



Hangar Talk


The Arion Aircraft "Lightning" Newsletter.

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Welcome to issue # 8 of the  Newsletter. The goal is "to get the word out" on happenings at Arion Aircraft, and "to give a voice" to Lightning builders and flyers. It is your **Lightning "Hangar Talk"** sessions put into print. To be successful we will need the inputs from Lightning flyers and builders 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**.

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And now, the rest of the news:

Lead Story:

The 51% Rule

As most of you know the current "51% Rule", or the Experimental Amateur Built (EAB) rule, is under review by the FAA with a comment period that has been extended until 30 September 2008. Many people feel that the reason for the possible change to the rule is because of the "hired guns" that do all the work instead of the person that claims to be the builder. Other concerns are the high performance and, thus, highly complex aircraft that are required to be built "at the factory" and certainly represent more work than can possibly be accomplished by a builder in his "at home" workshop. The FAA states that the reason for the new proposal is so that any interpretation of what really constitutes 51% of the work to build an amateur built aircraft will be more specifically spelled out in order to make FAA inspectors' jobs easier. Basically they want the 51% of the work to be performed by the builder to be at least 20% fabrication, 20% assembly and the remainder 11% can be either fabrication, assembly or a combination of both. All of that sounds good, but who determines what constitutes fabrication for a composite aircraft? Basically most EAA members feel that the current rule is good and that the FAA just needs to enforce the rule as written and stop giving airworthiness certificates to the "hired guns" and "factory built scam" builders.

To ensure all our newsletter readers understand the potential changes, I have asked **Nick** from Arion Aircraft to sum up the 51% situation for us. His article is below.

The Proposed 51% Rule Change, by Nick Otterback, Arion Aircraft, LLC, 7-23-2008.



As everyone is aware, the FAA has released a proposed rule change to the Experimental Amateur Built category. Specifically how to determine "major portion" and what amount of work a builder has done for their aircraft to meet the rule. You will hear the terms "Approved List" or "51% list" and although these lists aid in the determination of major portion for a DAR or builder choosing a kit, the list is not a prerequisite for an aircraft kit to be an Experimental Amateur Built.

The Lightning is not currently on this list. Having a kit evaluated is not difficult although it does require several items all in one place to evaluate. The first is a finished Lightning which is airworthy; the second is a complete and untouched kit, finally a build manual. The DAR takes the manual and determines if the builder would have to do at least 51% of the work to get from one to the other. We had made requests to have the Lightning kit evaluated; however, by the time we could get the FAA to come for the evaluation they had already suspended additions to the list barring the upcoming new policy. This is not a problem as it pertains to receiving an inspection for your Lightning, it just means that you as the builder must show to the DAR that you built the aircraft.

There are over 30 Lightning kits which have been inspected and are flying worldwide. In each case the DAR had to make the determination of "major portion" and found that the builder did at least 51% of the work, if not more. We are confident that, although considered in today's terms a quick build kit, the Lightning should have no problems with the new rule. We will make every effort to have the Lightning kit evaluated once the rule is finalized.

With this in mind we have filled out the proposed Amateur –Built Fabrication and Assembly Checklist provided by the FAA to see where the Lightning kit stands.

Arion Aircraft has filled out the list several different times and has had others fill it out as well, and find that the kit would comply with the new rule.

As to the check list we filled out, based on the current kit, most tasks applied to the kit, others did not due to the nature of the kit, i.e. not fabric covered, or sheet metal, and those tasks were listed as N/A. Also some tasks do not pertain to the design and therefore, are not used. There are also Lightning specific tasks which do not appear on the check list and we have added them to better evaluate the kit. Keep in mind this is only a proposed change and not a rule yet and this check list form will most certainly change many times before the final form is released.

The task check list helps to better evaluate the kit for the FAA and DAR. At EAA this year there were many forums on this subject which provided some insight on what was the intent. As stated above, tasks can be omitted for various reasons and tasks added that would better describe the kit being evaluated. As long as the points that were given during the evaluation added up to the same amount of tasks completed you were on the right track.

Using the proposed checklist Arion Aircraft found that the Lightning kit in its current state should comply. We deleted some tasks, as noted above, because these either did not apply to the design or were duplicates. However, Arion Aircraft did add tasks which we felt were necessary, (not added to solely help the builder or the manufacturer) because these tasks were required to complete the Lightning kit. This led to 165 total tasks accomplished and 165 total points that were broke down in 4 categories as noted on the checklist.

With this adjusted checklist, the builder would get a total of 89.8 of the points amounting to 54.3%. More than enough to account for the 51% for the major portion rule. Of these, 55.2 points of assembly which equates to 33.4%, well above the 20% of assembly required. In the fabrication column 34.6 points accumulated for 21%, this too is above the 20% required for fabrication from the builder. Arion Aircraft and its OEMs accounted for 75.2 points, or only 45.5% of the kit.

What does this mean for you as the builder? The Lightning complies with the current 51% rule, and should comply with the proposed changes as well. If you are currently building a Lightning you should take very detailed logs and pictures as you go to show to the DAR (and all your friends) the amount of work that you put into your new aircraft. Actually we have said this all along. With a good builder's log showing that you were involved in at least 51% of building your Lightning, you have shown that you meet the "Major Portion" requirement needed, and should have no trouble getting the Repairman's Certificate.

If you are thinking about building the Lightning and the new rule has you concerned, it probably should. The FAA is trying to change what has worked for many years. The problem is not the kits, but the hired guns that build them. This was expressed many times at EAA. Just prove that you built the aircraft and you will be fine. Remember building experimental aircraft is not a right but a privilege, and we all must do our part to ensure the rule's survival.

We hope this helps in the understanding of the proposed changes and that your interest in the Lightning kit aircraft will remain whether building one or just dreaming of it.

Remember, you can comment on the proposed rule change until 30 September by sending an email to: miguel.vasconcelos@faa.gov

News from the Factory:

Update on the new Wing tip extensions

By now you have heard that the second customer Lightning with the new extended wing tips has flown (**Lynn Nelson's** N13LN). **Nick** and I have been comparing notes recently on how we each like the new tips and how they change the flight performance of the Lightning. Although as of now I have only flown the prototype with the new tips, **Nick** has now flown three Lightnings with the extended tips (**Wayne's, Lynn's,** and the prototype), and we both are convinced that they seem to be a "win/win" situation. Although performance testing for specific numbers such as V_x , V_y , best glide, etc., are yet to be completed, it appears that the new extended tips will improve every area of the Lightning flight envelop. I plan to go back to Shelbyville about a week before the 27 September Lightning Fly-In to continue performance flight testing of the new tips.

As you know, **Nick** developed the new tip extensions to lower the stall speed for those Lightning builders that wanted to build their Lightning so that it would meet the light sport specifications. In addition to achieving this goal, I think **Nick** also came up with a more modern look that combines a winglet and a modified Horner tip. But the real test is how the new extensions improve the flight characteristics. So far we have seen shorter take off rolls, greater climb rates, and guess what, no loss of speed. In fact, I am convinced we will see a slight speed increase at altitude. Combine all these improvements with no decrease in roll rate and I think you begin to see what I mean by an "win/win" situation. **Nick** likes them so much he is even considering putting them on the current 2008 Demo aircraft. So bottom line is that they look great and perform great as well. You should certainly consider them for your future Lightning.

Lightning Wing Airfoil

If you have read any one of the three flight reports that I have written on the factory Lightnings (N233AL, the Prototype; N323AL, the original demo; and N324AL, the new 2008 demo) then you will probably recall that I listed the wing's airfoil as a 6200 series. That was the answer I got when I initially asked **Nick** what airfoil he had used when he designed the first Lightning wing that was tested on an Esqual fuselage – the "Hybrid" Lightning or "Frankensqual" as they liked to call it. I noticed that **Nick** kind of hesitated when I asked him that question, and when he only answered by mentioning a "series" I thought he was probably being a little hesitant with his answer because he wanted to keep that info "classified" until he was sure that the design was finalized and that any competition would not be able to benefit from it before the Lightnings were on the market. Heck, I really didn't care what airfoil he used, I was only interested in how the darn thing flew. Well, as Paul Harvey would say; "Now, the rest of the story."

On 8 August 2008, I got the following email from **Dr. Cyrus Ostowari**, a PHD in Aeronautical Engineering, and a friend of **Pete Disher** in Australia. Here is **Dr. Ostowari's** message to me:

Fellows, sorry to tell you but the wing section that is being quoted in your latest newsletter is no where near an NACA 6200 series wing section. Although you can generate theoretical coordinates for a 18% thick i.e NACA 6218, but that's where it stops. Remember that the NACA dates back to 1940's and very little was done experimentally beyond the 4 digit 44 series wings. I don't know where "Buzz" got this information from. Peter Disher brought this to my attention and

I jumped at him like a wild cat, as this is my domain, being an Aeronautical Engineering Professor who could have taught "Nick" if he chose a Texan University for his education at which I used to teach at. He would have never heard me utter the 6200 series wing as they don't exist experimentally. This would have been a highly cambered wing and pronounced droop nose with a lot of drag. Now to correct you folks, The airfoil section happens to be a NASA NLF-0218 which was designed by my friend Dan Sommers (formerly at NASA) and Professor Richard Eppler (Stuttgart University). The NLF stands for "Natural Laminar Flow". I have plotted this airfoil for Disher and matched it to his physical wing root section of his kit.

Cheers Lads

Dr. Cyrus Ostowari

My initial thought was "oops", I made a mistake, but "wow", someone is actually reading my flight reports. My email back to **Dr. Ostowari** is below:

Hello Dr. Cyrus Ostowari,

I really appreciate your information and the time you put into examining the airfoil. The background on my quoting the Lightning airfoil as being a 6200 series goes back to when Pete Krotje asked me to fly the prototype so that he could get a second opinion on its flight characteristics before he put money into building a demonstration Lightning. Nick had been the only one to fly the prototype and was very positive on it. After my flight I certainly agreed with Nick's assessment and Pete then funded the first demo Lightning.

While looking for some background info on the design before I wrote up the flight report I asked Nick what airfoil had been used for the design. He was a little hesitant to provide that and finally answered by saying a 6200 series. I thought he was maybe being a little "protective" by not saying what specific airfoil had been used, but his answer was good enough for me. Actually, I later got out some of my old aero books from when I was at the Air Force Academy, but was not able to glean anymore info so as to be more specific in the article. It had been just too long since I was studying all that "good old" aero stuff at USAFA. In later conversations I think I remember Nick once mentioning a different series, but that may have been poor memory on my part. He still currently answers 6200 series when that question comes up.

So your examination of Peter's wing is the first real answer to the question of what airfoil was used on the Lightning. One other thought, did you see that the same airfoil was used throughout the entire span? Probably so, but just thought I would ask. Based on what you have found, I will ask Nick the question again and send him a copy of your message if OK with you. They really might be trying to keep the specific airfoil from becoming general knowledge. Also, with his and your permission, I would like to put your message in a future issue of the newsletter.

Again, thanks for your efforts.

Blue Skies,

Buz Rich

Obviously I forwarded **Dr. Ostowari's** message to **Nick** and below is **Nick's** response back to me:

Buz,

Well that is interesting. Apparently someone who is educated cracked the code. That airfoil sounds about right. I would have to check back but I think that's it. Most who ask about the airfoil shape ask to sound smart but do not know the difference so it doesn't really matter. The airfoil use on the current lightning wing is similar to one of the very first Esqual airfoils. Very nice shape and good performance but only one that was flying in the states which was destroyed when the gentleman ran it into a river and a few fences along the way. They then went with the wing and airfoil you have. When talking to them early on about the changes the early wing would not stall slow enough or short enough for their micro-light airfields in Europe. Esqual destroyed the molds and developed the long wing you have. Believe me we did not care about slightly better slow

speed here in the US and tried to get those wings over here but no luck as they destroyed them. Having flown that airfoil I liked it and looked for the airfoil thru out the data bases and found it, so that is what we used. The number 218 sounds correct. We were not trying to keep anything from anybody just that if Esqual might have had a fit because we were using a similar airfoil shape which they were discontinuing use of.

Go ahead and put it in the newsletter - I do not have a problem with it.

I guess we will have to try a little harder with the locks on the skunk works.

Nick

So there you have it – now you have the rest of the story and know specifically what airfoil the Lightning uses. But as I said above and **Nick** kind of indicated, who really cares what airfoil it is, the important thing is how it flies. And the Lightning flies great.

Factory Assist Build Update

Paul "Bear" Bryant will start his Lightning build on the 15th of September.

News from the Dealers:

Arion Lightning, Shelbyville

Below is **Lynn Nelson's** Lightning, N13LN, which had its first flight at Shelbyville on 20 August. Note that Lynn's aircraft has the new extended tips. Another beautiful Lightning.



Lightning Australia

We finally heard from **Ron Ritchie** in New Zealand that ZK-TDT has flown. The weather there had delayed his first flight, but 26 August turned out to be the day that the first Lightning to fly in New Zealand took to the sky. Ron, please send us some more photos and a "flight report" for publication in a future newsletter. Below is Ron's message and a photo of his gorgeous aircraft:



17:20 hrs Tuesday August 26 ZK-TDT Arion Lightning took to the air for it's first of type inaugural flight in New Zealand. Test Pilot Roger Cruickshank took off from Hamilton International Airport with a dozen interested aircraft enthusiasts present and flew a few medium and steep turns, stalls and several circuits of the aerodrome as well as a pulsating low level flyby for the cheering onlookers. The "Wow" factor was evident with all. On Roger's return he opened the canopy with a big smile on his face, shook my hand and said "I am predicting we will see a lot more of these aircraft in New Zealand." A big thank you to Nick, Mark, Mike and all at Arion Aircraft for their assistance to date as well as all of you on the chat site with your continued inspiration and support.

Ron Ritchie, From Down Under

Green Landings Flight Center

I received the following email on 18 August.

*Mr. Rich, I am **Gary Winkler**, building Lightning No# 73 N428GW at Green Landings in WV with Ryan Gross. We are mid way of the first week in the assembly and all is going on schedule. Plan is to have it ready for paint by COB 15 Aug 2008. Will keep you up to date as progress continues. One main observation is that the instrument panel is quite a bit smaller than the previous panel. Because of my design, I had to convert to 2 ¼ gauges instead of the 3 1/8 gauges I had hoped to use. Building N428GW to be flown from the right seat.*

Gary R. Winkler, Fayetteville, NC 28312

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

Special Feature

Below is a special feature for this issue. **Anthony Morrison**, a Lightning builder and flyer from Australia recounts his personal experience when he had an engine failure in a Jabiru. Thanks Anthony: great article.

Engine Failure – It happened to Me

By Anthony Morrison



Hi Buz,

I read with interest the article on engine failure on takeoff. Early last year it happened to ME, before I tell you and your readers about it I will introduce myself. My name is Anthony Morrison and I am a Chief

Flying Instructor of an Ultralight (now known as a Recreational aircraft/LSA) flying school in Victoria, Australia. I now have over 2,000 hours of instructing, mainly in our Jabiru J160 but I also have on line a Tecnam Sierra and a Lightwing (confuses me with the Lightning when making radio calls at times). I also have about 800 hours GA, mainly in a Piel Emeraude my wife and I owned for some years.

I offer amongst other things a Partner Course, this course is about 10 hours long and gives the pilot's partner some experience as to how an aircraft is controlled, how to fly straight and level so the pilot can become un-lost, radio changes and procedures, get the aircraft somewhere near the ground under control in an emergency.

Anyway, early last year my Partner Course student John, was conducting touch and goes in the right seat and all was going well, during one touch and go, just after liftoff at about 200 ft the Jabiru engine shook and stopped dead, could have heard a pin drop. I immediately took over (well after the 5 second pucker, shit, I cannot believe this) and let the aircraft drift to the right thinking I could turn back (first dumb thought), I looked out the window and it was bleeding bloody obvious that I was going to have to make an out-landing. I looked inside and the airspeed was low, I put the nose down and then rounded out in the field, all in one quick movement (things happen fast, 500ft/minute starting at 200ft gives you about 20 seconds in the air – 5 for the “I cannot believe this” leaving you 15 seconds to put the nose down and take control). All was going well on the ground, not slowing down much on the short grass, (I was thinking how much is this going to cost) brakes on etc and then a small creek appeared, this was starting to look very ugly. I pulled the stick back and sailed across the creek and then the Jabiru J160 said enough is enough and dropped the nose on the ground bending the nose leg under the fuselage, we sat there looking at the ground rushing under the cowls and waited for the big turn over which luckily did not happen. Eventually all was quiet again and we abandoned the aircraft a bit shaken but unhurt. Damage was to the nose leg, all wheel fairings and the transponder aerial and of course the motor. Two through bolts on No 1 cylinder had broken, don't ask why, it is a long story and there are several theories.

As a flying instructor you always teach with an engine failure on take off to land straight ahead, but I can tell you the urge to turn back is very strong, the runway we were using (rwy 21) is now the only runway that we can practice engine failures (because of the houses encroaching on the airport) and as luck would have it, it was that runway that the engine failed, any other runway would have been a different outcome. Runway 03/21 is 1,400 meters long, I since have practiced the turn back; the earliest time you can get back is when half way around the turn on to x-wind at 700ft. this can be done at gross in nil wind and you can only just get back, tried it several times with students, so after turning x-wind or above 800ft no problems at all, and any head wind is a bonus.

Forced landings high key low key is the next subject in your newsletter. I would like to take this opportunity to give you my views on the subject. The first thing you need to know is how far the aircraft will glide, so we climb to 3,000ft AGL over an object, set a course across the wind and turn the engine off, after the first 1,000ft you get used to it, take the head sets off and try and work out how far the aircraft will glide, pick a point, all very nice and quiet. We then climb back over the object at 3,000 and turn 90 degrees and look out the window and mentally mark the strut (low wing, part of the wing) and then repeat from the other direction and flying straight and level over the object. Now we know how far we can glide in nil wind and then we practice. I was taught high/low key forced landings, it works if you are high, I now teach judgment with practice, is the field going up or down the window etc? Some techniques I use are (1) circling over the field, (2) aim at and slow down with side slip, (3) fly across the wind and turn in to a suitable field, (4) high/low key etc. ALL techniques rely on good judgment from practice, how long since you practiced a forced landing, your last BFR probably?

The other thing I practice with students is dead stick landings, so if you fly with me you WILL get several dead stick landings and I can tell you the first couple of times it is very nerve racking, and the first one will be on returning from your first session of practice forced landings, and every one is amazed at the amount of float during the hold off. I believe that because I had done many dead stick landings, the time it actually happened was far less stressful than it could have been.

Our Lightning (serial No 32) is flying and going well, will be fitting the new trim when it arrives, did some glide testing on the second flight at various speeds, will be climbing up high and finding the best glide speed next test flight and also doing the dead engine glide to see how far it does glide.

Regards to you, and all readers.

Anthony Morrison

And below is a photo of Anthony and his “jet”.



Thanks Anthony, for your informative article and the time you devoted in preparing it. For all you other readers, please share any similar experiences you may have had with the other Lightning readers. We can all learn from the experiences of others.

News from Builders and Flyers:

Below is an informative message received from Pete Disher on 8 August:

Hi Buz,

Sorry, I feel I've sent the cat amongst the pigeons. Cyrus gets very passionate and excited when he sees room for debate, he drops in every 3 to 4 days to see how I'm going and suggest many things, I think this is why I have been so long in the build, he certainly shows a lot of interest in the Lightning and he is very generous in his time.

Again Buz, your news letter made excellent reading which I always enjoy, particularly this time, your flight report on the new demonstrator is very timing, for my time to fly will be soon, TRE airport this week, wings on, C of G and arrange inspection.

I've been flying a Ciabria the last few weeks and this week the Euro Fox and Foxbat, to get used to the stick again, its strange, it doesn't seem any different to the yoke, but I'm hoping the fox bat might quicken up my footwork, some what different to the Archer.

*Iv'e attached a few shots you might like for your NL of some more fairings I made for around the wheel spats to fairings.
Again, many thanks for another excellent news letter.*

*Regards,
Pete D*



Wayne Patterson sent the next message on 11 August:

My kit (number 65) arrived in Perth (Western Australia) yesterday and is safely keeping our cars out of the garage. We have an avid Lightning community here – with this aircraft being the 4th Lightning to be built at our club (Serpentine Aircraft Builders club). I am greatly looking forward to reading the manual, looking at Jim's build site, and supplying coffee to the Lightning owners in our club who have gone before me!

The kit was very well packed (I work in logistics) and fits well in my garage with good, safe work room around it. Had the "Round Sounds" Vol 1 CD playing as we unloaded (for those of you who like NOISE!).

Cheers from Western Australia,

Wayne Patterson

Dick Clevenger sent the following on 15 August:

Hi Buz

As you know I flew to SYI in late June to clean up some issues on Lightning #42. Nick was very generous with his time. We got the new trim tab installed, tightened up the rudder cables and cleaned up their pathways, checked the other linkages, reset the toe in (to 1deg toe out as on the new demo) and gave the airplane a pretty good review.

I am very pleased with the new trim operation. Flying with the bungee trim, constant control was required to fly the airplane. Looking at a chart was next to impossible. The plane can now be trimmed to fly hands off for 10's of seconds. After reading the KitPlanes article and the following discussions, my experience would lead me to agree with your assessment that the instability resulted from the bungee trim and was not CG related.

I flew to Telluride in mid July. It is a beautiful airport at 9000 ft elevation with one way in (9) and one way out (27), with a rise or ramp at the west end of the runway equivalent to a 300 ft/min climb rate. We got out ok but didn't climb very quickly with two 200 pounders and about half fuel. At 12000 ft the density altitude was about 17000ft. OAT of about 85deg. Fuel burn on the trip was 5.3 g/hr, mostly at 11000ft and above.

I will try to remember my camera the next time I go to a high country airport.

If any of this is useful in a newsletter, you are more than welcome to use it.

Cheers

Dick Cleavinger
N213RC
Lightning #42



And another message from Pete Disher:

Hi Buz,

I chose to register my aircraft with our authority CASA (your FAA), being GA Experimental. Our flight test program looks very comprehensive, some 51 pages, with a 40 hr. fly off. I would expect it would be pretty much the same as yours. CASA here, with all the other regulations, does seem to just copy yours to a "T"

The other authority here is the RAA, (Recreational Aviation Australia), I don't know much about it, but most people seem to go this route. I believe one does not need a medical certificate and maybe there is a restriction on entering controlled airspace.

I'm sure Dennis could chime in here, there must be many advantages.

Pete D
VH-PDI
OZ

And from another of our Australian builders:

A bit off topic for gap seals but, in brief, a Lightning can be registered under the national GA (VH- prefix) registration as an experimental where the builder (or subsequent owner) is solely responsible for airworthiness and the builder (while still the owner) can do most maintenance. These aircraft can

basically be anything that one can dream up and build, similar to the U.S. experimental as I understand it.

The RAA registration (19- prefix) is not a national registration (is not recognized outside the country). The intent of the RAA registration is similar to the U.S. LSA rule, again as I understand it. There is a weight limit (544 kg for homebuilt), two place, fixed gear, single engine, maximum stall speed but measured with flaps etc in use, no maximum speed so no need to go through the propeller fiddles for certification. Again, owner responsible for airworthiness and owner builder can do most maintenance. RAA has a fly off period but no formal test requirements and I am not sure of the rule relating to development of an operating handbook.

Pilot qualifications for these are administered by the RAA under delegation and currently does not allow entry to controlled airspace but rule changes to allow this with appropriate endorsement training are in work. Medical requirements are basically fit to hold a drivers license and no medical exam required.

For the Lightning it would be relatively easy to move from VH Experimental to RAA 19- registration and accept the reduced weight but not so easy to go the other way.

Hope that helps. Cheers, **Selwyn**

Upcoming Events:

Next Jabiru Engine Seminar (that is not “sold out” already) **is 5 to 7 September.** Call **Dana Otterback** at Arion in Shelbyville to sign up. I have attended this seminar and I consider it a “must” for anyone with a Jabiru engine or anyone considering one. It is money well spent.

The 2008 Lightning Fly-In will be 27 September at SYI. This is the second annual event and you should start planning now to attend. Those attending last year had a great time. This is a fly-in for anyone that is interested in the Arion Lightning, not just those that are building or flying Lightnings. Good food, hangar talk, demo rides, informational briefings, and other “fun” activities are on the schedule. The fly-in corresponds with Dana’s birthday, so bring a generous donation towards the Lamborghini that Nick thinks she deserves.



Lightning Skunk Works:

The following info is classified “Top Secret – DAR” (Destroy After Reading), so please handle this data accordingly. We don’t want the word to get out to other kit aircraft manufacturers until after final test results are in and a possible US patent has been applied for and, hopefully, received.

Most of you are aware of the recent success of the United States swim team at the Olympics (as well as other countries swim teams) in setting new speed records when using the new Speedo Lazer swim suits.

Based on the success of this new technology which apparently allows the users to “go faster”, Arion has been doing some classified research with this new technology fabric as well. They were able to procure one of these new swim suits with the high technology fabric and have recently been running a series of speed tests to see if this type of “fabric skin” would improve the top speed of the Lightning. Nick has been busy recently with other high priority projects, so Mark was chosen to do the test flying in the prototype Lightning. As usual, the prototype is being used as a test bed before any possible changes are incorporated into future Lightning kits.

Nick called me yesterday with some preliminary results (which he asks that we keep “under our hats” for awhile, but this is what he had to say: “As of this time, speed tests are still being evaluated to determine if the new fabric allows the Lightning to go faster but I can say this for certain, Mark sure looks good walking out to the airplane wearing that Speedo swim suit.”

Reader Feedback:

This section will contain messages that I get from readers that really don't fit the News from Builders section.

The first messages below have to do with the recent KitPlanes article on the Lightning. If you haven't seen the article, I suggest you get a copy of the September issue of KitPlanes and see what you think of the writers “thoughts” on the Lightning.

Tex from NY writes: (How does a guy that lives in NY get the nick name “Tex”?)

Just finished reading the Magazine with Nick sitting in the left seat by himself, which was strange. The article left me puzzled and confused. I would be interested in others comments about the content and overall tone of the review of the Lightning. **Tex**

Doug “K” from Green Acres writes:

Buz has offered his more detailed discussion of the content of the Kitplanes article, I want to offer a couple other ones.

1) The editors comments and the article tried to complement Nick, et al, on their willingness to make changes to the design-----without explaining that the magazine was in effect holding a loaded gun to Nick's head. Had the cooperation not been there the negative and error-filled story would likely have run.. or no story at all. While it may not have bothered Nick that much, I consider it a breach of journalism practice. In my day, the Media was never the story, it was only to report it. And most of all, the media should never CAUSE the story.

2) It would appear that the writer of the story was not really qualified to write it. Oh, he holds degrees and has lots of experience as a Navy pilot, etc. He just has very little experience with planes like the Lightning. I have not flown for the Navy, the Army or even the Air Force. I only hold Commercial,

Instrument, Single and Multi tickets in some 30 or so birds over some 40 years. I do not consider myself a test pilot. But the Lightning Ryan and I first built flew just fine. I agree there was some annoying features to the trim system. But who the hell cares? It flies fast well, it lands very slow, it climbs like a homesick angel, it is smooth and handles like an imported sports car. That is the story, not some crap about the CG and the trim system. In short, the writer missed the boat. By a lot. Did it improve the Lightning by moving the CG forward a bit and having a trim tab like other planes? Of course. But that should not have been the real focus.

3) What should scare the hell out of KitPlanes is the reaction of others who would bring a new plane to market. About 3 years ago I worked with Kitplanes to have the SkyRanger flown at Sun n Fun. That writer was a seasoned professional and did a great job. He accurately picked out the good and not so good features of a SkyRanger. I answered his questions and he was reassuring. It was still nerve-racking to deal with media, but I was pleased with the outcome. He wrote a good, honest report. At the time we were advertising significantly in the magazine.

But NOW if I were a manufacturer I would not be very excited to hear Kitplanes wanted to do a story about my new bird. This guy and the editor missed the news point of the Lightning. What if they cant understand the real features of my new design? Why would I want to advertise with them? Am I to be the next designer to be badgered by them?

I want to reread the article and plan to write a letter to the editor that will better make the above points. Tex, I think your being puzzled and confused is a reasonable response.

Doug Koenigsberg

Clive from the UK writes:

I'm also with Doug RE the article, I managed to get a copy of the article (thanks again) and was surprised at the fixation, the ramblings of the content. As Doug says something like this can kill an aircraft's reputation with a periodical like kit planes and its circulation. The instability was undoubtedly caused by the bungee system which was quickly pointed out to me (thanks again) and without bungee up trim she's stable. With the new trim sorted. Doesn't take much to say that but the guy has managed to run on about it for some 10 pages and flavor what could have been a great article.

One question, was Nick and everyone at Arion aware of the trim bungees effect on the stability at the first flight test? Before the reunion 'of sorts'. With my communication with the LAA's engineer explaining the delay in my taking the Esqual to him he confirmed bungee up trim has been the cause of stability issues in a number of types. The latest, the TL Sting, which you might have seen in the LS category.

The guy who flew my Esqual for it's initial flights gets kitplanes and understands more about planes and controls than I'll ever know. He writes tests for a number of periodicals in the UK. I'll ask him for an opinion about the article.



One thing, it was nice to see the Lightning's heritage recognised with the Esqual comment. The rest of the comments seem good if a little opinionated (but that what we want isn't it?, the magazines opinion) and the self deprecating style has a certain charm.

Regards, **Clive**, UK Esqual

In response to my request for suggestions for the newsletter, the following two messages from Wayne and Bill have some good ideas for upcoming articles. All we need will be for some of you Lightning builders and flyers take the time and effort to share your experiences with the rest of us in “your” newsletter.

Can only suggest photo documented travel logs of trips with Lightnings. When mine is built that will be the primary use – so I need some dream material!

Wayne P in Perth Australia

Hi Buz,

Just a brief comment about the list's input. It would really be helpful, to me and I suspect other builders as well, if more builders shared how they accomplished/overcome the building challenges they encountered during the build process. I read the list several times a day and don't see very much of this, yet that is what I really want to see. A builder's tip/suggestions comment in the subject header of the Email would rapidly identify that this Email is focused in this direction, i.e.: **Subject:** Construction Tip, Canopy skin trimming

Thanks for all your effort in support of the Lightning.....**Bill Applegate.**

Technical Tips:

I have included two technical tips for this issue, both of which came from the Lightning list. The first tip has to do with suggestions on the canopy installation and the second is a modification to the tail section that provides for a tail “tie down” position. See below:

Hi All,

I have been struggling with getting the canopy skins trimmed where the acrylic is glued to the canopy frame. What I should have done and now recommend to you is, after the canopy frame is trimmed and mounted (hinged and gas struts installed) but, BEFORE you glue the canopy to the frame, clamp each canopy skin to the canopy frame and trace its outline both top and bottom of the frame on each canopy skin. This will give you a good reference point for trimming the skin at the top of the canopy flange. The bottom needs to be trimmed after the skin is glued on to achieve that close tolerance fit we all want.

Bill Applegate, kit #49, Tucson, AZ.

You can use this fashion but be careful as the canopy will add some thickness to the skins and they may not sit correctly on the frame. We have glued the canopy on, than taped it up good so as not to scratch it. Than fit the skins off of the aircraft, put a cleco in every 2” or so to hold in place. Trace the lower skin on the frame. Once done, take the clecos out and put the canopy back on the aircraft. Trim the frame long from the tracing enough to cover your gap between the frame and fuselage. Cleco back on and continue to block sand the edge until the gap is what you like. To get the upper trim line, take the skins off, measure from the bottom of the frame to half way on the flange which the canopy was glued, measure this every 2-4” all the way around and transfer to the skins to trim. This gives about ½” or so left to feather the frame into the canopy for a nice look. Of course this is only one way to do it.

nick

What I did was after bonding the canopy to the inner canopy frame, I ran a piece of narrow painters tape (easy to remove and leaves no residue) around the outside of the canopy, matching the lower edge of the tape to the upper edge of the inner frame, as seen through the canopy. Then after rough trimming the outer skin I temporarily attached it to the canopy and got it fitting smoothly. Then I applied a second piece of tape matching the upper edges of new tape with the old, and marked the lower edge onto the skin. This is effectively the same as marking the offset line and measuring down, but I found it easier and more reliable.

Hey, I'm finally able to give someone else advise! I must be making progress.

John Eynon

Lightning Kit #53

The following suggestion came from Gary Pennington and is a suggestion for adding a "tie down" to the tail of the Lightning.

Hello again to fellow builders

About three weeks ago, we had a discussion about tie downs. Call me crazy, but I didn't like the idea of using the Aileron or Rudder brackets for tie downs. Because of that, I've designed a **tail** tie down that seems to be very strong and does not conflict with controls or surfaces. I have attached a photo if you are interested. I used scrap aluminum channel for the vertical bracket, which I bolted to the stiffener web between the Vertical Stabilizer skins and aluminum angle which I bolted a Stainless Steel Eye Bolt to. The assembly attaches to the rear most part of the bottom of the tail section below the lower Rudder bracket. I'm thinking about making a small fairing for the eye bolt when I turn the plane over. Yes....I know an "eye bolt fairing" is a little over the top. I haven't given much thought to the wing tie downs yet....too much other work to do, but if I come up with anything, I'll share. Fly safe.



Gary Pennington

Pete Disher had previously shared his solution for "tie down" points on the wings. Below is a recap from a previous newsletter showing his modification to the wings.

Just a few shots as to what I did, bent some 1/8 angle and fixed them to the main spar in the area of the aileron bell crank, and used SS "I" bolts.

Pete D
VH-PDI
Kit #30



Other Items:

More on engine failures

Here is the third, and hopefully the last, part of a discussion I started about how to react to an engine failure in flight. I finished off last month's installment with a suggestion that you should take your airplane out and determine how many feet you lose in a 180 degree turn while at best glide speed in the landing configuration. Did you do your homework?

Ask any pilot who successfully glided to a runway when his/her engine failed in the pattern and you will likely find out two things:

1- he/she was flying a pattern **closer to the runway** than has become common in light airplanes, and,
2- he/she routinely pulls the throttle to idle and practices a gliding approach to landing in order to be ready for the rare time the engine does quit in the pattern. **I highly suggest that you include this "practice" occasionally during your landings just to make sure you are ready – just in case. Consider this your "homework" for the next time you go flying.**

The following discussion is "just one way" to "skin the cat", so to speak. It has worked for me and will work for you, but the key is to know your airplane and to have practiced in advance. Having said the above, here are some suggestions on how to fly an engine out landing pattern. Heck, it is basically the way I fly all my patterns – that is except when following some Cessna or Piper on a "cross country" pattern. Darn, I wish instructors taught patterns the way they used to – patterns that will allow the pilot some small chance of making the runway in case of an engine failure.

In the military we are taught the idea of flying an engine out pattern by looking for a "high key" and a "low key" position in the pattern. In order to keep this discussion specific to the type of aircraft we are now flying (Lightnings), let's "build" an engine out pattern by starting from the touchdown point and work our way back up to the low key and high key points. First, your desired touchdown point for an "engine out" landing should be somewhere in the first half of the runway (first third if you have a shorter runway). Remember, this is an engine out landing, not a normal landing, so you want to give yourself a "larger touchdown zone" of opportunity. And don't aim for "brick number one" on the runway. You should also try to be down by the midpoint so you have some room to get stopped.

From the touchdown point, back your pattern up to about ¼ mile on final (or even less – 1/8 mile) and that is where you want to roll out on final. You would like to be slightly high on the glide slope (you can recognize the desired glide slope, can't you?) at the point that you roll out on final. You can slip off any excess altitude if you are high, but, for sure, you don't want to be low (or slow) on final.

From the point that you roll out on final, continue to "back up" your pattern until the point where you are on downwind at the "low key" position. You want this point to be pretty much abeam your touchdown point, at 800 to 1000 feet above the airport elevation, and probably closer to the runway than you normally are. I say that because most people fly their downwind way too wide. Heck, I have seen some people over a mile wide on downwind. **No way they will be able to make the runway if they have an engine failure.** Even ½ mile out can be too wide on downwind depending on the airplane and/or wind conditions. I personally look for being about ¼ mile wide on downwind and the picture that gives me from the Lightning cockpit is - "I see the runway a little inside the wing tip when in a Lightning or an Esqual". If you are at 1000' you probably want the tip on the runway, and if you are at 800', you probably want the runway to be somewhere inside the tip, say along the aileron, but outside the aileron hinge line. In the

Cub the runway on downwind is about where the “spreader bar” is between the two wing struts. The actual picture you will see will depend on your sitting position or sitting height. Yes, that is close, but it works for me and insures I can make the runway. You may want to slowly adjust your pattern so you will feel comfortable flying downwind ¼ mile out, but remember, the reason you are doing so is to be able to make the runway if you lose an engine in the pattern.

To reiterate, if you want to be able to make the runway, engine out, from the downwind, you have to be close enough so that you can make a 180 degree “base to final” turn at your best glide speed in the landing configuration. This part of the pattern can be a “curvilinear” approach or you can put in a short wings level “base” (as required by the FAA for normal patterns) to check for traffic on a straight in final, but the important thing is to roll out on final slightly high on glide path and at no more than ¼ mile out on final.

The last part of building your engine out pattern (up to high key) is just to put in another 180 degree turn to a position over the runway – the place you will be trying to get to from wherever you are when you lose your engine if you are not in the pattern when that happens. So add another 800 to 1000 feet above low key and that should be your desired high key position – right over the desired touchdown point on the runway, headed in the direction of intended landing.

Remember, if you don't have the altitude to fly the overhead high key / low key engine out pattern, you can modify it to a kind of straight in approach. Visualize yourself on a low key about a ½ mile out on final. Once again, if you are slightly high on the glide path, then you can slip the airplane. If you are too high (way above the glide path), consider “S” turns on final to kill off excess altitude. Do not be tempted to fly a figure eight. You absolutely do not want to lose sight of the runway. That is why the high key / low key pattern works so well, it allows you to keep the runway in sight.

The above has been kind of “wordy”, but if there is one thing I want you to get from this discussion, that would be to try it before you actually need it. When making a normal landing, every so often get into the habit of routinely pulling the throttle to idle and practicing a gliding approach to landing. By doing this on a routine basis you will have a good feel for what your aircraft is capable of and you will maintain your “emergency engine out” skills in order to be ready for the rare time the engine really does quit in the pattern. Fly safe and have fun.



Which one has the best glide ratio?

Final Thoughts:



**The clouds may float across the sky,
The bee may kiss the butterfly,
The sparkling wine may kiss the glass, and you my friend . . .
May kiss my**

Well, Farewell for now.

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.)