Radio Controlled
Soaring Digest
June 2018
Vol. 35, No. 6

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Front cover: Per Takman launches his ASW-20 at Cime de Coma Morena (Pyrenees). "During the summer 2017, I took a trip by car, together with five of my Swedish friends, to France, Spain and Italy for some great RC soaring. This is my favorite photo from the trip." - Magnus Hedlund
Samsung SM-G930F, ISO 40, 1/1800 sec., f1.7

Back cover: "Pace VX2 at Sunset." Photo by James Clarke. Nikon D90, ISO 200, 1/100 sec., f18.0, 25mm

R/C Soaring Digest

The journal for RC soaring enthusiasts

June 2018

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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.

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In the Air

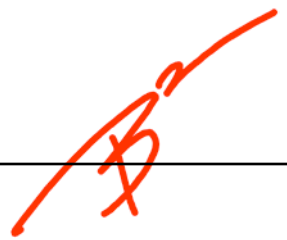
The 8th Annual KATIE MARTIN INTERNATIONAL TRIBUTE Fly-in is approaching rapidly. The event in the USA will again be hosted by the Torrey Pines Gulls at the beautiful Torrey Pines Glider Port slope near San Diego on Saturday, June 2nd, 2018. If your club is sponsoring this event elsewhere we encourage you to participate.

We received this notification from FAI:

FAI Record Claim 29 January 2018
==========
Claim number : 18210
Sub-class : F5 Open / Radio Control Flight
Category : Aeroplane
Group : Electrical Motor Rechargeable Sources
Type of record : Distance to goal and return: 174
Course/location : Pioche, Nevada (USA)
Performance : 224,22 km
Pilot : Gary B. Fogel (USA)
Date : 28.07.2017
Previous record : no record set yet
==========
FAI congratulates the Pilot on this splendid achievement.

We continue to search for either an individual or group to begin the transition to a new *RCSD* publishing team. Please let us know if becoming more intimately involved in the publication of *RCSD* is of interest to you, with our sincere thanks in advance.

Time to build another sailplane!



STEVE SAVOIE'S FOR SALE LIST

SCALE, ASW 24. SLIGHTLY DAMAGED, FUSELAGE MINOR REPAIR, 5 AIRTRONICS SERVOS, A, E, R, NOSE RELEASE 140" SPAN.

SCALE ASK 21 KRAUS. NIB, 164" SPAN, SHEETED WINGS, FRP FUSELAGE.

TR1 U2. CUSTOM BUILD, 127" SPAN, STAND OFF SCALE, 7 AIRTRONICS SERVOS, NOSE RELEASE, A, F, R, E, FLOWN AT SOAR UTAH 2000.

SCALE SALTO 1/5 SCALE. JERRY SLATES FUSELAGE, C.F. SD 6060 WINGS, C.F. RUDDERVATORS, 4 AIRTRONICS SERVOS, A, V-TAIL, MINOR REPAIRS NEEDED ON ONE WING.

SCALE DG-800. WITH WINGTIP EXT AND WINGLETS, 138" SPAN, 7 AIRTRONICS SERVOS, NOSE RELEASE, A, F, E, R, EXCELLENT CONDITION, LIGHT WEIGHT GERMAN KIT. FLOWN 3 YEARS

BOB SEALY CLASSIC CATALINA X-COUNTRY RACER. 144" SPAN, COMPLETE, VERY GOOD CONDITION, COMPLETE WITH 4 AIRTRONICS SERVOS, F ,R ,E.

PIK 20 FUSELAGE. JERRY SLATES, 61" LENGTH.

NIMBUS 4 FUSELAGE. JERRY SLATES, 54" LENGTH.

* BOB MARTIN COYOTE. WELL USED, NO SERVOS, WING SKIN SEPARATION FROM CORE.

* ORIGINAL BIRD WORKS 48" ZIPPER. NO SERVOS.

* = FREE TO A GOOD HOME

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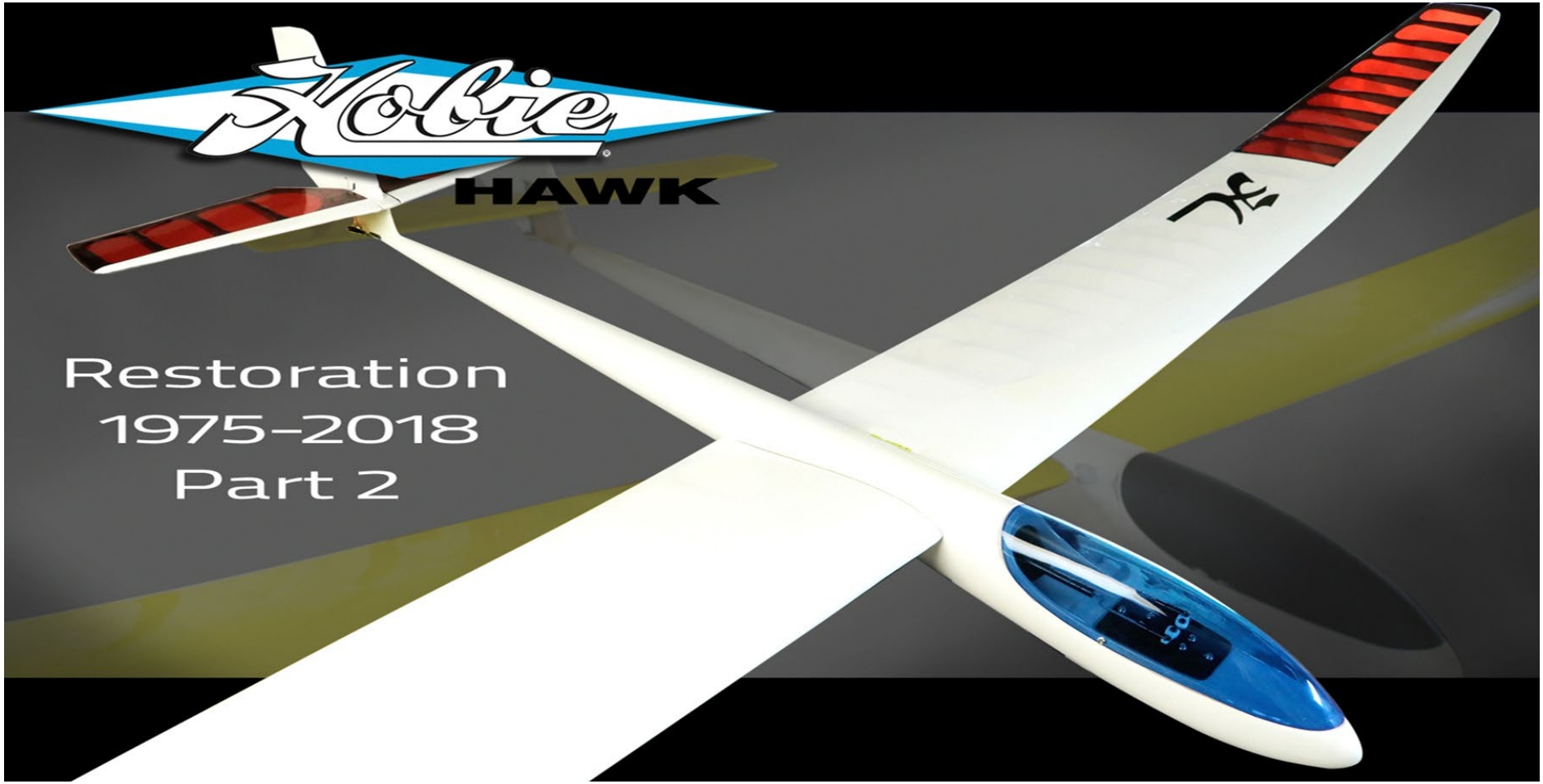
CBNFBR@GWI.NET
207-406-0610



Paul Naton/Radio Carbon Art Productions

In the December 2017 issue of *RCSD*, I wrote about a vintage 1975 Hobie Hawk I acquired and described the initial steps needed to restore the airframe and update the radio gear to modern standards.

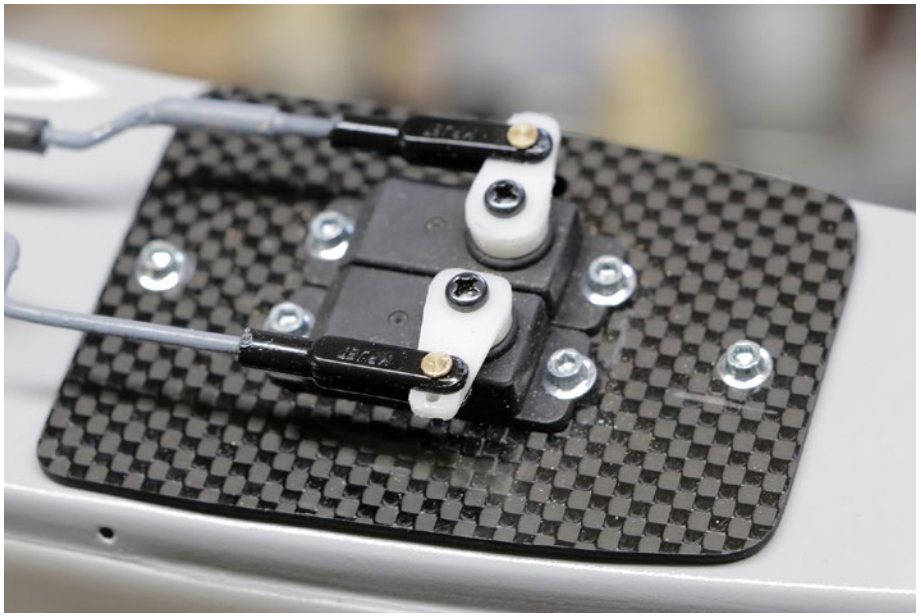
Now I could write thousands of words describing the restoration in detail, but there's an easier way to learn about the techniques and steps taken in getting the Hobie air worthy again.

I filmed just about every step of the restoration process and you can watch the complete 10 part video series on my Radio Carbon Art Productions website.

Here's the link:
http://www.radiocarbonart.com/pages/Videos/Podcasts.html.

Just find the Hobie Hawk icon on my video page and click to watch the complete playlist in HD.

On my model the tail skid which also secures the rudder keeper pin was missing completely. I fabricated a new tang and tail skid to hold the wire in place. Replaced the ancient nylon clevis with a MP jet fork which is much stronger.



I fabricated a new servo tray out of carbon plate to accommodate the small MKS servos and replaced one pushrod that had a fatal fracture in it. Notice the short servo arms to maximize the servo's resolution.

As with any restoration of a geriatric glider, you find new problems to fix as you strip down the airframe for paint and covering, and this old Hawk was no exception.

I found some hidden structural cracks in the fuselage near the wing rod tube, discovered the rudder skid that holds the vertical fin wire was completely missing, and found many hidden delaminations in both wings. None of these problems were difficult to fix, but they added lots of extra time to the time budget.

The biggest challenge of the project was removing the old covering from the wings and stabs.

The plane had been recovered at some point in its life, but as I slowly heat-gunned the current covering off, I found layers of the original factory orange Monokote that had not been properly removed before the new covering was added.

Since I had planned to use transparent red Ultracote Lite covering, the patches of ancient Monokote that had become one with the wood had to be scrapped and sanded off, a painful process as the skins are very delicate.

I demonstrate the removal process I used in one of the videos, though patience was the skill most helpful. The hard work paid off, the wings and stabs now look like new and are now structurally sound and safe to fly again.

When I test flew a friend's Hobie at Torrey Pines way back, the main thing I noticed about the flying qualities were the wing rocking and the feel that the plane was super nose heavy, it

wanted to only fly slow and if you wanted to go fast, the stick had to pushed far forward and left there.

Also the Hobie flew very nose down, which looked odd as compared to more modern designs. I loved the Hobie's look and pedigree, but I wasn't excited by the way she flew.

Once I had the airframe parts ready to assemble, I wanted to take a hard look at the tuning set up and see if the Center of Gravity and wing incidence/decalage could be optimized.

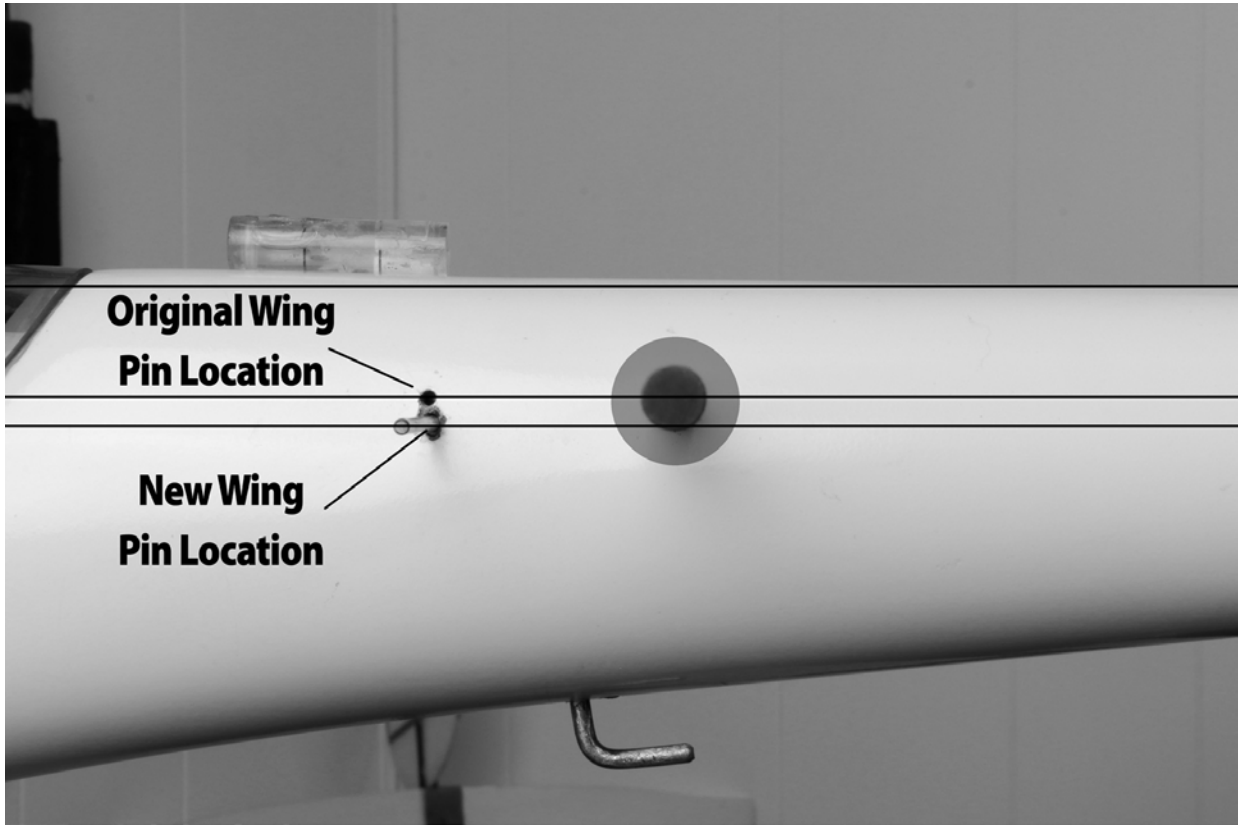
All of the old Hobie flyers (there is a huge Hobie Hawk thread on RC Groups) thought the plane flew just fine as it was and that designer Hobie Alter had gotten the tuning just right for most flying.

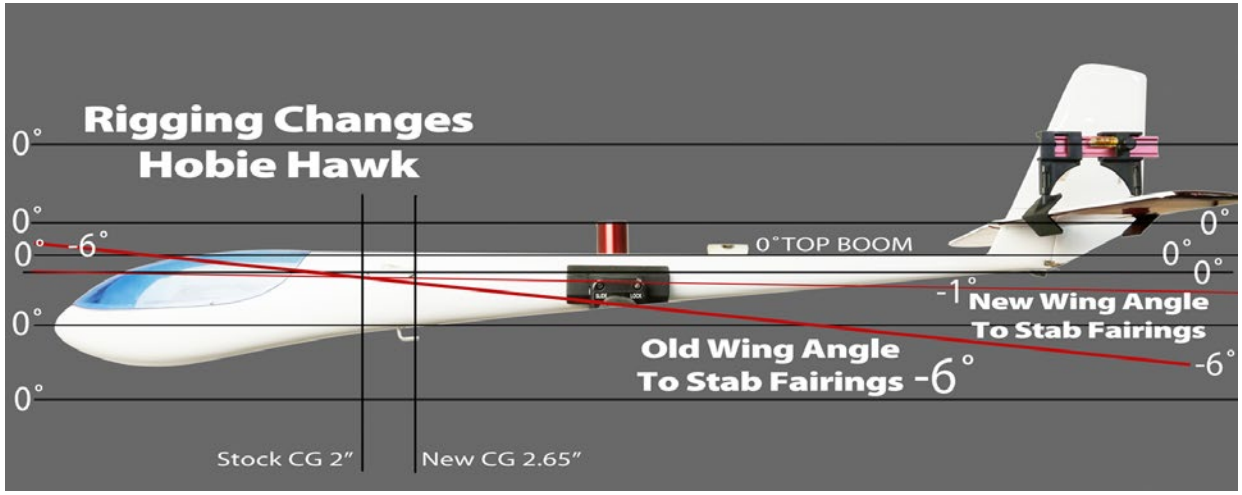
I wasn't sold on that idea at all and decided to change the basic rigging and CG set up.

I first used Markus Müller's brilliant cgCalc (https://www.ecalc.ch/cgcalc.php) to calculate the Mean Aerodynamic Chord of the wing, determine the actual CG range and where the neutral point would be.

As I suspected, the stock CG was way at the front of the CG range at 2" (50.8mm) back from the LE, but the NP was at or slightly behind 2.75" (69.8mm).

If you know tuning, this is a very large CG range for a wing with a 17:1 aspect ratio, and no doubt I would want my new CG to be close to the NP for the best





The dyed canopy really contrasts well with the white fuselage and new black carbon plate servo tray. I cover tips on the dying process in one of the videos.

The wings and stabs repaired and ready to cover. Sprayed the wood with flat black paint to hide the plywood which was stained orange from the original Monokote. I think a black stain would have worked better as the Ultracote covering adhesive interacted with the flat paint and caused blemishes.

thermaling feedback and speed/trim control, just like with all of my modern high performance sailplanes. After testing, the CG I like best is currently at 2.65" back or about 65mm behind the leading edge.

Moving the CG back that much brings up other tuning issues. The wing of the Hobie is at an extreme rigging angle to the fuselage, which makes the plane fly with its distinctive down angle or “squat.”

Now this high rigging angle is not an issue unless the CG changes drastically.

The Hobie’s vertical fin has fairings which the stabs are supposed to trim to, though with the very forward CG they just don’t.

As my CG location goes back, I would need to trim the stabs down as the tail is loaded less and stabs need to be at a lower angle of incidence to the wing. I was going to run out of stabilizer down travel quickly as the new CG approached the NP, so to have the stabs align to the fairings and have the correct low angle of incidence to the wing, I was going to have to change the main wing incidence angle to the stabs.

The old angle of incidence of the wing to the fairings was 6 degrees, and with the new CG, I needed to have the new incidence angle be 1 degree or less. This was easy to do as I just needed to drill a new hole for the wing’s front locating pin about 1.5mm below the stock location. (See diagram)

The plane completed and ready for a first test flight. I made the Hobie logo and numbers symbolizing the date of birth in Illustrator and cut out laser printed patterns onto sign vinyl.

The fully restored Hobie Hawk flies as good as she looks, styling like a late 70's Ferrari.

I could always go back to the stock angle if needed, but I know I was on the right track with this new tuning set up. I think the fuselage now better aligns with the air flow, and the stabs should trim right at the fairings at the new CG location and have full up and down travel available.

I do show the process of the rigging changes in the Hobie Hawk restoration video series.

The first hand toss with the new tuning set up was stressful, but the Hobie flew fast and flat right off with just a few clicks of up required.

I did reduce the rudder throw down to reduce yaw excursions, and the stabs now barely need to move to adjust the plane's pitch attitude and trim speed.

I used a short high start for further test flights with 14 grams of lead taped midway on the boom to quickly explore more aft CG points. The tow hook was also moved aft to match the new aft CG.

The last few videos of the series are of some of the test flights including the first big thermals taken out and the Hobie's first slope session in over 20 years. As the videos show, the Hobie looks natural in the air, has a fantastic speed range, and now has the thermal handling of my well-tuned mouldies.

Now the Hobie does have its flying quirks; if you use too much rudder at the wrong bank angle, you get the annoying wing rock-dutch roll coupling.

It takes proper coordination of pitch and rudder to make a clean turn with out a snap/flick or excessive wing rock, and this is a skill I'm finally learning now that I have a few hours of air time on her.

My aft CG change did reduce the wing rocking noticeably, and the plane wants to turn better versus the stock CG point.

I'm impressed with the Hobie's speed range and now that the CG is proper, it is super sensitive to lift and reads air well.

I'll live with the Hobie's bad flying habits, because it just looks so damn fabulous in the air.

Have a Hobie day!

WARNING: Moving the Hobie CG back changes it's flying qualities significantly, and be sure you have the skill and understanding of what you are doing before making the modifications I did in this restoration. Change the tuning at your own risk.

Again, here's the link to the Hobie Hawk restoration series: <http://www.radiocarbonart.com/pages/Videos/Podcasts.html>.

Just find the Hobie Hawk icon on that page and click to watch the complete playlist.

Vladimir's Model
www.f3j.in.ua

PLUS

Barry Kennedy of Kennedy Composites called me over a year ago to talk about a new project. One of the goals was to produce the best First Round, F5J sailplane out there. For those of you new to World Cup events, the first round of all the FAI World Championship events start at 8AM. It is still too cold to take your coat off and the grass is still wet from overnight dew. Because the contest scoring is Man-on-Man, you only fly against the others in your round so you are not competing against someone flying four rounds later when it is 20 degrees warmer.

As you can imagine, at least one of your sailplanes needs to be a cold morning floater.

Barry started telling me about a new 3.7 meter, 37 ounce sailplane (all up flying weight with motor and flight battery pack) with a twin boom, A-tail coming out of Vladimir's toy shop called the "PLUS." The basic design is all Joe Wurts. The PLUS is a five panel, four break wing with a new Wurts airfoil along with a pusher prop to reduce drag and a twin boom, A-tail to help create a positive roll moment when rudder is deflected.

Even with a basic three view drawing of the PLUS, I was having a hard time imagining how all the parts would fit together so a lot of this article will try to answer some of the questions I know you must have.

The construction and build quality is all Vladimir. The wing and tails are carbon over foam and then press molded to final shape. Servo wire is already installed in the wings as are the plugs that automatically connect when you push the wings together over the joiner. IDS servo systems are already installed in the wings, all you do is drop in the servos. The installed frames are for the MKS HV6110 servo for the flap and inboard ailerons. The tip ailerons and A-tail are setup to receive KST 08 v5.0 servos. In the pod, the motor mount and drive shaft for the pusher prop are already installed.

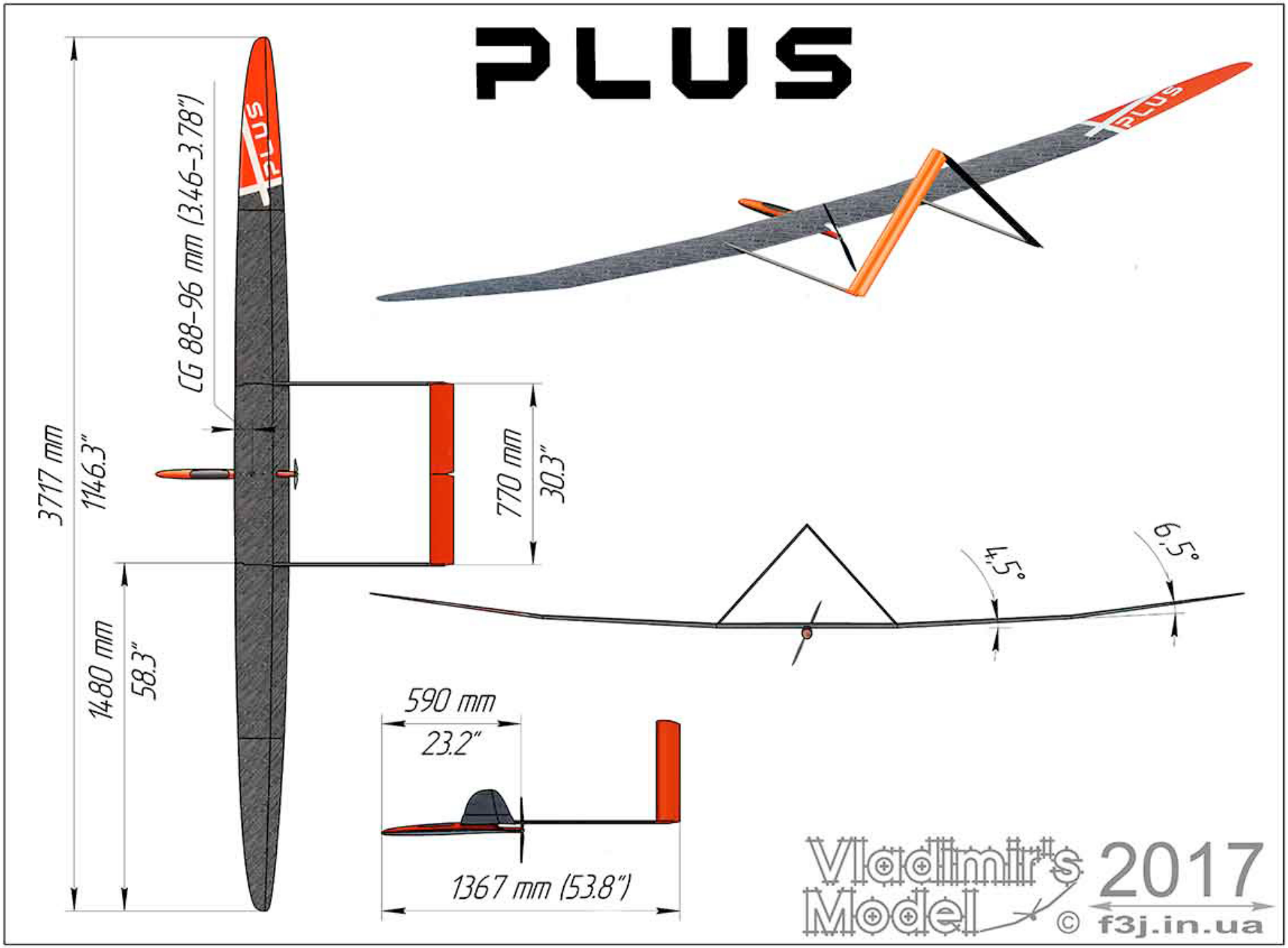
The servo mounting brackets for the A-tails are already constructed. The most complicated part of the build is installing the torsion rods for the A-tail and building the pull cable.

The parts bag includes the torsion springs, pull cable, special servo arms, cable keepers, servo frame stiffeners, clear servo covers, servo cover tape and an extra set of pins for the propeller hub.

There is also an online manual that is mostly composed of pictures with critical dimensions and angles clearly shown. There is also a series of drawings that will show you at what angle to install the servo arm in the IDS systems.

It just does not get much better.

Like any new sailplane early in its lifespan, early adopters come up with possible improvements. The latest from Vladimir includes new tail booms that are stiffer and lengthened about 4 inches, the angle of the A-tail increased by shortening each half, the torsion spring


PLUS
CG 88–96 mm (3.46–3.78")
3717 mm
146.3"
770 mm
30.3"
1480 mm
58.3"
590 mm
23.2"
1367 mm (53.8")
4.5°
6.5°
Vladimir's Model
© 2017
f3j.in.ua

for the A-tail is a little stiffer and a new propeller was developed.

Early in the PLUS development, one was lost from elevator failure. It was determined that the cause was because double torsion rods were installed in each A-tail half (where the online plans show only one) causing the servos to heat up under constant load, which then shut down without warning. As soon as the servos cooled off, everything was fine. Two things were done to make sure it did not happen again. A new torsion spring was substituted, and the KST-08 servos were upgraded to version 5 which don't have the shutdown problem.

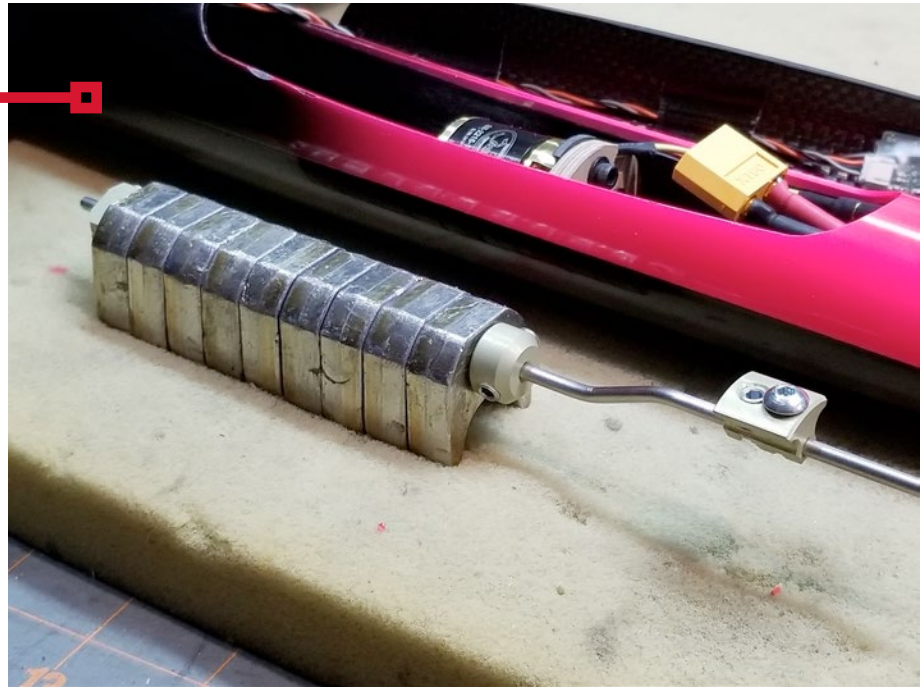
Vladimir also produces a "Windy" version that reinforces the wing and adds two ounces to the overall weight.

Finally, he just came out with five panel, five piece wing, (appropriately named the PLUS /5) so the longest part of the sailplane for traveling purposes are the tail booms. It all fits in a large suitcase.

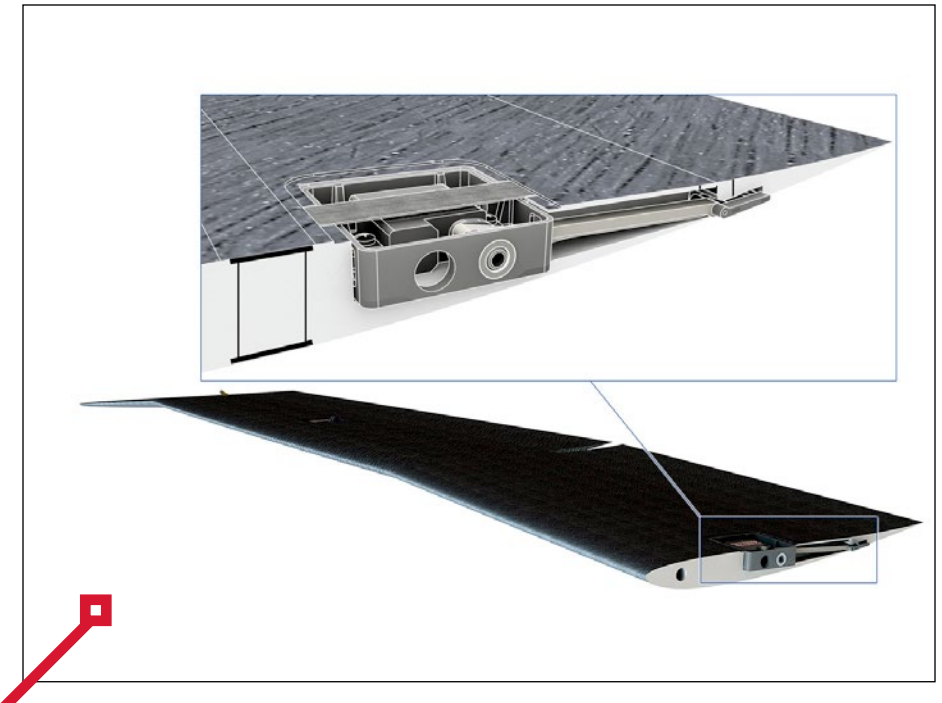
The pod is all carbon fiber, so whiskers are required. The wood motor mount is already installed as is the propeller drive shaft and shaft guard going over the top of the drive shaft. The canopy is similar to all of Vladimir's sailplanes and snaps into place and is removed with a fingernail notch on one side.

The carbon fiber drive shaft shield allows you to insert and remove the ballast without touching the drive shaft. The latest version of the PLUS has updated the motor to 1400KV.

Vladimir also came up with an interesting ballast system. The ballast system is composed of lead blocks that slide on or off a wire keeper system. The blocks can be moved forward or backwards on the wire keeper to adjust the CG. The whole assembly slides into the pod and over the propeller drive shaft. Then you lock it in place with a screw. A full load of ballast weighs 17 ounces.



The 12 x 4.5 propeller (also made by Vladimir) comes with the kit and the propeller hub is already mounted to the drive shaft. Between the motor and the propeller, the drive shaft is carried by independent roller bearings and comes preinstalled. Hinge pins for the propeller are held in place by the propeller cone. The new propellers are kept from unfolding too far forward and striking the trailing edge by a small nub molded into the propeller. You may have to sand the nub down a little so the propeller fully opens.



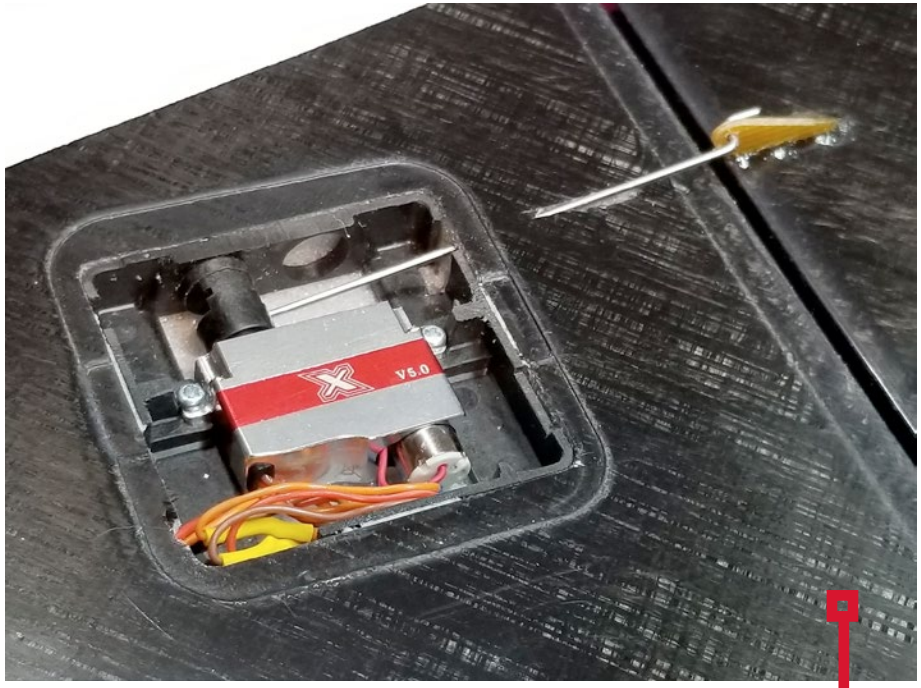
The wing comes with the IDS servo drive system already in place. The linkages for the center flap and inboard ailerons are all hidden inside the wing. No linkages are in the airstream.

Here is an image of the IDS servo frame before the installation of the servo. Notice the outbound bearing. Notice servo wiring in the upper right of the image. All the servo wires come already installed in the wing and each one is carefully labeled.

A cutaway view of the IDS system shows you how all the parts are preinstalled in the wing.

The IDS system comes with additional servo arms of various length if for some reason you need additional control throw.

The leading edge of the flap showing the preinstalled IDS flap control horn and linkage.



The linkage for the tip ailerons comes through the lower skin of the wing and connects to a short control horn on the tip aileron.

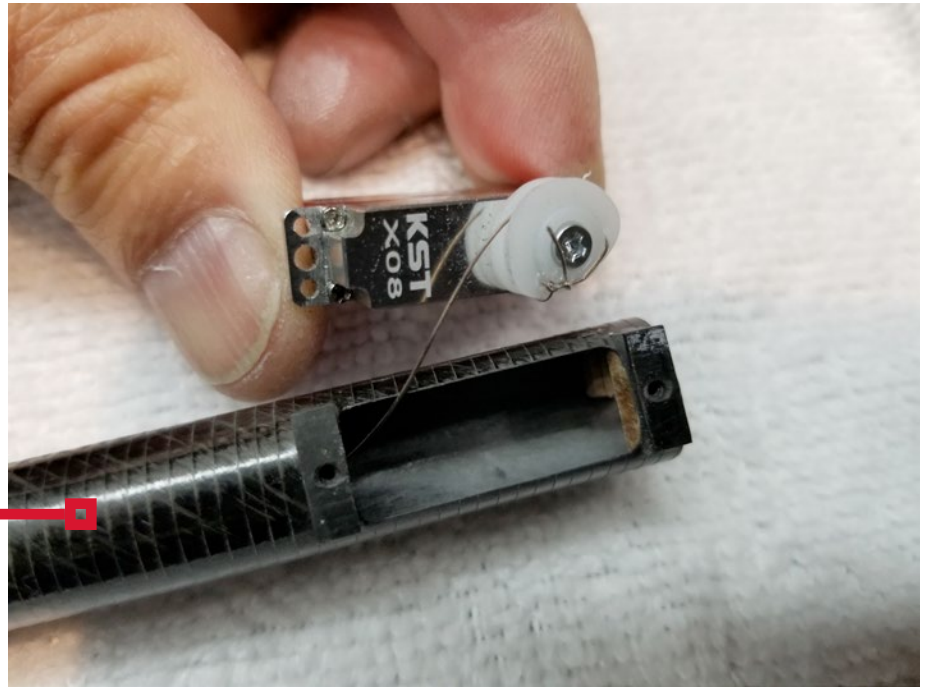
The area of the skin that needs to be removed for the linkage exit and for the location of the control horn are clearly etched in the skin.

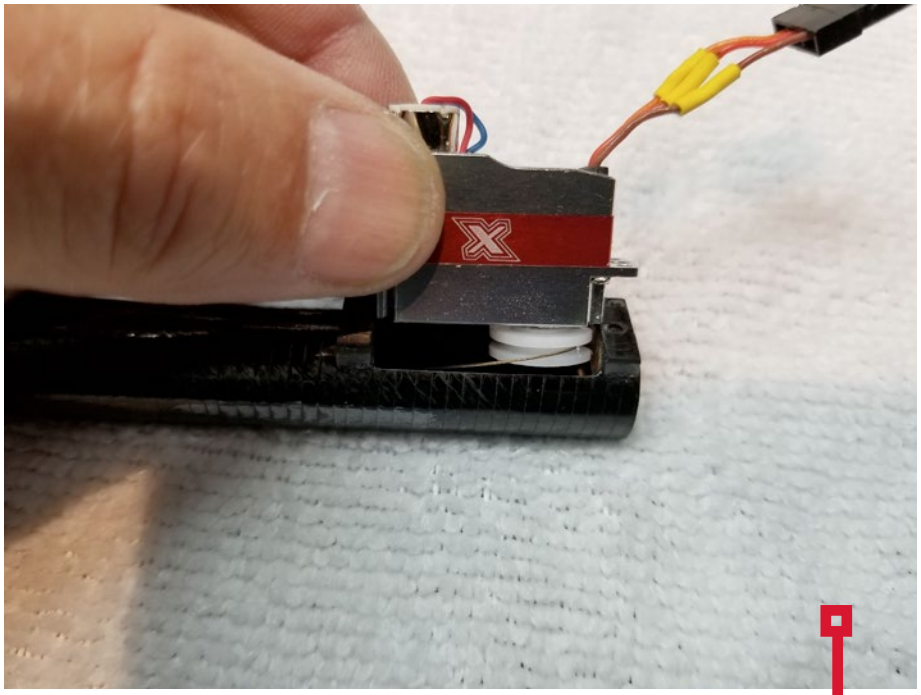
Clear servo covers, and tape are provided.

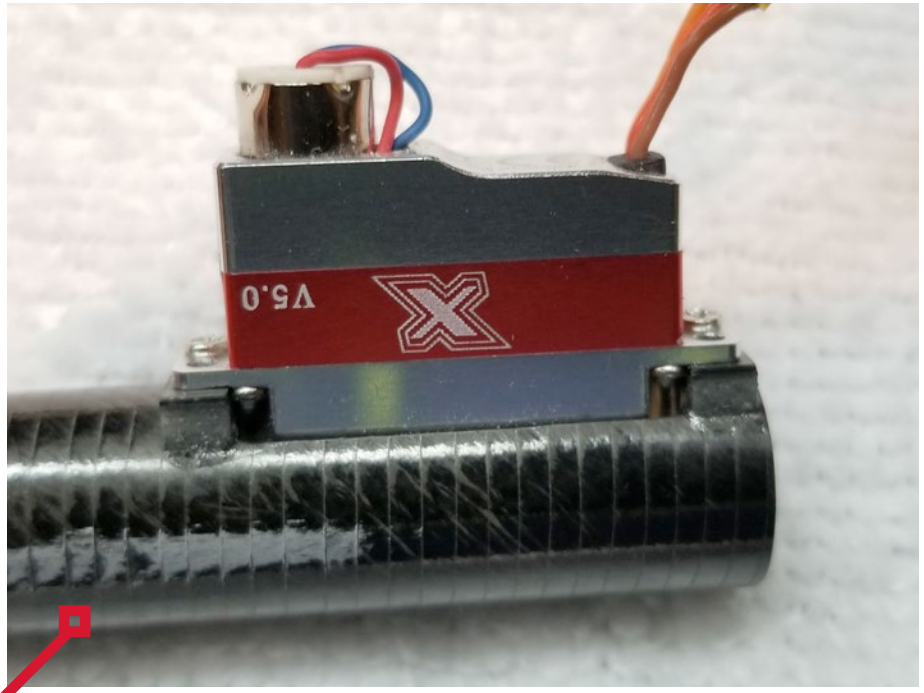
After the servos are installed, a precut piece of Carbon is glued from the front to back of the servo cutout and underneath the clear servo cover.

These next images show the servo for the A-tail.

The round servo arm comes with the kit.





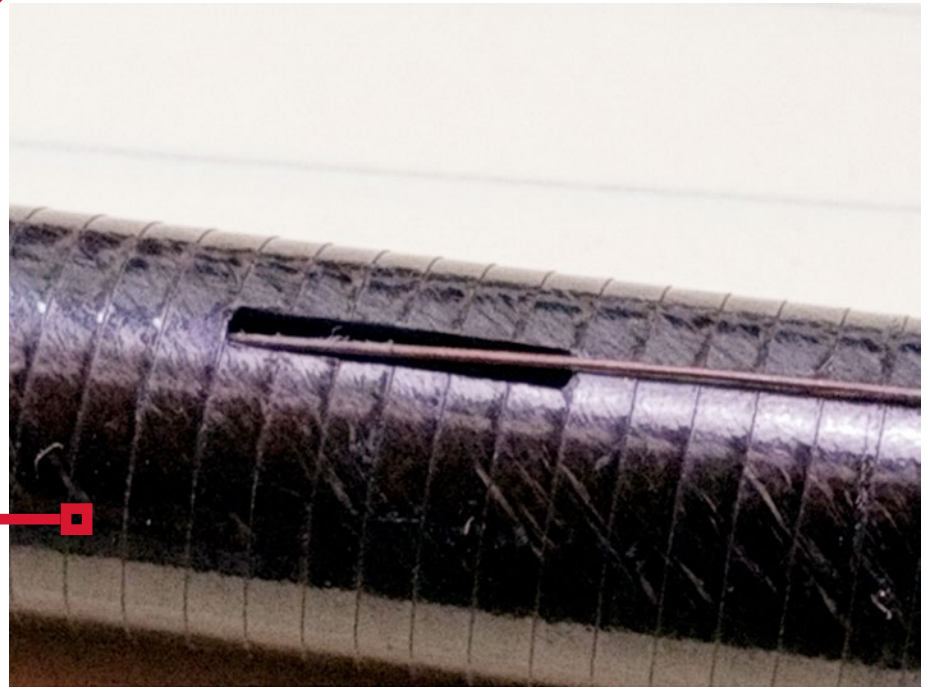


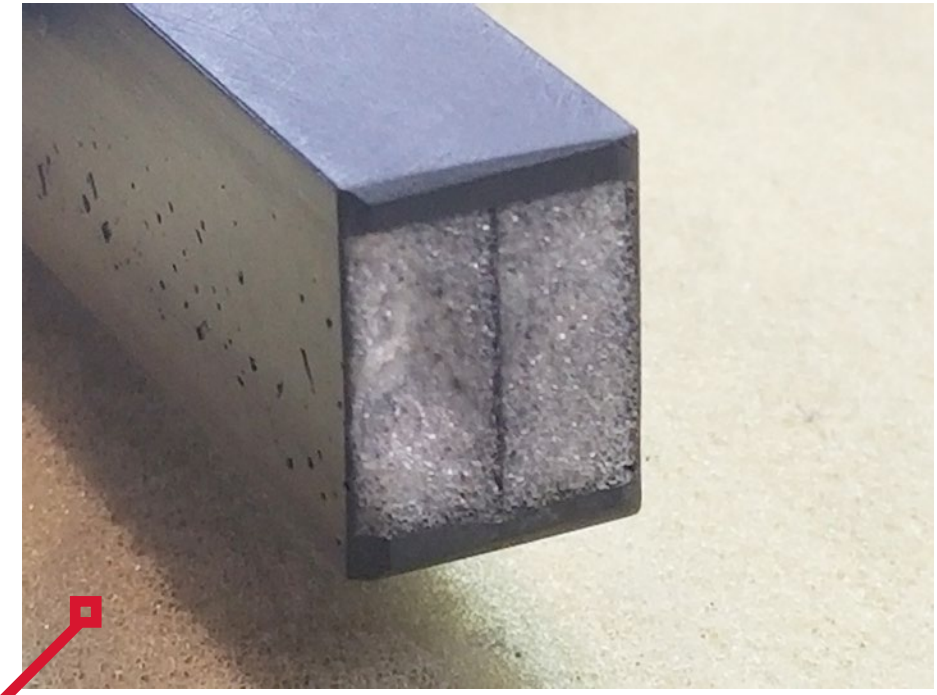
By using a round drive wheel with a pull cable, you wind up with linear servo output rather than output that changes as occurs with a servo arm and a pushrod. Notice the groove in the round servo wheel the pull wire sits in.

You have to shorten the servo lead wire. The pull cable runs inside the boom and exits the boom ahead of the A-tail in a pre-machined elongated hole.

The saddle that the servo screws to is already constructed. The holes for the screws are predrilled. If you don't already have one, some of you may need to buy a very small Phillips screwdriver.

The pull wire exits a hole already cut from the rear of the boom.



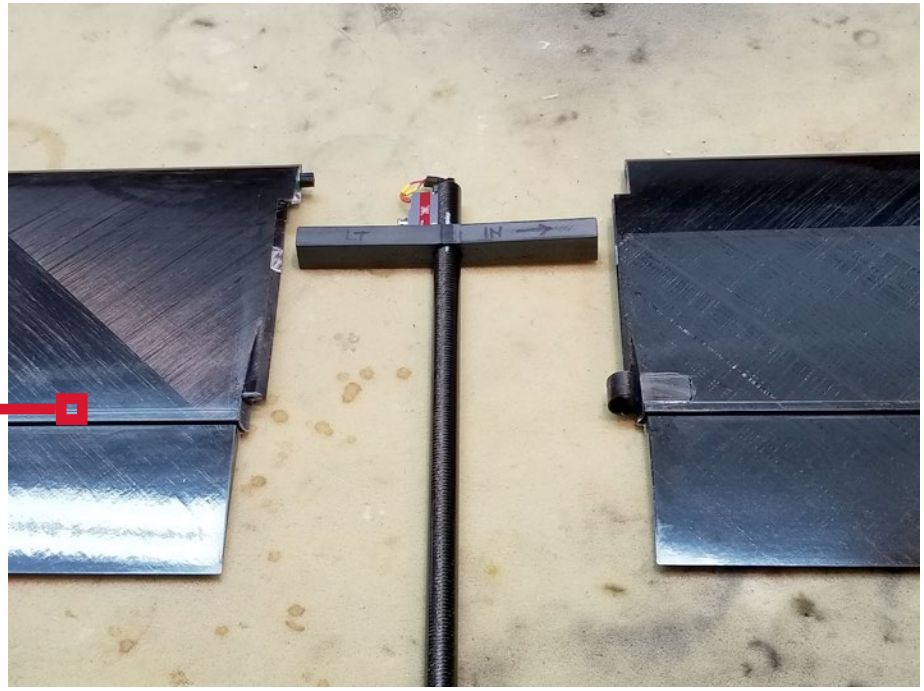


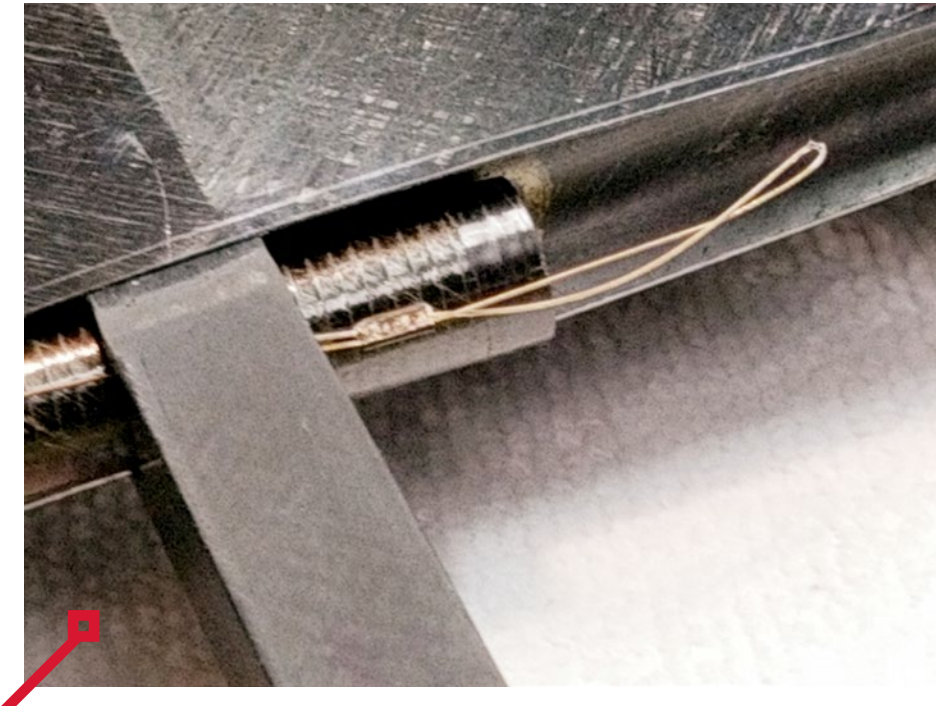
The joiner is rather unique. This allows the center wing panel, the A-tail booms and outer wing panel to all integrate into one single component, that is self-aligning and all the servos connect automatically. It is stronger than it looks.

The joiner is carbon fiber filled with foam.

It is difficult to understand how it all goes together so the following starts with an overview followed by close up details.

The overview. The boom goes through the hole in the joiner rod and then the center flap panel and the outer panel close over the whole assembly.





There is a sequence to the assembly.

First, the joiner rod is installed in the center wing panel. Image taken from the manufacturers website.

The rear keeper ring near the hinge line of the flap on the center panel is permanently installed. This rear keeper ring also provides an alignment hole that not only aligns the two wing sections, it aligns the position of the tail boom so you get the exact same length each time.

Second, the boom is installed through the hole in the joiner and the round keeper in the center panel. You have to install the pull wire in the servo, loop the ends and crimp the cable keeper you see here.

Continue to slide the boom through the joiner and rear keeper until the servo butts up against the joiner.

Third, there is a hole in the rear keeper. Align the hole in the boom with the hole in the rear keeper.

Fourth, plug in the servo for the A-tail servo into the center panel. You don't want any excess servo wire. The cutout of the foam in the outboard panel does not leave any extra room for extra wire.

Fifth, install the outer panel over the joiner. An already installed alignment pin permanently installed in the outboard wing panel aligns the two wings and the boom position and length at the same time. Slide the outer panel over the center panel and the installation of the pin is automatic. The boom length and alignment are consistently the same, one assembly to the next.

Notice the compound curve of the wing skin that wraps over and around the boom.

Electrical connections are already installed in the inboard and outboard panel which plug together automatically as the outboard wings lock in place.

This view shows the outboard wing panel and the plugs for the two wing servos already installed.

This view shows where the ruddervator servo installed in the boom plugs into the center panel and the female side of the plug that receives the connectors for the two wing servos.

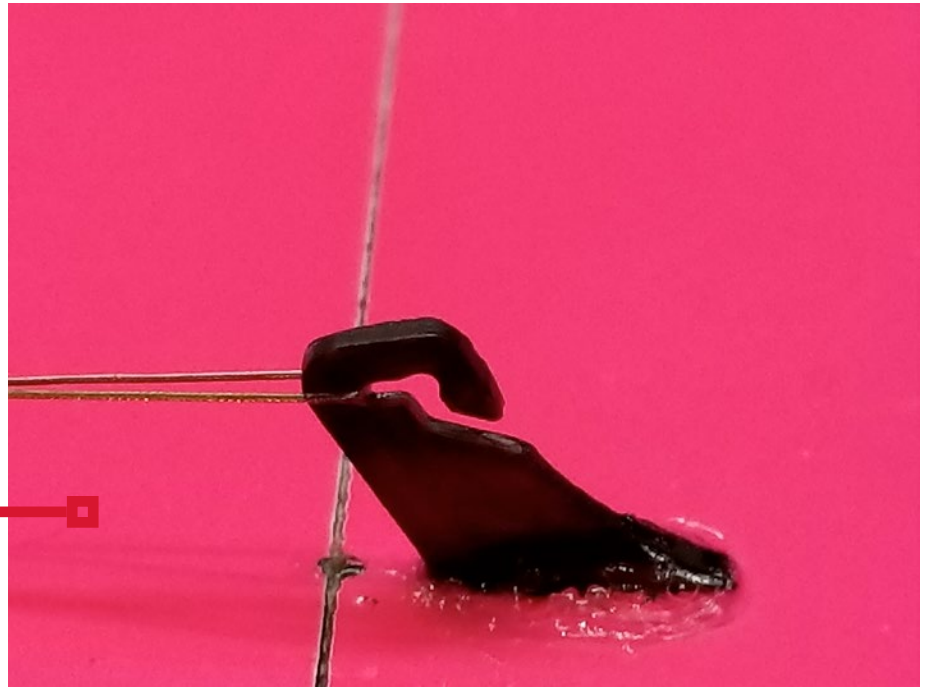
The A-tails are then slid over the ends of the booms.

The exit hole for the pull cable is already cut in the boom.

Pay attention to the detail in the online plans on where to install the pull cable keeper. The dimensions shown on the plane will make sure the keeper is installed on the wire so the keeper is past the end of the boom which makes threading boom and pull wire through the joiner and rear keepers easier to do.

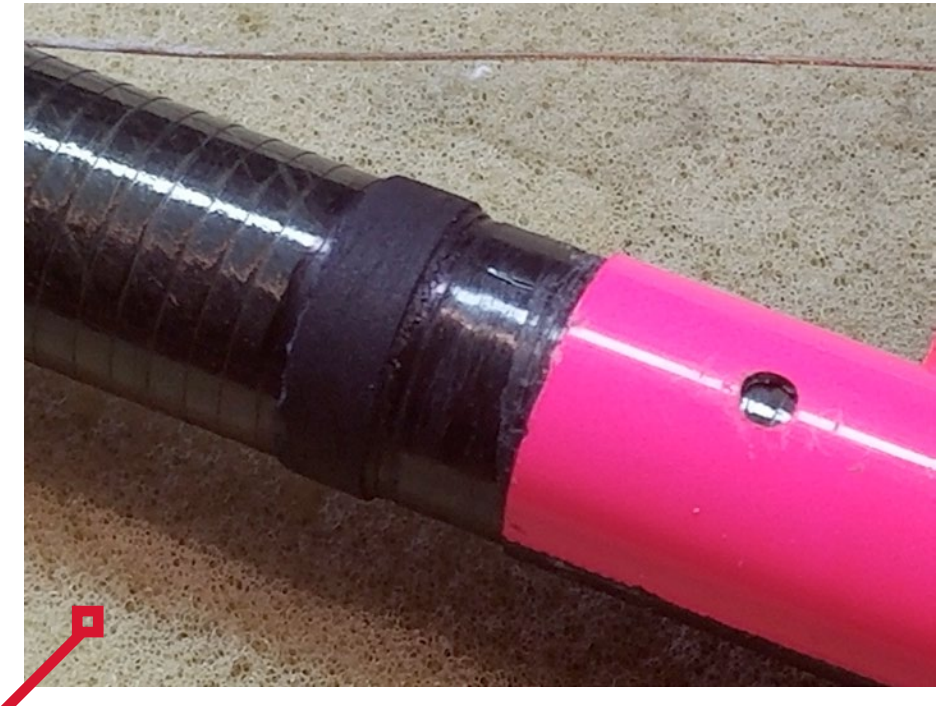
As you can see, I looked at the online plans and ignored the dimensions believing the dimensions were for cosmetic purposes. I got lucky. The boom is slightly tapered so the boom and keeper will fit through the joiner and the rear keeper ring if the keeper is flattened enough.

The pull wire is then slipped over the hook in the end of the A-tail control horn. The tails are tapped onto the boom. To make your control horn look like it is carbon fiber, just use a black Sharpie on it.



Where the A-tails come together at the top, two pins align the surfaces and then a piece of tape holds them together.

From one assembly to the next, my elevator trimmed seemed to change. I tracked it down to not installing the A-tail over the boom in exactly the same place. To remedy this issue, I decided to install some stop rings around the boom so the A-tails would consistently top in the same place. I made the stop rings from epoxy and micro balloons.

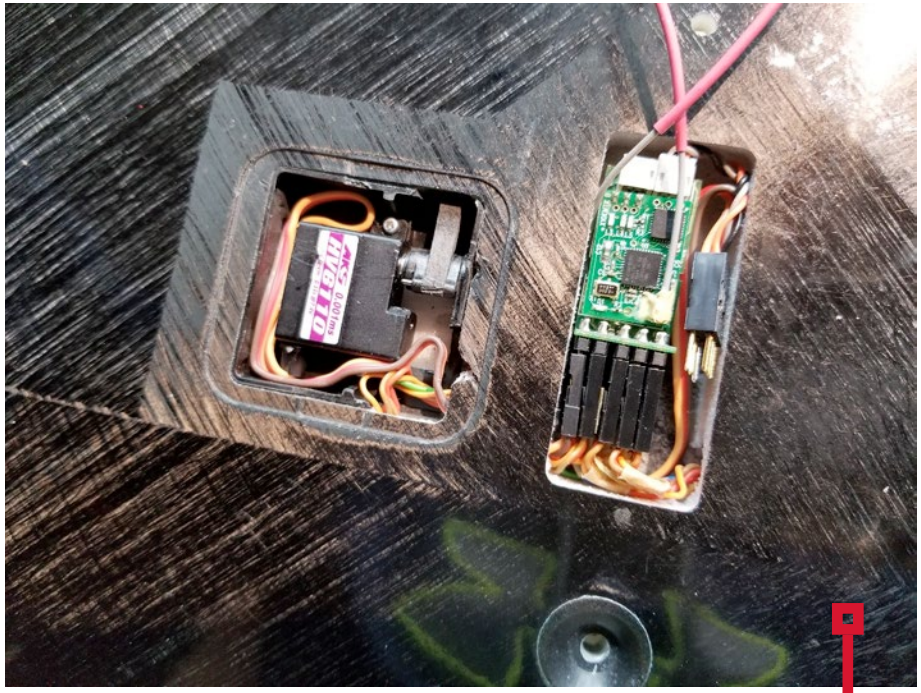


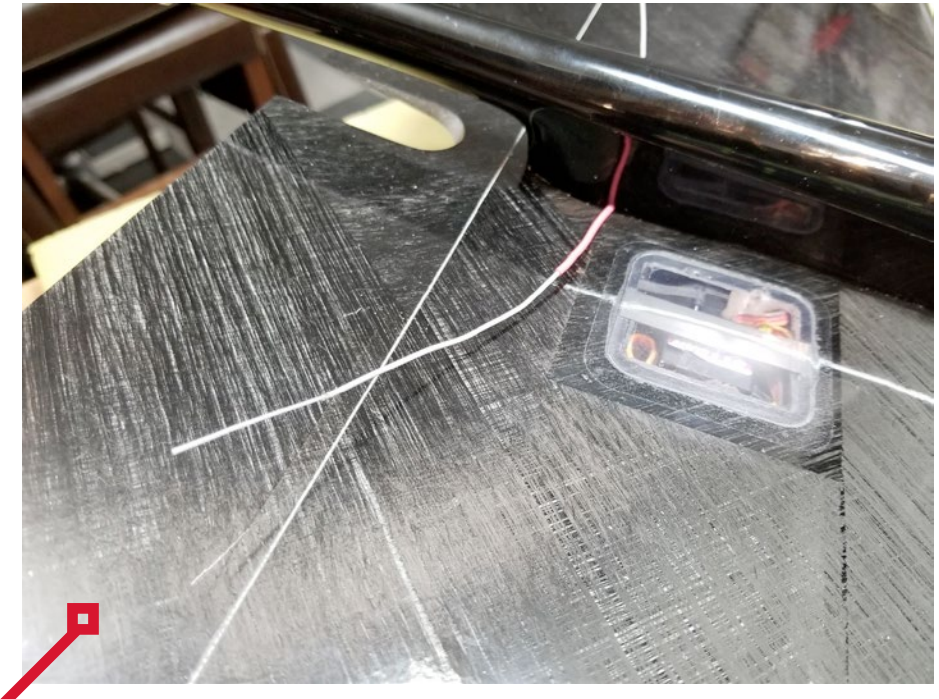
Start by covering with tape the area where you don't want the epoxy to bond to. Use a little water base jelly on the end and inside the tail where it slips over the boom.

Mix up the epoxy and thicken with micro balloons until it has the consistency of peanut butter. Then coat the black boom and smooth with you finger dipped in alcohol. Perform any necessary sanding while the tape is still installed.

Once cured use a black Sharpie to turn the epoxy black. Now when you push the A-tail on, it will stop against the ring in the same place each time the PLUS is assembled. Use tape to hold the A-tail in place.

The receiver is installed in the center wing panel, not in the pod. All the servos are in the wing assembly, so it makes sense. The PLUS was designed around





an eight channel Futuba receiver and it is a tight fit. I fly Spektrum and wound up using a Spektrum nine channel AR9310 with the case removed.

The IDS servo frame on the left is for the center (flap) pane. On the right (and directly over the pod) is the AR9300 without its case. The 6-pin plug visible to the right of the receiver is for the BEC circuit and for the satellite receiver installed under the canopy.

The receiver whiskers exit a depression in the fuselage wing saddle and hang in the slipstream below the wing. The Spektrum receiver requires at least one satellite receiver so, I mounted it to the underside of the canopy with a small hole where the antenna could exit upwards through the canopy.

In this image shows a XT60 plug for the ESC. Later I switched everything over to XT30's (a much smaller plug).

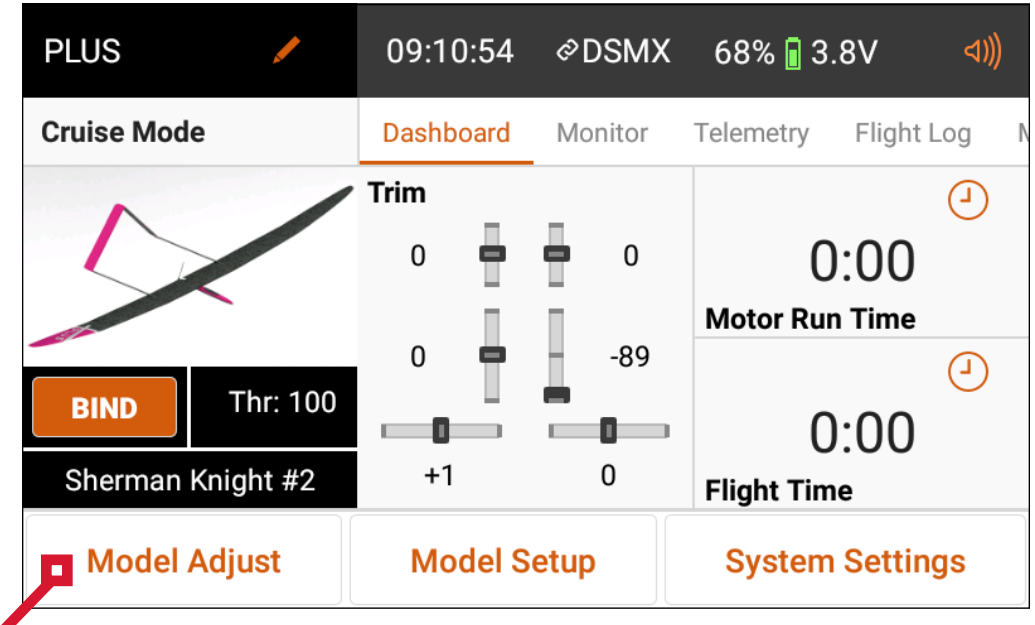
The satellite antenna

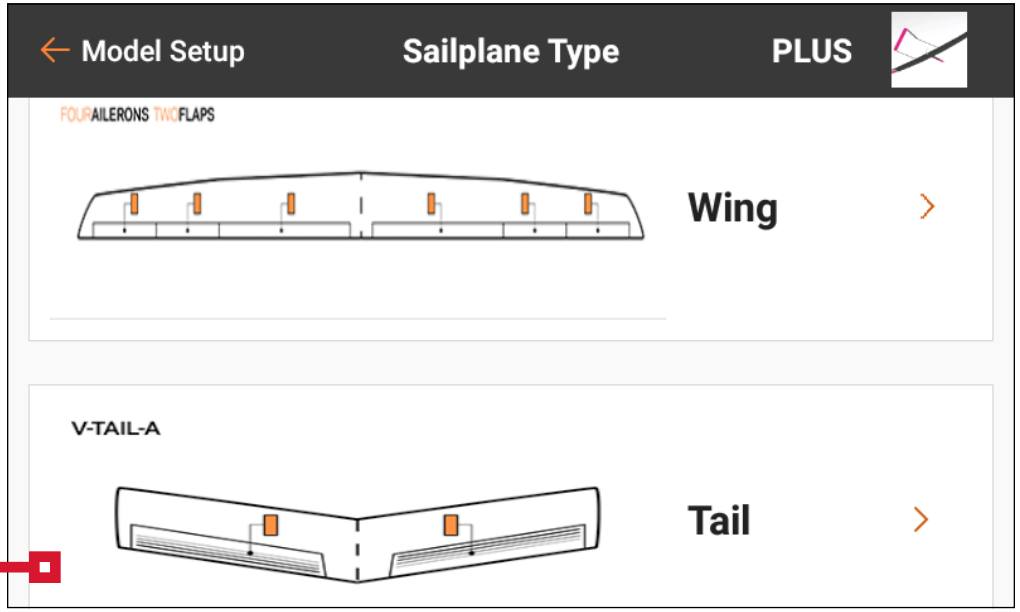
The motor is direct drive, so the propeller is smaller both in diameter and pitch when compared to some of the F5J sailplanes sporting a 6.7 to 1 gear box. For the ESC I used a Castle Creations Lite 55. It's overkill, but I wanted the data that could be downloaded from the ESC after each flight. The Castle Creations Talon 35 is more than enough to handle the propeller load and it has a BEC output of up to 7 amps.

A 650 to 850 3S seems to be the battery of choice for most pilots. Some have successfully used a 4S, but for my tastes, the motor heats up too much. I am using the Hyperion 900 3S, it is a little longer and skinnier than the typical 850 and is somewhat easier to fit through the canopy opening. I experimented with the new XT30U battery connectors and found they were more than adequate for the loads. They save a lot of space in a crowded fuselage.

With the provided motor (Scorpion SII-2215-1400KV) and propeller (S3), the system runs hot with the included prop. Real Hot. After reading Joe Wurtz's comments on RCGroups, I decided to cut down the propeller and trim its chord a little. The motor is rated for a continuous 35 amp draw. Because the numbers decline over time as the motor runs, the following numbers are taken about 25% into a 30 second the motor run. The motor pulls a consistent 31 amps (just over 300 watts) at around 9400 RPM with batteries at ambient temperature around 70 degrees. Without ballast, the PLUS easily climbs to 200 meters in under 25 seconds. After a 30 second launch, measured with an infrared thermometer within one minute of launch, the motor was only 113 degrees.

The longer blade is an original. The shorter blade is what I came up with.

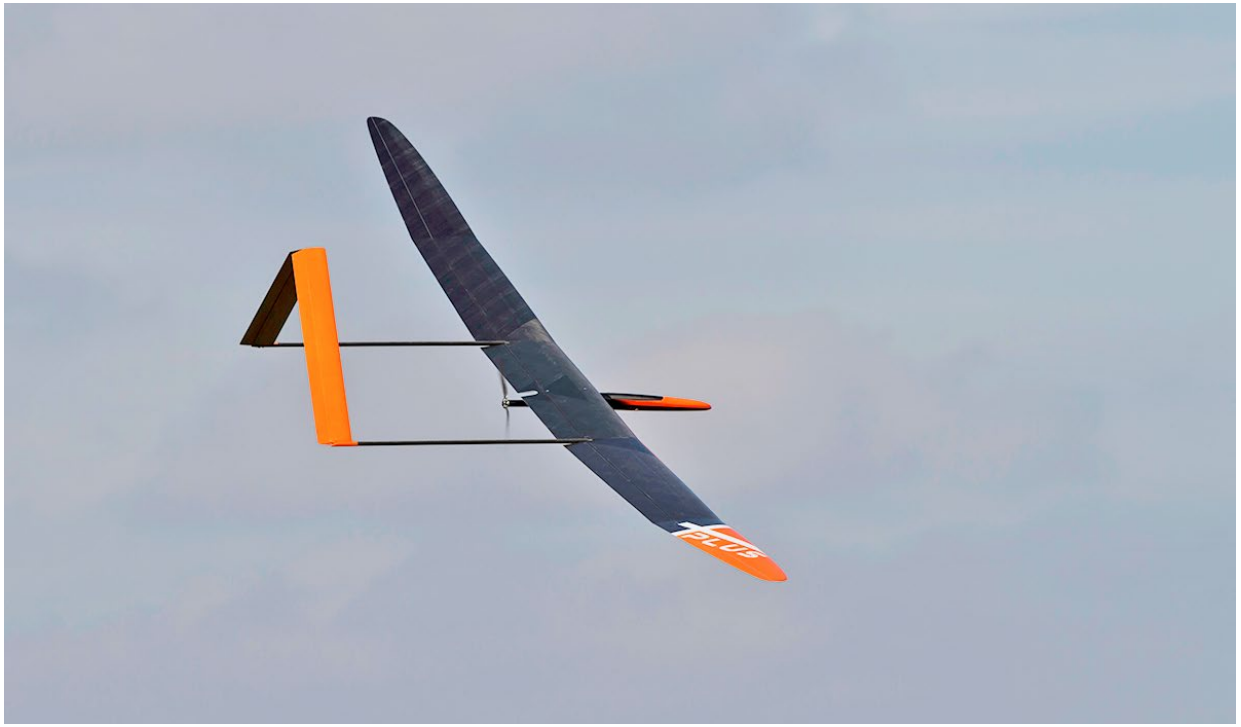




My radio of choice is the new iX12 from Spektrum. The Sailplane program for a 2-Flap, 4-Aileron wing works great and the color touch screen is easy to use. In Cruise Mode, I wound up with little if any differential on the inboard ailerons and about 2.0 : 1 for the tip ailerons. Aileron to Rudder mix was only 3/16th of an inch at full aileron stick deflection. In landing Mode, the Flap comes down to 80 degrees and inboard ailerons to 45 degrees. Tip ailerons droop a little in landing mode.

You can place a picture of your plane on the Dashboard.

With the built-in configurations for a 2-Flap 4-Aileron wing and V-tail, much of the programming work is already done.



I prepared some templates and instructions for the Spektrum, DX9, DX18G2, DX20 and the new iX12 and they are available from Kennedy Composites if you purchase your PLUS from him. You just have to ask for it.

So, how does it handle? Well, pretty darn nice! With a sailplane that deviates from a typical sailplane as much as this one (A-tail and four ailerons), I was expecting a significantly different handling sailplane than usual. Frankly, I was surprised that after several days of flying and experimenting with different setups, it handles just like any V-tail.

How does the PLUS handle wind and gusts? Well, much better than I was expecting from a 37-ounce sailplane. The PLUS is a slippery sailplane, so when flying close to the ground (continuous turns with the wing tip under 5 feet at an 80-degree bank angle) it was fairly easy to maintain energy even in gusty conditions up to 12 mph. People watching commented they had expected to see the PLUS bouncing around in the gusty conditions and were surprised that it appeared to have the smoothness of a heavier sailplane.

Can the PLUS cover ground when it needs to? I mentioned before that the sailplane is slippery and in Speed Mode with a reflexed trailing edge, even more so. Frankly, Speed Mode, even when unballasted, was more effective than I expected. With the full ballast load of 17 ounces, it covered ground as well as my F3J sailplanes weighing 20 ounces more.

How does it thermal? My other F5J/ALES sailplanes with a similar wing span weigh between 58 and 65 ounces. I could only imagine how much better they would thermal if they went on a diet and lost 1/3 of their weight. Well, now I know, and it is called “cheating.”

This is a very lightly loaded sailplane and when compared to another heaver sailplane with a similar wingspan it will fly very slow. But flying too slow is just as bad as flying too fast. In both situations, you just come down. If, when flying your own PLUS, and you are struggling to go up in good conditions, try flying a little faster.

In the landing zone, without a motor up front, you can dork or kapow without damaging a nose cone or motor.

I am still experimenting with different camber values and snap flaps.

The PLUS is a truly great sailplane. If you are one of those pilots looking for something a little different, the PLUS is for you.

Talks cheap, let’s fly!

Torrey Pines Gulls

25th Annual IHLGF

Entrants panorama © Ian Cummings Photography

The 25th Annual IHLGF (International Hand Launch Glider Festival) is a wrap! Contestants from USA, Canada, Argentina, Brazil, Germany, Switzerland, South Africa, China and New Zealand piloted their way through a series of daunting DLG tasks over the April 28th-29th weekend. The final fly-off round was truly international with six countries represented, including our own Mike Seid, Gregg Bolton and Gary Fogel… all in the top ten! TPG members Ian Cummings, Gary Fogel and Dale Osborn shot numerous photos of the event. Those by Ian Cummings are presented here for your enjoyment.

Complete results can be found at <http://www.f3xvault.com/?action=event&function=event_view&event_id=1177> / <https://tinyurl.com/y9yx8wwh>

© Ian Cummings Photography

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Charlie and Myra Morris © Ian Cummings Photography

Don Lochhead and Gary Fogel © Ian Cummings Photography

Jon Garber © Ian Cummings Photography

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Gregg Bolton © Ian Cummings Photography

Justin Tolman and Jun Catacutan © Ian Cummings Photography

© Ian Cummings Photography

Canadian David Webb © Ian Cummings Photography

Contest Director Michael Sneid © Ian Cummings Photography

Charles Martin © Ian Cummings Photography

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Gary Fogel © Ian Cummings Photography

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Toby “The Gorilla” Herrera and Skyler Raver © Ian Cummings Photography

John McNeil and Gary Fogel © Ian Cummings Photography

Gary Fogel and John McNeil © Ian Cummings Photograph

Skyler Raver © Ian Cummings Photography

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Lex Mierop, pilot © Ian Cummings Photography

Gavin Trussel and Thomas Lee © Ian Cummings Photography

John McNeil and Gary Fogel © Ian Cummings Photography

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Gary Fogel, Jon Garber, and John McNeil © Ian Cummings Photography

Paul Anderson © Ian Cummings Photography

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Joe Wurts © Ian Cummings Photography

Joe Wurts © Ian Cummings Photography

Joe Wurts © Ian Cummings Photography

CEWAMS April Saddle Mountain Slopener

Philip Randolph, amphioxus.philip@gmail.com.
Photos mostly by Michelle Lyons.

The Cow Corner campsite Saturday morning. Photo by Michelle Lyons.

Quote, du Gote:
“Some of you talk a big sloping game....”

Quote deux du Gote:
“We had great conditions. Every day good. Dumbasses screwed up this time lol.”

Author’s note: Airplanes were harmed during the making of this article.

37" Stryker. Experiencing poor planforms is experience.

Philip with the washout-corrected Mini-Blade. It flew great! Photo by Michelle Lyons.

Friday: Superb flying at east end of Saddle Mountain. Camping at Cow Corner. Sunny.

Philip (me) got to the east end of Saddle about 1:30 Friday. Chris and Michelle met me there about 6:30. Winds were 14 mph +/- 4 mph straight in. I flew from above the road so I could land in the soft sage on the ridge top. Chris flew from the road. Michelle took pictures.

The great thing about being able to try a bunch of different RC models...

Extremely mediocre RC models expand our experience with different planforms as much as the ones that fly great. (A planform is a top view.)

I started out flying a Stryker. I got two of those way cheap at the Monroe Washington Model Show and Swap Meet. They are severely swept elevon deltas with a quasi-military look and a fairly low aspect ratio. Pusher prop.

Too strong sweep makes for too much spanwise flow. Experience with Chevron planforms shows that sweep at model scales and speeds needs to be less than about 30°.

The Stryker flew. Without the motor it was a low performance glider. The motor is centered about $1^{1}/_{8}$" above the trailing edge, so it pushes the nose down pretty hard, hurting climb.

Great experience.

In contrast, Chris (Gote) brought his Opterra, a 2m flying wing with a folding prop vertically centered on the trailing edge.

Launch from the ridge where the LZ was softest. Photo by Michelle Lyons.

When I flew it Sunday I'd hit the throttle and its pitch wouldn't change. Perfect. Very well behaved.

So I flew the 60" Mini Blade V-tail and the Zipper. Superb toys.

Chris flew his 2.6m Phoenix Evo. He, Steve, and Damian still consider that the best possible deal for $110 with motor, ESC, & even flap servos. Gawrd.

Cow corner, a couple miles east, was remarkably free of cow pies!

Philip with 60" Carbon Zipper. Superb flyer. Photo by Michelle Lyons.

It's down a draw off a spur road.

Fire.

Fude.

Philip explained to Michelle that the horizontal layer of points of light off in the distance was the gravitational contraction of star field light due to the Hanford nuclear reactors.

Chris burned a fancy sandwich in a cast-iron sandwich press with a long handle that he put into the coals.

Arrowroot balsam.
Photo by Michelle Lyons.

Philip claimed that in a previous incarnation when he was a king in Persia and not having a sandwich-press temperature gauge, he'd used slaves to digitally measure the temperature of his sandwich press. Yelps indicated not quite done. Sizzles indicated about right. One slave was digitally good for ten sandwiches, although elbows etc. could extend their usefulness. Slaves were generally captured Greeks.

Chris flies his 2.6m Phoenix Evo. Zipper in distance. Photo by Michelle Lyons.

Steve flies his Boomerang with 15 ounces of lead. 25 mph turbulent winds. Photo by Michelle Lyons.

Saturday: Strong winds at Sentinel Gap, at the east end of Saddle Mountain. Sunny until later clouds.

Chris, Michelle, Chris's dad Erik, Steve, and Damian. Demolitions.

The wind meter averaged 25, mostly in the 20s.

Now here's the deal: There's a difference between winds that fight their way up between basalt outcroppings and the smooth stuff. In the smooth stuff, like way up, subjective wind speeds (which are relative to controllability and lack of surprises) are a lot lower than subjective speeds in bumpy less predictable air.

Steve was the air-time champ. He flew his Bowman Hobbies Super Scooter and then a new Boomerang. Wow!

He built his two new chevrons, a 48" Boomerang and a 60" Scout Bee, with elevons layered with 5 oz. carbon cloth at 45°, light 'glass, and 5 mil "New Stuff" laminating film.

Above: Chris, Steve, Damian, Philip, and 60" Scout Bee. Photo by Michelle Lyons.

Above right: Philip flies Yellow Wiffle Bat fuselage Frankenplane. Photo by Michelle Lyons.

Right: Demolition: Philip's Wifflestein, Sonic. Chris demolished his F9 Panther EDF on a previous trip. Philip said he'd put it back together. Gawrd.

He flew the Super Scooter with 12 oz. ballast, and the Boomerang with 15 oz. For hours.

Damian also flew a Super Scooter, and a Scout Bee and a 60" Steve Drake G-V-60, an EPP V-tail which was very fast.

Chris ballasted up his Phoenix and flew way high.

Philip promptly destroyed two planes.

Gawrd.

Okay, to quote an old guy from the TV show Kung Fu, “I plead infirmity of age.” Erik Utter’s family came down to the beach the day after my last birthday with a pie. It had eight candles. They lit the first, third, and eighth. That spells my age. Think base 2.

The first destruction was a Frankenstein kluge on a yellow plastic wiffle-ball bat of a fuselage with a 64" wing and a vee tail. No ballast. It flew okay, with mild penetration, but I got out of control behind the hill. Rebuildable, if I do.

And then I had a fine long flight with my venerable 48" Sonic chevron with 9.5 oz ballast taped on — two serving-spoon lead castings. It flew great and fast. An hour? Seemed like two? Hu Nose.

In a low pass it flipped so it was pointing down and facing downwind with little groundspeed. Turbulence from the basalt outcroppings below? Probably. It nosed into volcanic rock. It nosed in so hard both ballasts ripped free, and both broke in two.

Gawrd.

Saturday eve, back to Cow Corner.

Sunday: We all drove an hour or so to Sam’s Dirty Ridge. Mild winds. Sunny weather. FPV flight.

Except Damian: “I’ve got to go feed my dogs.”

Chris’ 2.6m Phoenix Evo at Sam’s Dirty Ridge. Photo by Michelle Lyons.

We recognized the flying site by the oyster shells. Philip claimed they were fossils from the pleoystercene geological epoch, which lasted from 2.6 million years ago until about the end of the last ice ages. It corresponds roughly to the period in which our ancestors ate oysters without cocktail sauce because they didn’t know better.

Steve: “I want someplace I can fly my crunchies.”

Winds straight in, NNE, 4 - 14 at first, then lower. Big thermal variability.

Steve flew his 60" Scout Bee (chevron). Steve and Chris flew their Phoenix Evos.

Above: Chris catches his Evo. Photo by Michelle Lyons.
Photo by Michelle Lyons.

Above right: Philip & Mini Ellipse. Chris, Steve.
Photo by Michelle Lyons.

Right: Philip launches Mini Ellipse. Steve, Chris.
Photo by Michelle Lyons.

Super soft LZs. When the lift died and Steve's 3.1m Graphite II was low he landed it tumbleweeds piled up down the slope. Big cushions.

Philip's Blade was a bit heavy, but his Zipper, his red V-tail with its DLG wing, and especially his 60" V-tail Jaro Muller Mini Ellipse all flew great.

Above: Mini Ellipse and Chris' Evo. Photo by Michelle Lyons.

Right: Philip Launches 60" Carbon Zipper. Photo by Michelle Lyons.

Opposite page: Mini Ellipse. Superb light flyer. Photo by Michelle Lyons.

Above left: Chris and Optera 2m with folding prop. Very steady flyer. Photo by Michelle Lyons.

Above right: Optera, Chris, Philip, Steve, & Zipper. Photo by Michelle Lyons.

Left: Optera and Steve's Evo. Photo by Michelle Lyons.

Right: Philip and Mini Blade: Photo by Michelle Lyons.

Above: Red V launch, Philip, Steve. Photo by Michelle Lyons.
Left: Philip and Mini Blade: Photo by Michelle Lyons.

Left: Steve with 3.1m Graphite II. Photo by Michelle Lyons.

Below: Graphite II launch. Photo by Michelle Lyons.

FPV: Chris coached Philip flying his 2m Optera with a folding prop with VR goggles. A hoot. And then Chris flew it. Even Chris had a tendency to tip his head back as if looking up at the sky. Which doesn't change one's view.

The Optera was incredibly well behaved. Power on and it goes faster.

We all left about 4:30 after nagging Philip to stop flying his Mini Ellipse.

Summary: Best winds and weather for any slopener.

Gud times rolled.

How to make...

Carbon Fiber Push Rods

Evan Shaw

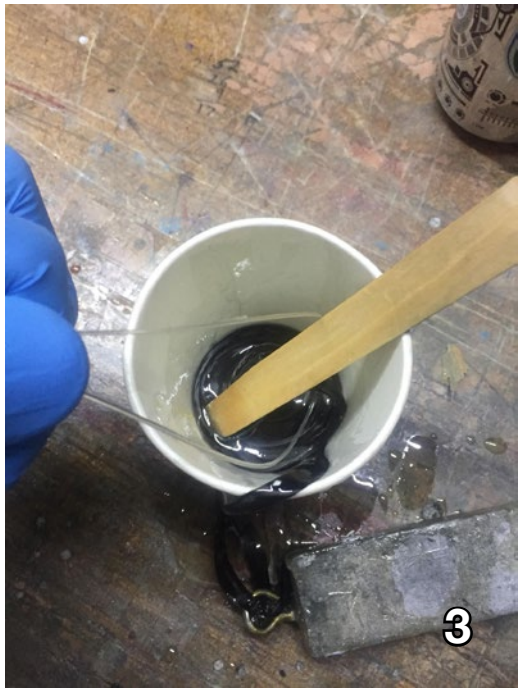
Composite Building FaceBook Group

https://www.facebook.com/groups/CompositeBuilding/

The purpose of this group to try and demonstrate the simplicity of building your own RC model from composite materials. Members are encouraged to share their own tips and composite building experiences. Ask questions and invite others to join the group.

1. Start by laying out the appropriate lengths of carbon fiber tow. This 12K carbon tow is looped to form six lengths of about 1 meter.

2. The loop is hooked onto a weight, then wet out with epoxy.

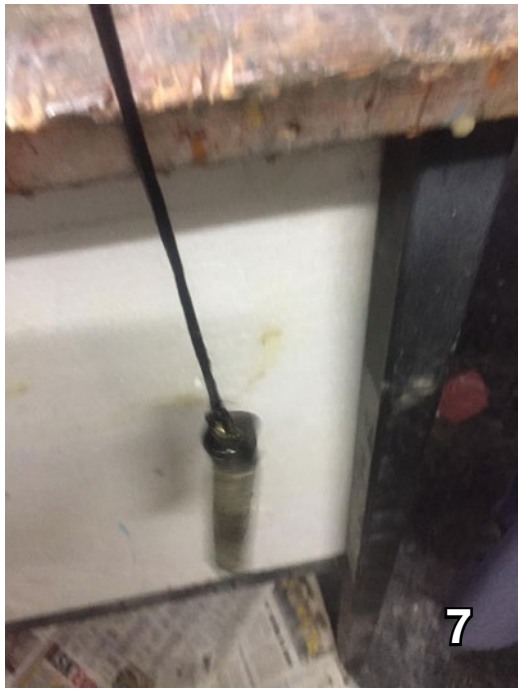


3. Attach a loop of strong nylon to the other end and continue to wet out all the tows.

4. Hang from the ceiling or other fixture.

5. The weight pulls the carbon tows straight.

6. Wipe away excess epoxy with a paper towel.



7. Spin the weight to wind up the tows nice and tight.

8. Then wipe away the epoxy that's squeezed out after winding.

9. Poke a screwdriver through the loop at the weight to stop it unwinding and leave to cure.

10. They aren't going to be ultra smooth, so lightly sand until you're happy they will slide inside the outer tube without snagging. These push rods are made from 12K Carbon tows. Four tows = 2mm, six tows = 2,5mm and eight tows = 3mm. You can make your own thickness by adjusting the amount and weight of tows you use. I've even made really thin carbon push rods like this for my Elf HLG from two 3K tows.

In celebration of the recently run 25th edition of the International Hand Launch Glider Festival, I'm sharing my 1.5 hour documentary film on this epic event for the RC soaring world to enjoy for free.

It's been 18 long years since pro cameraman Dave Reese and I made this film covering the Torrey Pines Gulls long running HLG contest, and it's fun to compare today's designs with the gliders we were flying way back in 2000.

In fact this contest was the last one to use the Javelin launch technique, and you can see in the film a few pioneering competitors tip launching the first DLG designs. By next years contest, nearly every pilot had changed over to the discus launch technique, and the handlaunch glider took a giant design leap forward.

This film features HLG stars like Joe Wurts, Paul Anderson and Austria's Wolfgang Zack.

At the end of the film is a special feature with DLG Phil Pearson documenting the development of the Discus Launch method and how the airframes had to change drastically to deal with the high launch forces.

You can watch the complete film for FREE on my Radio Carbon Art Productions website. Here's the link:

<http://www.radiocarbonart.com/pages/Videos/Podcasts.html>

Just find the International Hand Launch Glider Festival icon at the top of my video page and click to watch the movie.

While you're at my video page, spend some time and check out my large collection of professionally produced how-to and training video programs on building, preparing and flying today's RC gliders.

Enjoy the film!

Paul Naton / Radio Carbon Art Productions

Leading Edge Flaps — El Niño Especial

Alex Hoekstra, a.hoekstra@chello.nl

The El Niño is an all-new, computer-optimized F5J sailplane which promises to be a world-beater! It indicates the lightest lift and turns better than most older F5J designs, almost as if you will it to turn and it responds. Though the El Nino is built very lightly and has a thin, high aspect ratio wing (21.45:1), it is strong enough for almost any situation, and boy does it penetrate a stiff breeze! No-ballast downwind returns are just not a worry!

Gordy Stahl posted a short note on the Louisville Area Soaring Society email list concerning a modification to the El Niño 3.9m, a high performance F5J competition sailplane for from designer and manufacturer Alex Hoekstra. Alex has incorporated leading edge flaps and re-named the design El Niño Especial.

The relative RCGroups discussion starts at post 281 at <https://www.rcgroups.com/forums/showthread.php?2885469-HyperFlight-ETL-El-Niño-the-latest-4m-ultralight/page19#post39552139> / <https://tinyurl.com/ybn6emg7>

Alex Hoekstra:

“When the Flare DLG came in the picture I thought directly that this could be really good on a F5J plane since the high speed part is not there. So during design part of the El Niño I directly added LEFs in the calculations.

“This is why the center section is not curved, so I could keep the LEF at a constant percentage.

“The wing sections were chosen with pretty low camber to get the glide part as good as possible.

“The LEFs only add performance in cruise and thermal.

“I gave it a lot of thought how to build those left with the least amount of drag and finally came up with the easiest solution of all.”

A bit about the El Niño wing structure... Rather than using more common solid-foam cores, El Nino’s wing is hollow-molded. The manufacturer believes this is the only way to avoid the surface finish deteriorating with time, temperature flux, and sunlight exposure due to underlying expanded-bead foam cores. The front part of the wing incorporates a D-box to improve the torsional rigidity.

Alex continues:

“Simply add an extra help spar between the top and bottom skins. Put a kevlar hinge at the bottom skin and cut the top skin open with a sharp knife. This way the LEFs close completely in speed position and are hardly noticeable with the tip of a finger.

“When the LEFs open in thermal (mode) they might turbulate the airflow somewhat but that might actually be very favorable.

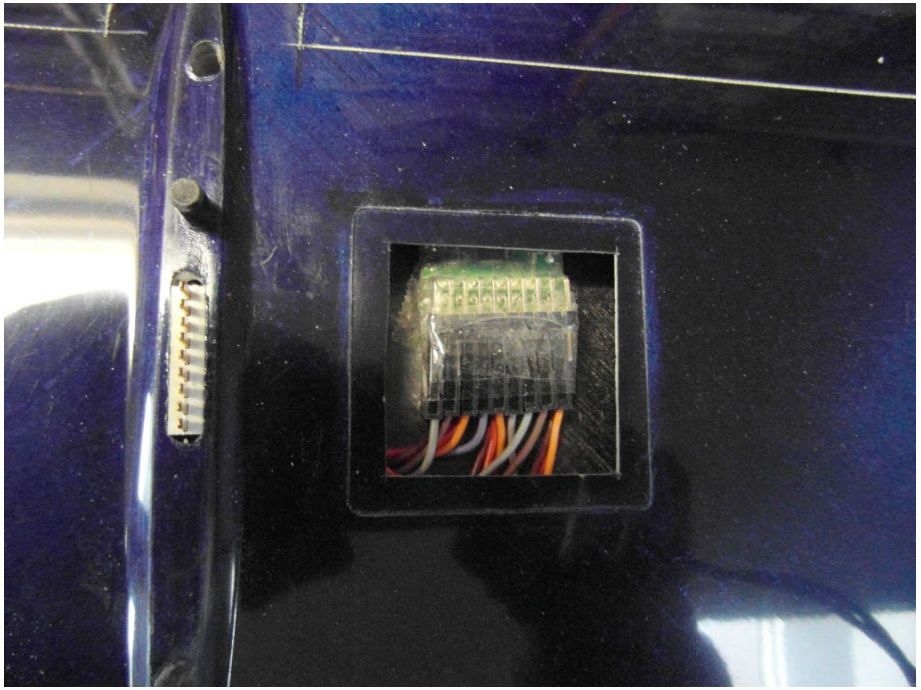
“It only requires a new set of wing molds.

“With the spar 10 mm backwards the wing joiners are not situated between the spar anymore. You can not glue them just between the top and bottom skin and think it will hold.

“85% of the possible gain is taken. It would require lots of changes and weight penalties to get the last 15 %. It’s just not worth it.

“I analysed it well before I took the decision to go to 18 %.

“Not putting any LEFs in the wingtips would make the plane unstable (chance of tip stall) and would add drag to the wing which would eliminate any advantage of the LEFs in the middle section.



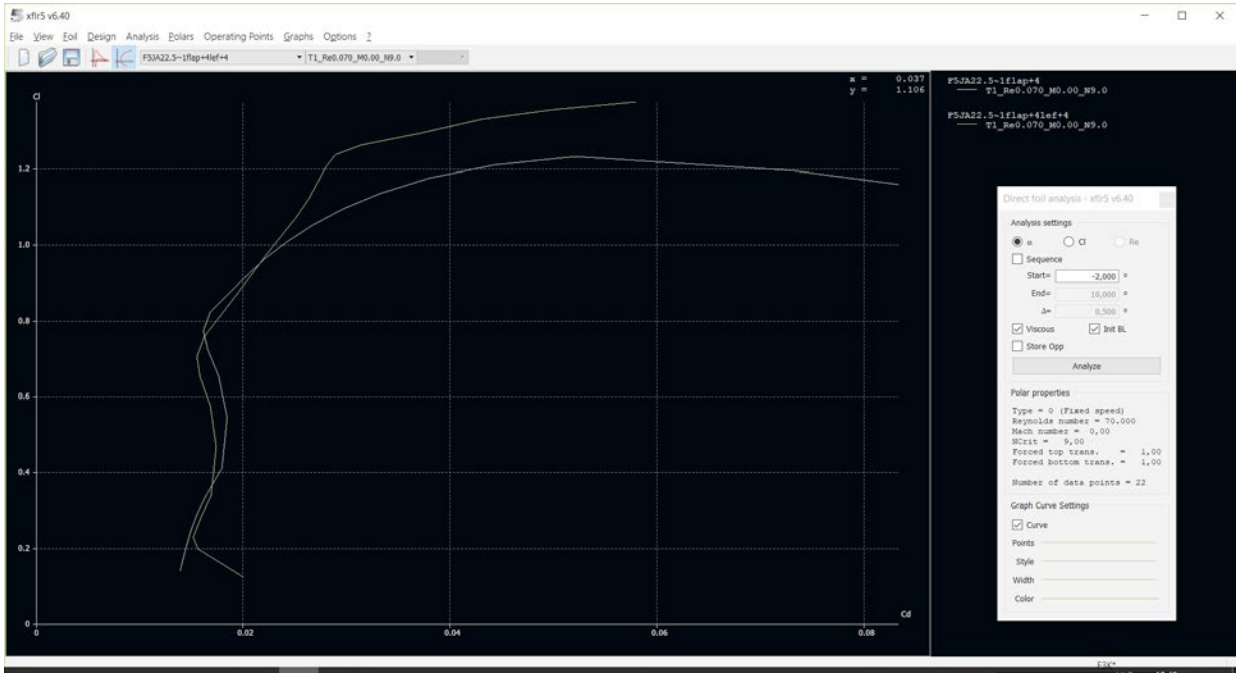
The 8-channel FRsky SBUS is mounted in the wing and drives eight servos - ailerons, flaps, leading edge flaps.

“I did the 4 servos since I did not want to have two meters of LEFs with just one servo. In case something would go wrong you would lose the whole left or right wing which would definitely lead to a crash.”

Marc Pujol:

“I fully support your project. I would have liked to do it first but my Genoma molds are not yet finished.I made a small studies a year ago on what can be expected by such additional Leading Edge Flap. It shows that it can work as a Flap (roughly the same Cl increase) and that the result can be added to the flaps.

“So, if flaps can reduce sinking rate by an average of 2cm/s, then you can reach a 4cm/s reduction in sinking rate at maximum. This is not very big at all and the main gain is not



Polar comparsion of airfoil with flaps deflected and with flaps and leading edge flaps deflected. Notice changes in the upper part of the curves.

here but in the speed reduction that allows tighter circling.

“And then in a normal thermal near the ground, this means an increase of 8 to 10 cm/s climb rate. And this is here quite impressive.

“Another aspect is in the tail compensation required. If you combine flaps and leading edge ones, then no compensation may be required (or minimum compensation). This is due to the contrary effects between leading and trailing flaps on pitching moment.

“Which size should be adopted in leading edge flap? Well 25% or even 30% should be an optimum. 20% may be a bit small.

“How much angle to apply? 2 to 3 degrees seems to be good and more may not be necessary. It may create too much drag. So be gentle with them.

“The main drawbacks are :

“1) When you deploy them, then the speed will reduce and then to recover speed you will have to loose altitude. So deploy them when you are in the thermal, not outside.

“2) Caution with any step at the upper surface (opposite of the the hinge placed at the lower surface). At low Cl this will create high drag. That’s why your solution seems to be the best. But even with it you may encounter more drag than with a standard wing with trailing edge flaps only. But since F5J is to fly in thermals, this may not be a big issue in low winds and in thermals days.”

Neil Stainton:

“Very interesting and impressive Alex. By my estimate:

“ • Standard airfoil: Best Cl/Cd range from 0.75 to 0.9
“ • LEF airfoil: Best Cl/Cd range from 0.7 to 1.25

“This will allow much easier thermalling, especially in turbulent conditions.”

Alex:

“The picture is of the 8-channel FRsky SBUS converter. Eight servos in the wing. Receiver is a 4/16 channel FRsky X4. Just three wires running to the wing.

“Yes I can build them for customers. Please mail me for prices and delivery times.”

The (standard) El Niño is available in the U.S. from Soaring USA at <www.soaringusa.com/El-Nino-F5J-3.9M.html> / <tinyurl.com/yd442q8a>.

Correcting Bad Behavior

or

Using a Medieval Instrument of Torture Enhanced Interrogation on an Innocent Little Airplane or (In Tawdry Realism) Twisting Washout Into a Hollow Molded Wing

Philip Randolph, amphioxus.philip@gmail.com

My 60" Mini Blade had two problems.

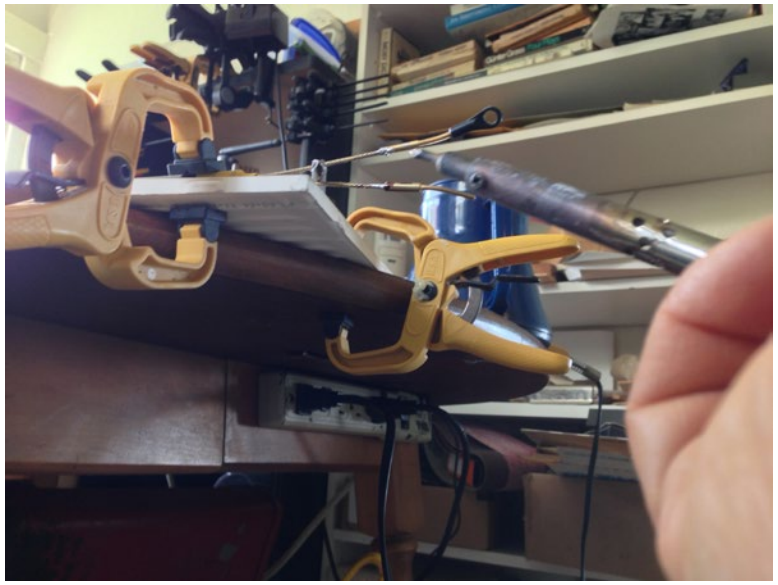
The first was that it had the worst tip-stall characteristics of any plane I've flown. That's probably why it had damage from a previous owner and further damage from his attempted repair that I described correcting in a previous article, "Blade Puffed." That was about fixing a hollow molded wing after the aforesaid previous owner filled its D-tube with expanding foam, making it puff up like a sausage.

Its second problem was that its designers had put the little X of tubes that hold the V-tail within half-an-inch of the back of the fuselage. That meant there was only room for the tiniest of plastic ball-joint loop connectors and only if the push rods were bent just right. Dumb.

I should have moved the X and tail-feather pins farther forward. Instead I shopped all over for the tiniest of plastic ball-joint loop connectors and bent the push rods just right..

See illustrations 1 and 2.

1. The X of V-tail mounting tubes were awkwardly far back, barely allowing space for ball-link connectors.



2. Note the bends in the threaded connectors. I should have moved the X further forward, but...

3: Clamping torsion onto Mini Blade wings to increase washout.

Not torture: In the interest of peace and non-violence I will assert that it does no good to beat or abuse an innocent little toy airplane just because it doesn't do what you tell it to. Corporal punishment won't correct a model airplane's misbehaviors.

So it wasn't for vindictiveness that I revived a medieval form of torture. I put it on the rack.

Now let me explain that my actions were entirely justified. I went on the web. Other Mini-Blade owners asserted that theirs also had tip-stall problems during turns and at low speeds, implying high angles of attack.

Recommendations were, "Just fly faster," and, "Land without flaperons." Or even, "Land with spoilers."

I figured a whole lot of aileron differential would help. But what I did was twist in a bit of washout. Judging from how the ailerons no longer lie flat I probably just gave it a couple degrees.

But: Now it flies fine. It resisted tip stalls even before I also put in aileron differential.

When I passed the transmitter to Chris Erikson out on the east end of Saddle Mountain, Washington State, he did manage to force a tip stall out of it. But easily recovered.

It is much better.

Publisher's note:

The author has been reported to the SPCA. That's the Society for the Prevention of Cruelty to [toy] Airplanes. And to PETA, which acrimoniously means Pilots for the Ethical Treatment of [toy] Airplanes, or maybe Philip ET Airplane, with a good chianti and a side of fava beans. ('ET,' as in the past tense equivalent of 'ate.' We presume he ate it, as the photos indicate he cooked it.)

4: Putting the assembly into the oven on low heat.

5: Containing the heat.

6: With just a couple degrees more washout the tip-stall misbehaviors are corrected. Flies great.
Photo by Michelle Lyons at E. Saddle Mtn, Washington.

Society of Antique Modelers

GLIDERS AT THE SAM CHAMPS

Larry Jolly, ljolly@aol.com

This year my friend Bob Galler and I will be co-event directors for the Society of Antique Modelers Glider Events at Muncie. We have five days of soaring planned starting on Monday September 24 and ending Friday September 28.

We will run the following events:

- RC Old Time Glider SAM 2015 Rules.
- RC Woody Glider special SAM 100 rules by Bob Galler.
- RC Electric Powered Glider Texaco.
  Proposed Class by Larry Jolly.

We will have winch and Hi-start launching equipment on the field. However, you can use electric launch for Old Time Glider and Woody class with an altitude limiter set at 200 meters. The installation can be permanent, normally in the nose or added power pod. Folding props will be allowed.

We plan to have an official contest window starting at 10:30 until 2:30 each day so interested contestants will have time to fly other SAM events. We hope to see many more gliders than past years at this year's Champs! If you or a friend need help we will be available to help launch you or help you if your glider needs help with trimming.

For more information contact Larry Jolly at 714 -675-8787 or ljolly@aol.com, or Bob Galler.

SAM RC Glider "Woodie" Rules

The SAM rules for "Woodie" or "Legacy" RC Gliders are along similar Legacy and Woodcrafter rules, but some sections are more in compliance with SAM ideals. True SAM Rule Book Old time Gliders have their own existing rules in SAM Rulebook 2015 edition, but may compete in both SAM and" Woodie" event as desired.

1. Eligibility -

Time frame of designs permitted are pre 1990, either published, seen at a contest, kitted etc. and is responsibility of participant to have some form of (lenient) proof.

2. Construction -

Shall be as accurately reproducing the original design as the builder deems reasonable. Major deviation from dihedral, outlines and airfoils are not allowed. Scaling is allowed but not to be scaled above a wingspan of 120" projected, unless the original was larger, in which case original wingspan is allowed. The builder may employ structural and internal materials improvements to improve safety and handling or withstand launching methods, discussed in section 4. SAM rules will disallow changing a sheeted to a complete fiberglass fuselage or wing for example, but will allow such material for the purpose of strengthening existing structures, bulkheads, braces etc. If a Fun Fly Class glider (see part 5) was kitted or originally

came with a plastic fuselage, power pod etc. that is allowed in the Fun Fly Class. Molded or carbon wing leading edges and booms are not allowed. Small changes to improve the glider's appearance are allowed and encouraged.

3. Controls -

Models built according to the original design plan for controls are acceptable. For the SAM Standard Class contest, ailerons (on standard bent wings) will not be used during flight (tape them etc), since many other models will not have them. Spoilers can be used if the original was so equipped, during landing . There are no points for landing in the Standard Woodie Class, the landing area is determined by the CD as stated in SAM Rule Book edition 2015. Flying wing types, V-Tails etc. shall have original design controls, as long as not intended to change airfoil. Other builder allowances such as changing to a full flying stab is allowed, if on an original plan variation.

4. Launching -

Either hi-start or winch launching is allowed. According to SAM rules a maximum length of 700 feet for either method is permitted and all competitors will be able to use the same equipment. Winch launching shall employ braided line and zoom launching is not permitted. Launch equipment to be approved by, and supplied by the CD (may be supplied by a competitor via the CD).

5. Tasks - A. Standard Class Flying, B. Fun Fly Class Flying

A. Standard Class - The scoring shall be the sum of 3 -10 minute maxes. In the case of a flyoff or tie by two or more pilots an additional round will take place as close as possible to same time launching with same equipment , as determined by CD, last man down wins.

B. Fun Flying Class - Fun flying is invited using SAM field and launching equipment as long as not interfering with Standard Class competition. Competitors are invited to issue their own flying rules, tasks etc. and awards and submit same to SAM CD. Restriction of controls section 3 does not apply. Powered gliders or gliders with power pods added also allowed. Events determined must be published in adequate time for any competitors to be aware of.

6. Model Judging - To give awards for both construction, rarity and charm- as approved by the CD and pilots, a judging by the glider pilots (only) will take place for each model. The glider must have flown at least once. Each pilot will give each model a score with his favorite being #1. This should be done prior to the duration task, but results released after the duration event.

7. Awards - Awards labels for SAM plaques will be provided by the contest manager, i.e.: "Woodie Glider," "Woodie Glider Fun Fly" to 5th place for Champs.

DISSMRPDDIR0218

Giuseppe Ghisleri, gghisleri@libero.it

It is not a fiscal code, it means more simply: “dispositivo per lo smontaggio rapido del direzionale” or “device for quick disassembly of the directional” (directional = rudder).

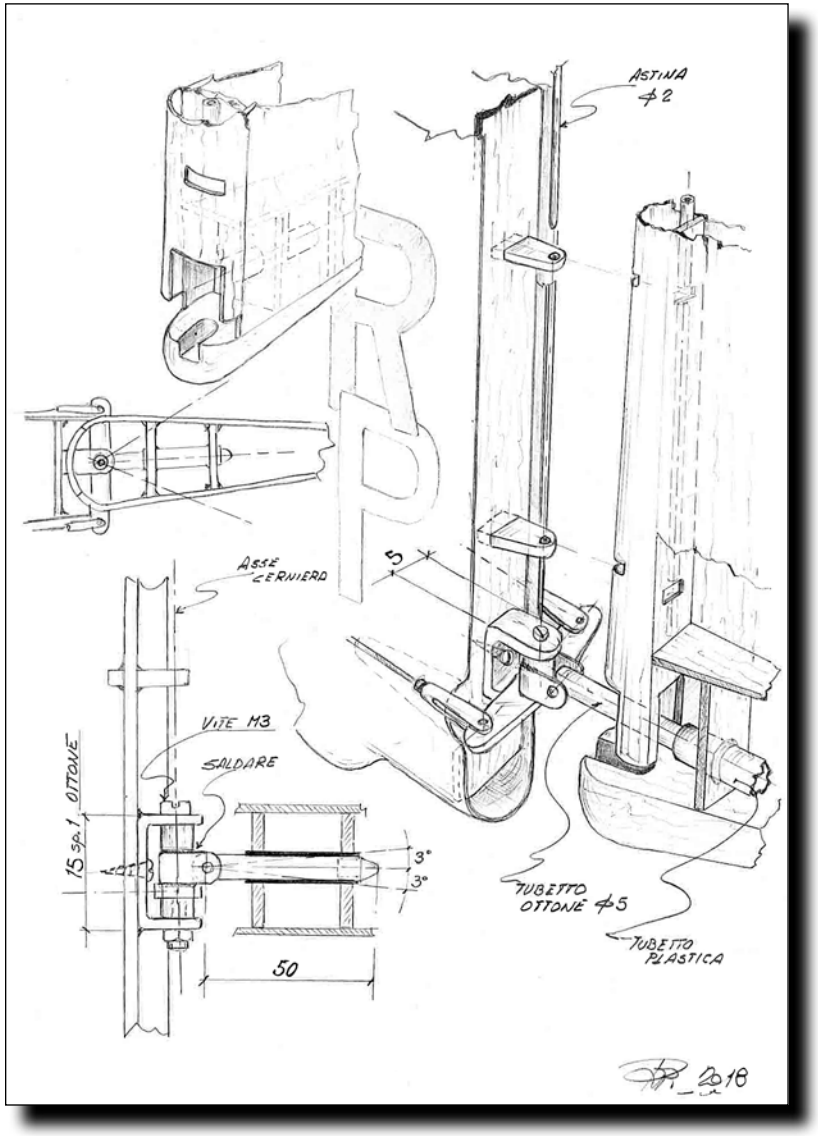
Anyone who has found the view of the exterior rear-view mirror on the right-hand side of his car obscured by the moving part of the vertical stabilizer of the transported model will immediately be aware of the usefulness of such a device.

Usually the control of the moving part takes place with a system of metal cables that are permanently attached to the rudder bracket and with adjustable connections on the servo side. Disengaging the latter to remove the rudder involves the extraction of cables from the fuselage and is a clearly impractical, system. One could think of using clevises to connect to the bracket of the moving surface, but also in this case we would face difficulties of various kinds through the tension of the cables which would cause difficulties in opening the clevises and then the subsequent reattachment of the clevises to the bracket.

Finding myself in the need to obviate the inconvenience exposed at the beginning of the article while building the Spillo, which has a fuselage about 2.5 meters long, I tried to solve the problem by replacing the cables with a system made of carbon tubes with a split bracket and a terminal bracket that allowed a threaded rod to exit the fuselage with an easy to open clevis.

The system, although it seems complicated, worked perfectly and without hassles and I was satisfied. But one day a bump on the ground during the bungee launch on the slope caused the clevis to open with consequent loss of direction command and subsequent abrupt landing. Fortunately it caused only modest damage.

I postponed the restoration work through winter, brooding in the meantime and searching for a solution that would allow me to return to the cable system while allowing me to easily disassemble the rudder.



Together with the drawing by Renato Piazzalunga on the previous page, these photos should provide all of the information needed to fabricate your own rudder removal system.

Until one day, wandering on the net, shared by I do not remember who, I ask forgiveness, appeared a device designed by the German company Gromotec and put on sale for a few Euros.

At first the “cazzamavero” as a dear friend would call it, seemed not to guarantee the necessary absence of hassles, but the testimony of those who had seen it mounted on gliders with turbines and a more careful analysis convinced me that this could be the simple solution to my problems.

I built the object and mounted it appropriately on the fin it has fully met my expectations: ease of assembly and disassembly of the moveable rudder and absence of complications.

On the occasion of the annual winter lunch of the members of SanFermoGlider, I talked about it with Renato and Nicola Piazzalunga, father and son, an indissoluble couple of designers, builders and makers of extraordinary models.

Renato, the father, who is also a very good designer, is not content to take what he sees for good and is committed to finding a solution suitable for the large models that Nicola, the son, builds.

The design, created by Renato, and the photos attached to this article clarify the implementation of this system better than a thousand words.

To conclude, look freely in the mirror on the right side and remember that on the highway the right lane can and should be used by everyone and not only by trucks.

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Our sincere thanks to Cesare de Robertis, editor of *Modellismo*, the Italian model aviation magazine, for providing this material and allowing us to publish it *RC Soaring Digest*.

“Ruby overhead,” a photo by Gérard Menut.
Nikon D90, ISO 360, 1/2000 sec., f5.6, 302mm
July 2, 2011, near Solano California

Slope Soaring Candidate

Boeing X-32A

Developed under the code name "Monica," Boeing's X-32A was perhaps not so pretty as the code name would suggest. Looking much like the creation of a cartoonist, the X-32 has over the years picked up nicknames not so becoming. While it may be an "ugly duckling," have face only a mother could love, and appear much like a basking shark from the front, the term "flying sugar scoop" is more humorous and one of our personal favorites.

Modelling the X-32A for PSS offers a number of challenges, not the least of which is the large engine air intake and bulbous fuselage. The wing is thick and has "graceful" contouring of the leading edge and a rather peculiar long blended "chine" at the wing leading edge-fuselage junction. And there's the wing tip extensions as well. The two vertical stabilizers will most likely be the easiest parts to duplicate.

https://en.wikipedia.org/wiki/Boeing_X-32#/media/File:USAF_X32B_250.jpg

Some background on the design of the X-32A is in order. The Defense Advanced Research Projects Agency (DARPA) launched the Common Affordable Lightweight Fighter project (CALF) in 1993, and shortly thereafter the Joint Advanced Strike Technology (JAST) project was started. The aim of the former was to develop a replacement for the F-16 Fighting Falcon, F/A-18 Hornet and AV-8B Harrier. Both of these entities were combined into a single Joint Strike Fighter (JSF) Program in 1994. The Joint Strike Fighter aircraft itself was to be a conventional take-off and landing (CTOL) aircraft with a variant capable of short take-off vertical landing capability (STOVL). The final aircraft would be configured differently for use by the Air Force (CTOL) and Navy (CV/CTOL - catapult launch, arrested landing) and the Marine Corps (STOVL).

https://vignette.wikia.nocookie.net/aircraft/images/c/cb/X-32_02.jpg/revision/latest?cb=20120417211306

The X-32A with munitions store open.

http://q-zon-fighterplanes.com/wp-content/uploads/2013/06/Boeing-X-32B-06.jpg

The X-32B while landing. Note shortened wing and VL nozzles.

Boeing began the X-32 design process by deciding to have the X-32A CTOL variant fulfill the needs of the Air Force and Navy, while the X-32B STOVL variant with its direct-lift system would be for the Marine Corps.

The latter requires the lift ducts to be on the CG and forces the engine forward within the fuselage. The vectoring nozzles are directly behind the engine and a long duct leads back to the afterburner and the thrust vectoring nozzle at the rear.

The X-32B fuselage is slightly shorter and the wing span has been narrowed to reduced weight. The twin lift nozzles are concealed behind doors in the fuselage belly when not in use. The engine air intake on the X-32B has to be large enough to supply the engine when the aircraft is not moving forward, so the air intake, although similar in appearance to that of the X-32A, is moveable. A Pratt & Whitney engine allowed for a top speed of Mach 1.6 (1,200mph).

A thick delta wing comprised mainly of carbon fiber provides good performance at high angles of attack and allows for significant fuel storage. This was a plus so far as the Air Force was concerned.

The first flight of the X-32A occurred on September 18 2000; first flight of the X-32B STOVL version on March 29 2001, about six months later than planned.

The Boeing X-32A flight performance precisely matched that of computer model predictions made over the previous four years. This was a first in aviation history.

Lockheed-Martin won the JSF competition with the X-35, a design which incorporated fans driven by shafts from the main engine for its STOVL variant, and the X-35 became the F-35 Lightning II. However, upon entering service it suffered such severe difficulties that the aircraft was grounded for extensive periods of time and it seems as though the Air Force is the only service which likes it.

Despite failure to win the competition, the JSF competition allowed Boeing to develop a number of new technologies that

have already been incorporated into the F-18 Super Hornet (still in production due mainly to the aforementioned F-35 Lightning II problems) and the X-45A Unmanned Combat Air Vehicle.

The Boeing X-32A was transferred to the National Museum of the United States Air Force near Dayton, Ohio, in 2005. It is currently undergoing restoration.

The X-32B was transferred to the Patuxent River Naval Air Museum and underwent restoration at the museum's restoration facility in June 2009 and is now on display.

http://www.arcforums.com/forums/air/index.php?/topic/270399-any-chance-of-a-148-boeing-x-32/

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Barnhouse, Wendell. *Boeing's X-32 Was The Ugly Duckling In JSF Competition*. Avgeekery.com, https://www.avgeekery.com/boeings-x-32-was-the-ugly-duckling-in-jsf-competition/

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X-32 Joint Strike Fighter, Historical Snapshot. Boeing, http://www.boeing.com/history/products/x-32-joint-strike-fighter.page

The Fighter Jet We Could Have Built Instead of the F-35. Gizmodo, https://gizmodo.com/the-fighter-jet-we-could-have-built-instead-of-the-f-35-1603031982

Boeing X-32 JSF (Joint Strike Fighter). Military Factory, https://www.militaryfactory.com/aircraft/detail.asp?aircraft_id=351

X-32A. National Museum of the US Air Force, http://www.nationalmuseum.af.mil/Visit/Museum-Exhibits/Fact-Sheets/Display/Article/198058/boeing-x-32a/

http://www.arcforums.com/forums/air/index.php?/topic/270399-any-chance-of-a-148-boeing-x-32/

The X-32A in landing mode. Note extended leading edge devices and downward deflection of elevons.

http://notreally.info/transport/planes/jsf/x-32/img/x-32_Boeing-X-32-medium.jpg

X-32B from above. No leading edge devices, shorter span.

https://www.militaryfactory.com/aircraft/imgs/boeing-x32-jsf.jpg

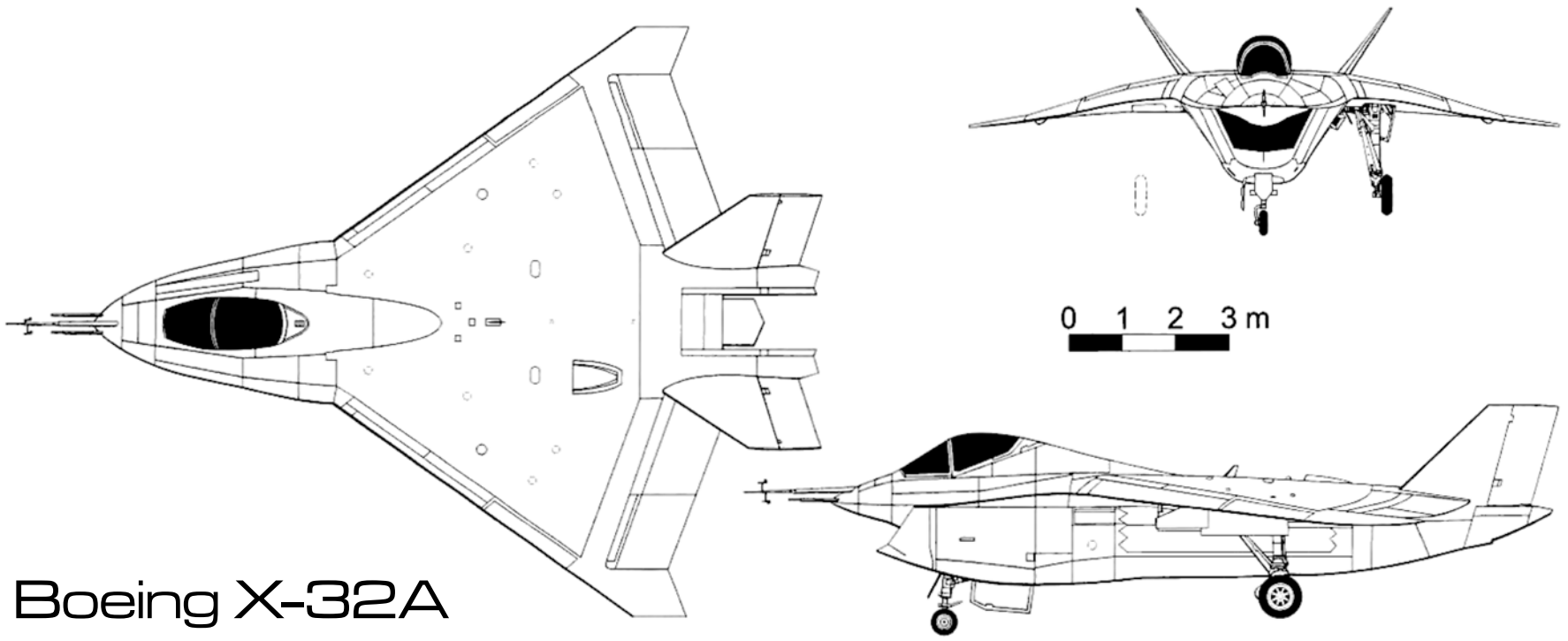
X-32A from above. Note wing extensions.

http://www.arcforums.com/forums/air/index.php?/topic/270399-any-chance-of-a-148-boeing-x-32/

X-32A landing. Leading edge devices include leading edge flaps outboard and leading edge spoilers inboard. Note the contrail coming off the right wing tip in this photo.

http://www.arcforums.com/forums/air/index.php?/topic/270399-any-chance-of-a-148-boeing-x-32/

X-32A in landing mode. Leading edge devices include leading edge flaps outboard and leading edge spoilers inboard.



Boeing X-32A

https://www.the-blueprints.com/blueprints/modernplanes/boeing/73472/view/boeing_x_32/

DIMENSIONS

	X-32A (CTOL & CV/CTOL)	X-32B (STOVL)
Wing span	36' 0" (10.97 m)	30' 0" (9.14 m)
Wing area	590.00 ft^2 (54.81 m^2)	
Length	45' 0" (13.72 m)	43' 8.6" (13.33 m)
Height	13' 4" (4.06 m)	13' 4" (4.06 m)

http://www.boeing.com/resources/boeingdotcom/history/images/x-32_hero.jpg