Radio Controlled Soaring Digest

August 2016

Vol. 33, No. 8

CONTENTS

August 2016
Vol. 33, No. 8

Front cover: A Swift S-1 at the Two Oceans Slope Soarers Slope Aerobatics 2016 event, Scale Class. Complete coverage of the event begins on page 75 of this issue. Canon EOS 7D Mark II, ISO 160, 1/1000 sec., f7.1, 244mm

R/C Soaring Digest

August 2016

Volume 33 Number 8

Managing Editors, Publishers Bill & Bunny (B²) Kuhlman

Contact bsquared@rcsoaringdigest.com
http://www.rcsoaringdigest.com
Yahoo! group: RCSoaringDigest
FaceBook: https://www.facebook.com/RCSoaringDigest

R/C Soaring Digest (RCSD) is a reader-written monthly publication for the R/C sailplane enthusiast and has been published since January 1984. It is dedicated to sharing technical and educational information. All material contributed must be original and not infringe upon the copyrights of others. It is the policy of *RCSD* to provide accurate information. Please let us know of any error that significantly affects the meaning of a story. Because we encourage new ideas, the content of each article is the opinion of the author and may not necessarily reflect those of *RCSD*. We encourage anyone who wishes to obtain additional information to contact the author.

———

Published by B²Streamlines
http://www.b2streamlines.com
P.O. Box 975, Olalla WA 98359

———

RC Soaring Digest is published using Adobe InDesign CS6

In the Air

Lots of photos in this edition! Our sincere thanks to all of the fantastic photographers who have contributed to *RC Soaring Digest*.

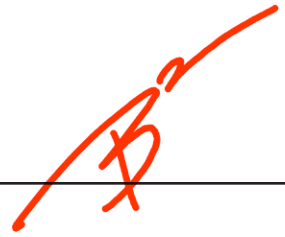
We made mention of the new F3B-RES Class in our last "In the Air" installment. Since then we have done some research on the event and now have the official set of rules. We've gone through our archives and done a bit of internet searching in order to set about making a list of candidate models. It's surprising how many models have been designed in the past and which are now eligible for this competitive environment.

Additionally, we picked up a copy of the German language "R.E.S.: Kleine Thermiksegler mit grosser Leistung" (R.E.S.: small thermal glider with high-performance) by Frank Schwartz, published by VTH (Verlag für Technik und Handwerk neue Medien GmbH). This volume describes twelve F3B-RES models and includes listings of each in a table of specifications, recommendations for radio gear - transmitter, receiver, servos, battery packs - plus sections on construction and aerodynamics. There's even a page devoted to a rather unique spoiler mechanism.

F3B-RES was also the major topic discussed at the most recent meeting of our local club, and it certainly generated quite a bit of interest and excitement. Here's a Class which does not involve any sophisticated equipment: an inexpensive hi-start, simple radio gear, and a glider which not only costs little but also fosters a return to actually building what you fly!

What could possibly be better for the hobby?

Time to build another sailplane!



RADIAN XL *first impressions*

Bret Sutton, oldcootonabike@gmail.com

Horizon Hobby's new EFlite Radian XL electric-assisted-launch sailplane is firmly in the tradition of those that preceded it: it performs well at its intended tasks, it's evident that design problems with earlier models have been addressed, and it leaves a bit to be desired. Here's a first-look review of the design and its implementation, the packaging, and initial flight tests.

Overview

As you can see from the photo, the XL dwarfs the standard 2-meter Radian. The wing span is 2.62 meters, or 103 inches. I expected that the larger wingspan would also have a higher aspect ratio, but this is not the case; in fact, it's just a tad lower: root chord has increased from 200mm to 275 mm. This is a result of the retention of the flat-bottom profile, which is in turn related to the chosen material (Z-Foam, same as the 2m). The fuselage has been lengthened proportionately, so that the plane is, overall, just about a 30% scale-up of the Radian 2m. Tail surfaces are noticeably larger.

All-up weight on my XL was 2518g, as opposed to 816g for my 2m; that's a factor of 3.1! The XL is powered by a 1250Kv outrunner brushless motor driving a 12x4 propeller. That's quite a bit more pulling power than the 480-type motor driving a

2

3

4

9.75x7.5 prop in the 2m – and the XL needs that additional power, and then some. I've been told that the 480 is rated at 920-960 Kv. Given the weight difference, that makes the XL look somewhat underpowered.

Packaging

The Radian XL box is about three inches longer and two inches thicker than that of the 2m, so you will probably be able to transport it just as easily. In my case, the foam container is a very tight fit into the outer paperboard box. I'll either discard the box, or change it so that it opens from the top rather than from one end.

The parts were packed in three layers inside the box; repacking everything is like putting together a jigsaw puzzle. I recommend marking the foam inserts to indicate packing order. I also recommend modifying either the box or the rudder to allow repacking of the fuselage into the box. Keep reading for more on this.

Plane Features and Assembly

The canopy is molded foam, like the plane, about a half inch thick. It is secured with a forward tab and an aft pushbutton latch, rather than with magnets. It should be much less likely to come off on hard landings. There is plenty of room in both the cockpit and the servo area for additional instrumentation. The receiver, like the servos, is fastened securely in place. If you need to rearrange the servo connections to the receiver, use small fingers.

With the recommended 3200mAh EFlite 3-cell LiPo battery, which weighs 260g (as opposed to the 100g of the standard 1300mAh battery on the 2m), the plane balances as recommended in the manual, if the battery is placed in its rearmost position. SASS member Sherman Knight recommends trying a lighter battery. More on this below. A Velcro-type strap secures the battery side-to-side. A small piece of sticky-back Velcro is provided with the kit, to prevent the battery from sliding fore and aft; usage is highly recommended.

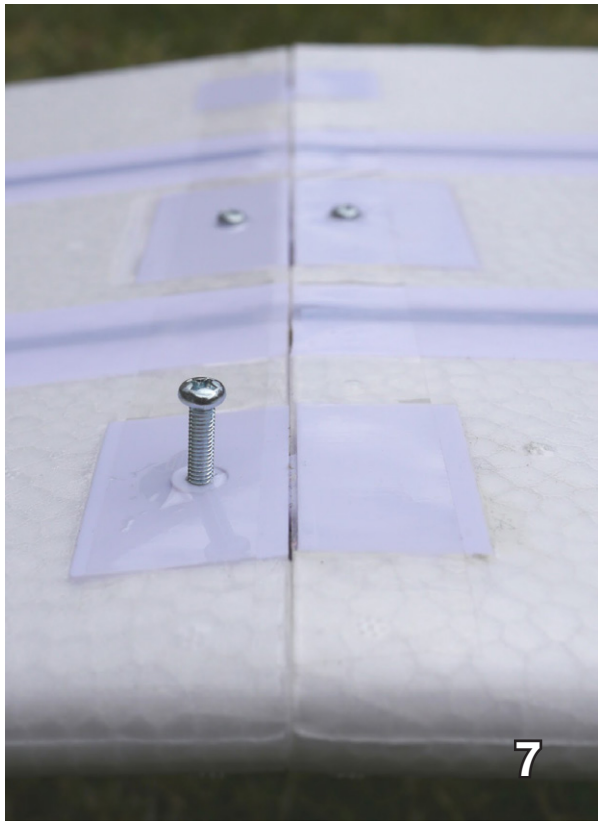
The receiver includes AS3X stabilization, which is effective but may be turned off. More on this below, also.

The rudder linkage, as on the 2m, runs along the outside of the fuselage. As the elevator mechanism is embedded inside the vertical stab, the elevator linkage is entirely inside the fuselage. Note in the photo above that it runs inside a very substantial carbon tube that extends most of the length of the aft fuselage and about 2” into the servo compartment. That tube makes the fuselage very stiff, and removes the tendency of the control tubes, in the 2m, to come unglued from the fuselage.

You’ll notice that the solid center wing section obviates the need for a wing rod. This is good, because sometimes I forgot to take mine to the field, or to put it in (ouch!). On the other hand, you now have four composite wing joiners and a couple of plastic alignment tabs that must be secured with six small screws.

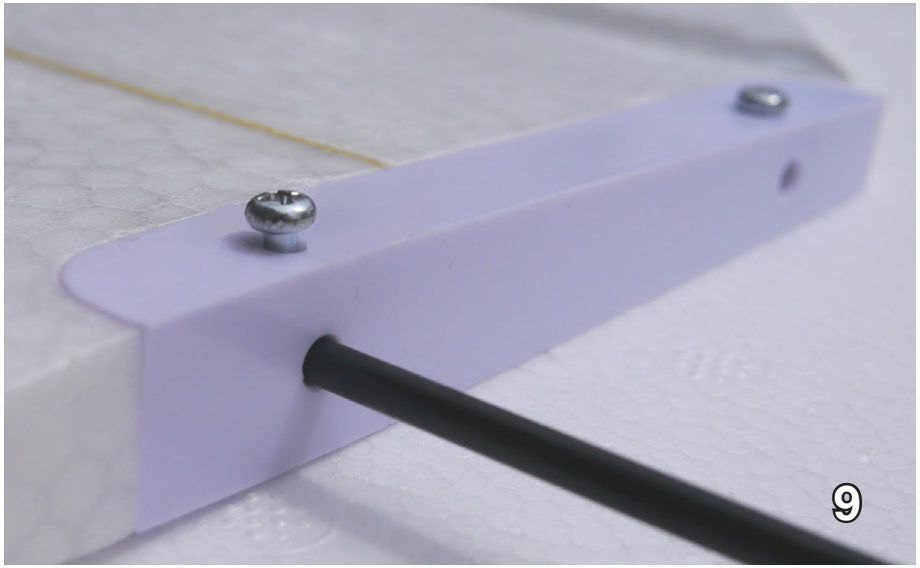

5

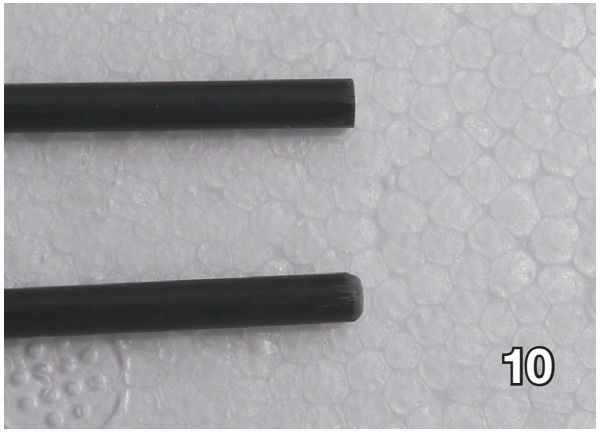

6

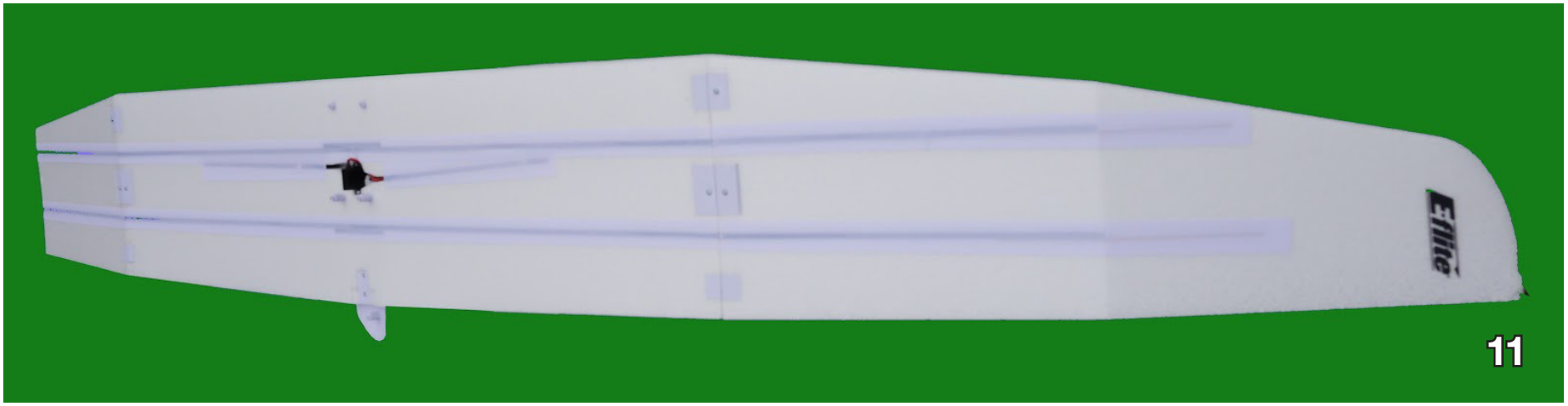


Note also that some assembly is required: as packed, the rudder is not attached to the vertical stab. The rudder has three flexible plastic hinges, which you must slip into corresponding slots in the stab, and secure with a few drops of thin CA. Unfortunately, once you've done this, you can't really get the plane back into the box: you run the risk of damaging the trailing edge of the rudder or of introducing a set into the hinges. One way around this would be to cut the rudder back off and trim the hinges flush with the foam; then install a hinge with a removable pin. You could also perform surgery on the foam box and extend it a few inches, using foam from one of your many boxes from previous Radians.

The elevator on the Radian 2m has been converted to a full-flying horizontal stabilizer. It's much beefier than the stab on the 2m, and we no longer have the work of modifying the decalage for better performance: just select it via adjustments to the servo linkage or the trim tabs on your transmitter. The two halves of the stab are joined with carbon rods which pass through the vertical stab and are secured with screws, which act as setscrews. Here I encountered a manufacturing defect: one of the metal plates through which the setscrews pass was not tapped to accept the screw (the photo shows that I could not screw it in all the way). If you have the same problem, don't try forcing it: it won't work. Luckily, my son had a 2.5 x .45 mm tap that made for an easy fix.







Another recommendation: use some fine sandpaper (e.g., 400 grit) to round off the ends of the carbon rods. This will make it easier to slip them in and out of the stab halves. The photo shows the original rod end on top, and a rounded end on the bottom.

The spars are quite evident when you view the wing from the bottom (photo at right). Note also the control linkages from the wing-mounted servo to the spoilers.

After the spoiler servo is connected, the assembled wing is secured to the fuselage with five screws that fit into posts in the fuselage. All connections seem to be quite secure – but between the outboard panels, the wing, and the horizontal stab, there are a total of 15 screws to install every time you put the plane together! And they are four

different sizes! You may wish to color-code both the holes and the screws with four different colors of foam-safe paint. And, even though a few extra screws are provided, be sure to do the assembly over a drop cloth: you'll never find the screws in the grass.

For the size of the wing, the spoilers look undersized. They're effective, but I think that another couple of inches could have enhanced their effectiveness.

Initial Flight Testing

If you've flown a UMX Radian, you've noticed that it doesn't really fly like a 2m Radian. Likewise, don't expect the 2m and the XL to be on equal footing in a contest.

I fly Hitec Aurora. For testing the XL with the built-in Spektrum receiver, I used a DX5 that I had lying around. It was a nuisance to set up the channels – I sure missed the programmability. Oh, well – at least I didn't have to worry about escapements and mechanical mixing.

You'll want to put the spoilers on either the left stick or a slider, so that you can accurately control your glide path on final approach. The DX5 doesn't have sliders, so I had to put the motor on a toggle. If you need to do that, I recommend configuring the ESC for a one-second startup to avoid strain, both on the drive system and on your grip on the plane. There's also a .25-second startup option; but I like the longer one.

There are small indentations on the bottom surface of the wing, next to the fuselage, that indicate the recommended CG point. Hand tosses indicated that the plane with the recommended 3200mAh battery was reasonably well balanced. So I went ahead with a powered launch. The launch can be most accurately described as stately. I could almost hang the plane on the prop, but altitude gain was minimal. So there was the first difference between the 2m and the XL. I found best practice to be a flat launch of 50' or so before allowing a climbout of somewhere between 10° and 20°. Too steep an angle results in mushing and waste of battery. So don't expect

any kind of advantage in timed-launch rounds. With altitude-limited (ALES) launches, it will be a bit nerve-wracking, trying to hit max height in the typical 30-second period before automatic motor cutoff.

Once the plane reached altitude, it performed very well. Given the airfoil and weight, I expected a lumbering behemoth. But it thermalled well and was pretty good at indicating updrafts, although not as bobbly as the 2m. After a little tweaking by Sherman, it performed well in the dive test, although he thought that it would perform better with a smaller (lighter) battery which could also shift the CG back a little. (The recommended 3200mAh battery, at recommended CG, is against the aft bulkhead, so cannot be shifted back any further.) I tried using one of the 1300 mAh batteries, but it was too light to make the plane balance. So I strapped in two side-by-side. The plane flew just fine, but I don't think lowering the weight by 60g made a perceptible difference in handling.

The AS3X stabilization may (or may not) affect the plane's ability to read the air. I haven't flown it enough to get a handle on that. It is possible to reprogram the receiver (at least, on the UMX Radian) to allow stabilization to be selected via a transmitter toggle. I will be installing an Aurora receiver, so will soon find out how much difference stabilization (or the lack of it) makes.

Glide ratio appears to be every bit as good as the 2m. So if you could max out a 10-minute round with the 2m, you shouldn't have any problem doing it with the XL. With the added benefit of spoilers, it's the landing portion of the round where the XL should shine. The spoilers were quite effective at steepening the descent – although, as I mentioned above, it would be interesting to try spoilers that were a little larger. In many planes, the loss of lift triggered by the spoilers must be compensated for with some up elevator. But this effect has apparently been minimized by the overall plane design: only slight elevator correction was needed. Note, however, that the spoilers do not reduce landing speed: you'll need to use elevator to keep speed under control.

After flying a Radian 2m for years, I felt that it was somehow cheating to use spoilers to control the glide path: no more (well, not nearly as much, anyway) zigzagging back and forth to make those pinpoint landings. But you'll still want to have good control over both your speed and your rate of descent: dork landings are not recommended, and the XL, with its much greater mass, has a much longer slide path over the grass.

Price and Availability

The Radian XL started shipping in early- to mid-June. Demand seems to be high, as it quickly went to back-order at Horizon Hobby. I ordered mine at just the right time, and there was no wait. Not to mention a good price: list was $270, but Horizon Hobby had two different coupon offers going, which lowered the price to $189 – not much more than the cost of the 2m. As of 6/30/2016, Horizon had the XL on sale for $230, with an additional $20 off, it appears, if you use coupon code FOAM.

Service Bulletins

On July 6, Horizon Hobby issued two service bulletins (linked below) dealing with apparent failure, in the early manufacturing process, to adequately secure stiffeners in the fuselage under the vertical stabilizer and the doublers that join the halves of the wing spars in the center section. It is the work of a half hour to correct this oversight with some thin CA. Subsequent models, identified with a sticker on the box or near the affected areas, will have had the defect corrected at the factory.

<http://www.e-fliterc.com/ProdInfo/Files/54014_EFL5550_Fuse_Service_Bulletin.pdf>/<http://tinyurl.com/hsu5uy4>

<http://www.e-fliterc.com/ProdInfo/Files/54014_EFL5550_Wing_Service_Bulletin.pdf>/<http://tinyurl.com/z8golgc>

RADIAN XL *not a football*

Ken Gantz, khgantz@gmail.com

No, that's not a football I have my hand around (1), but it is as big as one. It also has that pig skin texture. If I had any artistic abilities, I'd paint a set of 3-D white laces down the middle of it.

That's the canopy of the Radian XL. It is humongous! You could fit a family of four in there!

With any luck, it will maiden tomorrow. I've had it since last Saturday, but I just finished up all of the "building" and out-of-box repairs it needed.

To remove the wings and disassemble them for travel, Horizon expects you to remove 11 screws each time. I got rid of half of them by using the ol' tape on the wingtips method. All of the screws in this thing are machine screws that thread into blind nuts embedded in the various plastic parts.

There is a sort of huge plastic skeleton that gives the fuselage all of its strength and one of the five screws that holds the wing center panel on did not have a corresponding nut on my XL so I had to scrounge up the perfect sized sheet metal screw and that one threads directly into the plastic skeleton.

When I first unboxed this giant foamy, the vertical stab was poking outside of its protective shipping foam and it looked like someone had dribbled the box like a basketball on that end. The rudder ships detached so it was not harmed, but the tip of the vertical stab was so floppy, it would not stand up straight. It had the consistency of damp cardboard. It took gluing the rudder on

2

3

and several subcutaneous injections of CA (medical references to impress Marc) to get it to stand up straight again.

The wings feel like 2x4s. I think you could club someone with them. It comes with a 40 amp ESC and when I did my load tests, at full throttle it goes right up to 37 amps and then drops little by little. It will also be unloaded in flight so it should drop considerably more.

The AS3X stability stuff is weird. You have to be at 25% throttle for it to be armed. If you make any trim adjustments in flight, you have to wait 3 seconds for them to “settle in” in order to know how the trim adjustments have affected the airplane. On the workbench, you can use the trim to move the rudder way off center but, in 3 seconds, it will pop back to where it was before you made the adjustment. That’s just odd.

The spoilers seem very smooth in their movement so that’s a bonus. The entire model feels pretty darn rigid for foam, so I’m curious as to how it will fly. With any luck, I should find out Saturday afternoon once it passes its radio range test.

Many families will find their way to the park to celebrate the Independence Day holiday this year.

The same is true of the Radian clan who made it out to the field today to watch papa XL do a little sky surfing. Mamma and junior didn’t fly, they were just there to lend moral support and look good in the photo (2).

I ran out of the house so quickly when the rain stopped, that I ran right by the “hat cam” and forgot to take it with me. Papa Radian will surely show up in a hat cam video real soon though. He’s easy to see in the sky.

The Radian XL, which people are calling the RXL now, really is almost comically large. There’s no way it’s going to fit in the normal cradle that I use for working on and prepping various sailplanes (3). It’s kind of like Dumbo the elephant trying to ride in a clown car.

All UFO photos are always a bit blurry. Radian XL vs. Mothra...

This was my one unexpected surprise for the day. The last battery and last flight on that battery almost turned into the last flight EVER for papa Radian.

Apparently the rudder got jostled a little during the last landing and I committed the cardinal sin of not checking the flight controls before every single flight.

I launched it and the climb seemed pretty normal until I tried to turn and realized I had no rudder. It was above the trees and heading for the farm field where John's Radian landed recently. Then I got a little turn, and then no turn again. I had no idea why it wasn't turning but I kept trying to get it to turn. All of a sudden it did, and it made about a 270 degree turn which had it coming back toward me but it was flying straight again.

The only problem then was that all of our cars were straight ahead. I put out the spoilers and, to my surprise, by holding a lot of up elevator, had it descending almost in a flat attitude. It landed gently well short of the cars.

When I picked it up, I took photo (4). The silicone "safety" strap was still in place, nothing was broken, yet the clevis still was able to detach from the rudder horn.

I guess I got lucky a couple of times and was pushing the horn with the closed clevis. That is not a flight that I wish to duplicate any time soon! Now I will surely remember to check all flight controls before every flight!

All in all, I do like the way it flies. It will turn on a dime if you need it to and there were times when I felt I could almost set the radio down and go take a nap in my car without having to worry about where it was going to be when I came back. It just hung there in the sky. It almost reminded me of those old black and white videos of the Graf Zeppelin or Hindenburg. It almost ended up like the Hindenburg on that last flight.

While the general flight performance seems pretty good, especially with all of that heavy foam, It's climb is a little lackluster. It doesn't so much climb as it does saunter. It looks like a sailplane perched on a department store escalator heading up to Sporting Goods on the third floor.

I didn't have an altitude switch in it but it is highly likely that some of my climbs exceeded 30 seconds trying to get it well up there.

It tracked very straight for the lone loop that I did, just to see how willing it was.

I flew with 2200 mah batteries and had them strapped down pretty far aft in the nose. I know I was well behind the suggested 91mm CG. I don't know exactly how far back though because the darn thing won't fit in any of my CG measuring jigs and trying to balance it on one's fingers while measuring is tough to do.

All in all I'm very happy with the way it flew, even if it did try to scare me to death on the last flight.

There will be more to come! --

Based on the Micro Quark, here's another aerobatic sloper!

Fred Marie, GliderIreland.net

Following the design / build and flying of the Micro Quark, I had a brain wave (That does not happen too often, so had to jump on the occasion!) and decided to use the same "platform" as the Micro Quark, but with a scale twist.

I decided on the Lunak as I always liked the look of it, and if it flies half as good as the Micro Quark, that would be a winner!

So, back to the drawing board for a quick session.

The wings are exactly the same as those of the Micro Quark, so with a set of wings, you can end up with two different models. Just the extra fuselage to build if you already have a Quark.

Laziness at its finest!

Quick design, as this is basically a rectangular box in the shape of a Lunak. So, if you already build a Micro Quark, build the fuselage, and off you go!

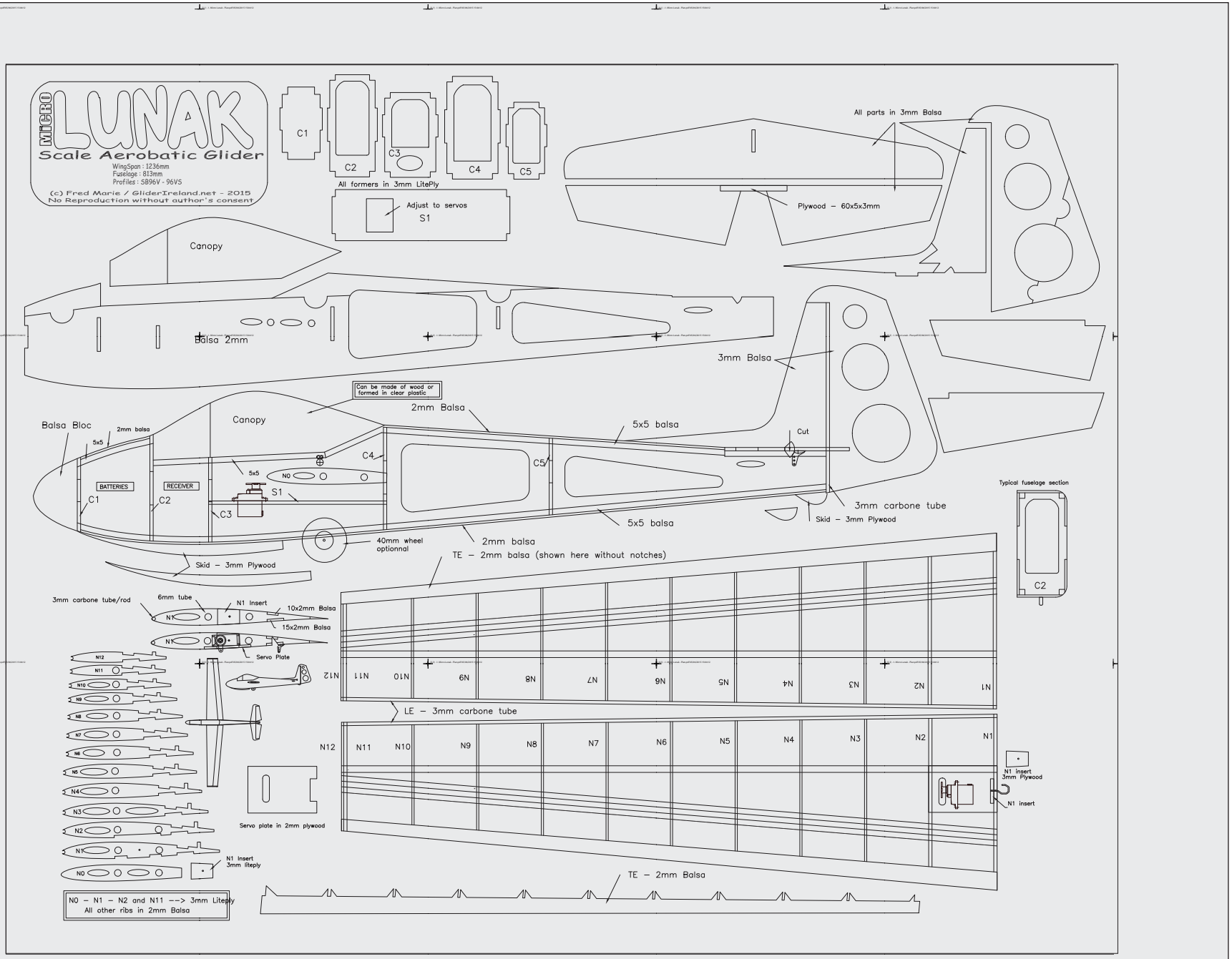
The Micro Lunak is of wood construction and is designed for four servos, five if you go with a towhook!

So, here we go!

Micro Lunak Specifications

Wing Span:	1236mm
Length:	840mm
Profiles:	SB96V - SB96VS

FULL SIZE PLAN in 15 A4 sheets to be assembled:
<http://gliderireland.net/images/Plans/Micro Lunak - Plan A4.pdf> 238k


MICRO LUNAK
Scale Aerobatic Glider
WingSpan : 1236mm
Fuselage : 813mm
Profiles : SD96V - 96V5
(c) Fred Marie / GliderIreland.net - 2015
No Reproduction without author's consent
C1
C2
C3
C4
C5
All formers in 3mm LitePly
Adjust to servos
S1
All parts in 3mm Balsa
Plywood – 60x5x3mm
Canopy
Balsa 2mm
3mm Balsa
Can be made of wood or formed in clear plastic
Balsa Bloc
2mm balsa
5x5
Canopy
2mm Balsa
5x5 balsa
Cut
BATTERIES
RECEIVER
N0
S1
C1
C2
C3
C4
C5
3mm carbone tube
Skid – 3mm Plywood
40mm wheel optionnal
2mm balsa
TE – 2mm balsa (shown here without notches)
Typical fuselage section
C2
3mm carbone tube/rod
6mm tube
N1 Insert
10x2mm Balsa
15x2mm Balsa
Servo Plate
N12
N11
N10
N9
N8
N7
N6
N5
N4
N3
N2
N1
N0
N1 Insert 3mm liteply
Servo plate in 2mm plywood
LE – 3mm carbone tube
N1 insert 3mm Plywood
N1 insert
TE – 2mm Balsa
N0 – N1 – N2 and N11 –-> 3mm Liteply
All other ribs in 2mm Balsa

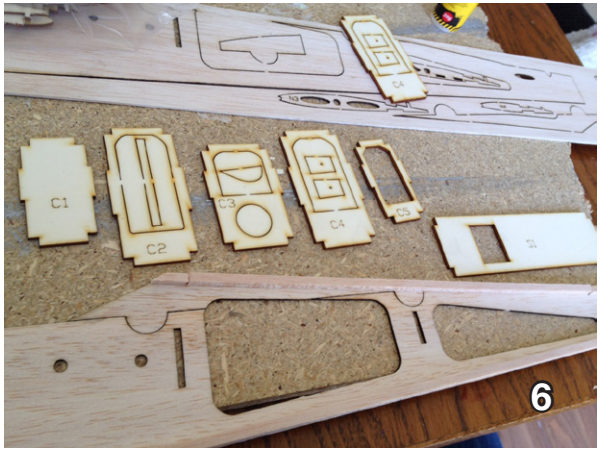

1

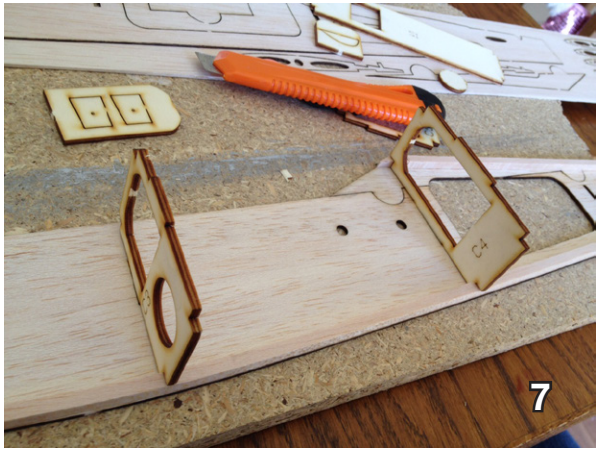

2

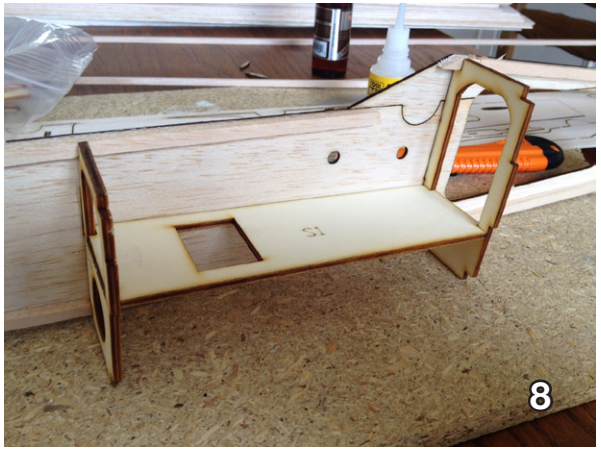

3


4


5


C1
C2
C3
C4
C5
6


C4
7


S1
8


9

Photos 1 - 5: The fuselage sides are cut in 2mm balsa, and 5x5mm balsa strips are glued all around the edges. (See plan.)

Careful, there is a left side and a right side! (The one who never made the mistake throw me the first sheet of balsa!)

Photos 6 - 8: Then the formers C3 and C4 are glued, followed by the servo tray - 9 gr servos should be a nice fit. Adapt the opening on the plan to whatever you have of course!

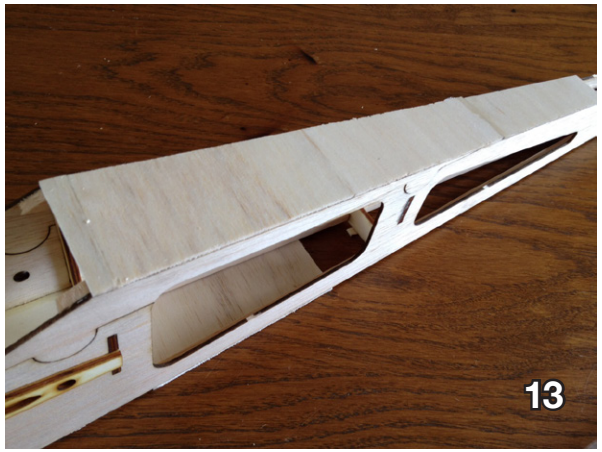
Photo 9: The other side of the fuselage can then be put in place making sure everything is straight and true.

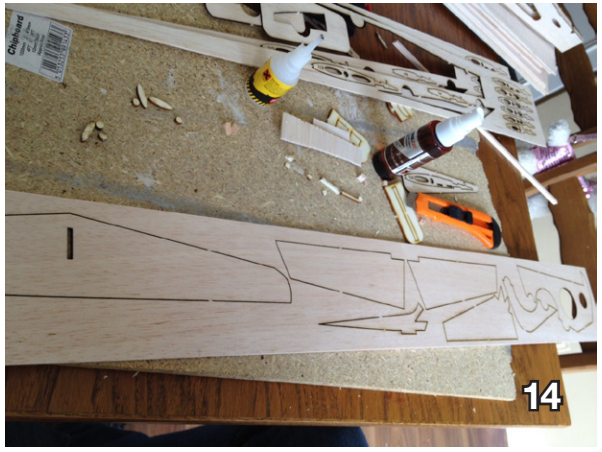
Photos 10 - 11: The other formers are then glued in place, constantly making sure everything is straight and level! Fuselage is built “in the air.” Make sure the fuselage ends are parallel and level, and you should be all OK.

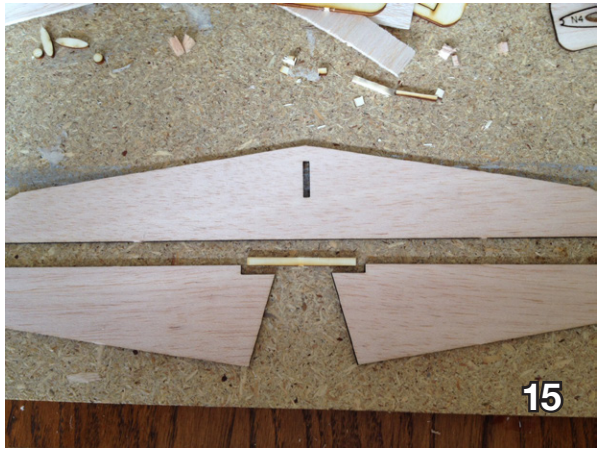
Photos 12 - 13: The fuselage top and bottom are then sheeted in 2mm balsa.

Photo 14: You can also prep the elevator / rudder (in 3mm balsa) to be ready to fit after the sheeting. Nothing serious there.

Photo 15: The two elevator halves are linked with a piece of 3mm plywood. (See plan.)







Photos 16 - 21: The nose is then roughly shaped in form from a block of balsa, glued on C1, then sanded with the fuselage to have a nice, smooth “roundy” finish.

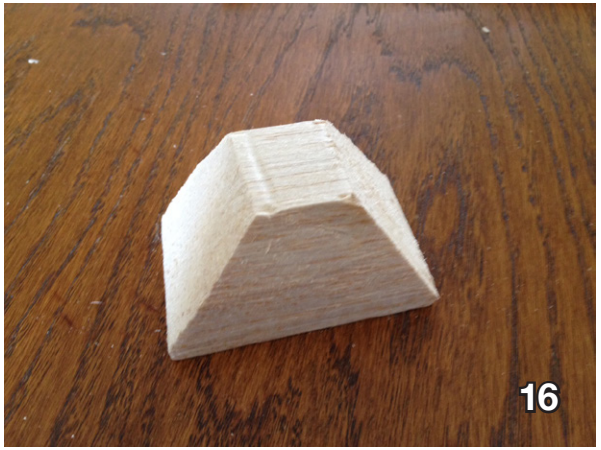
Photo 22: At this stage, you can start to cover the fuselage and the sub assemblies (fin and rudder, stabilizer and elevator, etc).

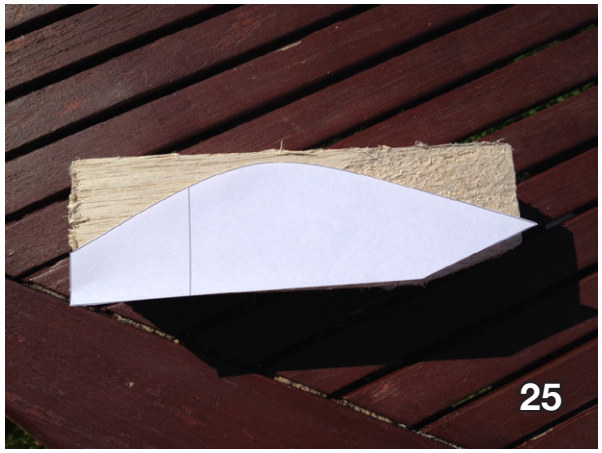
Once covered, articulate the elevator. I used the covering in my case. Small hinges or tape can of course be used.

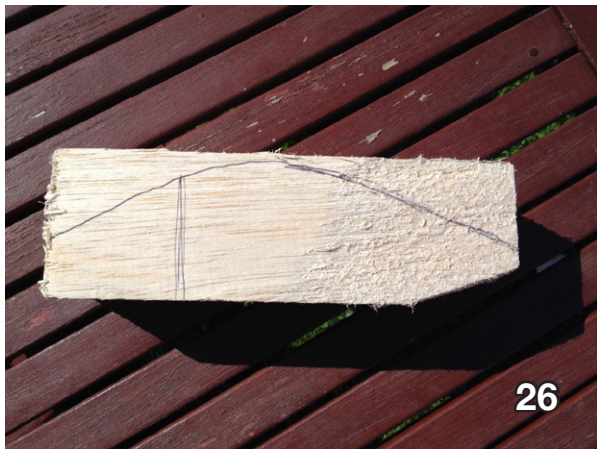
/!\ Before articulating the rudder, rigidify the fin by gluing a 3mm carbon tube at the TE first! (See plan.) /!\

Once the rudder is articulated, you can then glue the fin to the stabilizer, making sure you have removed the covering where the glue should go on both pieces.

Photos 23 - 24: The entire assembly is then glued to the fuselage making sure everything is square and straight.







The canopy can be made of wood like the Quark, but for the scale look, I went transparent.

And here is how I did it...

Photos 25 - 26: The profile of the canopy is cut from the plan and used as a template on a block of balsa (or any other hard wood).

Photo 27: Everything is painfully sanded to the final shape, making sure of its symmetry and that it fits nicely on the fuselage.

Once you are happy with it, go to the shop and buy a big bottle of water / Coke, soda, etc. You even have the choice of colors! Take the biggest one!

Photo 28: Cut the end of the bottle open and put the canopy plug in it. Must be a very tight fit, so you can add some scrap wood inside to “push” the plug to the bottle.

Then simply heat the whole lot in the oven, or even better, with a heat gun. Go slow, and magic, the bottle shrinks nicely around your plug.

Photo 29: Once down and cooled down, cut the canopy “et Voila”! Of course, not all that is needed if you have your own vacuum forming machine!

You can then glue the canopy on a balsa base, do a full cockpit interior, etc.

Photo 30: And we are done with the fuselage!

Nice warm up, just in time to start the “piece de résistance,” the wings! (Ta ta ta taaaaaaa!!!)

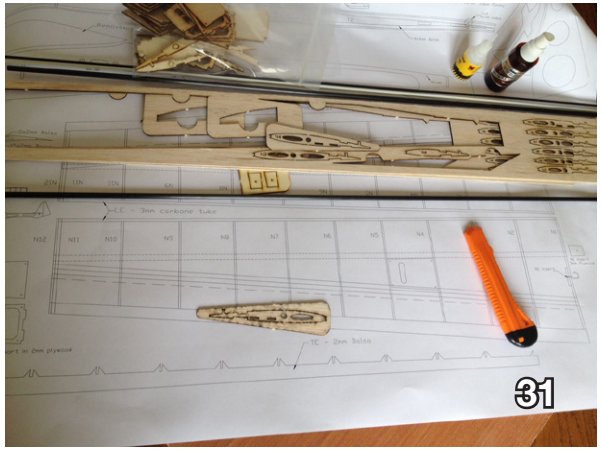
Careful now, this is the “hard” part of the build. The ribs must be manipulated carefully. They are small and can break if not careful!

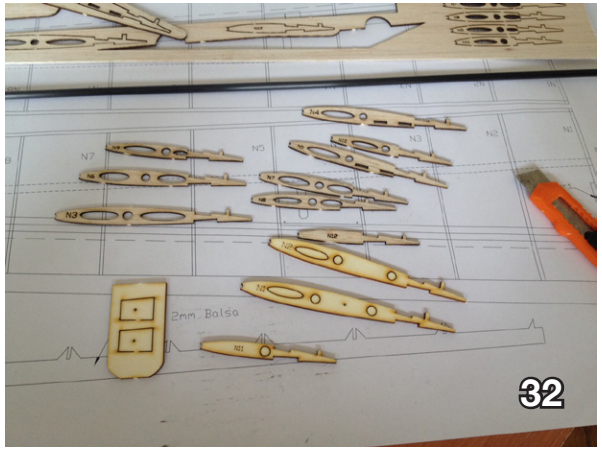
Photos 31 - 35: All the ribs are cut. The “sub assemblies” are done first (N1 Insert, servo support). The spar in 6mm carbon is then cut to size and all the ribs are slid onto it... In the correct order!

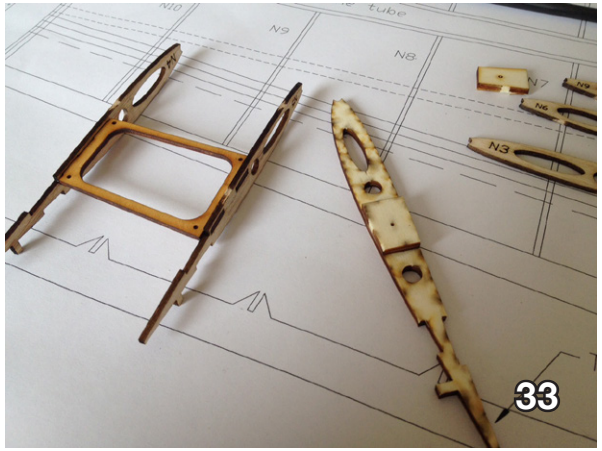
Nothing glued yet. Everything is put on the plan, upside down (the rib tabs will keep everything straight), the ribs properly spaced as per plan, and fluid cyano then keeps everything in place. Simple!

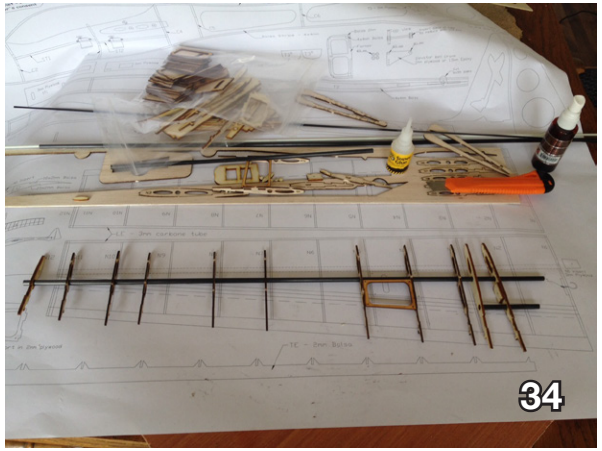
Photo 36: The LE in 3mm carbone tube or rod is then added.

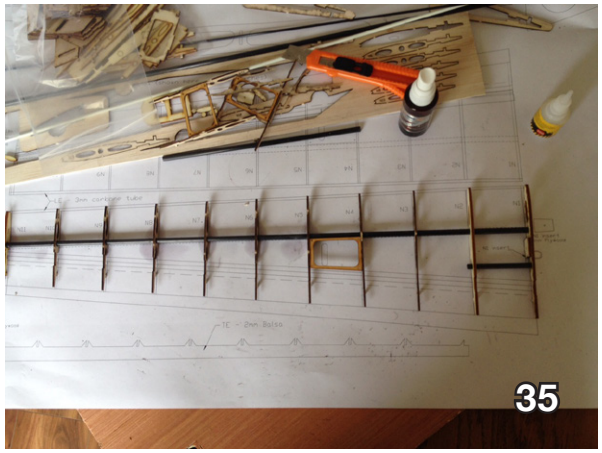
Photo 37: Followed by the balsa strip, in 2mm balsa for the aileron.

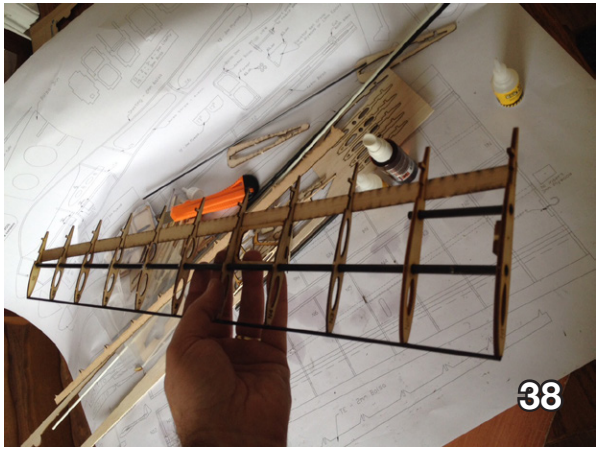


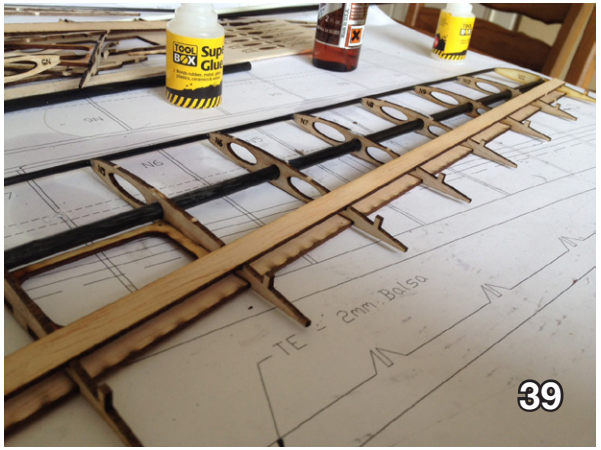












Photos 38 - 39: At this stage, the wing is rigid enough to be removed from the bench, turned over, and the top balsa strip is then glued in place.

The TE in 2mm balsa is then also glued in place, making sure it “follows” the profile all along the wing span.

Photo 40: A dry fit can then be done, making sure everything is straight.

And a bit of auto-satisfaction on a job well done cannot hurt!

Photos 41 - 44: And we repeat for the second wing.

Now, for the part where you need nerves of steel! The ailerons / wings separation!

Photos 45 - 46: With a big ruler, I traced the middle line of the top balsa piece (see plan), and with a knife with a new blade, slowly, but surely, cut through the balsa and ribs.

Go slow, and all will be fine! If you used lite ply for the ribs N1, 2 and 11, the same knife will go through without too much problem.

You can also double side tape a ruler and use a small saw to cut the ailerons.

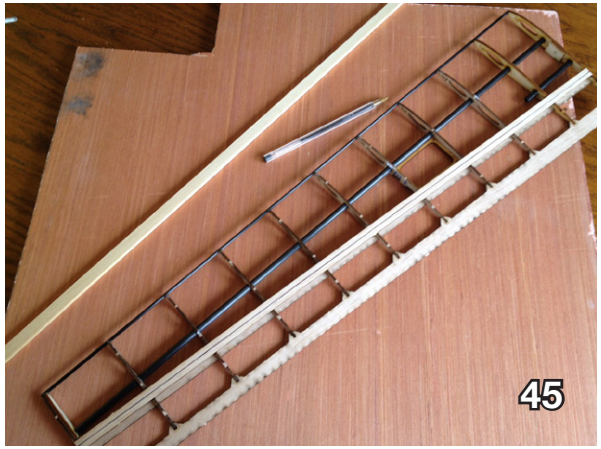
The secret is to take your time and avoid shaking!

The movable aileron part LE, once detached, is then sanded at 45 degrees to allow movement.

You now pass your servo cables into the wing, and time to cover the whole lot!

Like the elevator / rudder, hinges can be made with the covering if you are skilled enough, or blenderm-type tape. Or small “proper” hinges.

/!\ Careful covering the ailerons! Do not put too much tension as they will twist / bend! Set your iron to colder than it should be, and heat slowly! /!\




48


49

And with a bit of colors. Registration letters are left to do, so as a nice cockpit interior if I get the motivation!

And now you can take a break, open a beer, and admire your work.

Next, servo installation and we get ready (already!) for the first flight!

At the slope

I did the first flight of my Lunak at the slope during one of our annual meeting in Mount Leinster in Ireland.

I have to say, I launched the model with confidence as others flew it before me! But more on that later.

As expected, the first flight was a non-event! Like in a magazine, maybe a few clicks on the ailerons and the glider showed its good behaviour pretty much straight away!

Wind was about 10 to 15 Km/h but I had no issues going up! So now, it does look good in the air, perform nicely, but those big ailerons are not here for show!

In a nutshell, the only limits are the pilot's skills! You can throw all the moves you know, the Lunak will perform them without any hesitations, but also, and maybe the more important to me, without making you feel it is about to go out of control!

Barrel roll.
Photo by Jean-Louis Coussot.

Flips, barrels, avalanches, snap rolls, everything! Mind you, you can also fly the Lunak slow, and in scale manner if this is more your thing, or mood of the day.

Regarding throws and settings, I don't use any dual rates, exponential or mixing on mine as I like having sharp responses on all axis. The dual rates are my fingers! But for a start, you can use from the full throws, 50% dual rates, and 20% expo, except for the elevator (0%), but I can guarantee, after the first flight, you will remove everything as the glider is extremely gentle on all axis.

Ok, but now, can the glider really fly in all conditions and everywhere? Of course it can! John Pearson, from Northern Ireland, did the first flight of his Micro Lunak in a coastal slope in 50Km/h + winds!

Game of the day was to do flat spins, helicopter style! And that was only the first flight! Not bad for a wooden glider weighting less than 500 grams!

Definitively, my new favourite glider... the one, thanks to its size, which does not leave the car anymore!

At the flying field

The Micro Lunak also flies very well on tow, and as it happen, the very first “prototype” made its first flight behind a big tow plane in the expert hand of Ronan Plu, from France.

Like at the slope, you can do everything, plus the extra continuous rolls while going up... and catch thermals! The pilots of this little machine cannot be more enthusiastic about the machine.

How enthusiastic?

For the 15th anniversary of the famous Falaise Aerotow meeting next September, the club is building 15 Micro Lunaks to beat a record of the 15 being towed at the same time! That should be quite a sight, and I will be over there to record it.

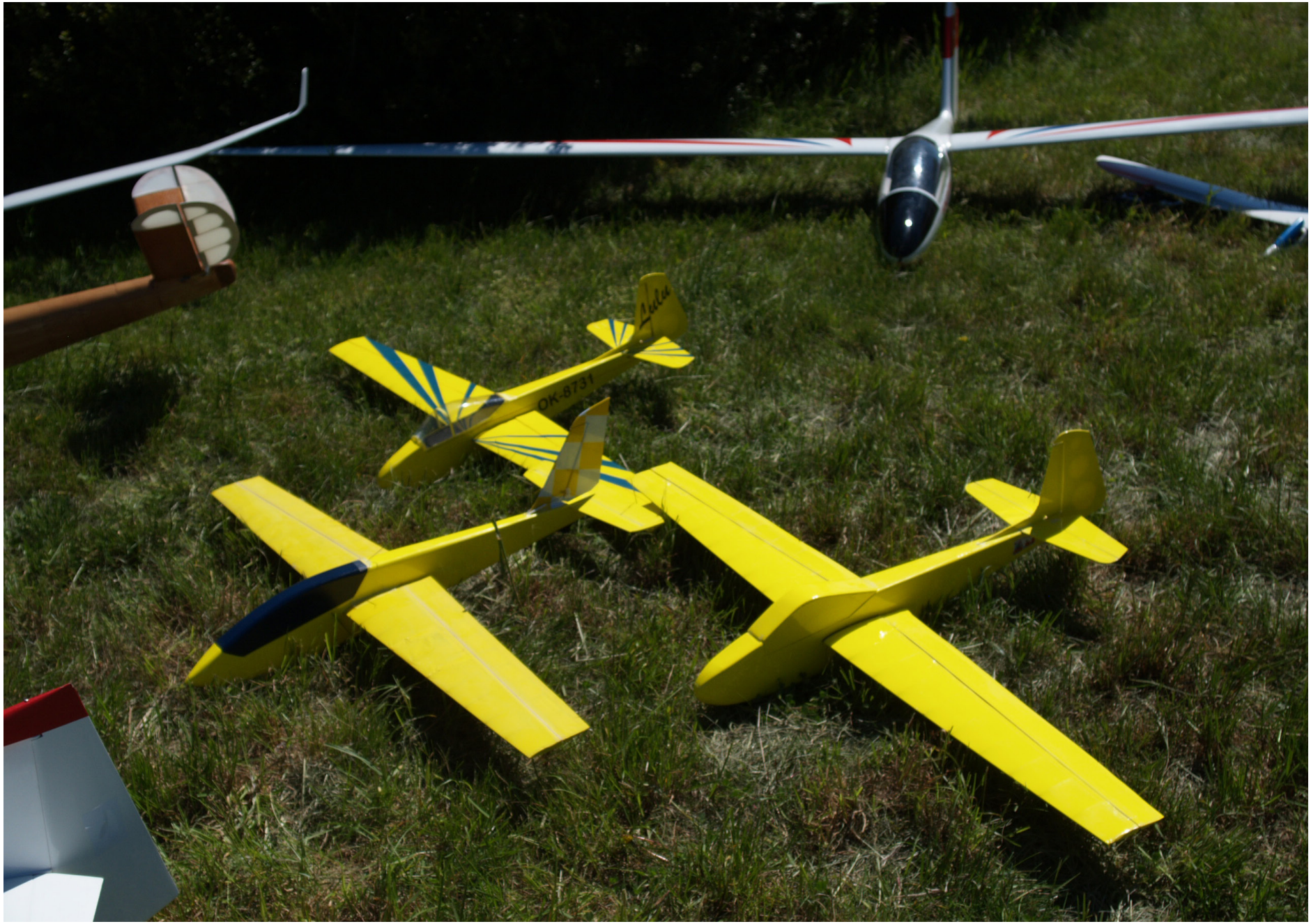
I can only invite you to download the plans (it’s free!), and build one. Very little materials and time are needed, but the fun that a simple machine like this one can give is immense.

And as usual, if you join the fun and build one, remember to send photos of your model to RCSD!

Slope and Field photo credits:

Jean-Louis Coussot <http://www. model-consult.com>

Matt Jones



A Micro Fox (!) and two Micro Lunaks.

Benoit Baradon's Micro Lunak with winglets.

Matt Jones' (Wales) Micro Lunak.

Jean-Louis Coussot's Micro Lunak.

Fred Marie's Micro Lunak.


Leila

Hobby Aréna

K3600

Rene Wallage, rene_wallage@yahoo.com

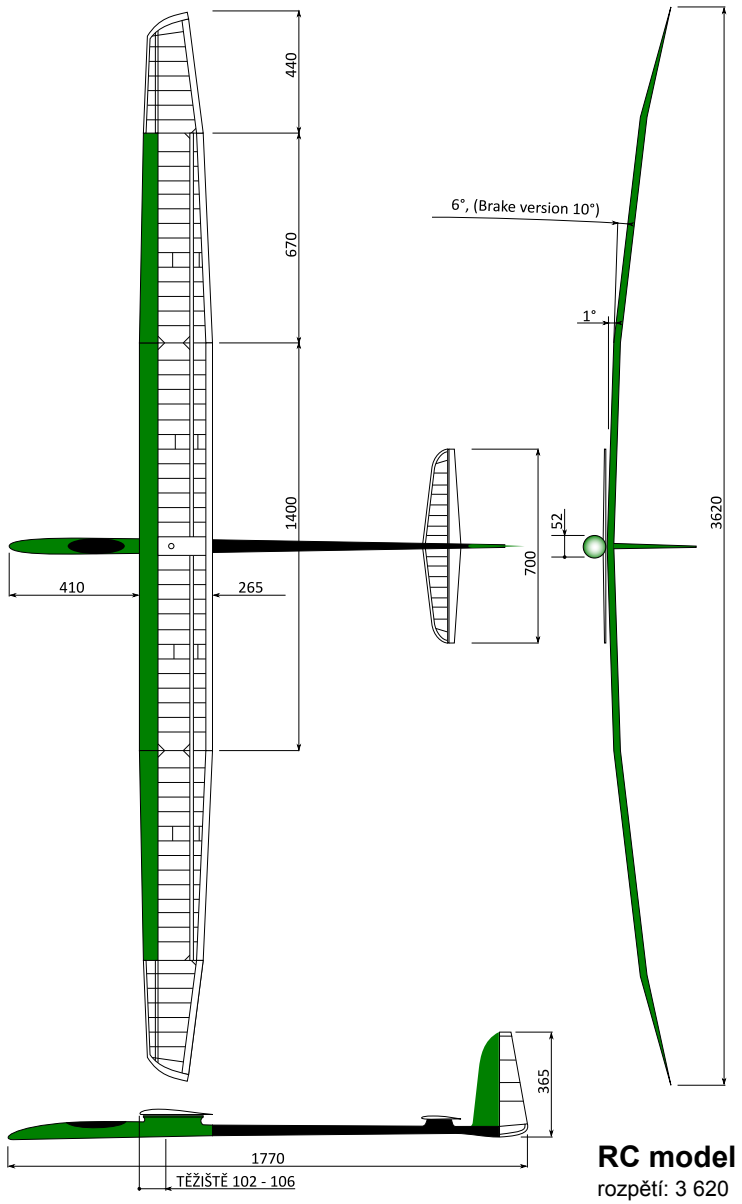
OK, so I crashed my Tango F5J glider three plus years ago. And then I crashed my secondhand JM Esprit…

Thoroughly dispirited, I had a chance to return to a previous “love,” the Bird of Time. I have been flying her for more than a year now. And then my birthday produced a slightly better cash harvest than usual.

Looking around for ways to spend it, I stumbled by accident on a nice 3 meter glider produced in the Czech Republic by Hobby Aréna. I had never heard of them, but there were some others on RCGroups who had good experiences with them when buying fuselages. Then I saw on their website <www.hobbyarena.cz> they also produce a 3.6 meter glider. This one had a D-box!

According to some, both the K3000 and K3600 are loosely based on the Bubble Dancer (of Charles River RC fame), sporting a Drela AG wing profile. In the UK she’s even sold as the “Circle Dancer” at some shops.

E-mail response was a bit spotty at first, but mostly adequate enough to answer my various questions without scaring me away.



RC model K3600
rozpětí: 3 620
délka: 1 770
hmotnost - elektro: 1 550 g
hmotnost - glider: 1 600 g

Wingspan:	142"
Length:	68.9"
Wing Area:	1235 sq. in.
Airfoil:	Drela AG
Weight:	53 oz.
Wing loading:	6.22 oz sq ft.
Controls:	Aileron, Rudder, Elevator, Flap

Manufacturer:
<http://www.hobbyarena.cz/Models/K3600/index.php>

US retailer:
<https://www.soaringusa.com/K3600.html> US$799.95

While drooling over the pictures from the website we agreed on the purchase, color and price, and two months later I was notified that there was a large parcel waiting for me at Israeli Customs. Following a nearly two week long battle with customs, I won and EMS delivered my parcel. Indeed, it was large!

Removing the plastic wrap, I had a wooden box (the type of pressed wood IKEA uses for the back of their wardrobes). Removing the wood, I had a thick carton box. Opening the carton box I found all parts double wrapped in bubble wrap, taped to the box so nothing could move! Superb!

Unwrapping, and unraveling all components showed immaculately covered wing, elevator, and rudder sections, a beautiful fiberglass/carbon pod, an equally beautiful carbon boom, a fiberglass vertical, a bag of goodies, and two plastic/metal Bowden cables for rudder and elevator.

Strangely enough, there are no flap or aileron pushrods. There are control horns of the PC board variety, some with pre-drilled holes in the base for the glue to get a better grip.

No big deal, apart from the fact that I had depleted my stock of pushrods, clevises and clutches, and my favorite supplier had them all on backorder. So I put in an order somewhere else.

And now, let's get started!

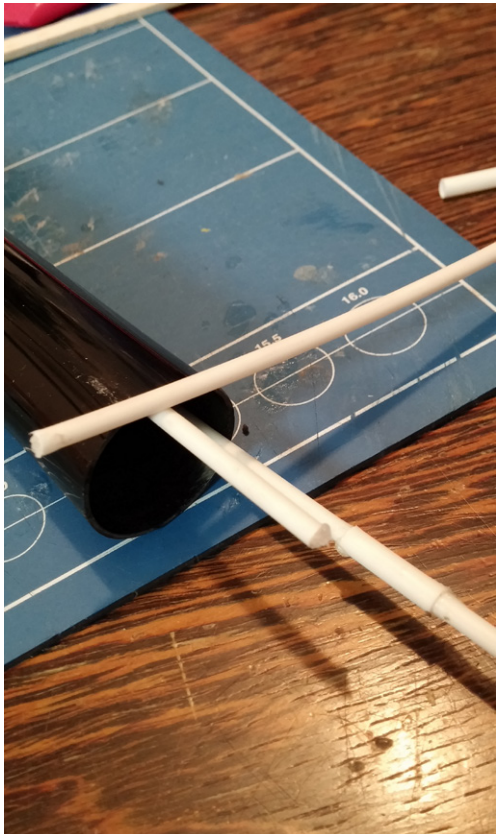
The outer Bowden tube comes in two parts, with a slightly larger tube connecting the two. To prevent nasty surprises at a later date, I decided to glue these together.

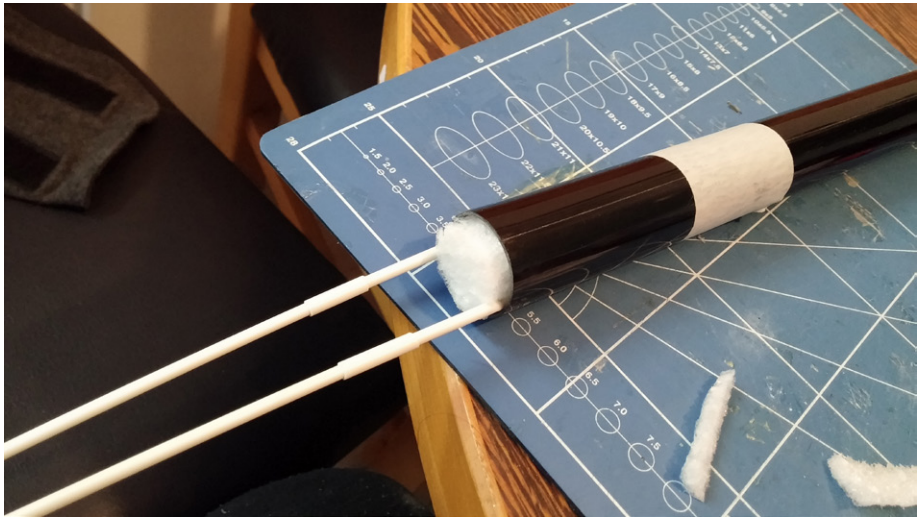
After removing the inner plastic/metal rods, I detached the two tubes, and inserted a small blob of Vaseline inside each tube with a toothpick (to prevent closing the tubes with glue). I then applied a small amount of UHU POR on each tube's outside, and inserted both ends into the connecting tube. When it had cured I applied a thin film of UHU POR on the outside as well, and left it overnight.

The plastic/metal Bowden cables for rudder and elevator have their outer tubes glued in at the rear end of the boom.

To make sure there is not going to be any slop further forward, I cut a piece of EPP to size, inserted it into the boom, and pushed it deep enough in to not interfere later with the rear part of the pod when I connect the pod and boom.

I dribbled a few drops of 5 minute epoxy on the side of the EPP and held the pod vertical for a while so the epoxy could slide in the pores and between the EPP and the tail boom. I only used a few drops of epoxy; not for nothing is epoxy dubbed "liquid lead."





The vertical tail attaches to the boom with two bolts. On the boom is a flat surface with a raised square which mates with the underside of the vertical. You can't go wrong here. It's a bit fiddly to get the nylon bolts in place through the boom's underside. I used a tiny bit of tape to keep the bolt attached to a screwdriver. Once done, I removed the tape with a long pair of tweezers. Once I saw that the bolts had some "bite," I applied some Locktite and screwed the vertical tightly in place.

Before gluing the pod to the boom I decided to insert the motor and gearbox. It's easier to do so now, rather than later, when I have this long pod and boom fuselage to swing about while trying to get the motor bolted to the already installed firewall. Just for peace of mind I applied some 5 minute epoxy to the firewall, both inside the fuselage and outside. Rather safe than sorry.

I measured the pre-drilled holes in the firewall and had to open them up by 1mm. The gearbox uses 3mm bolts. Then I measured the distances between the holes, and the mounting holes in the gearbox. They matched! That's a first for me, using all four bolts…

With the “goodies” is a lite ply servo tray for the elevator and rudder servos. This is supposed to go under the canopy.

Before gluing it in place, I test fitted the servos. I got some nice Hyperion DH13’s for this. They were slightly larger than the pre-cut opening, so I opened it up a bit, fitted the servos and screws (pre-drilled 1mm holes first), then removed the servo and screws, and added some thin CA to the screw holes. Now, when I’m ready, I can insert the tray and add the servos without any unnecessary drilling, sanding, filing, swearing, etc. (Not to mention damaging the fuselage while drilling, sanding, filing, swearing, etc.) All should be well now…

However…

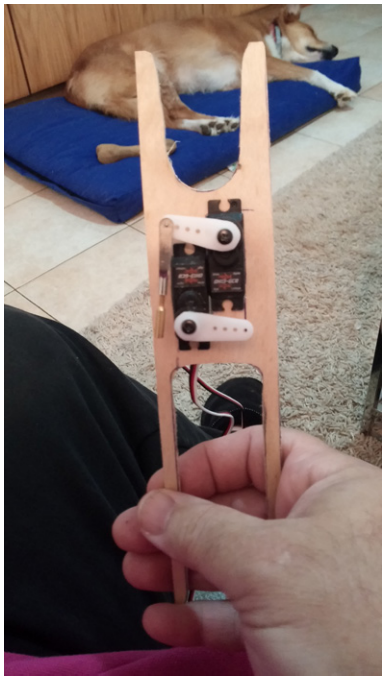
The servo arms, even when cut down to the second hole from the center, were too long.

OK, turn one servo around, and use long arms. Almost fine, were it not that one servo arm is now hitting the other servo arm when moved slightly more than 5mm.

I don’t know yet how much throw I need, but I’m not going to take any chances. I made a new servo tray from 3mm lite ply, with the servo openings staggered so the servo arms won’t collide.

As the original tray is 5mm lite ply I laid some fiberglass over the middle section, and glued some scrap ply on the underside, so the servo screws will have something to bite into.

The tray and servos are in the fuselage now, I have not yet glued the tray in place. That will be done once I have everything ready, and start balancing the glider. I may have to make more adjustments, or move the tray, to get her to balance.



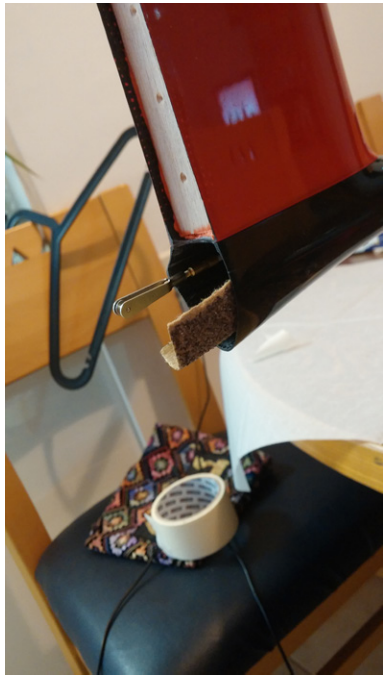
Back to the rear end (I love writing that…)

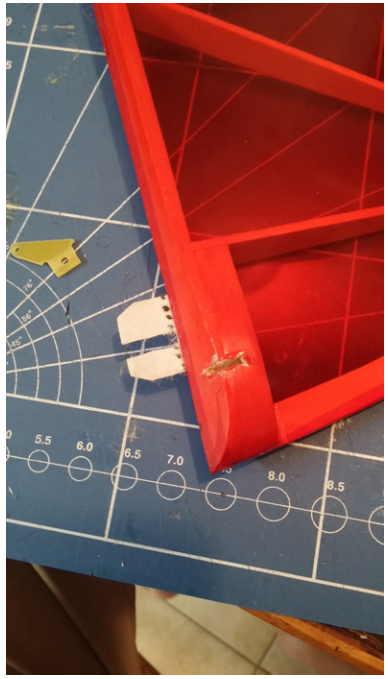
Making sure the rudder pushrod has free movement, I pulled it out so it wouldn't interfere with the next part. In the goodies bag is a small piece of balsa in the exact shape of the boom's tail end opening. I sanded the inside of the fuselage a bit to roughen up the surface, (after pre-fitting) I then applied a thin layer of epoxy, and inserted the piece. Easy-peasy…

The rudder's leading edge has pre-cut openings for the "fuzzy" CA hinges. Easy. I cut the covering, inserted half a hinge and carefully applied some medium CA. Normally I would use thin CA, but thin CA fumes a lot, and that could ruin the pretty transparent covering on the rudder. It takes a bit longer, and is a bit more fiddly to apply, but the results are the same.

Remember the adage "measure twice, glue once" (or something like that)? Well, add another one: "Do as I say, not as I do".

The vertical's trailing edge has small pre-drilled holes that (should) facilitate the builder/assembler to cut a straight slit for the CA hinge. The top and middle ones were fine. The bottom hinge was not in line with the trailing edge of the vertical. It was about half a hinge higher. I should've checked while pre-fitting… The bottom hinge was now right in the middle of the fin, and fuselage. What to do? I could soak the lower side of the rudder with CA debonder, but the fumes would ruin the covering. Or I could cut into the boom. Naaah. I decided to slice a wedge into the bottom CA hinge.





After further trial fitting I located where the control horn should go, and opened up a cavity in the trailing edge for the control horn. Once the horn fit comfortably, I mixed some 5 minute epoxy and filled the cavity nearly to capacity and inserted the control horn. With an alcohol soaked tissue I wiped the excess glue away and let it cure. Once that was done I connected the pushrod clevis to the control horn and inserted the rudder hinges into the vertical trailing edge slits. A thorough check that the rudder can move unhindered, a few drops of thin CA on either side of each hinge with the applicator, and that's the rudder done.

It was at this point that I found another niggle. The outer Bowden tube is just a bit too long. The pushrod cannot freely move forward for full rudder movement. As the rudder and rear post were already in place, this was a bit of a head scratcher. I again removed the pushrod, attached a rat tail file to my power drill, and *c a r e f u l l y* ground the outer tube down. Phew…

The fuselage is nearly done now…

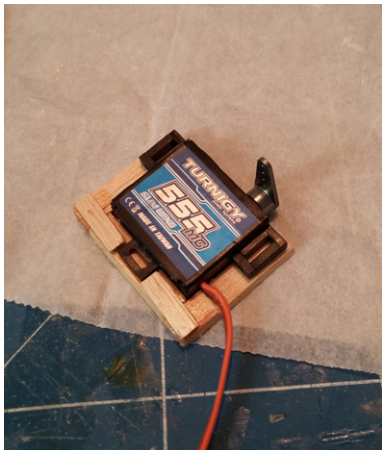
The wing servos are fairly straightforward. If you have done any kit/ARF building in the past, this should be no problem. The wings are deceptively thin, so thin wing servos are needed. I opted for Turnigy 555mg's for the ailerons and Turnigy 712G's for the flaps.

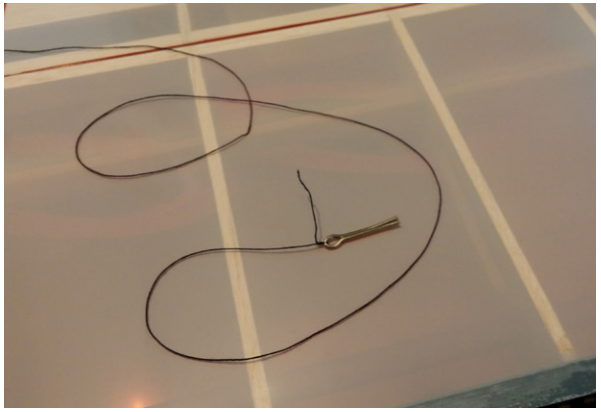
For both I made a simple servo frame out of scrap balsa. I glued the frames in place with thick CA and no kicker. Measure twice (or in my case three or four or five times), glue once.

The aileron servo needs an extension wire to the root of the outer panel. I cut the servo wire half-way and soldered a length of wire to the servo side. I then tried to thread the wire through the pre-installed wire tube, but it's a tight fit. I couldn't just push the wire through (like playing billiards with a rope…).

I cut and folded a paperclip and attached it to some of my wife's cotton wool (black; she's got a lot of that). I threaded the clip from the root to the servo well and attached the servo wire to the clip with some tape. Pulled the clip back to the root; done.

Now all I needed to do was soldering the connector back on. Care must be taken to make sure the connector can be pushed back in to the wing. As I mentioned, the wire tubing is narrow, so there is not much room.





The center panel with the flap servos is a bit more elaborate, since I needed to feed two sets of servo wires through, or at least from the flap servo location inwards.

First, I fed the aileron extension wire through to the servo well. The wiring tube is open here, for obvious reasons.

I then fed the clip and cotton wool through from the center to the servo well. I taped the clip to the aileron extension and the flap extension, and tried to pull this mass through the tubing.

No go; too thick!

Then I tried the "layered" approach. Clip taped to the flap extension, and about an inch behind that the aileron extension taped to the flap wire. This went well, for the first few inches and then the clip became unstuck! I tried this a few times. Remember, each time the clip had to be fed from the center, taping the various wires together, etc. Not really good for my blood pressure… During one attempt the clip broke free from the cotton wool, so I had to shake the wing to get that bl@@dy clip out!

Then I had a brainwave: tape the aileron extension to the flap extension, about an inch back. Than hold the cotton wool with the clip against the flap extension so the first bit of tape covers the cotton wool only. Fold the clip back to the front, and continue the wrap with the same

length of tape. Now the clip can't pull free!

Mind you, it probably would have been much easier if I had not used twisted servo wire extensions instead of straight ones…

With all the servos test fitted on the servo frames, I soldered a short piece of wire with a female servo connector on the aileron extension.

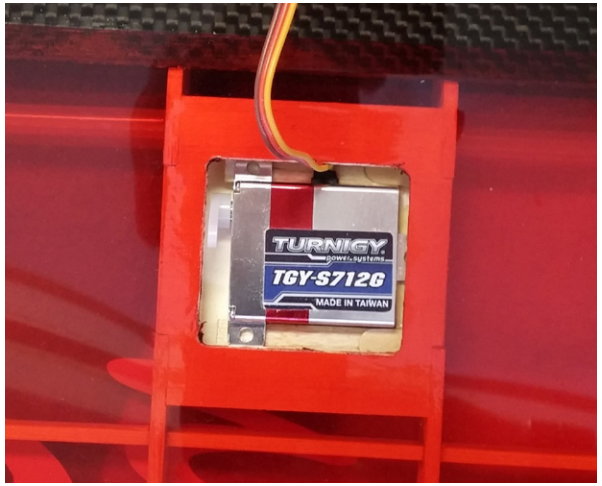
The plan is to have this plug glued flush inside the center panel, and the male connector from the outer panel "free floating." I had to slightly open up the space in the outer rib, for the connector to fit.

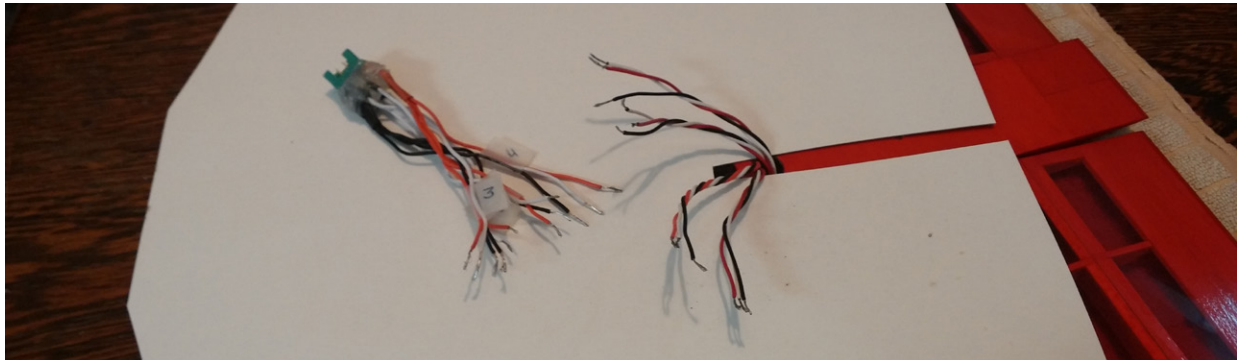
Now I had four sets of three wires coming out of the center panel that needed to get attached to the previously made wiring loom.

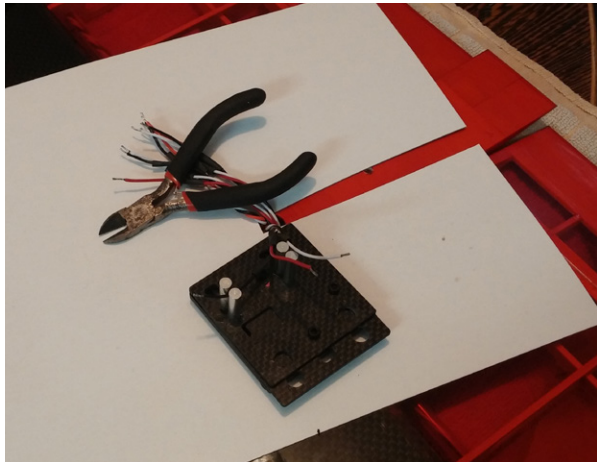
In order to solder the wires to the loom without damaging the wing, I cut a piece of cardboard with a slit on one side (20/20 hindsight: I could've cut just a hole) to place on the wing. This way I won't harm the covering if/when some hot solder drops, or if a red hot wire touches the covering.

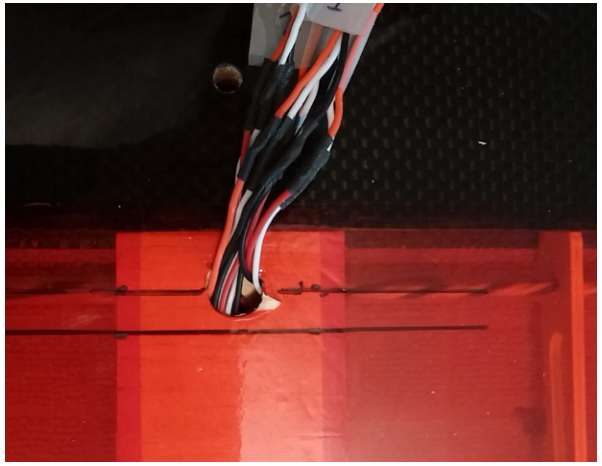
Or any other possibility of damaging the wing before the maiden flight.

I am good at that…









The control horns are next. The flaps and ailerons have different sized control horns, so be careful: the slightly larger ones are for the flaps… I will be using a Z-bend on the servo side, and a clevis on the aileron/flap side.

First aileron: To get the right location of the control horns, I took a long pushrod and made a z-bend at one end with my z-bend pliers (after my Permagrit sanding blocks, one of my better investments).

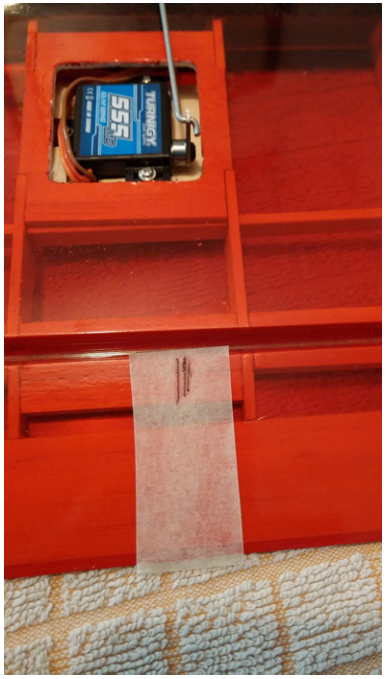
I inserted the pushrod in the servo arm and laid it on the aileron. That gave me the location of the masking tape. Then I made sure the pushrod made a straight line to the aileron, and marked it on the masking tape.

With an X-acto knife I carved the initial opening, and then used a pointy file to slowly dig wider, deeper, longer. Test fitting often, so the opening was a comfortable, but not loose, fit.

I made the cavity slightly inverted V shape, to be able to insert a decent amount of epoxy.

The wing control horns already have a hole in the base, so the epoxy can really "grab" the horn. A light sanding of the horn's base, a trial fit with a clevis, and the control horn was ready for insertion.

I mixed some 5 minute epoxy, mixed some micro balloons into it until it was a smooth paste, and applied the mix into the cavity with a toothpick. Once the cavity was almost filled I inserted the control horn, and pushed it firmly into place, making sure it was straight.



With a clean toothpick and a alcohol soaked tissue I removed excess epoxy mix, and let it cure. A quick check that the horn was still properly in line with the pushrod, and that's one aileron done!

One more aileron, and then the flaps.

With the control horns in place, and the epoxy cured, it was time for the pushrods. I turned a clevis onto a threaded pushrod until I could see about 1mm of the thread inside the clevis, and then attached it to the control horn.

Making sure the servos were centered (or at equal angles for the flaps), and holding the surface at zero output, I marked the pushrod at the servo arm with a felt tipped pen. That's where I will want the z-bend.

Now, I often get this wrong, so I did some trial bends with my Z-bend pliers to make sure the "z" would appear where I want it. After that, I had all pushrods in place in less than half an hour.

Now I could screw the servos into their frames, after re-checking the aileron servos were centered, and the flap servo center had the arms about 15° pointing to the rear.

The center panel has a female connector at each end for the aileron servo wire. I marked which side the signal wire is and then glued the female connector in the cavity and flush with the rib with some epoxy/micro-balloon mixture, wedged in place with a sliver of balsa.

For the loose wiring of the male connector I needed to open up the exit opening a bit, so the wiring could slide inside the outer panel and the two panels would fit flush.

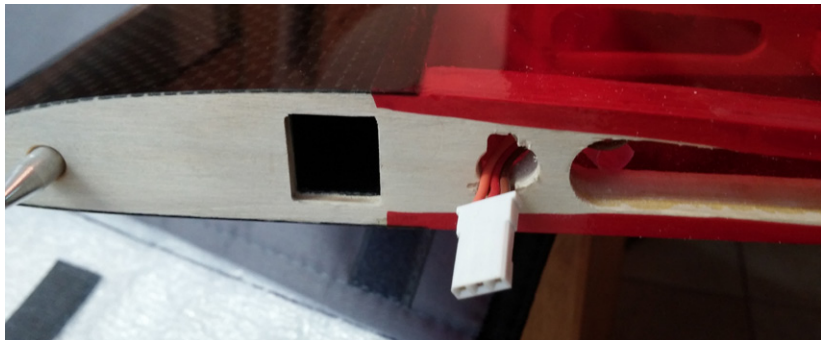
And while I had the center panel out, I marked the forward and rear positions of the recommended CG.

With all the wing's servos and pushrods done, I took the opportunity to copy my Typhoon MkII transmitter setup to a new model, and fiddled around for half an hour or so, setting up aileron movement and differential, flap movements, and "speed" and "thermal" camber.

I didn't set butterfly, as the flaps go nearly 90 degrees down. If that won't stop her, nothing will…

Strangely enough, there are no recommended throws mentioned anywhere. Not on the website and not on the info leaflet. So I went with the time trusted TLAR method.

With that done I cut the servo covers down to pleasing rounded corners and taped them in place with hingetape.



As the nose is thin, the wiring from the motor needs something to keep it flat against the inside fuse. I wrapped the nose in cling film, and marked where I wanted the wiring to be pressed down. I then took a scrap piece of 2mm balsa, soaked it in hot water and place it on the fuse, keeping it in place with rubber bands. The next day I had a scrap piece of 2mm balsa in the shape of the fuse. After trial fitting I CA'd some thin balsa to the ends, so the piece would cover the wiring, and have a decent bit of area for glue to attach to the fuse's side.

I have a 20cm stick of hardwood (I think it's poplar) with sandpaper at either end, to reach difficult parts, like the K3600's nose. With this I rough sanded a small area at either side of the motor wiring. With the piece of balsa in place I was now faced with the dilemma of how to apply medium CA to it, inside the nose, without dribbling CA all over the fuse's inside. The thin CA dropper is not good for medium CA, so I looked around for alternatives… a drinking straw! I simply dipped the straw in the CA bottle - figuring out first how deep, to get the right amount of CA dropping from the straw - put my finger over the top of the straw, moved the end inside the fuse, over the area where I wanted to drop the CA, and moved my finger from the straw's top.

Same for the other side, let cure…

I assembled the full glider to get an idea about weight distribution. Clearly I need to get as much weight towards the nose as possible.

With this in mind I tried fitting the 3S1000 Lipo I am going to use. Space is at a premium here, and trying to squeeze the Lipo and ESC together just behind the motor would be possible but for the small opening of the canopy. Especially with the servo tray as far forward as possible.

After an executive decision, the Dremel came out, and I ground away a large part of the lip the canopy rests on. Now the ESC and Lipo fit nicely together in front.

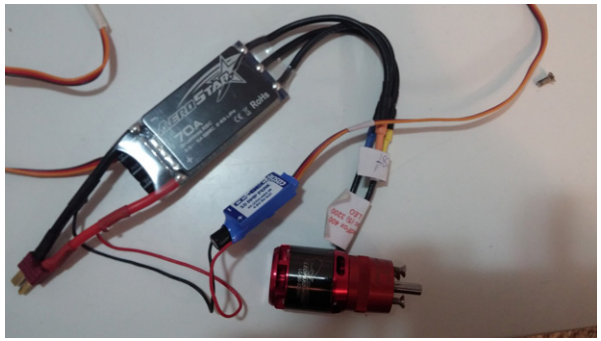
In the process I also needed to re-shape the servo tray and remove the forward pointing thongs.

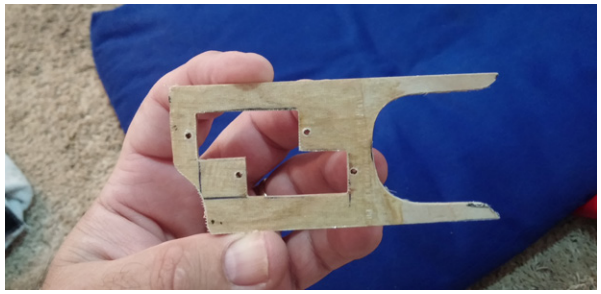
I now taped the pushrods and sleeves to the top of the fuselage, to keep them out of the way for the next step.

Trial fitting the elevator and rudder servos (again) I figured where to glue the servo tray in place. Holding the tray with one hand, I dribbled some medium CA on one side of the tray, a shpritz of kicker, and then the other side.

To give it all some solidity, I applied a ½" wide strip of fiberglass, covering the corner of the tray and inside of the fuselage on both sides.

When that had cured I screwed in the servos and centered the arms.





I now realized that the opening I cut for the servos was not exactly in the middle! So I had to cut down one arm by one hole. *Hmph*. Not the end of the world, but annoying.

As I now had the servos fixed in place, I pulled the pushrods halfway to the rear so I could cut down the outer sleeves to size; just past the canopy opening. Pushing the pushrods back forward I now had to cut them down to size, keeping in mind I still had to glue on the clevis holder.

I attached the elevator, so I could measure how long the pushrod would need to be. Attaching the clevis to the elevator's control horn showed another minor, but annoying, problem. The horn had not cured entirely straight. So the opening in the boom for the pushrod had to be opened up further for free movement.

After measuring a few times (with both rudder and elevator surfaces attached) I cut the pushrods down, rough sanded the plastic sleeve, and used 5 minute epoxy to glue the pushrods to the clevis holder.

When that had cured I connected the pushrods to the servos, and plugged in a receiver battery to make sure it all moved about properly. A good swirl with the sticks confirmed proper movements.

I couldn't detect any slop in the pushrods, but again for peace of mind I dropped some medium CA on the outer sleeves through the wing saddle opening, followed by a shpritz of kicker. And glued in a piece of balsa just behind the canopy opening, to keep the pushrod sleeves to the sides. This last one will also prevent any binding of the forward servo/pushrod.

And with this I declared the fuselage finished... for the moment…

I attach the wing panels at each flying session with some clear tape. Removing this tape at the end of the flying session could lift the wing covering. To prevent that, I always apply a piece of 1" or 1½" wide tape along the outer roots of the panels. I decided to use some white packing tape for this, also to enhance visibility.

The easiest way to do this without getting creases in the tape, is the same way I apply stickers: some window cleaner liquid sprayed on the surface, apply the tape - you can slide it about a bit to get it just right - pat it dry with a towel, put aside for an hour or so.

Returning to the nose, I trial fitted my blinky carbon spinner. Clearly, some sanding had to be done to get a seamless transition from fuselage to spinner. Easier said than done, as care must be taken not to sand at an angle. So it was sanding a bit, trial fit, sanding a bit, trial fit, sanding a bit, trial… you get my drift.

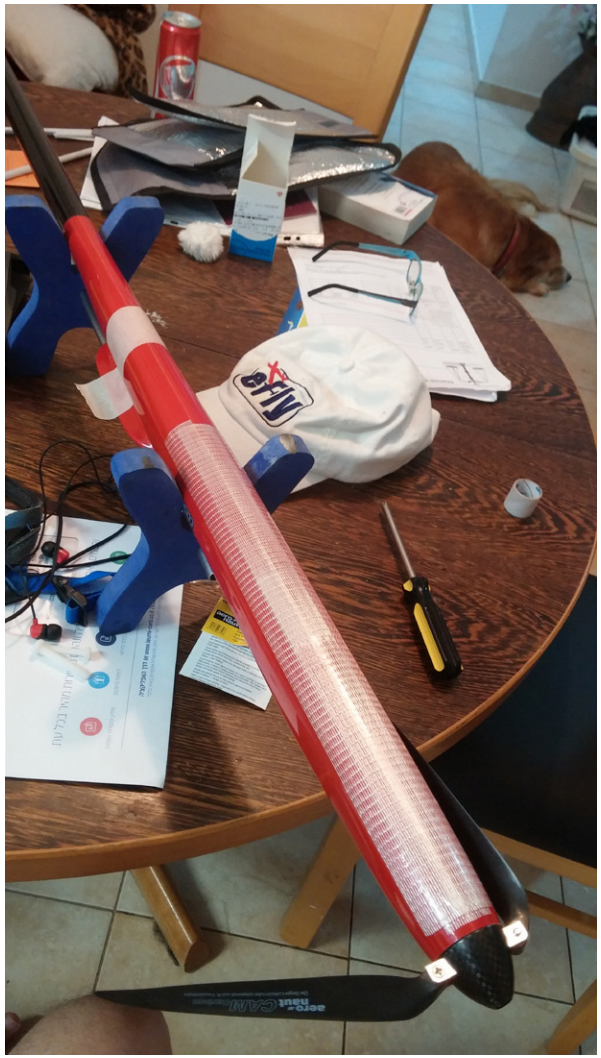
Nearly done now…

The receiver will reside under the wing saddle, so the two FrSky antennas needed to get a way out. I applied a piece of masking tape on the general area and carefully measured where to drill. Wouldn't want to drill through the pushrods now, would we?

Miraculously I didn't, and removed the masking tape.

With some infinite patience I managed to feed the antennas through the tiny 2mm hole (which is like picking your nose with boxing gloves on your hands…).

I applied layer of three small pieces of fibertape just behind the protruding



antennas, and another small piece covering the antenna and the three layers. This way the antenna is protected, and slightly pointing away from the fuse. And I am saving $$ by not buying the eye watering expensive bling bling antenna protectors.

And while I had the fuselage belly up on the table, I also applied a few strips of fibertape, to give some protection against the rough landing areas we have.

The last bit of work was assembling everything ready for flight, and see how much lead I would need to add to the nose. I put her on the balance, at the mid-point of the recommended 101 – 106mm from the leading edge CG. And she balanced as is!

No more excuses, we were ready for the maiden!

With transmitter and flight batteries charged the previous evening, I arrived at the field bright and early and assembled my glider.

Now the big dilemma; shall I take pictures before, or after the maiden?

I didn't need to make that decision, as my friend and infinitely more experienced glider guider, Israel Ofek arrived.

After an extensive pre-flight, zeroing all surfaces, verifying servo directions, flaps, subtrims, mixes, rates, expo… I than test ran the motor.

Now, I had only run the motor a few times at home to make sure it worked and spun in the right direction, for obvious reasons without blades, and never full throttle. I had assumed the ESC was.. well I don't know what I assumed. At full throttle, the motor stuttered. At ¾ throttle it ran ok. It seems the ESC needs some programming, which I completely forgot…

So, go home, or set the throttle servo trim so full throttle on the slider is actually ¾? We went for the ¾ trim setup.

No more further excuses…

Israel took her for the traditional test glide. A not-too-hard push, and off she floated. And floated. And floated… After floating along at the same level for well over 50 meters, we decided you might as well light her up! And up she went. <https://www.facebook.com/rene.wallage/videos/10154233367279647/> / <http://tinyurl.com/jxad4en> Israel took her up to about 100 meters, and he did some thermal turns, tried out the flap mix, etc. All was well, apart from being very sensitive to elevator input. A landing was called, and Israel landed her at less than a toddler's crawling speed.

We added a 20 grams lead strip, and launched her again. Now it was my turn to stir the sticks.

What can I say?

After the added nose weight she is very stable on all axes, indicates lift very well, and my chosen colors (red with a white panel) show very well at altitude. In short,

a joy to fly. After about 10 minutes of pure joy, I decided not to push my luck, and lowered flaps to get down safely, and handed the transmitter back to Israel for the landing. Which was again, uneventful.

Superb!

In conclusion; I don't think this glider is for a beginner. Both assembly and flight needs experience.

The few niggles that I had were mostly my own fault. After you've assembled and flown a few ARFs, maybe, but with constant expert guidance. Ditto with flying the K3600.

I put her on the scales at home and was not surprised: 1,816 grams, including 26 grams of lead!

If you're looking for a budget F5J glider, look no further.

She's beautifully made, and if you don't make the mistakes I've made - how could you, you've just read all this - she'll fit together almost effortlessly.

Handled with care, most model damage is in transit and storage, I'm sure she'll give me years of thermal hunting pleasure.

Yes, she'll never be as good as a glass/carbon/kevlar slipper, but she's about $1,000 cheaper!

As far as I know, she's being sold in the UK, the US, and Germany. Prices may vary, depending also on shipping costs.

And if all else fails, get in touch with Karel. Tell him Rene sent you. It might not give you a discount, but it might help me with my next purchase…

HORIZON HOBBY.COM

Aerotow 2016

This year was the 14th edition of the mythic aerotow that takes place every year in the heart of the Midwest in Monticello, Illinois.

This event has been one of the few that founded the aerotowing community in the USA, and it is for sure still today contributing a lot to the development of this part of the hobby.

The dates have been moved since last year to Fathers' Day weekend in the middle of June instead of the first week of June, and it has been quite a success. Attendance was up to expectations and weather got delivered!

Usually this event lasts four days, a great flying window in order to be sure of having flyable weather, as Midwest weather changes quickly, sometimes five times a day!

Title page: Some of the fleet out of the hangar, a very convenient place to store assembled model for an event like this.

Usually hard core fliers are joining the day before to help for the setup of the event, and to put an extra day of flying in their pocket.

This year Peter Goldsmith decided to stretch this to a five day event and most people stretched their stay accordingly, for the smarter of us, it is six days of flying.

The event had then been setup on Tuesday, and some of the hard core fliers, like Len Buffington, put some time in on Tuesday afternoon.

Weather began with a great start, reasonable temperature, humidity and wind. And it lasted six days in a row until the end of the event that been called at around 5pm on Sunday afternoon.

For my part it has been the 9th year in a row that I have participated in that event, and the more I go, the longer I stay, the more I wouldn't miss it for the people first. Peter and Caroline Goldsmith are doing a fantastic job preparing that event, and everyone loves joining even if they are driving far to get there, either coming for the northern coast of eastern USA, Florida, Alabama, Texas, Minnesota or California.

There is definitely something special about the event - the camaraderie and brotherhood spirit is already very developed in the scale sailplane community. But here it is special, as Ian Noble, a composite specialist at work, spending most of his stay helping fixing planes in the hangar. I think he allowed at least three persons to get back in the air after serious damage. And Len Buffington helping anyone that might need the screw that you never loose but this time it happens. If someone might have it, it would be he...

I think you can guess that everyone has a real good time there.

This year has been phenomenal, Peter delivered six days of non-stop flyable weather. I think everyone was sore of soaring - flights of hours plus were the norm. Everyone was shooting for two hours, but most gave up because of neck

pain. Some like me or Peter adapted by using reclining chairs to fly... This lead me to be awarded the longest flight after battling a lot with Peter Goldsmith, Scott Marnoch and Len Buffington for that title.

A couple of other awards were given during the Saturday night barbecue. Mikael Kelly won the best sailplane with his scratch built Franklin PS-2 Eaglet. What a great craftsman. And Kevin Kavaney won the Corn Award, with most in-the-corn landings with his 40% Ka-6. Rick Shelby received the farthest travel award. He drove from Montague, California, a healthy 2200 miles / 31 hours driving!

A raffle took place after this ceremony that was very well stocked with the support of Horizon Hobby, with headquarters located in Champaign, IL.

Don't forget to join us next year for the 15th edition of this fantastic event!

Stéphane Ruelle's 7.5m 1/3 scale ASW-22 from MCM pulled by a Hangar 9 Decathlon.

A beautiful T-shirt came with registration, a souvenir for bringing back memories for an entire year!

Peter Georges with his 7.5m 1/2 scale Ka-6 from Bill Hempel

Ali Machinchy and his 50% Fox powered by a turbine.

Len Buffington with his 8m H Model 40% Duo Discus.


SINCE 1948
ILLINI GLIDER CLUB
N137AC
DK
N106DK
GENESIS 2
XS

Above: Peter Georges with his 6m LET Ventus.

Right: Tim M and his Ventus getting trolled by Jeremy Hartmann

Opposite: Stéphane Ruelle and his son Mathieu getting ready for a flight with a custom E-Flite Blanik with a Russian scheme.


ДОСААФ

Kevin Kavaney and his 40% Ka-6 and Tom Broeski with his 40% TG-2, both contestant for the Corn Trophy, this year won by Kevin without a doubt!

Stéphane Ruelle 6.3m 1/3.5 scale DG-500.

Above: Robert Morrow with a 1/3 scale Fox customized with a citizen watch scheme.

Left: Len Buffington with his 8m H Model 40% Duo Discus.

Above: Another Bergfalke,1/4 scale this time.

Left: Don Chamberlain with a custom E-flite L-13 Blanik.

Above: Peter Georges with his 6m LET Ventus.

Left: A 10.6m Nimbus 4 after returning from a long flight.

THE BOSS himself! Peter Goldsmith with his 1/3 scale Weihe, going for an hour plus fight.

Above: Peter Goldsmith and Len Buffington were captured during a synchronized landing of their planes, a 40% Piper Cub and a 10.4m Nimbus 4.

Left: JD ready to tow with his 1/3 scale Hangar 9 Piper Pawnee

Ali Machinchy 40% Ka-3, with a beautiful red finish.


Eaglet

Above: Mickael Kelly with his fantastic Franklin PS-2 Eaglet.

Left: Mickael's PS-2 Eaglet on tow.


DUO
HB-3260

Above: Caroline Goldsmith with her 4m all composite ASW-15.

Left: 40% Duo Discus an instant before touch down.

Scott Marnoch Bergflake with a Pilatus B4 scheme, very pretty in the sky!

Stéphane Ruelle 6.3m 1/3.5 scale DG-500.

Mathieu Ruelle coming back happy from one of his flights with his father's E-Flite Blanik.

Stéphane Ruelle 5m 1/3 Scale Siren C-30 Edelweiss Uniform Juliet.

Len Buffington with his 6m 1/3 scale HP 304 Shark.

Duo Discus on final with the well known Monticello barn!

Two Oceans Slope Soarers

Slope Aerobatics 2016

Text by Christo le Roux, christo@diel.co.za
Photos by Nic Steffen and Steve Meusel

Cape Town, South Africa

This year's event began with a lot of speculation about what the weather was going to do. The wind report, right up until the Thursday before the event kicking off, was volatile and only settled on the Friday afternoon.

With many competitors coming from afar, we had the traditional practice day on the day before the event with many of the guys taking to the slope for a last minute cram session which proved to be quite eventful.

There was a perfect south east blowing, lending itself for flying at the favorable Red Hill.

About eight pilots showed with their competition planes and maneuvers ready to get stuck in.

The early part of the day began well but came to an abrupt pause when Durban-based Lance Cranmer and Durban (now Cape Town based) pilot Neil Allen had a mid-air, losing their gliders to the big branchy obis below. After searching for some time, practice resumed with the return of their gliders to no avail.

Saturday morning dawned and the wind was howling, the wind gods were on our

side and the predicted day-long south easter was upon us. Rushing to the slope for briefing, batteries charged to the max for what looked to be a great day.

Though everyone was excited, with the briefing out of the way there was definitely a sense of nerves in the air as we all prepped for round one.

Judges Stewart Nix, Bob Skinner, and Andrew Anderson were in position, pilots had their score sheets filled in, and the event began with Open class flying first. The class consisted of seven pilots, some from Durbs, Cape Town, and one or two that we have not seen on the slope for quite some time.

Next up was the scale class, a class that has not been flown in the event before but proved to be a success with five pilots entering but four competing.

Though these gliders were not really built for aerobatics, it was certainly entertaining watching their pilots putting them through their paces.

The final class to fly in the first round was Expert class consisting of six pilots, with the competitors at the top of the class pushing for seamless maneuvers with Louis Genade and Christo Le Roux neck-and-neck.


FUSION
AEROBACIC
Precision Slope Aerobatics
Two Oceans Slope Soarers

A total of two rounds were flown on the first day, followed by the most welcome “tea time” after a long day baking in the sun.

With the Cape weather being so unpredictable, we were only too happy to welcome the brisk wind out of the south east upon our arrival at the slope on Sunday morning, and guess what? It was set to be that way for the rest of the day. If I am not mistaken, this is only the second year in the history of the competition that a full weekend event was able to be held, and what an event it was!

Another round of flying took place in the morning to seal the scores and positions of our weekend toils.

Prize giving was held just after lunch at Dixies Restaurant. With all the scores tallied up and all checks having been done, it was time to unveil the results.

A big thank you goes out to the judges of the event, Bob, Stuart, and Andrew, it would not have happened without you! Thanks!

Another goes out to our sponsors for the donations of money, prizes, trophies, and bags; you guys certainly filled the goodie bags and your generosity is certainly appreciated by the Two Oceans Slope Soarers.

Well done to all who took part. We hope to see you back next year. For more info about the event, visit <http://www.toss.co.za>.


HB-3114


Conquestador


13
11


Two Dreams Shape Soarers


Vector


FLIGHT PAD


MEGANE
CA 678-249
28
D-8D28


FUSION
AERODRAG


D-8028


1
JUDGE
11


13
2
11
12


15


6


3
Two Oceans
the Soarers


HB-3114


14


Futaba


ITOR PILOT


Vector


Conquestador


JUDGE
Oceans


HB-3114


13


RCRCM
Vector


TOUCAN II


Vector


COMPETITOR
CAMERA PILOT


HB-3114
Swift S1
Graupner


Vector


TOUCAN II


TOUCAN II
Slope Soarers
Two Oceans Slope Soarers

Left to right:
Lance Cramer
Dave Greer
Russell Conradt
Charlie Blakemore
Christo le Roux
Louis Genade
Jeff Steffen
Bill Dewey
Rudi King
Hans van Kamp
Schalk Human
Bob Skinner
Rose Steffen

Scale Class

1: Christo Le Roux 100%
2: Dave Greer 79.68%
3: Russell Conradt 65.51%
4: Charlie Blakemore 49.32%

Open Class

1: Rudi King 100%
2: Ryan Matchett 99.16%
3: Hans van Kemp 98.57%
4: Lance Cranmer 93.65%
5: Neil Allen 78.81%
6: Charlie Blakemore 71.83%
7: Schalk Human 22.26%

Expert Class

1: Louis Genade 100%
2: Christo Le Roux 97.47%
3: Russell Conradt 73.33%
4: Malcolm Riley 66.83%
5: Noel Cochius 65.11%
6: Alan Ball 61.48%

The First Sailplane Pilot

Chuck Anderson, chucka12@outlook. com

Orville Wright was the first sailplane pilot.

He used rising air to fly for long periods of time. Lilienthal, Chanute, and other earlier fliers just glided down from hilltops, but both Orville and Wilbur worked slope lift for longer flight times.

Orville set a world gliding record of 9 minutes and 45 seconds at Kitty Hawk, North Carolina, on October 24, 1911; a record that stood for 10 years. In 1921, Dr. Wolfgang Klemperer broke Wilbur's record with a flight of 13 minutes using ridge lift.

In 1900, Kitty Hawk was an isolated fishing village and Coast Guard Rescue Station on the outer banks of North Carolina reachable only by boat. Wilbur Wright selected this site for his kite experiments because of the steady winds and large level plain of bare sand free of trees and other obstacles.

Image 1: First manned controlled powered flight, December 17, 1903.

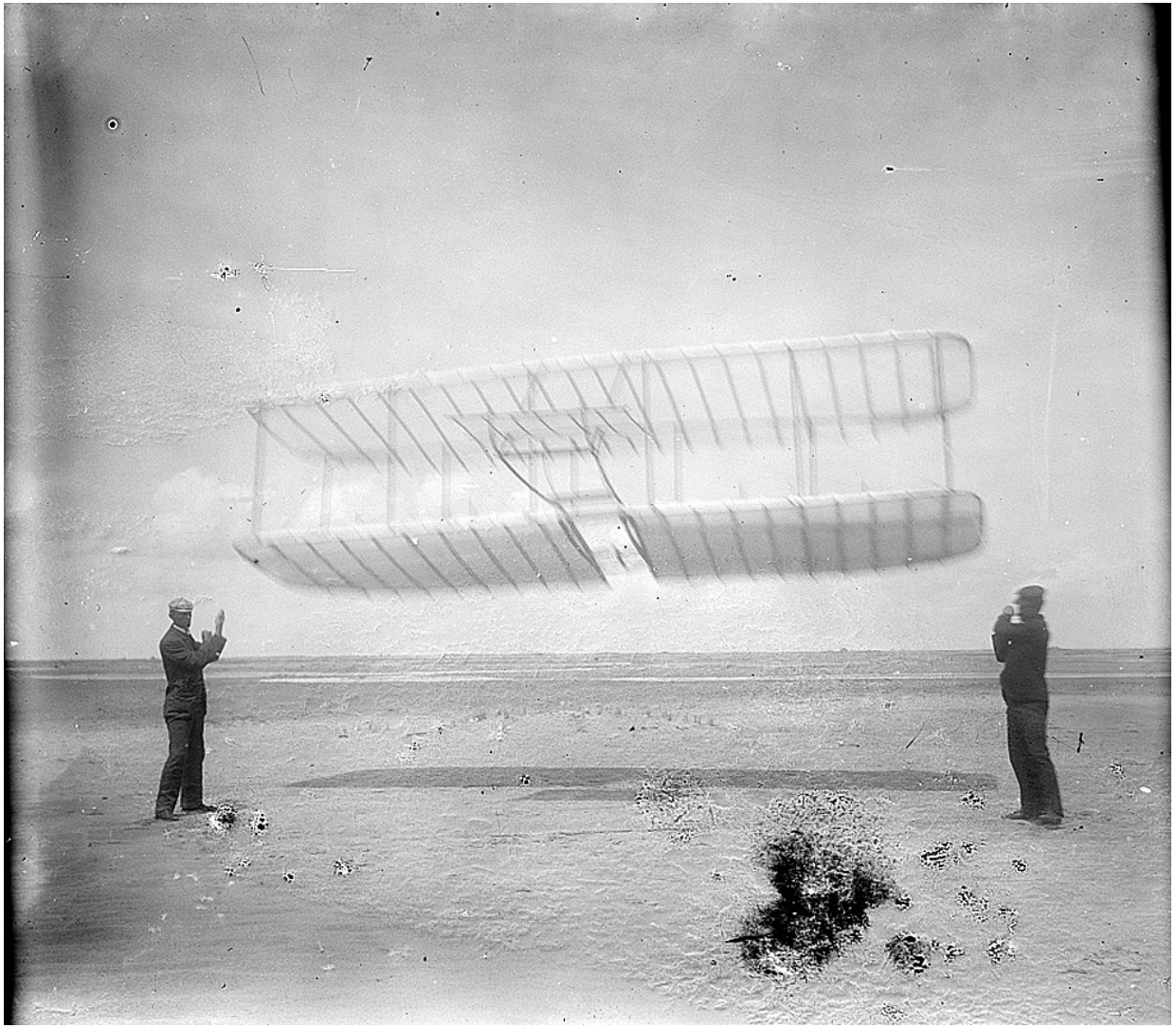


Image 2: Tethered glider, 1901.

Wilbur and Orville camped on the beach for a month or two each year between 1900 and 1903 to conduct their flying experiments during a vacation after the end of the bicycle season.

In a letterto to his father dated September 23, 1900, Wilbur wrote

> "My idea is merely to experiment and practice with a view to solving the problem of equilibrium (control). I have plans which I hope to find much in advance of the methods tried by previous experimenters. When once a machine is under proper control in all conditions, the motor problem will be quickly be solved. "

Three years later, Orville made the first successful powered flight with the Wright Flyer. (Image 1)

Wilbur went to Kitty Hawk in 1900 to fly his first glider as a kite to test wing warping for roll control. When it didn't develop enough lift to fly with a pilot on board, he moved the experiments five miles to Kill Devil Hill and flew it as a glider in slope lift. In 1901 they moved their camp to the foot of Kill Devil Hill to fly their glider as kites and free flight. (Image 2)

As a result of lift and drag measurements taken with the tethered glider in 1901, the brothers decided that Lilienthal's data were inaccurate. Upon returning to

Dayton, they spent the winter measuring the lift and drag of small airfoils on a bicycle mounted balance and in a homemade wind tunnel. They found that the Smeaton coefficient used by Lilienthal and other earlier experimenters to calculate lift was too high and came up with a value very close to the modern value from their wind tunnel measurements.

The 1902 glider designed with the new data was successsful and used to design the 1903 Flyer Orville used to make the first successful powered flight. (Image 3)

The 1902 glider was flown in 1903 to practice before flying the Flyer.

No further glider flights were made until 1911 when Orville went back to Kitty Hawk to do some flight research away from spying reporters. (Image 4)

In his article *Possibilities of Soaring Flight* in the December 1922 issue of U. S. Air Service magazine, Orville Wright wrote

> "I have seen thousands of birds in soaring flight over level ground on a calm day... These currents of raising air are most commonly seen on calm days when the sun is shining. We see them in the whirl winds stirring up leaves and dust into the air... A buzzard circles to keep within the whirl which increases with height."

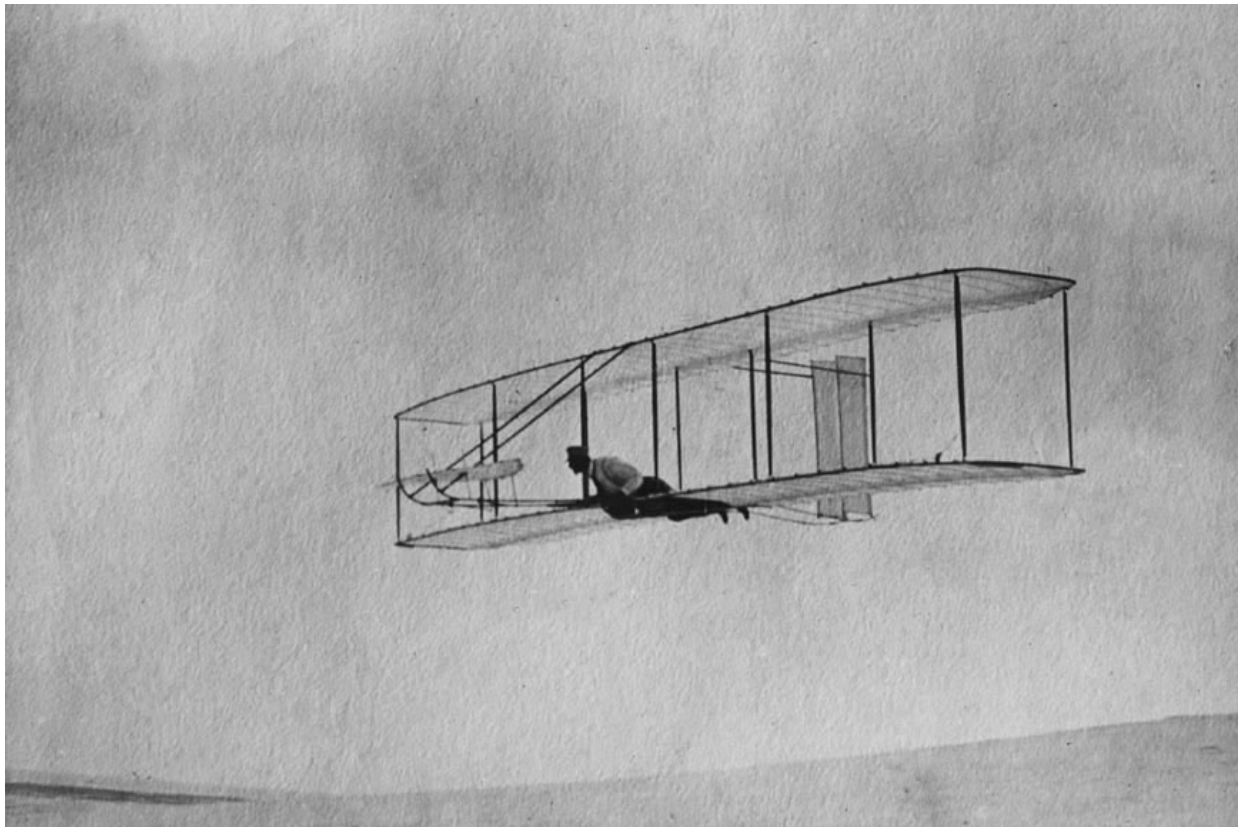


Image 3: 1902 Wright glider slope soaring.

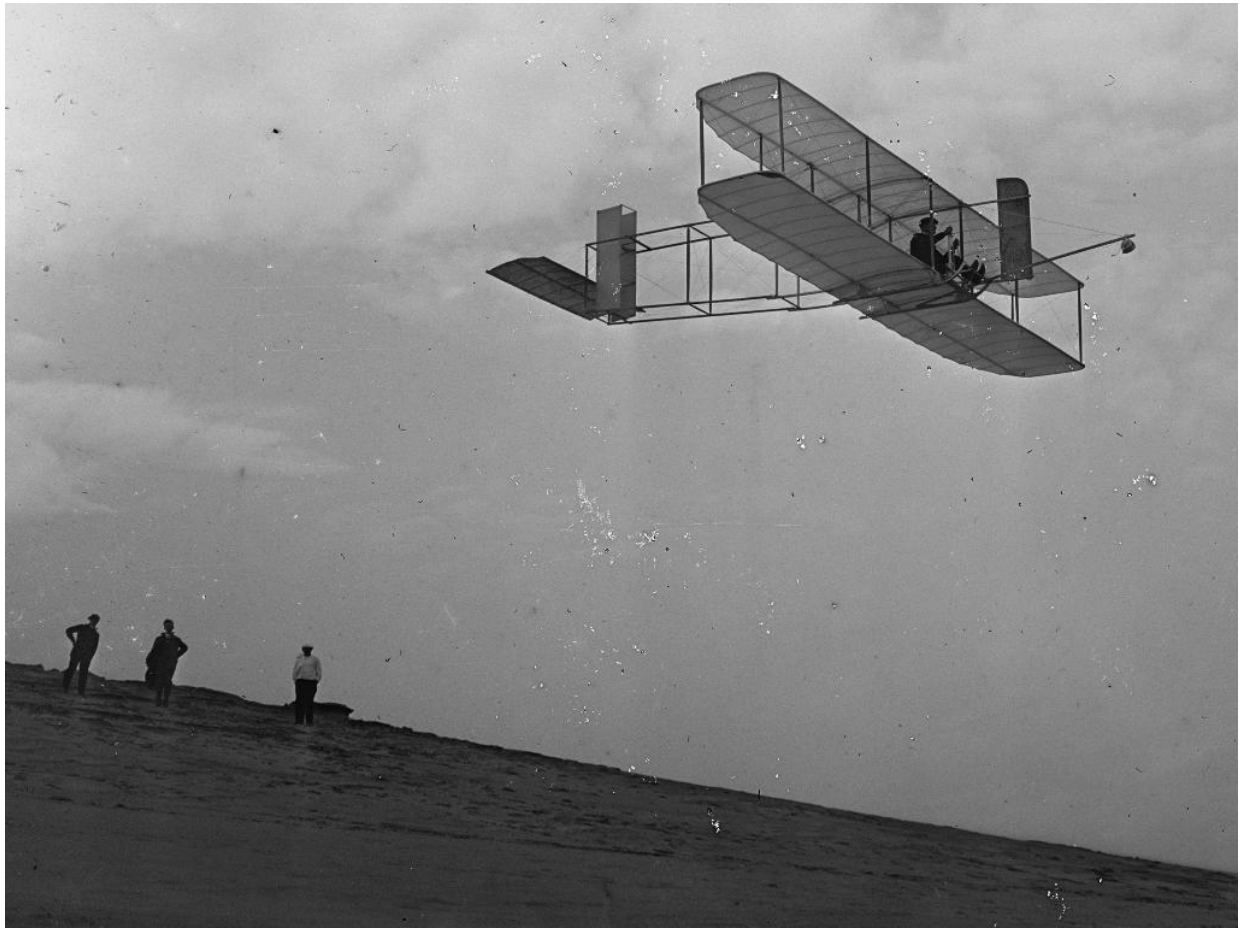


Image 4: 1911 Wright glider.

While neither Orville or Wilbur did thermal soaring, they understood rising air from heated ground from years of observing bird flight when there was no slope lift.

In his article “Flying as a Sport—Its Possibilities” published in the February 29, 1908, issue of *Scientific American*, Wilbur Wright discusses the possibility that men will eventually learn to fly without motors in the manner of soaring birds.

In 1910, Orville was instructing in their flying school at Montgomery, Alabama, when he encountered a strong thermal at 1500 feet altitude and could not descend for five minutes even with the motor at idle.

I used “The Published Writing of Wilbur and Orville Wright” by Smithsonian Books as the source to write this article. I especially enjoyed the technical articles originally presented to the Western Society of Engineers and published in Smithsonian reports and other technical journals between 1902 and 1908.

“Wind and Sand” by Wescott and Degen presents the story of the Wright brothers in their own words and photographs in a much more readable form.

Scheduled for the September 2016 issue

Alpina 4001 Elektro

Gino Alongi is the creator of the “Gas-powered Sport Winch” detailed in the January 2014 edition of *RC Soaring Digest*.

A little over a year ago, Gino inquired about the thrust line for the Alpina 4001 Elektro, wondering if there was a generalized rule for required downthrust, as it seemed what the manufacturer had built into the model (8°) was a bit extreme.

Gino recently finished the model and has determined it is a “fantastic machine!”

RC Soaring Digest will be publishing photos of Gino’s efforts.

Plans for large scale gliders

Jilles Smits, who is an active member of the Loganholme Club on the southern outskirts of Brisbane, spends his time using his draughting abilities to draw up plans for large scale models of gliders that he makes feely available to all who would like to use them - including a 3-view and files for laser cutting the parts. As Jilles says:

Below is a link to my modest website. It shows the designs available. Building drawings are free including files for laser cutting the parts. The designs are not for the beginner builder and some details are left to the builders preferences About half of the designs are actually built and those fly very satisfactory.

https://sites.google.com/site/jillesgliders/home

To be added in the near future are a 40% Moswey 3, a scale 1:3 Slingsby T21 Sedbergh and a 1:3.125 (4.8meter span) ASW15B

Courtesy of:
Australia Electric Flight Association
Electric & Glider Flight Australia
Edition Number 23, June 2016, p. 19

“Amongst the flowers.” Vampire F3F, Monte Cucco, Italy. Photo by Jiri Hladky. Canon EOS 7D Mark II, ISO 800, 1/8,000 sec., f2.8, 70mm