**, with kit #16. His story not only covers some of his building and flying experiences, it also features where he flies his airplane from; his fairly new grass strip on the 50-acre farm in Indiana where he has lived on for over 30 years. Just look up Cooper Field in Greencastle, Indiana. I am willing to bet that many of us have dreamed of having our own private airstrip – I know I have. So **Joe** is living the dream; a beautiful farm with grass landing strip, a nice house and hangar, and a beautiful Lightning airplane to fly. Perfect. Here is **Joe's** story and some great photos of his airplane and hangar.*

Living with my Lightning

I started my Lightning build (kit #16) in the fall of 2006 and brought **N396JC** home to Indiana in the summer of 2007. The great group of people at Shelbyville made the experience of building the plane enjoyable beyond my expectations.

Total time in the plane at this point is around 83 hours. The Lightning was my first homebuilt airplane, and I was in the rental pool up until that time; so this is also the first plane I have owned. I was also considering a used Jabiru, went to Shelbyville, met Nick, and ran into N31BZ, Buz's highly modified Esqual LS- Lightning Stuff. I loved it. At that time Nick said the Esqual was being phased out and the Lightning was coming on board, which made my decision for me.

I have lived on a 50-acre farm for the last 30 years, but only in June of 2007 did I apply for and get zoning board and FAA approval for a private strip. I hired a D-6 dozer to come in and level the ground, but finished it out with tractor and disc myself. The first summer we had no rain, so consequently I had difficulty getting grass to grow. I tried to save what



little grass we had by putting a 300 gallon water tank in the back of my pickup with a 20 foot spray boom. That effort proved to be futile. Finally in the spring of 2008 I had grass growing and the mowing began. Currently I am in the process of extending the strip another 1000 feet as a result of the acquisition of an additional 27 acres.

The more hours I log in the plane, the more I love to fly it. I have been most pleased with the appearance of the plane and overall design and have been asked repeatedly if the jet is a type of Lancair. I also hear radio chatter after take-off saying, "That's one good-looking airplane!"

Other than a flat tire on the taxiway after a landing at the local airport, the Lightning has performed flawlessly. Upon inspection of the tube and tire, we found a small piece of metal which had punctured the tube. We speculated this may have come about when we constructed the wheels near the metal bench in Shelbyville. Likely my own fault! ☹

I brought my Lightning home to *Cooper Field* on Thanksgiving Day, 2008, and have been using this short field landing since. The 2000 foot grass strip has trees at both ends, and has been no trouble for the jet. I renovated a 36x24-foot, three-car garage into a custom built hangar and want to share this affordable plan with the rest of the owners.



To transform the garage, I began by removing the back wall and installing a steel I-beam across the 36-foot span. This addition opened the building up on the west side and I then added a concrete approach and installed two sixteen-foot insulated garage doors. The middle tracks for the doors are attached to an aluminum beam, which is removable with the pull of a pin once the doors are in the upright position. This allows for a clear span of about 33 feet. With a height of approximately 8 feet, the plane fits perfectly. A wall mounted heater and a window-unit air conditioner mean the hangar will be suitable for all seasons. The most difficult part of the renovation was clearing the garage prior to beginning work!

I am looking forward to a *great season of flying from my home strip, Cooper Field, in Greencastle, Indiana.*



Any questions regarding my build or plan for a hangar may be directed to: ljcooper@tds.net.

Joe Cooper

News from the Factory:

SLSA “Lightning Sport” Update:

Quite a lot of activity in Shelbyville this past month as ASTM testing continues for the future Special Light Sport Lightning. This airplane will be called the Lightning Sport with a model number of LS-1. Actual construction started on this new SLSA Lightning (serial number 1) on 5 January 2009, but most of the progress has been towards accomplishing some of the required ASTM testing for basic airframe strength. Below you will see some of the test rigs that were used to verify the strength of the Lightning design. So far, all systems and components have passed with “flying colors” as the original Lightning design was more than strong enough to meet the required standards. In addition to testing and building the ASTM-compliant airplane, the Lightning crew has also spent a lot of time updating the construction manual. So not only will future ELSA Lightning customers benefit, but the EAB Lightning customers will also end up with a more complete builder’s manual.

And speaking of manuals, while **Nick** and **Mark** are working on the Construction Manual and other ASTM required paperwork, **Pete** is working on the Maintenance Manual. **Linda Mathias** and **I** are working on the Pilot’s Operating Handbook (POH) and hope to have the first draft completed about the time this issue of the newsletter is released. As usual, this airplane cannot fly until the weight of the paperwork equals the weight of the airplane. By the way, the N-number reserved for the SLSA Lightning demo is N325AL.

Specifically, **Nick** reported that a lot of work has gone into the configuration report (an ASTM requirement) and that it is already over 20 pages long. Also, the pedal testing went well as they loaded up the test rig to 400 lbs for the pedal system and 200 lbs on each individual pedal. The minimum requirement is a mandatory 130 lbs with an additional safety factor of 1.5, so obviously the Lightning pedal system passed this test requirement.



This above photo shows the set-up for the rudder pedal test.... (the important part being a Chevy truck!) It was a tug of war between the truck and the forklift with the pedals in the middle! We anchored the aircraft tail to the bumper than put scales between the forklift and the pedals. By tilting the forks back we were able to apply the required force of 200 lbs per pedal, or 400 lbs total to the set. Passed – no problem.

The next series of photos shows the rig that was used to test the motor mount to see if it could withstand the required loads. By definition, an ASTM-certified SLSA is only required to be certified to a maximum of 4 Gs positive. A down force of 1058 lbs would be the equivalent of 4 Gs on the motor mount. Also, the motor mount is required to withstand a side force of 406 lbs for max power torque.



This photo shows the engine mount test rig. The long arm is for positive limit load testing and the arm sticking out the side of the engine is for the max power torque limit load. Both arms are set so that they are acting thru the engine CG.

Nick reported that the results of the test were that the motor mount withstood 1200 lbs of positive load and 800 ft lbs of torque load. These loads are both 13% over the required load with a safety factor already applied - well beyond what was required. As **Nick** said, "You know us, go big or go home."



The photo below shows the drop test rig. The white pole in the center of the cockpit is a “deflection rod” and is how the amount of gear deflection is measured. There will actually be two drops, one from 33 cm and one from 50 cm (that is about 13 inches and 20 inches), and the purpose of the drop is to determine the amount of gear leg flex. Once the amount of gear leg flex is known they will be able to calculate the gear leg shock absorbing capability.



Lightning Sport “drop test” rig with deflection rod in place.

24 Jan 2009 Update: Nick just called from the Light Sport Aircraft Expo at Sebring, Florida. Pete, Nick and Mark “Possum” Phillips are there from Shelbyville. Nick reported that attendance was good with lots of interest around the Lightning booth. Several Lightning owners had come by the booth to say hello and, hopefully, some of them will send some photos of the event. As far as an update on the SLSA, testing will continue when he returns to Shelbyville and the drop test is scheduled for next week (last week in January '09). Actual building of the Lightning Sport (N325AL) is underway with initial flight testing scheduled to commence in March. The overall goal remains to have the first ASTM-certified SLSA Lightning Sport LS-1 on display at Sun-N-Fun. Everyone should start planning now to attend this year's first major general aviation event of the year. See you there.

Lightning Sales Update:

Mark Stauffer, Production manager for Arion, sent me the following summary of Lightning aircraft activity:

- Since April of 2006 they have sold a total of 77 Lightning kits. The most recent was to **John Krizman**.
- A total of 38 Lightnings have now flown, with the most recent being **Steve Belie** of Australia.
- 38 flying out of 77 sold represents a completion rate of just over 49%. Amazing.
- 22 Lightnings had their first flights in 2008.

Overall, the above numbers represent an amazing accomplishment for a small company like Arion. That kind of performance can only be because they have a great product with great product support, and a staff of dedicated workers. Keep up the outstanding work, Arion.

Mark also sent some additional photos (see below) of **Bill Strahan's** Lightning which made its first flight on 19 December, 2008. It was the 37th Lightning to fly.



Bill Strahan's Lightning (N197RW) and panel are shown above.

Most of you know that **Mark**, besides being the Lightning production manager, is also building an aluminum airplane in his garage. Yes, he builds Lightnings all day then goes home and "cuts tin and bucks and pulls rivets". Now that is dedication to airplanes. I have had the pleasure of visiting **Mark's** project several times and I can report that he is doing a fantastic job on his Zenith Zodiac 601XL. In my experience as an EAA Technical Counselor I have seen many projects and Mark's is one of the best – a future award winner. Below are some photos of **Mark's** project and some of his words updating us on his hobby of building airplanes.

Buz, Here is a picture to prove that I'm still moving forward with the plane. The wings are on with temporary spar bolts. The dihedral was within .1 degrees, angle of incidence within 0.0 and from the wingtips to the center line of the tail within 1/16". I hope she flies straight. Next is rigging and flap travel. The light at the end of the tunnel is getting a bit brighter.



Tomorrow Mark Phillips (Possum - the RV-6 guy that works in the Jabiru hangar with Ben and the guys and also my tech counselor), Ben and probably Katie are coming over to help remove the wings, install the control cables and then rig it. After that, I have to install the aileron and flap stops, set the final positions for the micro switches for the flap motor and a host of other small details. Maybe by the end of the month she'll be in paint?? After that it's wire up the panel and go!

Take care!

Mark (You can reach Mark at: mark.stauffer1@gmail.com or mark@flylightning.net)

News from the Dealers:

From Lightning Australia:

I received the following message on 3 January 2009, so I suspect the flight was earlier in Australia.

Hi Buz, **Steve Beile's** Lightning Kit # 35, flew this evening with good results approx 2 Hrs
Dennis & Angela Borchardt
Lightning Aircraft Australia

Gday Buz,
A little info, Owner builder--- Steve Biele, Location--- Meadows, South Australia. (near the city of Adelaide-- God`s country), Kit # 35, First flown----- 3 January 2009.
Thanks, Steve



Steve Biele's Lightning (19-5562) and panel are shown above.

Aussie Travel Log - This next entry comes from **Pete Disher** (pjdisher@bigpond.com) and has some great photos made during his first flight of 2009.

G'Day Buz,

I'm a few days late this year, sorry, will get it right next year. A few pictures of our eastern coast line, 8nm east of Taree and 120nm North of Sydney.



Forster Tuncurry Inlet into the Great Lakes.



Town of Forster; old airstrip in background on island.



Forster Tuncurry looking North.



Looking South from Crowdy Head to Harrington Inlet and Forster 22nm further South.



South to Forster Tuncurry and the Great lakes.



Our East coast - looking North to Harrington Inlet.



My loving Speed Bird



Pete's Instrument Panel.



Crowdy Head looking south, Sydney 145nm.



Approaching Taree to the right.



Taree Airfield YTRE

Current Lightning Dealers:

Arion Lightning, LLC, contact Nick Otterback, Shelbyville, TN, 931-680-1781, 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

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:

*This first message came in from **Walt Mefford** and talks about the mags on the Jabiru engine. He says they are similar to those found on his Ford Model T. Walt is the fourth owner of this "T", his father was the third, and a friend of their family was the second owner. He went on to say that his grandfather flew until he was 91 years old. I hope we all are that healthy.*

I am sure that someone besides me has noticed this but when I finally got around to looking at the magneto on the Jabiru, what a surprise to see that the design was the same as used on the Model T Ford. My Ford will be 97 years old in March and as far as I know the magneto as never been touched other than to have the magnets re-magnetized. This says a lot about the reliability of the design.

Walt Mefford



Walt Mefford's Ford Model T

*The next message is from **Wayne and Nel Lenox**, the "Sheriff" and First Lady of Lakeside, AZ.*

Buz, Nel and I decided to enjoy your annual New Year's Day tradition. We enjoyed five stops and 2.5 hrs of zipping around AZ. The weather was questionable. Started out at 10:00AM with clear skies and 62 degrees, wind NW at 3 gusting to 31/2 (*Wow, tough conditions*). In the afternoon the temp went to 72 degrees with calm winds. The attached pictures are of Nel in Marana, AZ (AVQ) just after lunch. We were then off to Greg Hobbs airport for the afternoon. Thanks for starting this tradition!!
Fly Safe in 09

Wayne (*Wayne can be reached at: waynelenox@juno.com*)



Wayne and Nel are planning a Lightning Fly-In at their place on the 7th of February. For all of you that live anywhere around Arizona, be sure to attend their **LAKESIDE LIGHTNING SHOW AND TELL**. It is for anyone interested in the Lightning, not just current owners. Show time is between 9 to 10 AM and **Wayne and Nel** will furnish the lunch and everyone else will furnish the "show" by having their Lightnings on display. It should be a great time to meet other Lightning enthusiasts and to share information and ideas. Contact **Wayne** to let him know you are coming. 602 615-4132 or waynelenox@juno.com

*The next message and photo is from **Allan Maxwell**, an Esqual owner and flyer from Louisiana.*

Buz, Here is today's picture of me and my Esqual. The airplane flies great and I have put 110 hrs. on it since it was purchased in Oct. 2007. I had it laid up for a wing tank fuel leak for 2 months. I would like to find out about heavy stick only with flaps. Is that normal?

Thanks, Happy New Year and Happy Flying,

Allan Maxwell allanmaxe@yahoo.com



*Below is a copy of my answer back to **Allan**. Remember the original Lightning bungee trim system is very similar to what was in the Esqual, so these comments apply to bungee trim equipped Lightnings as well as Esquals.*

Allen,

My guess on the heavy stick force you are experiencing with the flaps down is due to the bungee trim system that is out of adjustment. The bungee system needs regular adjustments due to it losing elasticity with age or change in temperatures. The only permanent fix is to change to an actual trim tab like Nick developed for the Lightning.

Blue Skies,

Buz

Hi Buz,

Happy New Year. Couldn't fly new year's day so I went the day before & the one after & again tomorrow, hope that's OK. Buz perhaps in your next new letter it may be an idea to warn our builders against starting their test flying before the gap between the wing root & the Karman is taped up. We had a guy here send someone up to do his first flight before this gap was closed & luckily this guy has considerable experience, he said it is not very pleasant to fly without & especially so for a low time pilot. After speaking to the builder he said nowhere in the manual does it say not to fly the aircraft before this gap is closed. To my way of thinking that should be part of completing the aircraft before test flying, but obviously everyone does not think that way. Perhaps this could be pointed out to our builders this must be done before flying.

Dennis & Angela Borchardt angeladawn@bigpond.com
Lightning Aircraft Australia

*I am frankly surprised that anyone would even think of making a first flight **without** the wing root gap covered, but I passed the above comment to **Nick**. Many of you probably read **Nick's** comment about the wing root gap on the Lightning list, but just to make sure everyone gets the word, below is his message.*

I will have to take the blame for this one and I am sorry for not having it the build manual. During the first flight of the prototype we noticed a heavy buffet in the tail plane when in high angle of attack situations. Like slow turns, say under 110kts. Or slow with no flaps. Without the gaps between the wings sealed there is a significant root wake formed. This will buffet the tail plane when the tail plane is down in the situations listed above. The wake is created thru the gaps and the spar and other attachments which cause very good turbulence. With the gap sealed, there is no buffet, i.e. smooth airflow about the fuse and tail plane. I have been guilty of forgetting myself on a few occasions with the exact same results. No it is not fun and will give you quite a pucker factor....discontinue the flight as soon as possible if you have forgot and find out on the first flight! So, seal the wing root gaps!!!

Nick Otterback
Arion Aircraft, LLC

G'Day Buz, and happy New Year, 2 Jan

I've wanted to ask you for your mailing address. The guys here took a DVD of my first flight and we did have a few problems. I would be very happy to send you a copy.

The problems I had were: 1. Fuel flow too low for climb power, I only had a maximum of 25 Li/hr to the carby. Why? I'm using a Revmaster Carby and you have to control the volume of fuel to it and I goofed. Your email in November mentioned at WOT you were using >40Li/hr, I adjusted the fuel to my Revmaster Carby to 47Li/hr and its working well, and on the plus side I can adjust the mixture in the cockpit and it has idle cut-off, I like it.

The next error was my airspeed. It was showing 23 kts slower than actual and couldn't understand why I was not getting 135 like Anthony's aircraft in VIC. I put the static points 9 Ft back from the firewall and goofed again. Why did I not use the pitot tube supplied with the kit? I wanted AOA. Dynon and its pitot did not have static. What a wank. I'm still using the old ASI; it is so easy to use. Airspeed seems all good now - at 3000 rpm I have 136 at 2000 feet and the engine will certainly over rev the 3300. Maybe I can add some pitch to the prop. I'm 20 deg (50" pitch) at present and seems to climb well, at 100 about 1400 F/M with weight of 1230 lbs and 86 degrees F.

The next problem was probably a real problem - I had the wings shimmying from about 2/3 out. I believe it is called 'aileron flutter'. I took up two and a half washers in the endplay of the aileron bell cranks in the wing and I replaced all the castle nuts and cotter pins and Nylok nuts on all the rod bearing joints and hinges to the aileron and this locked them all up tight. All flies well and smooth now.

I always had trouble with the battery; I replaced it with the PC925 Odyssey, just great.

What a magnificent aircraft to fly, you just guide it through the air like a missile, and the comments I get when I circle people's homes is, "By Christ, its fast and it sounds and looks just great". Where you point it is where it goes and I can understand now how a man of your background enjoys the Lightning. I certainly have no disappointments; it is a far lift from my old Archer.

I think I need to get this information to Nick; he certainly has designed an aircraft, second to none.

I've got 15 hours now and when I look at the program of the test flying to do it seems never ending.

Again, have a good and safe year.

Pete D
VH-PDI pjdisher@bigpond.com

Hi again Buz,

Interesting reading of the weather in the states. It is about 38C outside at the moment (11.45am) and will get hotter today – somewhat of a contrast! I would like to add some color to my Lightning but the outside temps are causing me to probably stick with white or silver. Even with white if we leave aircraft sitting in the sun when there is no wind, the surface temp can go well over 45C. I Am thinking of buying a remote temp reader to measure actual temps on aircraft surfaces to aid in decision making. Still – we have no issues with any fluids freezing

Cheers!

Wayne P, Perth WA Wayne@lpwa.net

Wayne,

Nick did some surface temp testing at Sun-N-Fun last year on the new silver demo aircraft. I don't remember the actual numbers but they were well below any danger point. I borrowed the handheld temp tester and also did some comparison test on various other composite aircraft on display. Obviously white was the coolest, but not that much cooler than the silver. The hottest was on a maroon colored nose section on a new factory Cirrus. Again, sorry, I don't remember any of the actual numbers. Nick probably has them written down somewhere. I feel sure that if you stay with white or silver as your primary color you will be good.

Buz

Talking with Nick recently on another subject, he told me that he was helping Lynn Nelsen put an aileron trim on Lynn's Lightning. Below are Lynn's write up and some photos of the modification plus his airplane parked in a beautiful Florida location.



I took a couple passengers for a ride in my Lightning, after I had gotten it trimmed up for me as single pilot. I instantly noticed that I needed a significant amount of left aileron to compensate for the extra passenger weight. So I decided to take the bullet by the horns and install an aileron trim. Fortunately for me, I had to take the airplane to Shelbyville for some other needed work. I was able to enlist the advice of **Nick Otterback** on where and how to install the servo.

The servo has been placed in the left aileron, near the leading edge on the inboard side. I made an aluminum plate (.032) to fasten the servo to the bottom of the aileron. A couple of nylon washers on each servo hold down screw moved the servo into an alignment that provided enough trim tab movement. I made a trim tab about 1 X 7 inches and fastened it to the aileron with $\frac{3}{4}$ X $\frac{3}{4}$ light weight aluminum hinge. I used the Ray Allen T4-5 servo, their 5 wire Teflon installation wire and the RS2 rocker switch. I obtained power/ground from the Composite Design Inc trim relay buffer board used in the Lightning.

The installation was made easier by wing removal, which allowed me to run the wire in the same channel as the aileron push rod. I tied the wire to the tube and bell crank to facilitate getting it routed to the aileron. I have only the flight home from Shelbyville to compare before and after, but it certainly seems to do the job.

Lynn Nelsen



Left - Lynn's aileron trip tab.



Right - Trim "rocker" switch on the center console.



Lynn Nelsen's beautiful "jet" in sunny Florida.

Flight Safety:

Craig Sumner, an Esqual owner and Lightning enthusiast, has kind of become the Lightning Newsletter Flight Safety editor because he has now given me two suggested safety articles. That fact makes him eminently qualified to be our safety editor. Well, that plus the fact that he is an aerospace engineer and works in "the industry" as a Chief Engineer, Space Shuttle Propulsion Elements, United Space Alliance. Craig's article this month comes from an accident at Moontown Airport in Alabama. Some of you may have visited Moontown as they have an EAA breakfast one Saturday each month that is often attended by the Lightning guys in Tennessee. Craig can be reached at: Craig.E.Sumner@nasa.gov

Buz, The NTSB just released the results of the accident/fatality last year at Moontown Airport that reminds us all of the importance of good checklist discipline. An experienced pilot took off with the fuel selector in the off position! That gave him just enough fuel to get airborne with only 50 feet to recover from his costly oversight. How long will our Jabirus run with the fuel cutoff switches in the off position?

The NTSB report (<http://www.nts.gov/ntsb/GenPDF.asp?id=NYC08LA270&rpt=fa>) is listed below.

Craig E. Sumner

On August 5, 2008, about 1440 central daylight time, a Piper PA-12, N7820H, was substantially damaged when it impacted a soybean field after departing from Moontown Airport (3M5), Brownsboro, Alabama. The certificated private pilot and his passenger were killed. Visual meteorological conditions were reported, and no flight plan was filed for the local personal flight, which was conducted under the provisions of 14 Code of Federal Regulations Part 91. The pilot and passenger were planning to fly over the passenger's corn field to take photos of a corn maze. According to local police officials, the airplane had just departed runway 27, a 2,180-foot-long by 160-foot-wide turf runway, climbed to approximately 50 feet above ground level, before impacting the ground in a nearby field. A witness, who was in a house near the accident scene, stated that she saw the airplane takeoff and climb to a point "about tree top high." It "then went down behind the trees," and that was followed by the "sound of a crash." The witness then observed a plume of smoke rising from behind the trees. Another witness reported that he did not see the airplane in flight, but he heard the engine "falter" and subsequently heard an explosion.

TESTS AND RESEARCH

The fuel selector valve was examined by a mechanic and by the FAA inspector on scene. With the handle in the position it was in at the time of the accident allowed two of the three orifices to be closed and only one of the three orifices open. The fuel selector valve was forwarded to the Safety Board Materials Laboratory. Examination of the fuel selector valve revealed that the inner valve orifice was open to only the right port and in that configuration there could be no flow through the valve, therefore the valve was in the OFF position.

ADDITIONAL INFORMATION

In an interview with investigators, the owner of the airplane stated that when he parked the airplane on a ramp, he normally placed the fuel selector valve in the "OFF" position, in order to prevent wing tank fuel from draining out onto the ground through the carburetor. He further stated that with the fuel selector valve in the "OFF" position, there is enough fuel in the lines and collector tank to allow the engine to run for approximately six minutes. This was corroborated by other PA-12 pilots. One pilot stated that at idle the engine will run for approximately 12 minutes with the fuel selector in the "OFF" position. He added that depending on the length of the taxi, if the airplane is taxied to the runway and then takeoff power is applied, the airplane will climb to approximately 50 to 150 feet agl before the engine is starved of fuel.

Upcoming Events:

7 February – Wayne & Nel Lenox’s Fly-In Lunch at AZ05, Buckeye, AZ.

RSVP to: waynelenox@juno.com

21 to 26 April - Sun-N-Fun at Lakeland, FL.

Arion Lightning will be in Booth LD005.

30 to 31 May - Virginia Regional Festival of Flight.

27 July to 2 August - Oshkosh AIRVENTURE.

The Lightning booth will likely be in a new location this year at Oshkosh. Lots of growth and improvements of the entire convention area are in progress. These changes are designed to make the entire Oshkosh experience more enjoyable and easier to “navigate” as convention attendees walk from place to place.

25-27 September (most likely date) - Lightning Fly-In at SYI.



Lightning Skunk Works:

This month I am including two “Skunk Works” photos for you to think about. The photo on the left is something the SYI skunk works “might be” working on in their spare time. The photo on the right is being worked on at an “outlying” Lightning skunk works site. In case you don’t recognize what it might be, think about a true Horner wing tip that includes a winglet. The combination will reduce wing tip drag caused by vortices and make the wing “think” it is longer than it actually is. Great engineering? Time and flight testing will tell, but I think it will reduce drag enough to be well worth the effort.



Technical Tips:

The following excellent technical tip was received from **Clive James** on 31 December 2008. He is a current Esqual builder and flyer in the U.K. and can be reached at - clive.james@uk.bp.com. Clive has previously built a Jabiru aircraft fitted with a 4 cylinder Jabiru engine, so he "knows his stuff". Following Clive's suggestion is a comment by **Gary Pennington** about his Lightning and a similar tech tip.

I liked the idea that someone else had to stop flexing the rudder cable ends but wanted to reduce the amount on length lost and also make the strength of the attachment not an issue, pivot from the centre etc. I'd had criticism from the PFA about the stress on the cables when I was there in September so something had to be done. There isn't a lot of room as you'll recall from the standard set up its close but there's clearance enough. I've lost about 1/2" each side but the way I'd fitted the top pulleys in the centre of the plane I'd shortened the cable well doing the build.

Regards, Clive



Good morning James,

I really like the looks of your brackets....it appears they are machined from aluminum. Very nice.

I made the same kind of brackets for the rudder cable ends on my Lightning from stainless steel flat

stock. They flex in multi-directions with no binding. I had to shorten the cables and turnbuckles more than I wanted, but they still seem to be safe. I understand that Arion Lightning has the cables made for them. They could order shorter cables and use this type of installation.

Thanks for sharing.

Gary Pennington pennington@g.com

*Next tech tip comes from **Tex Mantell** and is about a Champion spark plug that he uses on his Jabiru engines.*

Enclosed picture is of the plugs in the Jabiru engine. The one on the left is the standard D9EA which has a 3/4 inch base. The one on the right is a direct replacement Champion RA4HC which is a 5/8 inch base. You see that the mounting of the CHT ring is much easier and has less chance of being damaged.



Tex wb2ssj@frontiernet.net

*Editor's note: I have also used the Champion plugs on my 3300 Jabiru engine. Sometimes they are easier to find at auto parts stores and **Tex** is right, the smaller bases on the Champions do give more room for the CHT washers.*

*The next tech tip entry comes from **Brian Whittingham**. Although **Brian** now lives in Houston, working in the aerospace industry, he used to be in Shelbyville and did some flying for the Lightning guys helping to fly off hours during the phase one testing. Brian can be reached at: dashvii@hotmail.com*

Buz,

Do you have a good straight on picture of your fuel valve selector? It's such a simple part, but I remember that being a wonderfully designed part. I also liked that you couldn't go to off accidentally. Is your fuel valve a left, right, both, off all at 90 degrees apart? It might be worth a little blurb in your newsletter to "review" that piece of hardware. Thanks, Brian W.

Brian Whittingham

*The fuel valve that **Brian** is talking about is an **Andair Fuel Valve** from the UK. I chose it for my airplane because you only had to move the selector knob a total of 90 degrees to go from one tank to the other. Previous selectors required a 180 degree turn. Also, the design prevents you from going to OFF unless that is really what you want to do. When I chose this model it was brand new and not yet available in the US, so I had to get it directly from England. Now it should be available everywhere and several Lightning builders have used this same unit.*



Cold Weather Starting

If you have a good warm idle set of around 800 to work from then you know your throttle plate will be in the correct position at idle. Your idle mixture should be about 1 ¼ turns out in the cold and a coil cap of

0.010...it is possible that it is a bigger gap and will start when warm but not really cold. Also if you have read the service bulletin from Jabiru to move the engine ground strap to the long AN3 starter bolt than this should be accomplished too, adds a good deal of revs to the starter. With the throttle closed and the choke completely on pull 6-10 blades thru and then get back in she should start. This used to work all the time in WI it pretty cold there.

nick

Reader Feedback:

I received the following message during January and thought it would be interesting reading for the newsletter. It represents how important the entire Lightning community is to all of us as well as to future Lightning builders and flyers. Keep up the good work out there, guys.

Dear Buz,

I'm **Greg Crouchley**. We met at OSH this year when you came over on the cart to the Green Landings booth. I WAS the owner of the SkyRanger / Jabiru 2200 that **Ryan** was showing. I sold it (by accident?) at the show to a gentleman from Oklahoma! I returned to Green Landings with **Ryan** in **Buddy Carlisle's** (then short-wing) Lightning. My first extended flight lesson in a Lightning.

I returned to Green Landings and started ANOTHER SkyRanger with **Ryan** - this one a short wing with Jabiru 2200 also. She is almost ready to bring to life for the first time.

A funny thing happened on my "Journey to Inspection", though one I'm sure you've seen before. I flew a lot with **Ryan** in a short wing Lightning, and logged many flights with **Buddy**, even some left seat time, in the now-long wing. About a month ago I could resist the Sirens no longer and ordered a Lightning. It will be a Green Landings Build Center project and I HOPE to get her airborne by OSH 09.

Back-story: I am a low time Sport Pilot trained 90% by Jimmy Long at Green Landings. 3 years ago I decided that being 45 it was time to revisit my teen year's goal of becoming a pilot. After consultation with wife and daughters, I set off to earn my Sport ticket. A few twists and turns and I found myself at Green Landings, building a SkyRanger while learning to fly her. A trip to Shelbyville followed for the Jabiru engine class, and a few nights with Ryan's troupe in Lakeland 08, talking Lightnings over hot dogs and burgers at the 'Lightning Hotel' with Nick and Dana, Pete, et al, as well as all the Green Landings guys. Jimmy and I flew my SkyRanger there, too...my first real x-country. A business trip allowed me to stop by Greg Hobbs place this fall and see his terrific builds and shop.

Anyway, my late start at aviation, meaning having a family, kept my mission focused on safety and fun, but not aerobics, low passes, or high-G maneuvers. Rather, I love seeing the world from my 500-1000' AGL god-seat. So, for this mission, the SkyRanger was, and still is, perfect. However, we live in Rhode Island, a mere 6.5 hours from the Build Center when I "fly" at 2' AGL in my Jeep (10 last evening in the snow storm!) I have never brought my SKR to RI yet, although I am dying to fly the 'neighborhood' and look around.

I have been able to fly a SKR/Jab 2200 at Green Landings whenever I'm there (a surprisingly often event) as a friend has his there, and can say it feels like an 'old glove' to me now versus the trepidation days of my first solo. So, familiarity, hanger talk with all the current and past SKR owners there, and my trips to Sun-N-Fun and OSH, has replaced 'nervous' with 'respect'. Yet still the mission remains unchanged.

The more I get to fly the Lightning, the more I realize this airplane is everything I IMAGINED flying would be like when I was relegated to ONLY a dreamer. In the short wing, for some reason, the more I fly it, the more I am 'getting in front' of her, yet the more, for some reason, man and machine are communicating'. Can't describe in words the UNIQUE sense this plane and I are developing. I was afraid my limited experience and skills would violate my mission with a plane with this performance profile, (read...'I'll probably crash and kill myself!) and I was actively NOT interested in owning one. But with time in the seat, the Lightning is connecting with my nervous system. If you have ever spent any time in the Porsche Boxster, it is the closest auto experience I can identify. The Boxster reacts to my thoughts. The car itself becomes invisible to the ride, though with a TOTAL performance envelope that is breathtaking and fun. This is what I feel happening to me with the short wing Lightning. (The long-wing has not affected me the same, so despite all info on the site, I get to fly both back-to-back and 'makes my choice'. Therefore, as of now, am building the short wing.)

Sorry for the long yak. Here's my point....The process of MY Lightning choice is completely different than the process my friend Jim Langley went through. The confluence of Ryan, the Green Landings community, Nick, and the plane are all significant factors in my decision, obviously. But there is something else. Something also hard for me to put into words. I suspect it is the same 'something' that Pete and Nick tapped when they asked you to test the new bird. Experience, knowledge, scientific tests, willingness to report it, and good cheer is that 'missing dimension'. It is the 'emotion' factors...fear, nervousness, excitement, fun, satisfaction, etc. that drove my decision, and without your contributions, I would not be 'in the club' right now.

Simply put, you have given me the confidence in the plane through your reports to let me develop a fair set of personal limitations and a training schedule that I'm moving forward and building my Lightning. I think I am moving into a new level of flying satisfaction that I sincerely think I might have missed were it not for your reports. THAT to me is the value of the newsletters. They are the 'Library of Confidence'.

I appreciate the community the letters create and focus, and am certain I cannot understand the workload for you and Linda. Format aside...newsletter, website, 'Vans AF', whatever is decided, I hope you will continue to test, enjoy, teach (techniques for landing, takeoff, maneuvers, emergencies, practice missions, etc.) and communicate your experiences with the Lightning. Your personal history, experience, knowledge, and style are as much 'Lightning' to me as is Nick himself.

Sincerely,

Greg

A New Lightning Customer crouchley@mac.com

Other Items:

Please indulge me a little on this next write up. It has absolutely nothing to do with the Arion Lightning that we all know and love. However, it does have something to do with a life style and a type of flying that I spent 28 years of my life doing. I hope you enjoy learning something more about the latest operational USAF fighter, the F-22. Heck, maybe Nick will get some ideas for the next generation Lightning, the LS-2.

F-22 BRIEFING

Below is a summary of a declassified briefing from late last year on F-22 operations by two pilots of the 90th Fighter Squadron, presently in Alaska at Elmendorf AFB. They were unassuming young fighter jocks who looked remarkably like I did 40 years ago – plenty of hair and no beer gut. While they tried to keep the briefing low key it was obvious they know their “jet” is superior in capabilities to anything else in the world. I certainly agree with that assessment.

PERFORMANCE

They didn't talk much about specific performance of the Raptor but most of you have seen demo flights at Oshkosh and Sun-N-Fun. An Energy Maneuverability chart showed the ability of the F-22 to sustain a 5 G turn at max power up to 54,000 feet at about .95 Mach. At Mach 1.8 it can sustain a 5 G turn at 62,000 feet. Amazing. As a comparison, looking at an old EM chart for the F-15 shows that it can maintain a 5 G turn in full power up to about 30,000 feet. I need to get out some of my old F-4 manuals, but I seem to remember that an F-4 could maintain a 5 G turn at max power at maybe around 5,000 to 10,000 feet. I don't believe an F-100 could maintain a 5 G turn at any altitude. By this I mean you could go as fast as you want on the deck in full burner, enter a 5 G turn and you would begin to lose energy, eventually falling below 5 G's. Maybe some of my fighter pilot buddies that were operational in the F-100 and read the Lightning Newsletter will let me know. (Dale?)

COMBAT CAPABILITY

The unclassified briefing was eye watering. In mock combat against the F-15 Eagle, the Raptor guys said that it didn't matter how many Eagles were against the Raptor. Kills were only limited by the numbers of weapons carried by the Raptor. First of all, the F-22 cannot be seen by the enemy radar – either ground based or air to air. It does not use active radar like other fighters. Yet it has a complete 360 degree threat awareness capability, seeing everything above, below, and all around. This includes all aircraft in the area and all missiles on the ground around it.

The F-22 is tied into all others in his flight and sees everything that all F-22s in his flight sees and everything (that he wants) that an AWACS sees, if one is around. He sees this in an easy to read, all purpose scope that has user friendly displays. For example, friendly aircraft are displayed as green blips on his scope, enemies are red. They say, “If you're red, you're dead.”

They can engage multiple enemy targets with their fire-and-forget, all aspect missiles (the latest Sidewinders, AMRAMS and Sparrows). They have multiple communication options including scrambled audio that can be used within their own flight only, if they so desire. They can also coordinate information through a system they call “High Fiddle” which is High Frequency Data Link. They have sensors that let them look through the floor of the cockpit, so to speak, electronically, and see missile sites on the ground, displayed on the scope with SAM rings depending in size on the type of missile

detected. They practice coordination with F-15s/16's and can guide the latter to avoid having them flying into the SAM rings while the F-22's can move through them without worry.

The F-22 radar keeps track of all targets by shooting out pencil beam radar signals, lasting fractions of a second that gives them heading, speed, and type aircraft information. And it does this automatically, keeping track of all aircraft in the area. The radar, on its own sends these signals out periodically to keep track of the targets around without giving away its own position.

All weapons (including JDAMS if needed) are carried internal. When they fire a missile, the bay doors snap open, the missile fires and the doors close immediately. Only in the second or so that the doors are open is there any radar reflection area to be detected.

They have variable nozzles for the engines which allow them to appear to defy the laws of physics while maneuvering. These nozzles move left, right and up and down, allowing the aircraft to move laterally and to engage in any attitude. In other words a fighter could be chasing an F-22, assuming he could find it, and the 22 could turn laterally and fire its all-aspect missiles from any position or attitude.

At one point, one person attending the briefing said something like, "I guess you guys can fly circles around the F-15's." One of the young Raptor pilots spoke, almost under his breath, saying, "Well, that's basically what we do."



Final Thoughts:

Bounced landings result from one of three conditions:

1. The pilot does not arrest descent by flaring and the airplane impacts hard and then rebounds from the surface;
2. The pilot attempts to touch down at too great an airspeed, while the wing is still developing excess lift, and the aircraft skips back into the air; or

3. The pilot relaxes elevator pressure at the point of touchdown, reducing the wing's angle of attack from a stalled condition to one that generates enough lift to put the airplane momentarily back into the air. (No, I am not talking about a tail wheel airplane.)

There are three main hazards with bounced landings:

1. Aircraft damage from the initial impact, such as blown tires or damaged landing gear components. This can also cause loss of directional control and additional damage or injury.
2. Damage to additional aircraft components as a result of "crow hopping" or dropping it in on subsequent touchdowns. This often causes propeller strikes (and costly engine teardowns), more substantial landing gear damage, and sometimes buckled engine compartment firewalls and other structural items.
3. Runway overrun from a bounced landing where the pilot recovers, but in a position where there is insufficient runway remaining to stop. Don't hesitate to go around if things do not look good.

Airspeed control is the key to a smooth, accurate landing. Too fast on short final can be as disastrous as too little airspeed. Focus on proper airspeed control on every landing so you'll be less likely to bounce one in.

Blue Skies,

Buz Rich

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

Check out below to see what might be coming after the F-22 and the F-35?

