



## **DLG APOGEE-Sport / construction report/**

<https://pfmrc.eu/topic/61974-dlg-apogee-sport-relacja-z-budowy/>

[Posted May 28, 2016](#)

After making the DLG BUG, which I am extremely happy with, I decided to make another one called Apogee-sport. Thanks to the courtesy of our colleague Miro-er1, I received the plans and started to implement the plan. Mirek and I decided that under this topic we will post the order of construction. During construction, I introduced minor changes that I will describe.

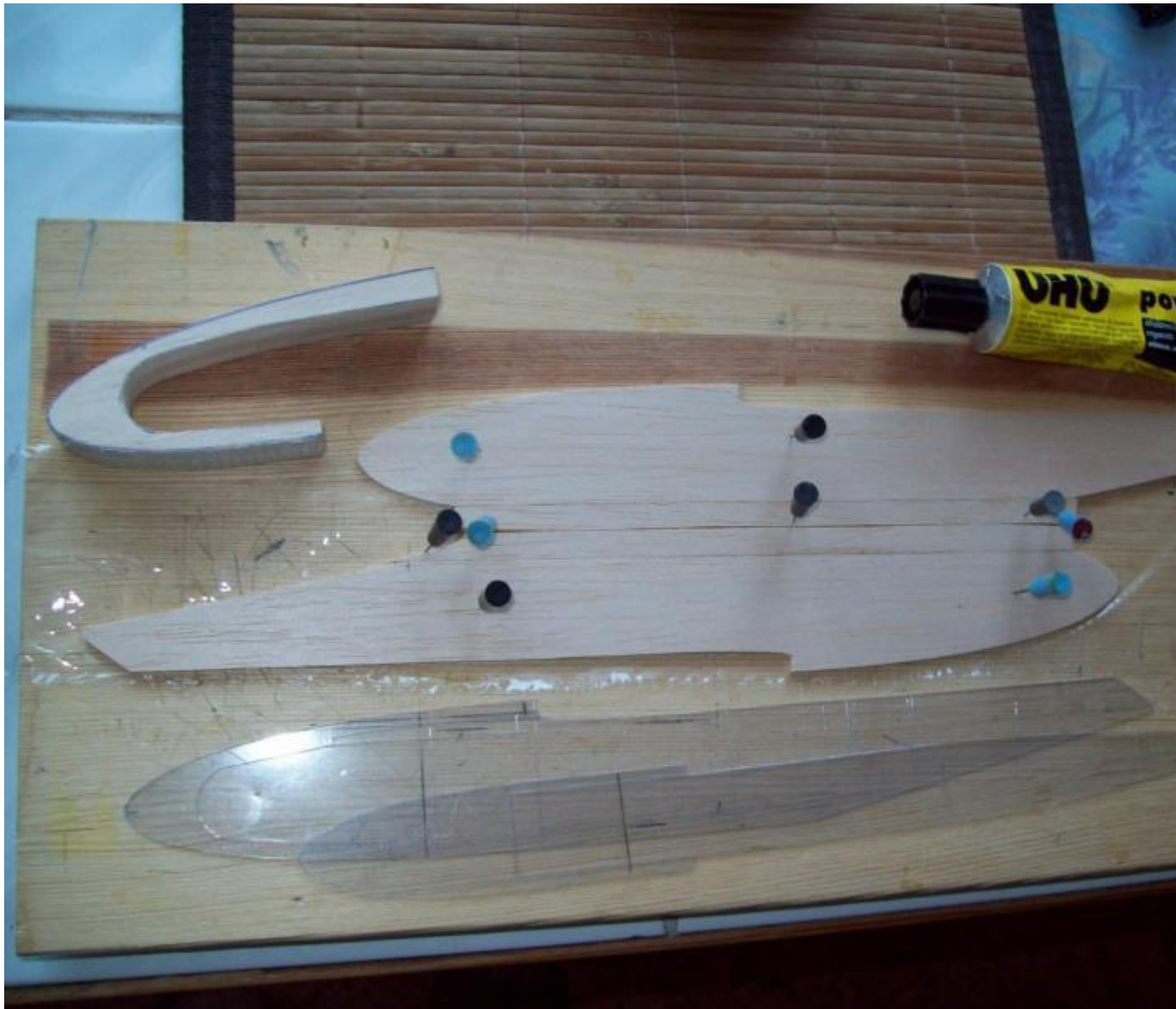
As with the Bug, so now I started with what material I have, namely the vertical and horizontal stabilizers. With the help of templates, I cut these elements from balsa 2.5, which received relief holes and will be profiled.



Along the fins I will reinforce with a strip of carbon roving. probably spring hinges. As a hull beam, I used a carbon tube with a diameter of 5.5 m/m, in which I sawed a groove at the end for gluing the rudder. The base of the horizontal stabilizer was made of medium-hard balsa, which after gluing on resin will be reinforced with two vertical carbon pins 1 m/m. to prevent longitudinal breakage in the event of a "crash" this is what it looks like



The next stage of my work was to make the hull. Using templates, I cut the sides of the hull from medium-hard balsa wood, 3m/m thick, and the bottom, but the template was extended to 22m/m. I had to make the correction due to the width of the receiver and the package. I glued the bow element from three layers of balsa 2x8 m/m and one hard layer 6 m/m





instead of plywood 0.8 in the area of contact between the airfoil and the fuselage, I glued strips of mahogany veneer 0.8 m/m  
After checking if everything fits me, I glued the sides of the hull to the bow part with UHU power glue



pinned elements served only as coordinators. Earlier, I cut a groove to cut off the "flap" so that after the glue dries, it can be cut off completely. Of course, the sides of the flap are not glued.





The next stage is finishing - grinding the nose, which turned out very nicely 😊

Next, I cut out the frames from 3m/m hard balsa and reinforced them with 1m/m plywood where necessary.

I cut off the flap



I glued the bottom end element of the fuselage.  
At the end of the fuselage I fitted / grinding / tail beam which I will paste in the final stage.



I treated the finished hull with resin spread with a finger so that there was enough to harden the balsa. The hull will be the color of raw balsa.

That's it for now, because I'm planning a trip for two weeks.

I think Mirek will also add something, as well as plans, but for curiosity's sake, I'm giving you a link from the construction of this model

<http://www.rcgroups.com/forums/showthread.php?t=595551>

Is anyone going to build this model with us!?, It is not a high-performance one, but you have to start with something and it will provide fun.

[Posted June 12, 2016](#)

I came back from Wrocław and there I bought balsa 1.5, 2.5 and 3m/m, a balsa pin 3m/m, as well as CA glues and steel wire 0.3 for hinges.

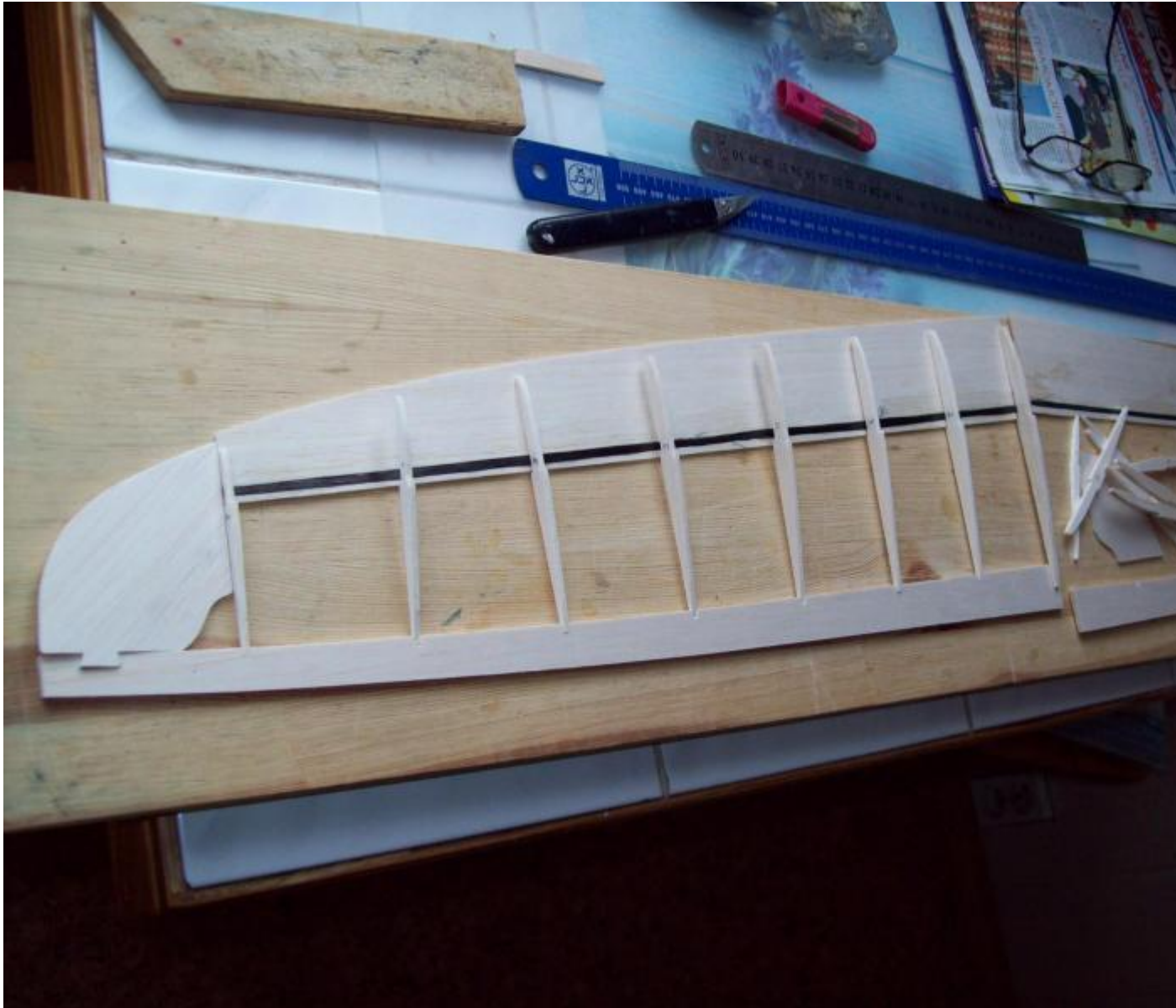
Mirek, the number of downloads shows that someone will rush us with the work. 😊

[Posted June 13, 2016](#)

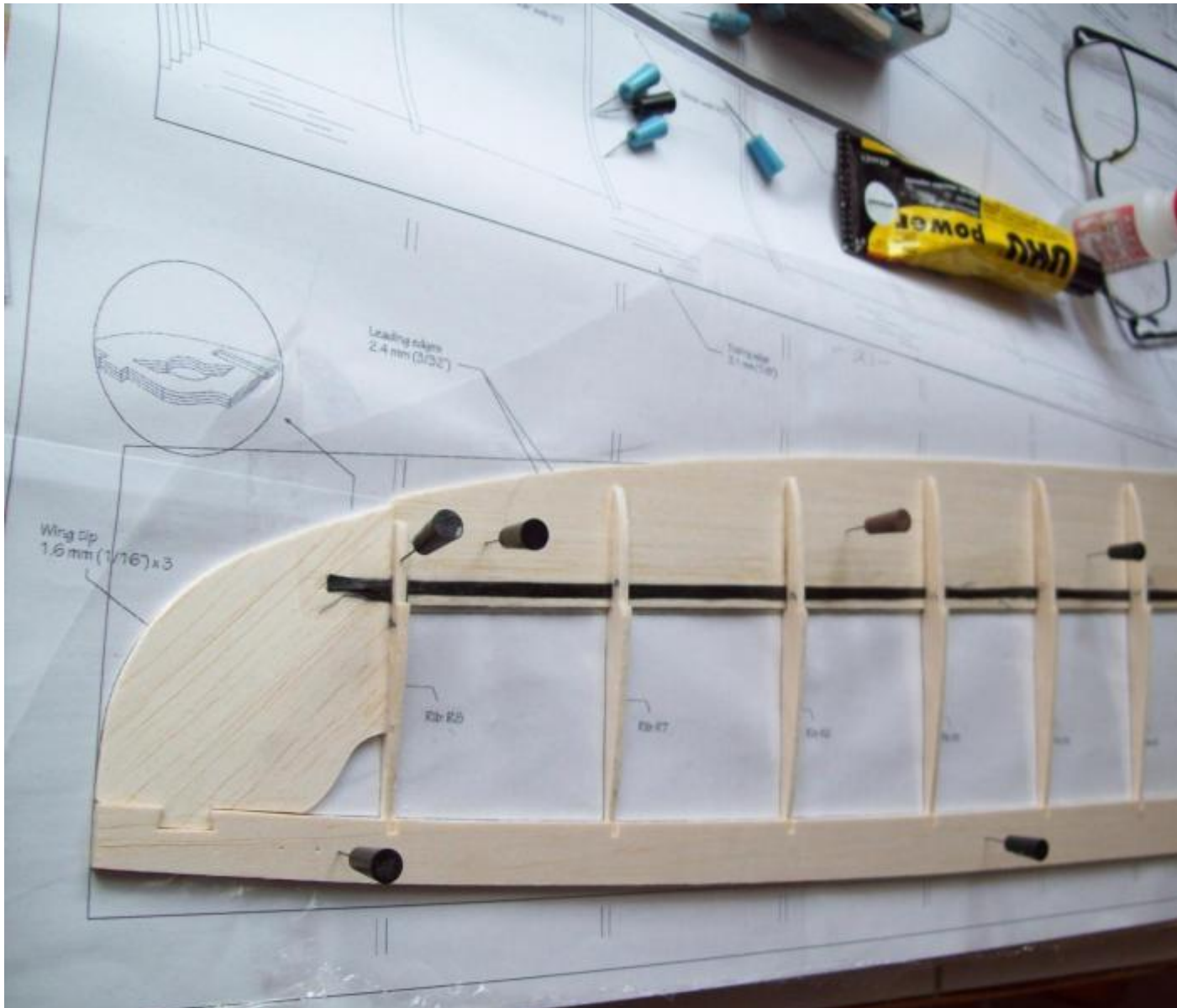
The templates are made, so I cut out the runoffs from 3m/m balsa, the caissons are from 1.5m/m balsa and the ribs are from 2.5!!!!



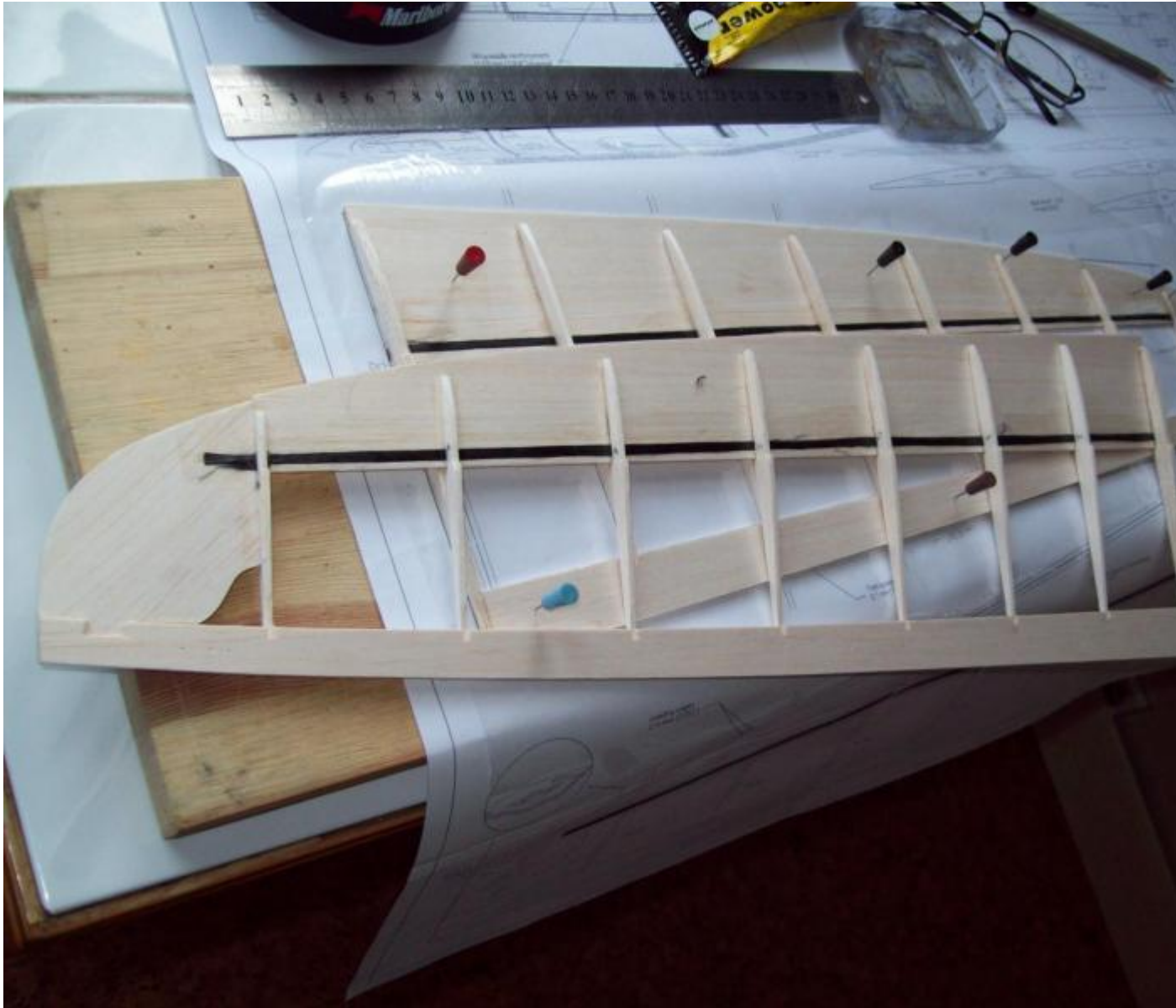
and make sure everything fits



before I started gluing the ribs on the caissons from the inside, at the height of the pseudo-girder, I glued strips of carbon roving onto the CA.



The ribs are also glued onto the CA, apart from the ribs in the center wing which I glued with UCHU-power.



After gluing the two halves, I glued balsa slats 2.5x5 mm on the leading edge as a filling of the nose / you can't see it in the picture /



and glued the second layer of balsa wingtips 3m/m

Currently, everything is drying and waiting for me to glue the caissons, fill the pseudo girders with 1.5m/m of balsa and sand them. 😊

As for today, I did a lot. The work was pleasant, because I had everything ready, and making an element from templates does not require sanding.

I think that what I do does not require a deeper description because the model is simple 😊

[Posted June 14, 2016](#)

Mirek, I won't say anything about the weight, I'm just building from balsa light "Panama" because in my store you won't have anything else, except for the balsa that I had in a block and cut into boards - medium hard.

As for the roving - I put it from the inside because it will not be visible and I will get a smooth surface, and it will fulfill its role anyway.

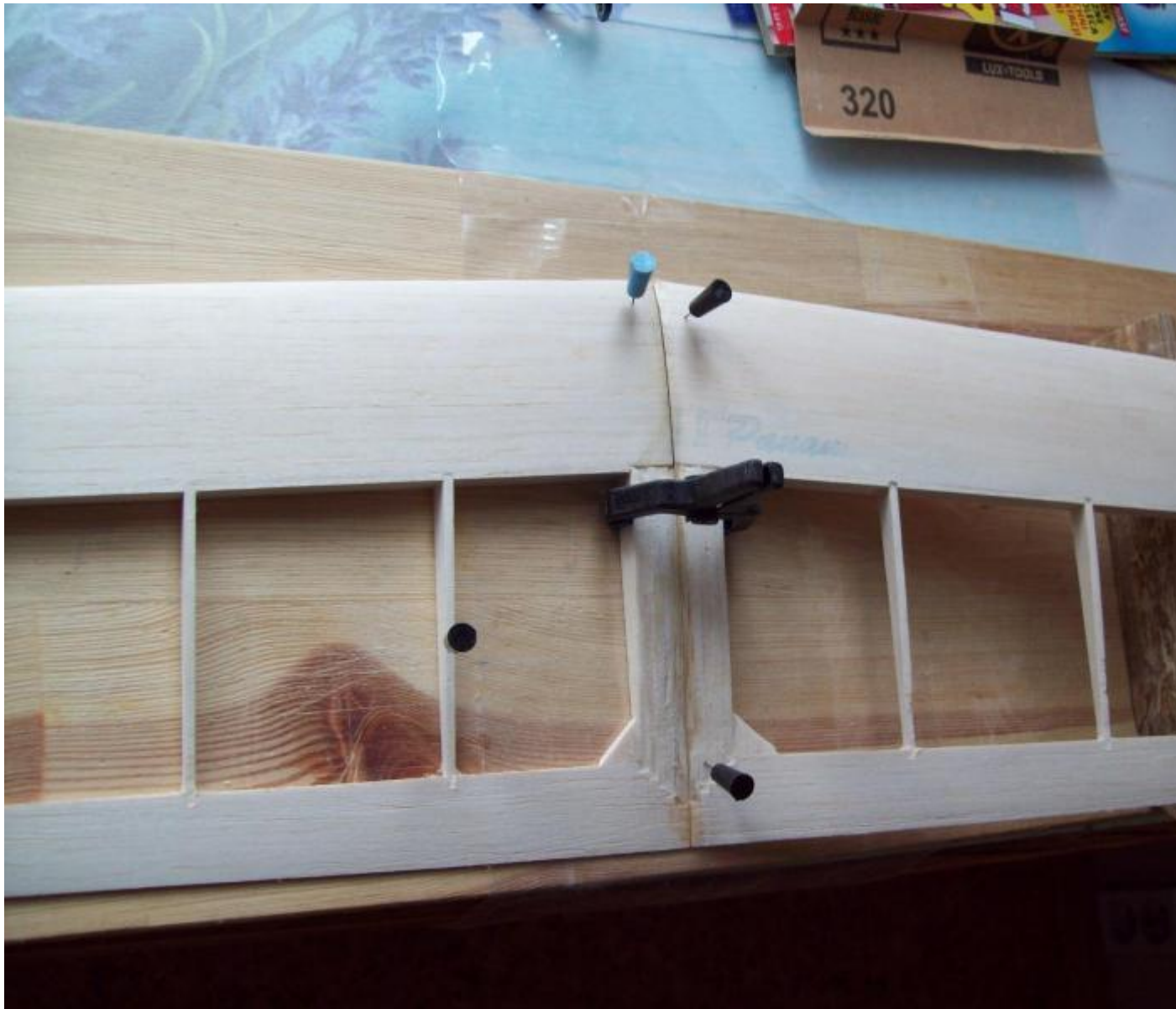
This morning I covered the caisson with 1.5 m/m balsa, which created a false girder that will add longitudinal stiffness to the wing.



And then it was time for sanding, it took me four hours. The rafting was made of balsa 3m/m unnecessarily because it was in the plans /oh those inches/, I could have given 2.5m/m and it would have been OK, but it gave me a hard time. There was a lot of work with the attack because I tried to reproduce the profile and nose as best as possible. It turned out not too bad, despite the lack of templates on individual ribs.



The next step was to make a groove in the center wing for the pin fixing the wing in the fuselage and grinding the center wing ribs to a 12 degree angle. After that, I was able to glue both halves on 15-minute resin after fitting.



As for attaching the wing with a nylon screw, I'm wondering whether to use the solution from BUGA. There, on the trailing edge, there is a hole reinforced with 0.8m/m plywood, which enters the pin glued into the hull frame and protrudes 5 m/m. To protect this wing from falling out, a rubber band is put on the protruding pin, covering the hull beam. The rubber band is small in diameter and strong enough that the airfoil will not separate during the throw. These are little things, but very important.

I just weighed what I have, which is everything "naked"

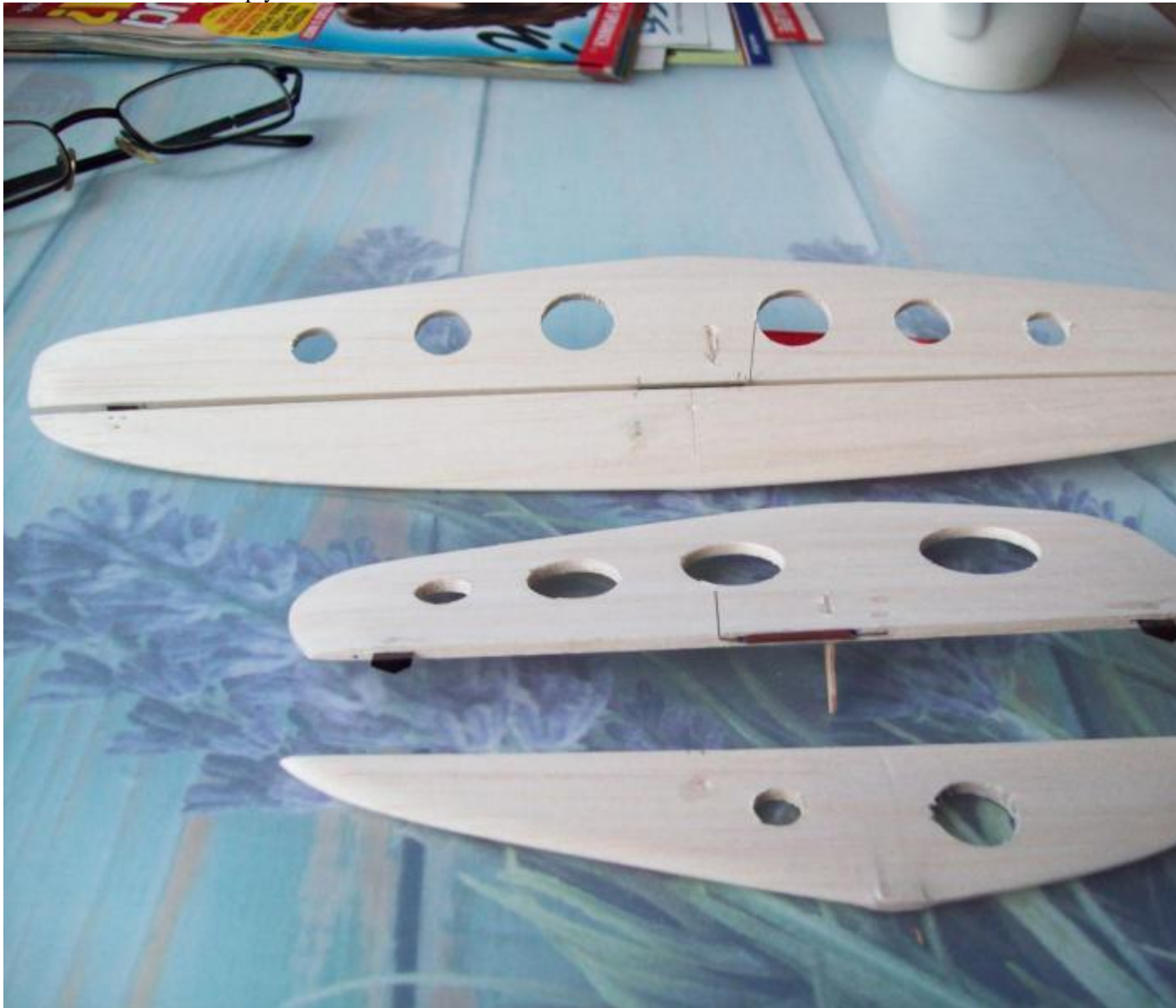
- wing 40g
- 5g ballasts
- hull with a 26g beam
- in fact ; 71 grams

[Posted June 16, 2016](#)

Today I played with the ballasts, pre-profiling them and started making the hinges. I made them from a "floppy disk" by cutting a strip 7m/m wide. In the places of the hinge, I made two holes through with a tailor's needle and let in a drop of rare CA, which immobilized the hinge.

The spring hinge is made of steel wire with a diameter of 0.3 m/m and a length of 25 m/m with whiskers 20 m/m, bent at an angle of 90 degrees /almost the letter C/ From a thin wire I took off the coating which was previously applied to the wire and acts as a sleeve. I matched the hinges and the spring hinge with the

rest On the side of the ailerons, in the place of the spring hinge, I made a groove for the sleeve. I also made rudder levers from 1m/m plywood





The components of the fins are not glued together. only folded, this will happen after covering with foil. Is it supposed to be like this, I don't know 🤔, but the aileron works softly and precisely, the only question is whether the springs / their hardness / will be strong enough for the servo to have no problems with their deflection.

In the frame of the fuselage at the advancing of the wing, there is already a hole for the wing pin and everything fits, but I miss it!!! M3 nylon screw to fix it.

As for the servos, I have 5 grams but they fall off!!!, / little space / ABC 3.7 grams or E-max ES 9251 2.5 grams are at stake. So far I don't have foil and servos 🤔

[Posted June 17, 2016](#)

Mirku, nothing lost, I will do as you write, a thin strand of carbon and a 0.5 carbon rod will not hurt. Both ballasts weigh 5 grams, not much, but there must also be strength. 😊 Anyway, I'll change it to balsa 2.

My dear friend promised me Solara film Solite-lite film, very thin, I have to wait a bit, so I can still "lick" it all. And solder a new voltage sabiizer to which I recently bought new cables.

It is a pity that no one but us joins the discussion and will not suggest whether we are going in the right direction 🤔

[Posted June 17, 2016](#)

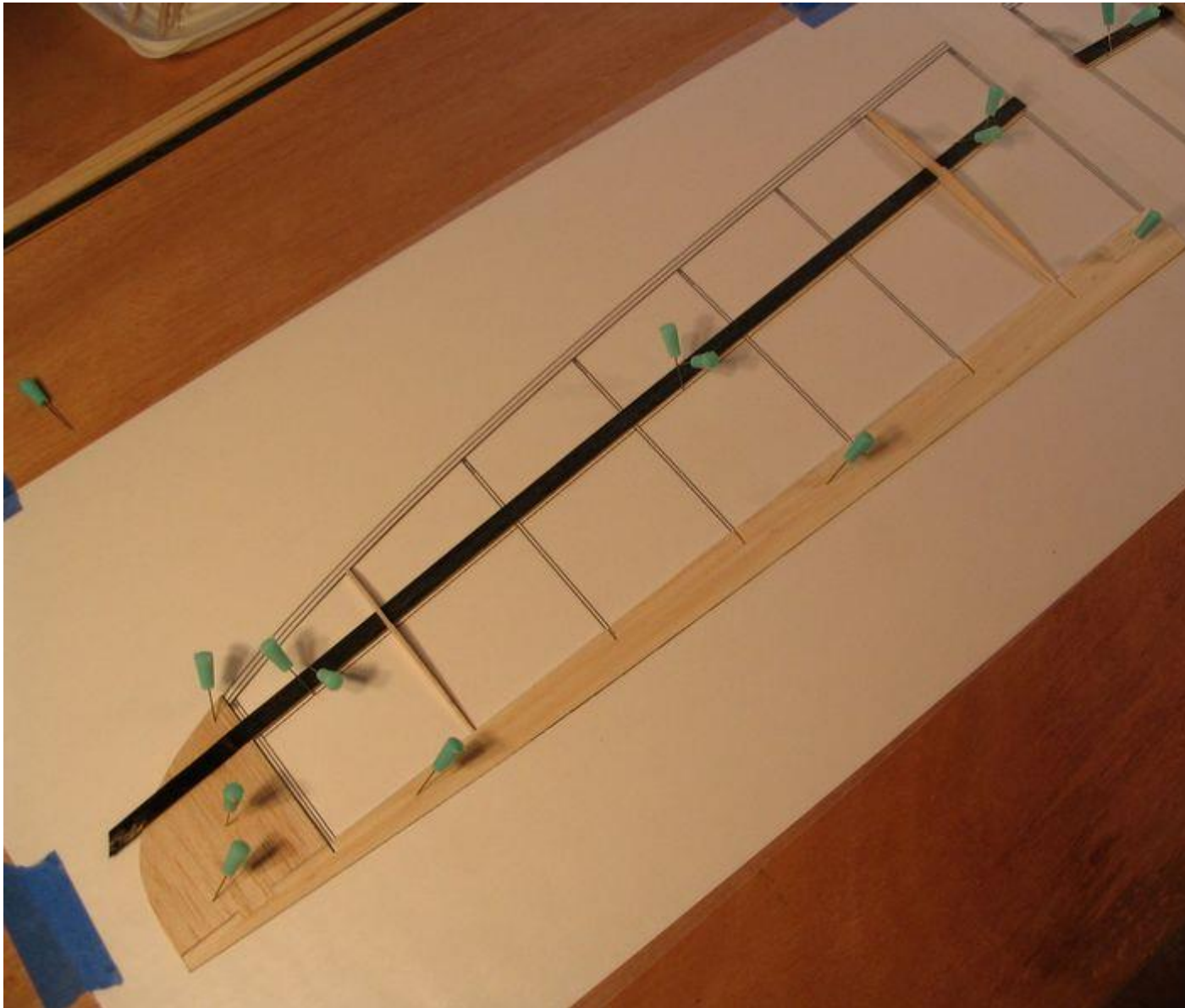
Lukasz, I don't understand what's going on, do you mean roving on caissons? This airfoil has no girder and receives its stiffness from caissons and balsa elements enclosing it between the ribs. /I called it a false girder/ In the plans, this black belt is a roving and not a spar, what does "filtered" mean?, because the essence is a permanent connection and that's what I got.. As for this sleeve, I used it because there is an aileron lever in this area and the aileron itself has tiny hinges at the ends. As the servo pulls the cable, this area will bend, hence the idea.

Thanks for the advice and tell me what wire you use for the springs and its length and what servo.

[Posted June 17, 2016](#)

In the photos from the linked topic, there are girders in the structure made of balsa slats covered with carbon on one side.





(photos borrowed from Rcg)

Of course, under the right conditions, we are able to obtain a laminate with Ca similar to a resin laminate. Although we use Ca with roving rather as ad hoc reinforcements, e.g. wrapping. You did not describe how many layers of what roving you used. At the same time, I exclude that it will not give stiffness to the panel, but out of perversity I would do it as in the pictures or use flat bars in places where you glued the roving.

As for the springs, I fly a 1.5 meter model with the fin placed under the beam. Spring 0.5mm bent in C, the length between the arms is about 50mm. The servo has a force of 2.2 kg/cm<sup>2</sup>. 0.3mm springs should be sufficient for such a model 😊

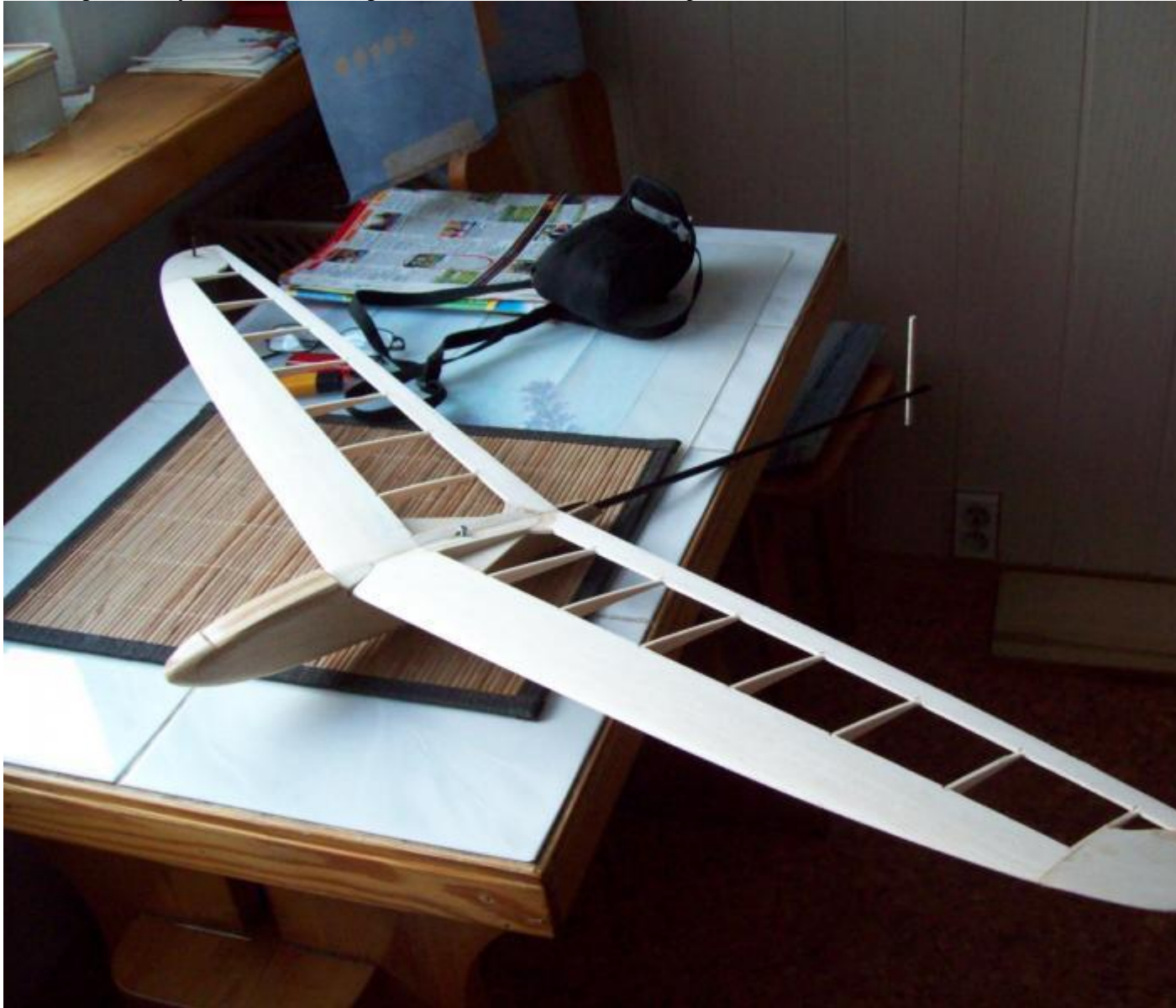
[Posted June 18, 2016](#)

Lukasz, mine is the same, except that the slat is not cut off and the laminate is laid, but immediately on the caisson on one side. Carbon surpluses go between the layers of the end of the panel. I put two layers of balsa at the end, 2.5 m / m. / plans are more layers. / Same plans, different construction techniques. 😊 I am satisfied with these springs.

One more thing bothers me, namely, my receiver must have a 5V power supply. The Bug is OK, even though I have the RHINO 360mAh package and the stabilizer. The package is not large, but it does not fit this model - it is too big! 😞 😞 😞

[Posted June 21, 2016](#)

Practically, I have nothing to do with the model. Everything is ready for wrapping and gluing the servo. The wing is already fitted to the fuselage with a screw mount / it will be plastic /.





Plans, plans, but in reality it turned out a little differently because; receiver, servos and package are too big. I decided to move it like this; I removed the rebate under the wing so that I had access to the wing fixing the wing and insert the receiver there with the antennas backwards. The servos will be in the front part under the wing one after the other, while the package and voltage stabilizer in front. The receiver must already remain in the model, or something needs to be invented to remove the links from the servos to pull it out.





The last photo shows the location of the receiver. One antenna comes out diagonally at the bottom of the fuselage, the other at the same height on the side of the fuselage forming an angle of 90 degrees.

The E-sky servos I had are defective and I decided to order the TGY-1370A, 3.7 grams / dim. 20x17.6x8, plus Turnigy nano-tech 180mAh 2S package, 13 grams /size 35x20x10/

Solara film-lite dark blue 18g/m2 and transparent violet.

Well, I'm waiting 😞

I will only add that the weight of 71 grams will come with a 6 gram receiver + 2 servos -7.4 grams + a 13 gram package and a 2 gram stabilizer, it turns out that the model without wrapping is 99.4 grams.

[Posted June 23, 2016](#)

Idleness kills, and without waiting for the shipment, I decided to cover the front parts of the fins with the remains of the blue foil.



In the beam and rudder, I drilled a hole vertically into which I put a rod on carbon glue, which will strengthen this knot.

Out of curiosity, I temporarily assembled the model and took a photo.

I like the look and I'm happy with his choice. 😊 😊 😊

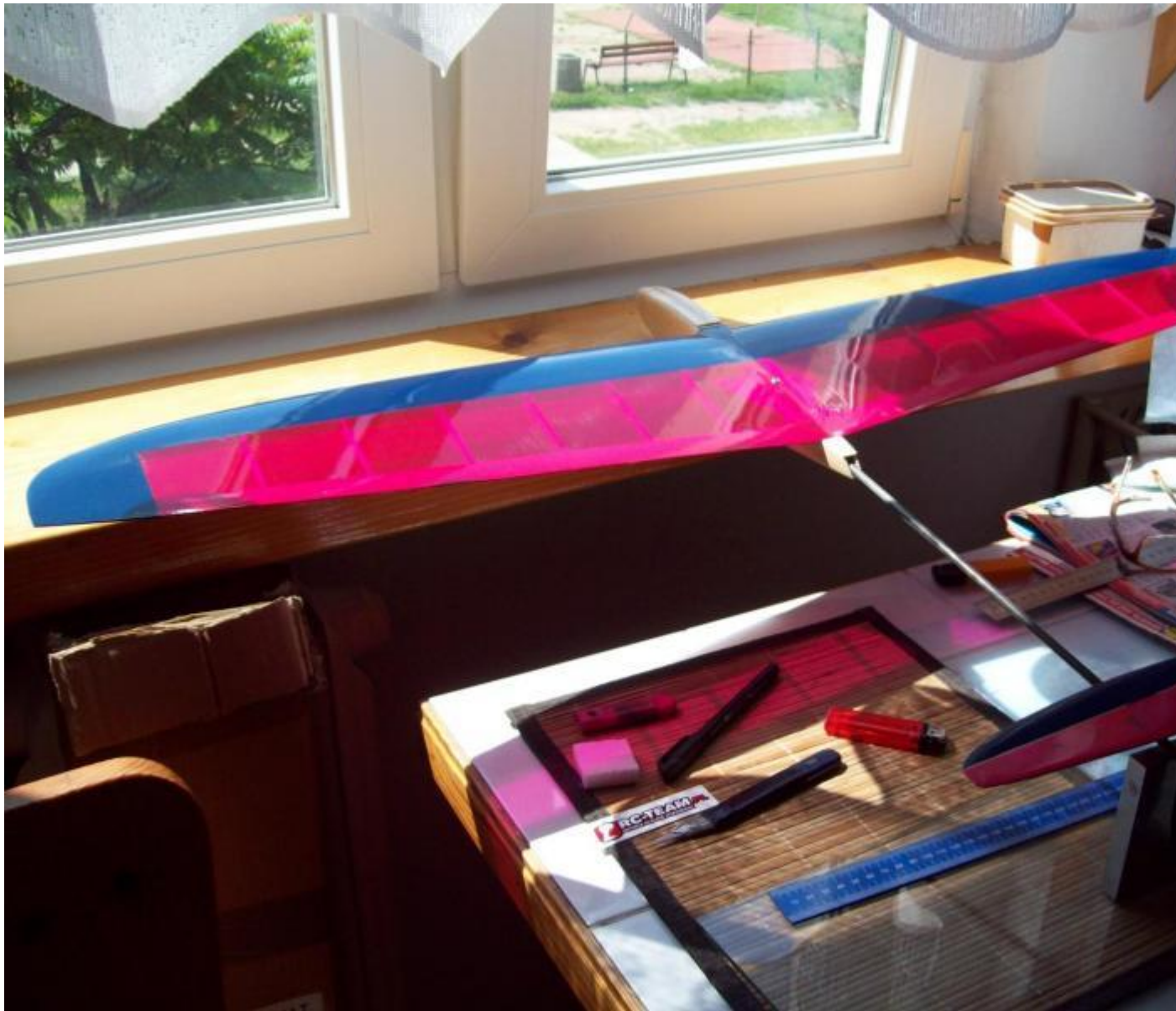


It was nice 😊 because I received a package with foil and I can start wrapping - blue and Lilac colors



[Posted June 24, 2016](#)

Today has brought these results













At the moment, I can permanently paste the rudder ailerons with springs.  
And still waiting for the rest of the equipment. 😊

After weighing, the wing gained 55 grams and the fuselage with two servos 42 grams = 97 grams  
The package, receiver and stabilizer will also come. 21 grams, which is a total of 118 grams!!!!  
Apogee should weigh 4oz, or 113 grams

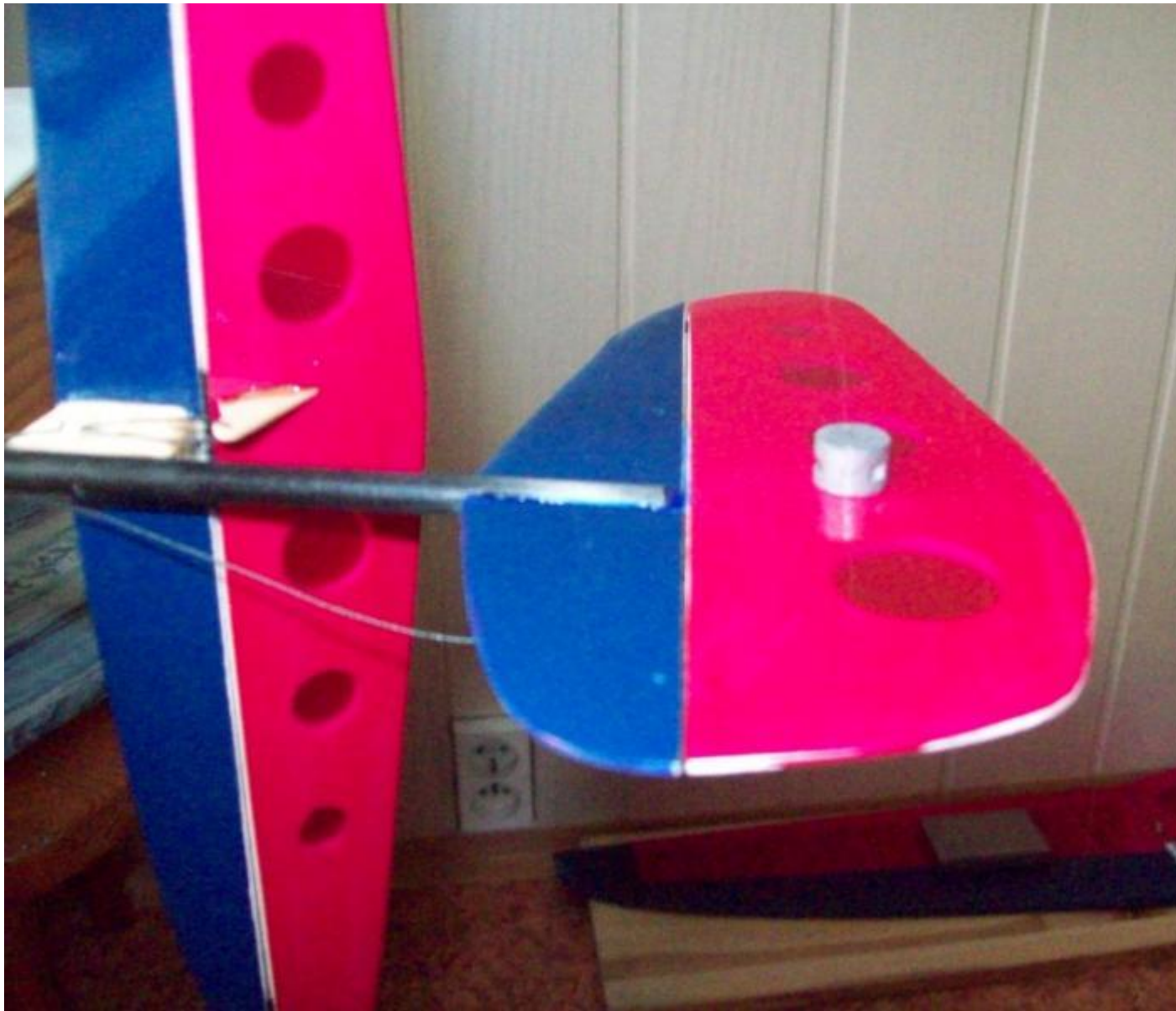
[Posted June 27, 2016](#)

Yesterday I glued the ailerons and their levers as well as the fuselage beam to the fuselage. The steering lines were also installed and the grommets were glued on the beam and in the fuselage.





For the servos, I made two balsa beds that will allow me to find their proper placement.  
The 7 gram lead seal almost balances the darts





let's see if it will be good!!! 😞

Just for curiosity, if you would weigh the model in the field or even at home and you wouldn't have anything to weigh it with, you can use coins anyway:

50 groszy weighs 4 grams

20            3.2

10            2.5

5             2.6

2             2.15

1             1.7

I didn't weigh 5, 2 and 1 zloty.

It just so happened that I had everything prepared but left it at home. 😞 You can stick a coin anywhere on the tape and then on the glue.

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And this is where the cosmetics of the model end





[Posted June 28, 2016](#)

Just to be precise, if I had Lilac foil with a weight of 18-20g/m<sup>2</sup> such as blue, the model would weigh exactly as much as the author's plans, i.e. 4oz. These 5 grams 😞 but still good.

Thanks for the praise and that you like it 😊

[Posted June 29, 2016](#)

One more thing puzzles me about the voltage stabilizer, or not replace it with a voltage converter and supply the receiver with 3.7V. A smaller package, takes up less space, saves energy, less heat. There is such a pulse converter under the symbol S7V7F5V 1A. The power supply can be from 2.7 V to 11.8. The tile has dimensions of 9x12x3 m/m, weight without connectors 0.5 grams.

oto link

<https://botland.com.pl/przetwornice-step-up-step-down/941-przetwornica-step-up-step-down-s7v7f5-5v-1a.html>

Does any of you use this or that converter in DLG / HLG.

[Posted June 29, 2016](#)

Paweł, I don't know what receiver you have, I have a Turnigy TGY i6 and the manual says about the power supply from 4 - 6.5 V. I have to check it tomorrow.

Thanks 😊

[Posted June 30, 2016](#)

Paweł, this converter is not from HK, but from us from Botland. As for the battery, I have a dismantled Zippi 500mAh 7.4V / it was brand new but my friend fixed a short circuit / so I'll try this good cell. If it works what you say it will be great. 😊

[Posted June 30, 2016](#)

You said it right, the receiver works, the servos are also connected. But I also made a package with 7.4V / 350 mAh and soldered it in parallel, so it has the same dimensions but 3.7V and 700 MAh. After charging, I have 4.2 Volts and nearly 700 capacity. I will check it out, because the package was a bit "fat" and hence the fun..

[Posted July 7, 2016](#)

Thanks Mirek for the praise and info.



Zrzut.pl

I'll check it in practice in the field.. There

is no problem with one servo and everything works like butter, I wonder how the receiver will behave when it will be loaded with two servos / the second one is not there yet / ..

I am still waiting for the shipment 😊

[Posted July 13, 2016](#)

Finally, I received a package from our friend Andrzej 351 who ordered servos and a package.



I immediately started the assembly, and since I had everything ready, after half an hour everything was ready with the adjustment. It looks like this



Totally FINE 😊

After the final balance check, it turned out that I need to add something minimally to the nose, but that's already in the field. Only the weather.

Thanks guys for the support  , I'll try to record something.

Zrzut.pl

[Posted July 19, 2016](#)

Unfortunately not yet, the weather is the same as yours 😞 . I just have time to sew an acrobatic kite "Stacker" /two-linker/, which my grandson ordered from me before the holidays. Well, it will come to me on holidays.

[Posted July 24, 2016](#)

Last Saturday was perfect for trying out my Apogee - no wind!! I had high hopes for this model, I didn't see any problems, everything was set up. A normal throw showed that the model glides beautifully both against the wind and with the wind. The problem started with the fact that when throwing from the wing, the model does

a strange roll on the throw line and does not gain height. It's good that it doesn't do it down

Normal ejection video

[100\\_1292.MOV](#) 5.77 MB · 309 downloads

wing ejection

[100\\_1293.MOV](#) 9.19 MB · 267 downloads

and one more

[100\\_1294.MOV](#) 7.77 MB · 225 downloads

Different settings don't help.

I do not have experience in such models, but so far I have come to such conclusions - I do not know if they are correct;

- or the pin on the wing is wrongly positioned
- too weak aileron springs, and during the throw they cannot maintain a fixed position forced by the servos.

The thought comes to me to use carbon pushers instead of cables and see if there is an improvement.

If not, the model will be put aside and wait for an opportunity on some slope.

As for powering the receiver with a 3.7 V package Whoever has a turnigy TGY-i6 apparatus can supply such voltage to the receiver without fear. Half a day of flying / with breaks / the package was 3.97V / made of 2S 350mAh

The fuselage beam must necessarily be thin-walled because, however, it was not without adding lead to the spout and the model gained weight to 138 grams.

Piotr, you praised me unnecessarily because I gave d ... all the way  
Maybe I'll get some advice from you.



[Posted July 28, 2016](#)

It's interesting that the model is properly balanced, symmetry, balanced wing, angles. Unobstructed level flight from normal ejection without control input. At that time I changed the pull rods to carbon 0.6m/m, Nothing has changed but the ailerons are now stiff in both directions.

Thanks Mirek for the advice, I will adapt to your tips, but I will take into account the fact that I am left-handed.

[Posted July 29, 2016](#)

Adrian, I don't have the lines anymore, I replaced them with carbon pushers and it probably doesn't matter on which side, somehow I always gave it - I think. I'll check, I'll write back. Today, after the rains, there was water in the meadow where I was flying and it takes time for it to soak in. 🙄

[Posted August 10, 2016](#)

And it happened!!! Friday was beautiful!!! I charged the package to the model and in the morning I went to the countryside. I struggled a bit with the adjustment of my Apogee, I checked the balance and gliding, It worked, everything was fine. I was happy as a kid, 😊 I made a dozen or so throws, and the last one 🙄, the model was not high, but there was something wrong, it suddenly started to ascend quite briskly, so I started to mess around and I wanted to direct the model towards myself. Something must have happened, because the model did not react to signals from the transmitter and the model flew away and I followed it not to lose sight of it. When I put on my sunglasses, I did not see it anymore. All I can say is that the model flew over acres of growing corn.

I lost the model and everything that was in it 🙄. Yesterday I went again to look for the model but it was a waste of time, maybe someone will find it or it will be run over by a combine harvester.

PITY

[Posted August 11, 2016](#)

I don't know anyone like that, the corn is already quite high. I have a signaling device, but it would be too much for this model. Difficult!!, the loss is not so big compared to other models. I checked the apparatus with another receiver and I did not lose contact on a section of 300 ..400m. Apparently something must have moved in the model and blocked the servo or maybe it fell!!? Well, the next ones will be difficult 😞 , but they will be bigger.

[Posted August 15, 2016](#)

it's a pity 😞, once the model fell into high corn and I was looking for it with a friend for about 2 hours, maybe try to look again, comb this field of corn in a few people and maybe you can find it, I've already started doing my own, I already have a hull and SW and SK, I'm making wings this weekend. I feel sorry for you Heniek, pity those guts, they were not cheap for sure.

[Posted August 29, 2016](#)

hello, today I finished building my APOGEE, the weight without the package is 122g, but it will not work without the lead, tomorrow I plan to throw it a bit in the evening, so I will write the final weight, this is how it looks at the moment.



[Posted August 30, 2016](#)

The weight for the flight is 152g, unfortunately there was about 15g of lead, the back is too heavy, I tried to give up a bit, but the wind is too gusty, so further tests and adjustment closer to the evening, greetings.

[Posted September 12, 2016](#)

EUREKA!!!!!!!, the model has been found!!! 😊 I think this is an UNUSUAL event! Yesterday morning I went to the countryside, to the same place as always, to fly a Magnum. I see an older guy with a model in his hand comes to me and asks me what kind of toy he has. some time ago he "ran away". I ask what he wants for it, he replied that he got some medicine for it. He found the model at the CPN station 3 km from the starting point, not in corn as I thought. After looking at the model, I found that it was intact, only damaged the beak, made of a single piece of balsa, broke off and lost its weight. An interesting fact, the 1S packet was disconnected / the guest did nothing with the model / and it makes me wonder how he could disconnect himself.

It is important, and it makes me happy, that the receiver is functional, as well as the servos. After charging, the package keeps the voltage. 😊 A moment ago I glued the spout on resin and will re-volatilize it, and maybe I will make a new elongated nose part to facilitate balancing and get rid of excessive lead ballast.

All in all, I'm very happy 😊

Mirko!

model cacuszko 😊 so that it flies well and does not run away 😊

I wonder how it was with you, mine had a broken nose that is glued to the sides and bottom of the fuselage.

[Posted September 13, 2016](#)

Today's fun in such great weather was just a pleasure. There was a breeze, but not strong. The throwing model behaves very nice / practically set to 0 / Minimum height deflection, and now the model reacts gently, not as I had at the beginning that it would go up and as if it would stand still and towards the ground!! !

I don't have any film because there was no one around, only a photo with my brother BUG, which I also flew. Whole models 😊



[Posted September 19, 2016](#)

hello, the new hull is ready, laminated and the front extended by about 3cm, a lot of space for the package and BEC, I thought about spray painting it black, but I'll see how much the weight will show.

I hope it's lead free 😊



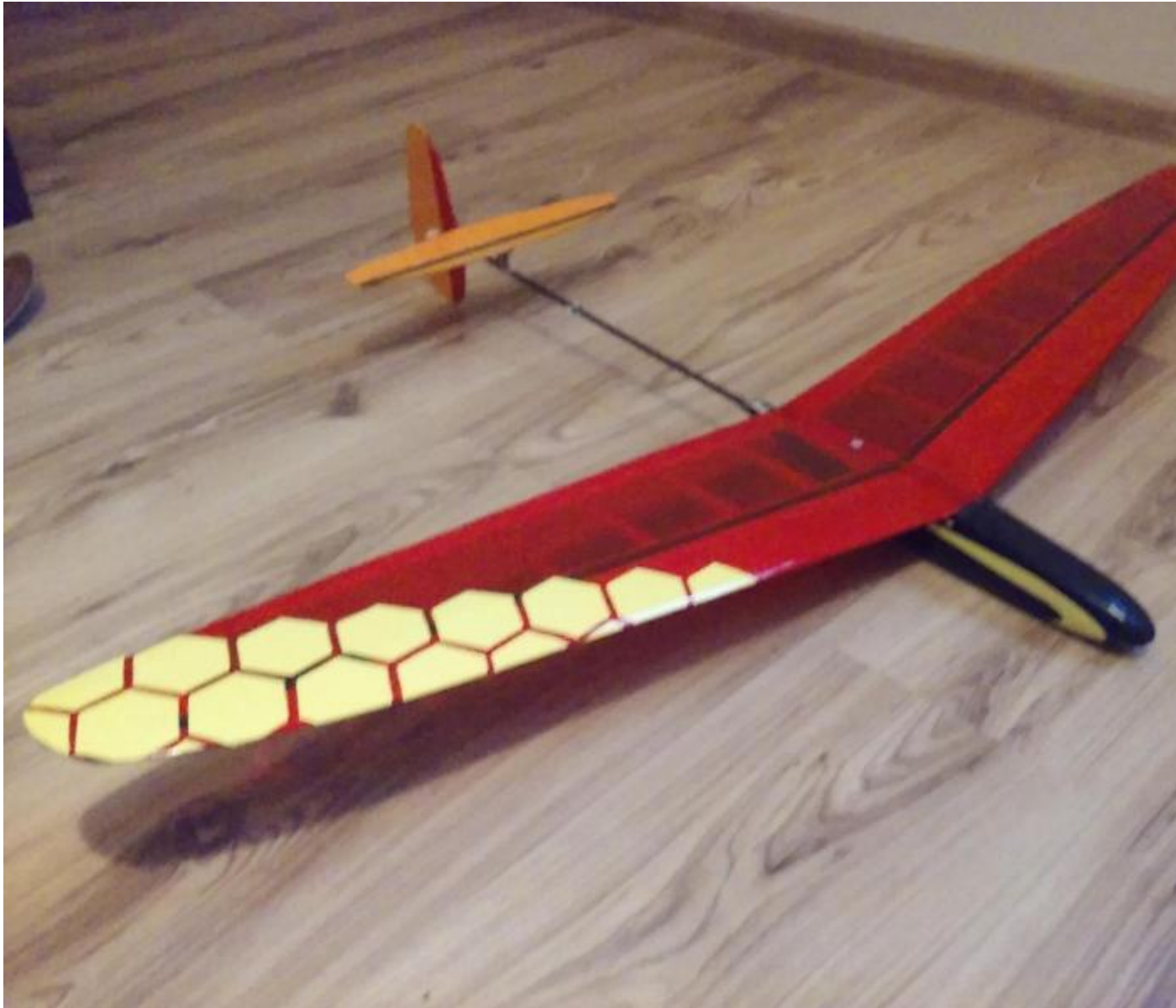


Posted September 26, 2016

Anyway, I think your weight came out nice but is it heavy? After flying at the end of the previous week and the last two days with today, I came to the conclusion that in windless conditions and a gentle breeze, "Apogee" flies great and copes with this breeze. But with bigger gusts there is a flap, the model stops and stands still when set to the wind, and you have to be careful when turning because it quickly loses altitude before it gains speed and the flights are short, the wind does its thing. In Conditions of Silence, I manage to make several flights close to a minute for several dozen throws. For throws, this model is too light for me, you can't throw it properly. Maybe it's the model size. All in all, I'm very happy with it. I already have a 1.5 m Manta on the wallpaper, you'll see and compare the performance and flight characteristics. I power the receiver with a 3.7V / 350 mAh / 10 gram package converted from 2S, I got rid of the stabilizer, I have two 3.7gr micros servos that work flawlessly.

Posted September 27, 2016

Hello. APOGEE is already ready to fly, weight 155g, I had to add 5g of lead because it leaned slightly backwards, today I'm planning a flight. there will be a video too 😊, cheers.



Posted September 27, 2016

Damn! nice. It will be visible in the air. I wish you great flights



I'm curious about your settings.

Posted October 5, 2016

On 9/27/2016 at 6:05 AM, miro-er1 said:

Hello. APOGEE is already ready to fly, weight 155g, I had to add 5g of lead because it leaned slightly backwards, today I'm planning a flight. there will be a video too 😊, cheers.

Hello

Inspired by your actions, I also built my APOGEE, mine weighs 132g to fly, it's not as pretty as yours, but it flies nice. I also built a second wing with ailerons, now the model weighs 150g, although I haven't flown it yet, the weather sucks, and I think what if...

Enlarge the plans by 125% then the model will have about 1300 spans, do you think it's worth delving into?



Posted October 5, 2016

Andrzej, don't be modest, the model looks great. Firstly, if the model is the first of its kind, secondly, that you built it yourself from plans / not cash, and thirdly, if you are satisfied with building it, and finally, how will it be flew consider yourself proud.

At the beginning, the model is super and cheap. Will it be a pity if it is "eaten" by moles, probably not as much as if you had a 1.5 m model bought for more serious money.

I'm interested in your version with ailerons and how you solved it technically. Maybe you can share! and equipment Mine could be even lighter if I used a carbon tail tube from a fishing tip /conical/ 6x80cm or 5x80 and cut it to the desired length. It would have a diameter of 6 -4.5mm. Being at my fishing salon, I saw one for PLN 25. on the eye, it would be just right. On Allegro, they are for PLN 15. What would it give is that there would be less lead on the nose and the model could weigh less.

As for the enlargement of the plans and the effects, I will not comment, because I made only two models, i.e. BUG and Apogee, but the more serious one is 1.5m in full size.

I think so 😊