



Hangar Talk

The “Lightning” Newsletter

February 2010 - Volume 3, Issue 2



Lynn Nelsen’s – “Lightning of the Month”

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

The newsletter goal is **to get the word out** on happenings at Arion Aircraft, and **to give a voice** to Lightning **builders and flyers**. To be successful we need your inputs. So it is not only a way for the factory to provide Lightning news, but it is your newsletter as well, and its success will depend on you getting involved to spread the word and to help other builders and flyers. So think of this newsletter as an “exchange of information publication”. Send your inputs directly to: **N1BZRICH@AOL.COM**.

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And now, the rest of the news.

Lightning of the Year for 2009

Before I announce the overall winner, I would like to thank everyone who took the time to vote for the Lightning of the year. Overall, we had a pretty good voter turnout (democracy at its best) and many of the monthly winners got great support. In fact, there were four aircraft that actually got 77 percent of the total votes and the top two of those were extremely close. Heck, I might as well tell you that the winner only won by two votes, and the third and fourth place aircraft were tied, at only one vote being number two. Wow, only four votes separating first place and the two Lightnings tied for third and fourth. That was a close contest!

The top four candidates in the order that they were monthly winners:



The Arion Lightning Silver Demo – January 2009



Jim Langley's N730AL – February 2009



Ron Ritchie's TDT – April 2009



Steve Biele's 19-5562 – July 2009

And the overall winner of “Lightning of the Year for 2009” is:

Jim Langley's N730AL.



When I asked Jim how he happened to pick the colors for his Lightning he explained to me that orange and black are the colors of his and his son's favorite baseball team (I am guessing that is not the Green Acres Mud Hens). Jim went on to explain that 730 is July 30th, his wife's birthday, and the AL is Anna Langley, his granddaughter (but also could be Arion Lightning). Looks to me like Jim had the bases covered – a smart man.

Congratulations to Jim and to N730AL!

We will plan on running another Lightning of the Year contest at the end of 2010. We already have two great competitors lined up, Tex Mantell's January Lightning of the month and Lynn Nelsen's Lightning for this month. Please send a photo of your Lightning for consideration for a future Lightning of the Month directly to me at N1BZRICH@AOL.COM

And speaking of future newsletters, in the **March Lightning Hangar Talk** you can look forward to some photos and a write-up from the Light Sport Expo at Sebring and another great travelogue by Peter Mitchell from Bunbury, Western Australia. In a previous newsletter Peter had written an article for us that covered his trip home after completing his Lightning. Next month, look for Peter's article and photos about his trip around the top of Australia.



Lightning of the Month for February 2010

As you saw above on the first page of this issue, the Lightning of the Month for February 2010 is Lynn Nelsen's N13LN. I am happy to be able to provide a little extra something for this issue of the newsletter, a showcase article by the owner of this aircraft. Most of you know Lynn Nelsen from write ups by him (tech tips, etc.) in past issues of the newsletter. Below are two great articles by Lynn on his airplane and his home airport. First, his beautiful Lightning.

Buying and Building the Lightning by Lynn Nelsen



I had been trying to convince my wife to let me paint the Bonanza for a few years. I bought our first airplane in 1968 (1947 model Bonanza), and we owned the last one of six for over 22 years (a 1965 S model Bonanza with lots of modifications). When I completed the annual inspection in March, 2007, I noted several little spots of corrosion forming under the paint. My wife said no to a paint job, so my response was to say "OK, we will have to sell it then," to which she immediately agreed. I had to have an airplane, so I started looking for a replacement. In my thought process were things like cost, maintenance, how long will I have a medical, as well as performance for limited cross country flying. I initially settled on a Zenith CH 601 and I purchased a used one with about 120 hours TT.

On the flight home (from southern California) to central Florida I started to notice things that I was really going to miss (from the Bonanza) such as no autopilot, no real IFR capability, low speed, and not that great a reduction in fuel consumption. The Bonanza routinely delivered an honest 160 mph on less than 11 GPH. My Zenith was lucky to provide 105 mph on better than 5.5 GPH. (Yes, it had the Jabiru 3300.) There were other detractors, but I will not go into those. After my father died in late October, I kept thinking about how long do I have, and, how nice it would be to have a new airplane? I started pushing my wife about those things, and she finally relented with, "It will be the last one". So, I made arrangements to paint and sell the Zenith and started looking for a replacement.

Obviously, I could not afford to buy a new factory built airplane that had most of the things I really wanted in an airplane. My Zenith was experimental, and it made me think that was the way to go in order to minimize the cost and maximize my return on investment. I had gotten a demo ride with Nick, so I was aware of the Lightning, but really looking at any and everything, when I signed up for the Jabiru engine

seminar in February of 2008. During the engine seminar, I looked hard at the Lightnings being built in Shelbyville. When I got home I pestered my wife until she said OK, and I immediately put my order in for a Lightning. I also convinced myself and wife that I needed help in putting the Lightning together and if I used the Shelbyville crew their experience would be a great help.

I made arrangements with Nick and company to get my Lightning (N13LN) put together as soon as possible. I was planning on doing the wiring, interior, and possibly even the painting, myself. I spent hours and hours reading the Aero Electric Connection and even purchased an EXP 2V bus so I would not have to use a bunch of circuit breakers with switches for everything. During the first week of the build process (April 2008), I was trying very hard to document everything as well as evaluate how I was going to put the electrical system together. My daily routine was to arise at 5 AM, walk at least 1 ½ miles, then shower and eat breakfast to be at the airport before 0730. I would work on the N13LN build process while trying to decide how I was going to wire and finish the panel, as well as finish the airplane and interior. Working with Mark and Mike, trying to get the needed items accomplished, and worrying about the finish items did not go too well for me. It only took me two days of working till 5:30 PM or so then spending another 3 hours reading Aero Electric Connection to decide to have Arion aircraft complete all those items. I sat down with Ben for an hour or so to set up the panel arrangement (complete with my glove box). He even, belatedly, came over to my way of thinking about using the EXP bus.



I had decided I definitely wanted the new style wingtips so N13LN would fit the Light Sport category. Unfortunately, the first set of wing tips did not meet Nick's expectations, so they were not ready to put on the wings. Now that I had decided to let Arion do all the hard stuff, things went much better for me on days three through five. I was still working the long hours, but all I needed to do was make decisions about paint colors and design, instruments, radio/transponder, and interior furnishings. Friday evening came and the airplane was almost ready for paint (but still needed wing tips). I must admit that I was amazed at what had been accomplished in only five (albeit long) days.

Due to the wait for the wing tips, my personal scheduling, and Arion's busy schedule, I could not get back to utilize Mark and Mike's expertise in helping me put N13LN together until after the 4th of July. I must admit I was truly amazed at the transformation that had occurred in the painting process. A bunch of parts and pieces had become a beautiful airplane. Sure, I still had to put it back together, but now it really looked like an airplane. With Mark, Mike, and even occasionally Nick's help, I was able to get N13LN together for the DAR'S inspection on 17 July 2008. Then, there was an OOPS! Discovered about 3 hours before the DAR showed up, but that will remain unspoken. I must admit I was amazed that

N13LN passed the DAR's inspection but she did, and to make a long story a little shorter, I now have a beautiful airplane with 145 hours of flight time that I am really proud to say is MINE.

I have not made any cross country trips that have required a fuel stop. I routinely get over 140 mph on just less than 4 GPH. So with 30 gallons of fuel I can go quite a distance without stopping for fuel.

Ending up at Lake Clinch Airpark by Lynn Nelsen

I feel very fortunate living here as part of Lake Clinch Airpark in Frostproof, Florida. We definitely took the long way around getting here, but now I would not live anywhere else. We have almost 7 acres, but the important part is the connection to the runway, and water front.



I started flying with my father in the late 1940's, got my Private license in college through the ROTC training program and bought my first airplane in 1968, while stationed at the Naval Air Test Center. (Ending up in the Navy is another story.) We sold that first 1947 model Bonanza while I was at The Naval Post Graduate School, but soon bought another, 1958 model, and those two led to 4 more as we moved around the country, ending up in Virginia. My wife and I had agreed when we got married in 1963 that we would not live permanently in South Dakota (my home state) or Florida (my wife's) and after I retired from the Navy we lived at our home in Bumpass Virginia where we had a hangar at the Bumpass airport. (Fortunately, I had built both the home and hangar.) Our home was on Lake Anna (warm side) on a point with about 900 feet of waterfront. Unfortunately, I retired from the Navy at a bad time economically and I had to sign an agreement that I would not work for any government contractor for at least three years. My wife's cousin was able to get me a job with a Lear Jet operator in Ft Lauderdale, Florida. It took a couple years, but we decided that living apart was not the answer and I had found a new home on Jordan airport near Ocala. We agreed to buy it and build a hangar.

However, I moved to Flint, Michigan, to fly as a Lear Captain and my wife moved with me and

then had to go back to Virginia to take care of our daughter who was seriously injured in an auto accident. I then flew with a D-20 Falcon outfit out of Louisville, Kentucky. We decided that we really did not like the home at the Jordan airport and started looking for a place on an airport and on the water (preferably a lake big enough to fish in). There were several in Florida that advertised they had both, but when we went to look at them there was always a problem (usually with the waterfront/fishing). After a couple years looking I was told that if anyone knew where this sort of place was it would be Roscoe Morton (airshow announcer for Sun & Fun, Oshkosh, and others). I obtained Roscoe's phone number and called him. As he was telling me that he was not aware of any place like that, I heard a female voice say something in the background. Roscoe said he would call me back, and in about 15 minutes called me and told me that there was a place for sale off the end of the runway where he lived. This place had waterfront on Lake Clinch and abutted the end of the runway. Roscoe felt that it may be possible to gain access to the runway.

We flew to Florida two days later to look it over. It was for sale, had lake frontage, and was separated from the runway by two fences about 15 feet apart (turned out to be an easement for lake access for the orange grove next door). We made an offer contingent on gaining access to the runway. Then we flew back to Virginia and returned the following week to meet the homeowners of Lake Clinch Airpark at their annual meeting. After a couple hours of asking/answering questions we were asked to leave and the real debate started. Another two hours elapsed before we were told we were accepted IF we paid a significant fee to join the association. We negotiated the fee down to a more reasonable number and we were in. After closing on the property we built a hanger/garage and took down the fences that separated the property from the runway. We also put in a dock, worked on the runway access and modified the home and property to better meet our liking. We were able to sell the property at Jordan Airpark and our Virginia property during better economic times, and I decided to retire permanently.

We have now lived here for over 12 years and owned it for almost 15 years. During this time the runway has been extended, fenced, leveled and seeded, and had the wires removed from the other end. There are only 13 members of this airpark community. All have waterfront and runway access. Believe me it is truly terrific to be able to walk out of the house to the hangar and go flying whenever you want (at least 95% of the time it is VFR). If you desire to go fishing, swimming, or boating it is also available whenever one wants it.



Thanks, Lynn for the great rundown on your beautiful Lightning and your beautiful airport home. Next time any of us are in Florida, we need to surprise Lynn and stop by for a visit. Do you have any alligators living in your backyard?

News from the Factory

Saturday night on the 23rd of January, Nick called me from Sebring for a quick rundown on how things had been going for the Lightning team at the Light Sport Expo. (Yes, I think he and Mark were in a bar doing some beer taste testing.) We will hopefully have a complete rundown on Sebring in next month's issue, but for now, just let me say that Nick was very happy with the Sebring show. He had flown lots of demo flights and they sold two SLSA Lightnings while there. One was the current maroon and cream demo Lightning, N325AL, and the other will be built to order. That's superb news. It's a good thing the blue and cream Lightning demo is now up and flying.



325AL, first LS-1 SLSA demo, sold at Sebring.



The blue and cream LS-1 demo, now flying.

This next "factory news item" is from Mark Stauffer, Mr. "I like rivets". I will print his entire email to me below:

I'm now the owner of an RV-9A kit. I got back yesterday afternoon after a 21 hour round trip. The kit looks to be in good shape. The wings are 98% complete (need to rivet on bottom skin and maybe add wiring for lights, strobes etc) but I have to build the flaps. The empennage is finished except for the trim tab. The fuselage is still a box full of parts! The work done already will save me a year or two (if done at the same rate as the Zenith!!) He was building it for a friend of his but the guy backed out. He was going to finish it but decided he needed the money to finish paying for Ag Spraying School. Yup, he's going to school to get his license for Ag spraying. He's built three RV's before and he runs a machine shop with his dad so he's done a pretty good job so far. Also, he's young - 41. That's kind of uncommon in this business. I'll post some pictures to Facebook in the near future.

Have a wonderful new year!

Mark

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, hobbs28@gmail.com



Green Landings Flight Center, Ryan Gross, WV, 304-754-6010, www.greenlandings.com



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



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Lightning Florida, Max Voronin, DeLand Airport

News from the Dealers

Hello Buz,

Thanks for all your great work during 2009! I'm sure the growing number of Lightning newsletter readers is due to your diligence and excellent job.

Here is a quick update on my Lightning project. My wife, Kate, talked me into taking some pictures of the Lightning decorated for the holidays. I included a couple pictures with this update.



My first demo plane, N81DJ, has progressed to the final stages of its build. It has been taxi tested and the brakes seated... it's ready for its first flight but there has been some delay in getting the airworthiness certificate. It's was built to meet the 51% rule, but my intent from the start has been to license it as an ELSA. It will be the first Arion Lightning ELSA and will hopefully pave the way for many more. This is the first ELSA for me, the guys at Arion and for the Albany FSDO, and as such, is a learning process for all. Unlike an EAB, Arion Aircraft needs to be listed as the manufacturer on the registration. A Statement of Compliance is needed from Arion as well as the SLSA POH with the Flight Training Supplement, the same Service manual as issued for SLSA and a Construction Manual applicable to ELSA. So while all this is coming together, I'm fighting the urge to pull back a little on the stick during a high speed taxi tests!

Here are a couple of building tips I hope will be helpful:

The first tip goes hand in hand with Mark Stauffer's addition to the January news letter regarding using the USB port on the GRT EFIS to update and save settings. However, this tip is only useful if the plane is equipped with dual GRT EFIS system. If planned for in advance, the instrument panels can be built with a USB extension cable(s) installed so a flash drive can be plugged from the front but my panel was already built when I became aware of this. I'm far from limber and afraid if I were to contort myself into a position to plug a flash drive into the back side of those units, I may well want my cell phone within reach with 911 on speed dial! I started to look for an alternative and what I found was the following; Available at Radio Shack for about \$30.00 is a USB extension cable that has the ability to plug into two units and switch between them with an "A/B" switch.

USB A/B Switch with 5.91-Ft. USB Cables,
Model: 26-422 | Catalog #: 26-422

Lets two computers share a single USB device.

This item has an "A/B" switch that allows the user to switch from one device to the other. In this case the two GRT EFIS units. The cable length is enough to allow it to be mounted most anyplace in the cockpit. I chose to mount it in the center console; I just had to be careful it did not interfere with the elevator push-pull linkage or the flap motor. The "A/B" switch and the flash drive receptacle are secured with Adel clamps to a bracket fabricated from aluminum. The bracket is mounted inside the center console. It's mounted such that the switch and receptacle are just below the top surface of the console and positioned toward the back of the console but not so far back that the padded armrest would not cover the switch and receptacle when not in use. Now to update the GRT EFIS system or store the settings, I peel back the padded armrest and the USB receptacle and "A/B" switch are easily accessible.



The second tip is just one of those little helpful tips, not a real biggie. My plane is equipped with boarding steps and I have noticed how easily the paint on the steps scuff from normal use. I found heavy duty adhesive coated shrink tubing at Fastenal (see picture for shrink tubing information). I cut two pieces 4-1/4 inches long and slid them over the boarding steps and used a heat gun to shrink and bond them in

place. Since the step is a pretty good heat sink, before sliding the heat shrink tubing in place, it helps to pre-heat the step a little with the heat gun, particularly if it's cold to begin with like it is right now here in NY. The white lettering on the shrink tubing comes off with denatured alcohol.



Thanks again Buz for the great newsletters. I'll send more updates later and more tips if I have any.

Dave Jalanti
Jabiru Power Solutions, LLC
dave@jabirups.com

NOTE: All you other Lightning dealers, this is your section to let the readers know about your dealership and what you are doing. Use it to keep us informed and advertise your products and services. Just email me your information and I will put it in the next newsletter.

News from Builders and Flyers

This month's first entry in the News from Builders and Flyers section is from Tex Mantell. As you might recall, Tex's Lightning was the January 2010 Lightning of the Month. I asked Tex to provide us some additional information about his airplane and his build process. Tex was the first builder to buy his kit with the plan of building his Lightning at home – no factory build assist at all.

BUZ,

My N-number was picked because it's my second home built. First was N51TM (Kitfox with 2200 Jabiru) and now the Lightning is N251TM. I now have 35 hours on it and have no problems. I have re-flexed the flaps and the ailerons a few degrees and it took a few hours to get it trimmed out for total hands off flying. I have the Trio auto pilot and it's connected to my anywhere map system. It's got more features than the flight management system in the G5. I have been cruising at about 138 mph at just about 3.2 gal, and 2450 rpm. I have pushed it to 3100 rpm and can get about 168, but the fuel burn is real high. I had a nice tail wind recently and was doing 201 ground speed. I have reached the goals I was hoping for with the Lightning and am extremely pleased with the plane. One note to the readers you can pass on is the importance of proper alignment of the gear fairings and the wheel pants. It's a good 15 mph to 18 mph when you get them right. I still need to do some fairing work around the (gear to pant) area and where the gear meets the fuselage. I hope to pick up a few more mph, or as I like to look at it, the same speed with

less gas. I feel the sweet spot on my plane is around 135 to 140 mph. I have counter balanced the elevator with a spring system and it has made the stick forces very light and balanced between both aileron and elevator. I have the trim tab built into the elevator and lucked out on the size. It's about 38 square inches and will trim out with about 25 or 30 degrees of flap deployed. On landing it requires very little pressure on the stick. It also is small enough that trim at cruse is not touchy. I am having a lot of fun with the group I fly with. We all go the lunch or breakfast somewhere and it's kind of fun to pass them like they are standing still. I hope to see you all at Sun & FUN or maybe Sebring.

Tex



The first two airplanes Tex built.



Tex's Lightning. He probably has about 40 hours on it by now.

Clive James sent the message below about his recent trip to Florida from the UK:

Hi Buz,
HNY, we had a fine time and enjoyed some great weather, relaxed and did some sleeping. Distant memory now as I've been back offshore for a week. Finally catching up on the E mail box which filled right up when we were away.

A few pictures attached. Did Kennedy. Did Kermit's place. Got myself checked out and flew a Cessna out of Executive which is downtown Orlando (different as no land out options at all). We did an afternoon trip to Space Coast airport to visit the Airplane Museum (mainly Navy stuff, excellent, you been there?) and then flew down to Key West for the Saturday night. On the way back we dropped into Everglades

city and did the airboat thing to get up close to some gaiters. \$95 dollars an hour for the 172 which I think is really good value, did 11 hours.



Had a few days at Universal, without queues we were soon round what we wanted to see. Drove to Sarasota and Venice for a night out towards the end (Venice is full of old folk), saw manatees at a power station where the warm water outfall attracts them..

Nice weather, nice people, good food, shame about the beer. ;-) Made friends with a guy called 'Sam Adams'. Just what we needed before the British cold. We're having a proper winter and the moment with snow and ice, now statistically coldest in 30 years.

Cessna was an old girl that had tinted windows, the tint had turned milky so all our aerial shots are hazy, that and it was hazy made for some poor pictures. Should have opened the window.

Regards, Clive



The next input is from our Colorado “high altitude” expert, Dick Cleavinger, and is in response to my request for how much flying time any already completed Lightnings have to date. So as a reminder to other Lightning owners currently flying their jets, give us a run down on your flying time, etc, as Dick has below.

N213RC, Lightning #42, was the 19th to fly on September 20th, 2007. My home field is Boulder, Colorado, KBDU. The Hobbs now reads **257.0 hours**. The avionics is: Dynon D180 EFIS & Engine monitor, a Lowrance 2000 GPS, and a GTX 320A transponder and SL-40 Comm.

I am including an airborne picture taken near Steamboat Springs, Colorado.

You are doing a fantastic job with the newsletter. I hope you can stay with it till it can support itself (whatever that means).

Dick



NOTE: When I cropped Dick’s photo, above, I made sure I left the bottom un-cropped so that you could see the ground and know that he was making a great fly-by near Steamboat Springs, CO.

Reader Feedback

Do any of you recognize the airplane shown below? In a small way, this design may be part of the Lightning’s history. As the story goes, the Esqual designer and developer looked at this airplane design when he was working on the initial Esqual. And we know that Pete, Nick and Ben, the

North American Esqual importer and dealer for a while, looked at the Esqual when they were designing and developing the prototype Lightning. So that is the connection to the Lightning.



This airplane is a Pulsar, and this photo is an excellent example that was built by a friend of mine, Jim Dabney, from Texas. Jim and I flew the F-4 and were in the same fighter squadron while stationed in Germany.

This in flight picture shows Jim in his recently completed Pulsar on a test flight over Texas. The photo was taken by Rhea Sherwood and was made while Jim was flying in formation with a Glasair.

Below is Jim's write up on his Pulsar:

Hi Buz,

I now have 60 hours on my Pulsar. There is still calibration work to do, but I have done a couple short cross countries. At about 40 hours, I found some cracks in the lower skins where the main skin and leading edge skins butt together at the root of the spars. I spoke with the designer, and he told me there was an unpublished service bulletin that fixes the problem. I removed the wings and made the patches, and so far, that's working fine. He also told me that the problem has not recurred in any planes with the patches in over 15 years.

My Jabiru is still running fine. It doesn't use much oil these days - about 1 oz every two hours. Most of that ends up in the breather bottle. The CHTs and oil temperatures are very low now that it's getting cold. The CHTs run around 200 and oil stays down around 140- 150 except in climb, and then it might push 180. The EGT spread is about 80 deg, and the hot EGT will go over 1400 in the denser winter air. So I just reduce the power to keep the hot one at around 1350. That gives me ~2600 RPM and 110 TAS with only 3.1 GPH.

I worked on the plane off and on over a 19 year period. I bought the fuselage kit in 1989 and started in early 1990. I bought the wing kit in early 1993. There were some years where I could only work on it one or two Sunday afternoons a month, but I kept chipping away at it. I retired from the Air Force Reserve in 2004, and was able to work on the Pulsar 10 - 15 hours a week since then. The Pulsar kit was great, but the company changed hands a few times, and went dormant before I was ready for the firewall forward

kit. I read about the Jabiru and contacted Pete; he put me in touch with Greg Smith of the Pulsar Builders Association. Greg helped me obtain a nose gear and missing documentation, and I bought the Jabiru 2200 Pulsar firewall forward kit from Jabiru USA. Glasair builder Russell Sherwood (N688RS) provided lots of assistance with fabrication details, welding, and machining. Throughout the firewall forward construction and test flying process, I received excellent advice and support from Jabiru USA. My EAA technical counselors were VariEze builder Jim Voss and RV-8 builder Paul Dye, both of whom were very helpful.

My first flight was August 6, 2009. Of course, you were my flight advisor. I developed a flight test plan following your template and guidelines. Following the test plan, the 40 hour Phase 1 was barely enough. I strongly agree with your advice that every builder follow a formal test flight plan and keep careful records. It's the only way you're going to become completely familiar with the aircraft and locate and fix potentially hazardous anomalies. And there will be anomalies.

My Pulsar has flight characteristics similar to your Esqual, which is not surprising. In fact, the insurance company accepted my orientation flight in your Esqual in lieu of a Pulsar checkout. Pitch and roll control forces are well balanced. Response is brisk but not twitchy. The stall characteristics are also similar to your Esqual, with lots of buffet before the stall, and excellent roll control throughout. It is easy to hold the aircraft wings level in moderate buffet with the flaps up at 39 knots (idle power) and 33 - 34 knots with flaps down. With flaps, slow flight at 30 knots is also easy.

I have the Advanced Flight Systems AFS-3500 EFIS, including the AOA system. The AFS systems are well thought out and make good use of the screen real estate. The Pulsar instrument panel is small, so I needed a single screen EFIS. AFS puts the HSI in the middle of the ADI. It seems strange at first, but it puts your entire instrument scan in a narrow field of view, and works quite well for instrument approaches. The AOA system works perfectly, but as you pointed out recently, is unnecessary in an aircraft such as the Pulsar. The aerodynamic stall indications are always evident before Jennifer Hickman says "angle angle, push push."

With the 2200 engine, performance is less than the 3300 powered Esqual or Lightning, but still very good. My maximum cruise speed is 115 knots, but I usually cruise at reduced power. A fuel flow of 3.1 GPH gives me a 110 knot cruise speed and decent range for my 17 gallons of usable fuel. Gross weight rate of climb is about 1100 ft/min at sea level and still over 500 ft/min at 12,000 ft. I'm using the Sensenich ground adjustable prop, so of course the climb and cruise numbers depend on the prop setting. Vx and Vy are surprisingly low - 54 and 56 knots. The climb rate is almost the same at 75 knots, however, so I usually climb at 65 - 75 knots so that I can see where I'm going. I'm experimenting with reducing power to 25" MP for cruise climb. It lowers fuel flow significantly and still climbs great.

The Pulsar is a very comfortable aircraft, but it's not too roomy. Two 5' 10", 170 lb FAA standard issue pilots fit just fine, but larger pilots (particularly larger diameter) might not be too comfortable. Leg room is good for me, and there is plenty of leg room for pilots several inches taller than me - probably up to 6' 2". My tank is between the instrument panel and firewall, so if you have big feet, I think your toes might hit the tank bottom. With full fuel, I can carry 340 lbs of people and baggage. The baggage compartment is limited to 50 lb, so Beth and I can't get to maximum takeoff weight even with full fuel and baggage.

The Pulsar uses heel brakes, with the brake pedals mounted to the floor just aft of the rudder pedals. The kit came with Azusa go-cart wheels and cable-operated band brakes. I replaced them with 5" Matco wheels and hydraulic brakes, with the master cylinders actuated by the original brake pedals. Although I'm not too crazy about heel brakes, they're a good idea in the Pulsar. My feet rest on the rudder pedals

angled forward, so toe brakes would be difficult to use. The heel brakes are easy to control and when airborne, the brake pedals are not in the way.

Overall, I'm very happy with the Pulsar and Jabiru 2200. The extra room, range, speed, and payload of your Esqual would be nice. But 3.1 GPH is nice, too.

I hope there's something here you can use. I enjoy reading the Lightning newsletter each month. I think it's valuable and would be of interest to all pilots. I'm also happy to see that the William and Mary fin flash is becoming popular. We could still bring back the Loefflescheid fin flash and see if it catches on too.

How is your Esqual doing? You must be over 600 hours by now.

Dabs

NOTE: My Esqual, N31BZ, as of mid January 2010, now has about 630 hours. It has been flying 4 years. Great airplane and great engine (Jabiru 3300).

Engine Clinic

Sorry, this is not one of Pete's expert engine clinic articles, but instead, something that I wrote based on maintaining my own airplanes and engines for many years. It is hopefully something that you will find helpful and informative, although not on such a high technical level as one of Pete's engine articles.

You have all heard that oil is the life blood of your engine, so keeping your oil changed on a regular basis and the oil quantity at the proper level are must do items to ensure long engine life. There are two other things along this line that you might want to do when you change your engine's oil. One is to have an oil analysis performed by a laboratory, and the other is to cut open your oil filter to check for any obvious metallic substances.

Oil analysis:

Think of an oil analysis as an engine early warning detection system that can forecast future engine problems and possibly save you money. It can help you reduce engine down time, by allowing for scheduled maintenance and repairs before you have an unexpected engine part failure. Knowing that some engine part is experiencing excessive wear will allow you to operate in the "fix before failure" mode as you will be able to spot trouble before it gets serious.

When two or more moving metal engine parts touch, there will be friction that may result in microscopic wear and thus some metal particles that remain suspended in the oil. When a sample of this oil is sent in for analysis, the amount of suspended metal is revealed in parts per million.

Identification of the nature and quantity of these metals helps determine excessively worn parts and can predict failure long before the problem would otherwise appear.

Oil analysis kits are available from several suppliers, and I don't want to recommend one over another. Just search the Internet and order one, or possibly get one from your local aircraft maintenance facility, as many keep them in stock. The oil analysis kit will include a sample bottle and a prepaid shipping container. Just follow the instruction to take the oil sample to be analyzed while you are draining your oil sump during your regularly scheduled oil change. Seal up the oil sample and mail it in. Upon receipt, your sample will normally be processed within 24 hours with the results emailed (or mailed) to you. The results will tell you how many parts per million of various metal parts (such as iron, aluminum, copper, nickel, chromium, etc.) were in your sample. Normally, if they see something that looks unusual for an engine of your type with the total time that your engine has, they will notify you immediately.

Probably, the ideal situation would be to have an analysis accomplished at every oil change. However, some mechanics say that if you are changing your oil every 25 to 30 hours, an analysis at every oil change might not be necessary. What is probably important is to establish a baseline oil analysis for your engine as early in your engine's life as possible. Most of you probably have 200 or less hours on your engine, so why not get an analysis at your next oil change to establish that baseline for your engine. Then you can determine how often you may want to have an analysis to compare with that baseline. Heck, even once a year is certainly better than never knowing. You decide how often you want this to be part of your engine maintenance program.

Cutting open an oil filter:

The reason you want to cut open an oil filter is to see if any relatively large chips or slivers of metal can be found. If you do find any metal, you may want to consider grounding your airplane until you get the results from an oil analysis as noted above.

The oil filter that the Jabiru engine uses is a common automotive oil filter, not the much larger (and expensive) aviation oil filter. So if you have an oil filter cutter for an aviation oil filter, it may not work on the smaller Jabiru type filter. Below are two photos of an oil filter cutter that is readily available from aviation supply companies and will work on the small Jabiru type oil filter.



Below is a photo of the parts you will find when you open a NAPA Gold 1394 oil filter. Actually, the folded paper element is not shown, as it was hanging up so that the excess oil would drip off of it and make it easier to inspect for metal chips or slivers. This filter came off Linda's engine, but is the same filter I normally use on my engine as well.



The folded paper filter element was between these two parts and was cut off with a carton cutter.

Upcoming Events

Sun-N-Fun, Lakeland, Florida, 13 - 18 April, 2010

AirVenture, Oshkosh, Wisconsin, 26 July to 1 August, 2010

4th Annual Lightning Homecoming and Fly-In, Shelbyville, ?? September 2010.

Safety

Never trust your fuel gauges.

During a recent discussion with an aircraft builder who was taking the wings off his experimental amateur built aircraft to install a modification, he mentioned that he also wanted to change the fuel gauge system since his current set up was never accurate. He went on to say that he was never comfortable flying the aircraft unless he was sure the tanks were full before takeoff, and that he avoided any real cross country flights because of never really knowing his true fuel quantity.

Of course, the newest capacitance type of fuel quantity measuring system (as use on the Lightning aircraft), when properly calibrated, is certainly more accurate than the old float type of measuring system. This is the type of system he wanted to use to replace his current inaccurate float type of system. I certainly agreed with his decision to change to a more accurate system, but his comments did prompt a discussion on the basic regulation on fuel systems and some suggestions on fuel gauges.

First, I am a big believer in the statement, **“Never trust your fuel gauges”**. They are installed in the airplane because they are required to be, but the regulations require they be accurate ONLY when empty. Well, I ask you, how helpful and reassuring is that when on a long flight? My answer to this situation is **-the best and most accurate fuel gauge is the one you wear on your wrist.**

If you always takeoff knowing how much fuel you have aboard your airplane, and you know your airplane’s fuel burn rate at various power settings, you should be able to compute how much fuel you have at any time during the flight. So if you takeoff with full tanks, or if you use a dip stick in each tank during your preflight inspection to determine how much fuel you have, you will have a good starting point to be able to compute your fuel on board at any given time during your flight. Obviously the key is to know accurate fuel burn rates in order to be able to calculate your remaining fuel. That information should be in your POH from the aircraft manufacturer or from your own flight testing during phase one if you build your aircraft. One last thought. It is a good idea to give yourself a little cushion on the fuel calculations. For example, if your aircraft burns 5.8 gallons per hour at a certain altitude and power setting, why not round that up to 6 gallons per hour? It makes for easier calculations and gives you a small pad for fuel on board at any given point in the flight.



Lightning Skunk Works

Some skunk works technological advances are years in the works, whereas other developments come about fairly quickly when someone has a new idea or something happens and “the light bulb” comes on. This recent skunk works development is one of the latter types – a recent technological breakthrough that was inspired by the currently popular movie, AVATAR. If you have seen, or even heard of this recent movie, you know that one of the reasons it is so popular is that one version is shown in 3D or three dimension vision. Sitting in the theater watching the 3D

movie (and wearing the special 3D glasses – see photo) is very dramatic, with part of the on-screen action appearing to come right into the audience. You get the feeling that you are surrounded by the action and you can reach out and “touch” the on-screen action or it is coming right to your seat.



Well, that movie is the inspirational “light bulb” that resulted in the Arion Lightning skunk works crew developing the just completed technological breakthrough that is now available as an option on your Lightning. Yes, thanks to Mark Stauffer’s expert computer work, you can now have a 3D version of the Grand Rapids Electronic Flight Information System (EFIS). Just imagine how real your EFIS will become when you have the latest and greatest 3D system. You will get the feeling that the display is coming right at your face and surrounding you with flight information. You can almost feel the aircraft’s attitude, altitude, and speed as it “leaps” right onto your face. Wow! What a feeling.

I just finished testing the 3D EFIS unit with it installed in my Corvette, since I didn’t want to ground my airplane for the test phase. It was truly amazing. I normally pass Ford Mustangs like they are standing still, but now they all seem to be backing up at warp speed. Below is a photo of my youngest daughter, Catherine, test driving the Corvette with the 3D EFIS installed. My camera does not do justice to the new 3D display, but if you are wearing the 3D glasses, you get the full effect as is shown below.



Order your new 3D EFIS today. Just call Nick or Mark to order one, and then build or convert your Lightning to the latest and greatest 3D visual display just like on the planet Pandora.

Technical Tips

We can always depend on Tex Mantell to have a good simple technical tip for our newsletter. Here is Tex's latest suggestion.

Here is another twist on a jack that someone listed earlier. Get a 5 or 6 "long 1/2" bolt and cut the head off it. Mill, saw or file a notch in the end of it to fit into the axle of the wheel. Get a 2 ton jack from Harbor Freight and drill a half (1/2") inch hole in the piston. It makes a nice sturdy jack for less than \$12.00.

Tex



Since winter is upon us, this next "cold weather" operations question will probably be helpful to many. I put this on the Lightning list a few weeks ago, but the info may be good for others in the future. Stephen Hacker has the question and Dave "Corky" of Esqual fame, had a good answer.

Buz, I like your New Year's day flying idea but it has been quite cold here in Minnesota as of late - last night temperatures dropped to -15 F, and our projected high for today is -5 F. Otherwise flying conditions are great - smooth air and calm winds. Between pre-heating the engine canopy, battery trickle charger, and the Jabiru cold start recommendations, I have had no problems starting my Lightning which I keep in an unheated hanger.

My problem has been on the inside of the canopy. Last week, out with my instructor at around 10:00 am with temperatures around +6 F, the inside of the canopy iced up while we taxied - and we had to work very hard to rub off the frost before we could see well enough to take off. *The addition of a glaring sun did not help matters.* However, once we got up in the air, between a little bit of air vent, and cabin heat, we were able to keep the canopy clear. Once we landed, the canopy started to ice up again on the inside.

Is there a trick or a compound that can be applied to the inside of the canopy? Or should I acknowledge the fact, that once temperatures start dropping below 10 F that inside canopy icing is simply something that I need to contend with.

Thanks
Stephen Hacker

From Corky:

Isn't Minnesota fun? I leave my side window open during taxi. Be careful to be sure it is cleared off to fly. I didn't one time, thinking it would clear off better during take-off roll, which it always did before, it got worse and by the time I cleared it off I had hit fog, not fun. This happen because the Equal was outside in the rain the night before. I am only saying how stupid of a mistake I made, and for others not to do the same.

I have a muffler which gives off much more heat to the cabin than the straight pipes do. Almost forgot, they do make an anti-fog spray that does work well for snowmobiling, might be worth looking into.

Dave

NOTE: Dave's anti-fog spray sounds like a great idea.

This next "cold weather ops" tech tip actually came from a Bonanza list that I am on, and is very similar to a homemade engine compartment heater that I made for one of my past Bonanzas. I actually used two very inexpensive lady's hair dryers and some dryer ducting to take the heat to the engine compartment. If I still had the Bonanza, I would probably be using the light bulb trick that I am now using on the Esqual. A seventy-five watt light bulb under the cowling near the oil sump, with the cowl intakes plugged and a big blanket over the cowling seems to provide about a twenty degree rise in temperature above OAT. During the winter I keep the bulb on all the time when the airplane is in the hangar. It makes for easy cold weather starts. Below is a Bonanza owner's description of his homemade heater for his engine compartment and his cabin.

I thought some of you may enjoy my cheap entry for engine/cabin pre heat. My hanger typically gets down to around 35° on cold days (sometimes less) and I decided to do something to help. The heater was \$10.00 from Wal-Mart (Sunbeam) and the duct work was from Lowes for about \$18.00. A test in the hanger showed about a 20° increase in cabin temp over a 30 minute period, and the engine oil temp went up 10° during the same time.



NOTE: I think if this were my design, I would just buy two of the heaters, one for inside the cabin and one with the duct work to heat the engine compartment. Then put the thing on a timer to automatically come on about an hour before you were going to be at the airport. Or as I mentioned above, use the light bulb under the engine and just leave it on all the time. And if your battery is not brand new, get a trickle charger and have it on in the winter time as well.

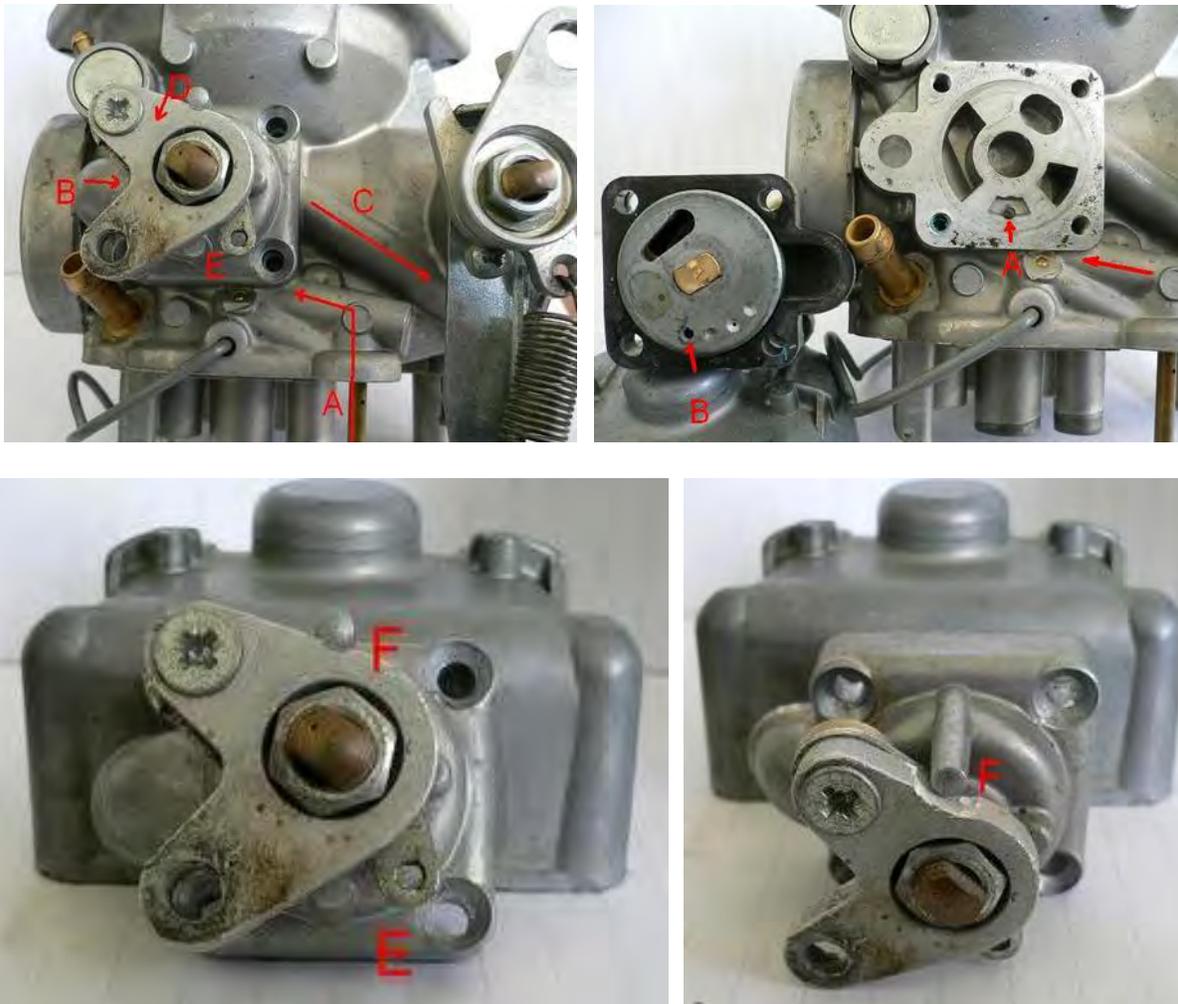
This last “cold weather” tech tip comes from our British agent, Clive James. Clive had previously mentioned to me a choke mod for the Bing carb on the Jabiru engine that he thought was a big help for cold weather starting. Here is Clive’s response when I asked about the Bing choke mod.

Reference Roger's choke mod, I should kick myself as I spent ages trying to improve the choke cable attachment on the Esqual when the engine mount was a clash. Never did notice the restriction in rotation to the 'starting carburetor rotary slide valve'. You can make the room using a Dremel tool without taking anything off but the cowl. Roger’s words and pictures are from the Jabiru UK owner’s site at: <http://www.jabiru.flyer.co.uk/>

Cold Start Problems - an ongoing issue -- Roger, 05:40:52 12/19/09 Sat (91.85.130.20)

Over the years I have worked on the Jabiru engine, I have noticed a trend common to engines with chronic cold start problems. With these engines, the choke linkage (a Jabiru add on) restricts the choke from operating even if the choke lever is pulled fully open. If your engine has this restriction, it will be starved of fuel and IT WILL NOT START. You can confirm this by visual inspection and if you check a spark plug it will be dry.

Once you have identified the cause, the fix is easy. For those not familiar with the Bing carb, I have included pictures to show the workings of the choke, the restriction and the simple modification that is required. If the restriction is removed your engine will start without the need for any primer system, preheating or frustration.



With reference to the above pictures:

The choke system is a separate fuel system that is „activated“ when the butterfly is closed and the choke selected open. Air is drawn from a bleed-off on the side of the carb wall and combined in a small mixing chamber with fuel that is drawn from a separate „reservoir“ in the fuel bowl. Fuel can only be drawn when fuel bleed holes within the mixing chamber are aligned. If the choke is restricted then these holes will not be aligned properly and no fuel will be drawn up into the mixing chamber. In the pictures the bleed hole should be at the 6 o clock position to be fully aligned.

While you are looking at the carb it is worth dropping the bowl to check for evidence of water. There is a reaction between water, fuel and aluminum which will congeal and harden over a period of time. If this happens at the entrance of the choke reservoir, fuel to the choke will be restricted. A typical symptom is that the engine will fire briefly and stop and then be reluctant to start thereafter.

With the choke now fully working, a start procedure that works for me is:

- Throttle Closed
- Choke FULLY OPEN
- Electric pump On
- Hand swing the prop 5 blades (with the restriction removed you will be priming the carb)
- Start

Additional Notes;

Ice buildup in the carb (particularly on uncowled engines) will melt when the engine is shut down after a long taxi in. The water will find its way into the bowl and eventually restrict the choke reservoir inlet. A good practice is to run the engine briefly at 2000 rpm with the carb hot air selected On to clear the ice before shutting down. If you have an electric heater leave it On until shut down.

If you enlarge the choke jet at the bottom of the fuel bowl in attempt to get more fuel to the choke system, the fuel consumption will rise and the engine may run rich.

There is a small hole $\frac{3}{4}$ the way up the small pick up tube in the choke reservoir. Stopping this hole with a sleeve will help with cold starts but again the engine will run rich (don't ask me why).

Jabiru's solution to overcoming the choke travel restriction is to insist on a minimum of 300 rpm during start up. Nothing wrong with that, because at that rpm, the suction is strong enough to bring the main idle system into play. However, in cold weather the battery is at its most vulnerable and if the fuel system is not 100% the rpm will very quickly drop below 300 rpm. You will then be left with no alternative but to remove the cowling, charge the battery and warming the engine. In the cold weather this is no fun.

Other Items

The following turned up in an email recently, although I don't remember who sent it. I thought it was quite funny, but it may possibly give offense to some even though none is intended. Read at your own risk!

Old pilots (**and I am not sure what constitutes an old pilot, but I am probably one**), this is for you. You think you have lived to be 65 or so, and know exactly who you are, and then along comes someone and blows it all to hell!

An older gentleman wearing a beat-up old leather flying jacket sat down at the local Starbucks ear the airport and ordered a cup of coffee. As he sat sipping his coffee, a young, rather attractive looking woman sat down next to him. After noticing the leather flying jacket, she turned to the man and asked, "Are you a real pilot?"

He replied, "Well, I've spent my whole life flying; biplanes, Cubs, Champs, even experimental aircraft. I have flown combat, taught many people to fly, and given rides to many others. So yes, I guess I am a real pilot." Then, before she could comment, he added "What about you, what do you do?"

She answered, "Well, I spend my whole day thinking about naked women. As soon as I get up in the morning, I think about naked women. When I shower, I think about naked women. When I watch TV, I think about naked women. It seems everything makes me think of naked women. I'm a lesbian."

Of course, this caught the old pilot off guard and he was at a loss for words. He just sat there as she got her coffee and left.

A little while later, a young man sat down on the other side of the old pilot and asked, "Are you a real pilot?"

He replied, "Well, I always thought I was, but I just found out I am a lesbian."

Final Thoughts

You have probably heard the old aviation saying: "Flying is hours and hours of boredom, interspersed with moments of stark terror". The photo below shows the first part of the story.



This guy is experiencing the second part.



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.)

Remember when cool was measured in cubic inches?



And the only substitute for cubic inches was cubic feet.