Radio Controlled Soaring Digest

May 2014

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Front cover: Jerome Bobin's Multiplex K6E, 4.2m wingspan, flying in front of the Obiou summit (2,789 m) at Corps in the French Alps. Photo by Pierre Rondel.
Canon EOS 650D, ISO 100, 1,1250 sec., f5.6, 95mm

Back cover: Yellow Billed Kites and Kevin Farr's Sky Climber.
Photo by Noel Cochius, near Hermanus South Africa.
For further information, see page 49 of this issue.
Canon EOS 350D, ISO 250, 1/500 sec., f11, 85mm

R/C Soaring Digest

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In the Air

Putting this issue of *RCSD* together was an interesting experience in that the symbiotic relationship between aeromodelling and full size aviation was in evidence in nearly every article.

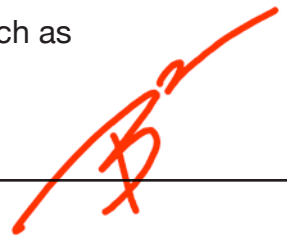
This relationship is obvious and clear in those articles devoted to scale models where the goal is to precisely mimic the full size counterpart in reduced size. And the SOARINGCAFE.COM photos of the Laister-Kauffman TG-4 may serve to motivate someone to create a large scale model for aerotow.

The fundamentals of aerodynamics are, of course, just as important to modelling as they are to full size aviation, and the similarities and differences between the two disciplines goes far beyond the concept of Reynolds numbers and the strength of materials. The pioneering theoretical work of Ludwig Prandtl and R.T. Jones has had a large effect on the design of both airliners and contemporary F3B and F3J designs, as has the more recent work of Ilan Kroo involving non-planar wings. Low Reynolds number research, originally aimed at improving full size sailplanes and other forms of motorless flight, has lead to dramatic effects within the areas of large scale turbine technology and automobile design, as well as continuing to make major contributions to the aeromodelling community.

Chuck Anderson's "First Flight" portrays the model-full size symbiotic relationship in a more subtle manner. Much of what Chuck relates here relies on practices and habits acquired during decades of wind tunnel work.

We hope you enjoy reading this issue as much as we enjoyed putting it together.

Time to build another sailplane!



APIS

big and small

Authors: Rastko Kos, Boštjan Pristavec, Prof. Dr. Rafael Cajhen and Uros Šoštarič

Pictures by: Dr. Rafael Cajhen, Rastko Kos, Uroš Šoštarič and Boštjan Pristavec.

English translation: Gorazd Pisanec

Slovenian people have its own history of glider construction as well its production. After a few years of production pause a new project of modern glider was born. After that also R/C model glider was born. In this article we will describe the real glider Apis and continue with description of construction, production and test flights of R/C model at domestic airport in Lesce.

Let's start with the description of real glider described by glider pilot Boštjan Pristavec:

Glider Apis was developed in company Albastar. First flight was taken in 1998 and up until now several different types of Apis were produced. Here is a list of all types:

Glider Apis M - Bee over home airport during test flight.

- Apis – Glider with wingspan 15m.
- Apis 13 – Glider with wingspan 13m.
- Apis WR – Very light version of glider with wingspan 13m.
- Apis M – Glider with two-stroke petrol Rotax motor and wingspan 15m.
- Bee* - Glider with two-stroke petrol SOLO motor and wingspan 15m.
- Apis AE – Glider with electric motor and wingspan 15m.
- Glider Apis M – Bee over home airport during test flight.

*Bee is a version of Apis M adopted for German market.

Apis M, Apis AE or Bee is motorized version of glider Apis. This version can independently retract and turn off the motor and continue the flight as pure glider. The wingspan of motorized version is 15m.

Apis 13m is a version without motor and is intended for amateur builders. This version comes as a build kit. The builder must finish the glider on its own with all final adjustments.

A model that stands out of the crowd is the WR version. WR stands for World Record and is intended for competition flying. The weight of the empty glider is 119 kg and by FAI rules falls in DU class of ultra-light planes where AUW must not exceed 220kg. With Apis WR several world records were achieved and some are still valid today. Just to name a few:

- Free out and return distance – 310 km, (Tanja Pristavec, DU feminine)
- Free distance using up to 3 turn points - 347.6 km (Tanja Pristavec, DU feminine)
- Free distance – 154 km (Tanja Pristavec, DU feminine)
- Free distance using up to 3 turn points - 808.9 km (Boštjan Pristavec)
- Speed over a triangular course of 100 km: 76.9 km/h - (Tanja Pristavec, DU feminine)
- Out-and-return distance: 501 km - (Andrej Kolar, DU general)

Bee flying above Dobrce slope. Most test flights were done with motorized version.

- Speed over an out-and-return course of 500km: 82.1 km/h - (Andrej Kolar, DU general)
- Free Three Turn Points Distance: 619.7 km - (Andrej Kolar, DU general)
- Free out-and-return distance: 511.6 km - (Andrej Kolar, DU general)
- Speed record over a triangular course: 118.2 km/h (Boštjan Pristavec)

High expectations before first flight of Apis WR. The glider weights only 119kg.

High expectations before first flight of Apis WR. The glider weighs only 199kg. Lifting the light Apis are Kolar S., Brejc K., and Pristavec B.

Rastko Kos describes the making of new R/C model Apis:

Anyone who has visited the homepage http://www.aerozaprega.si surely came across Vlado Kobilica. Vlado Kobilica is a former glider pilot and former employee of Elan glider Manufacture Company. As a hobby enthusiast he decided to produce R/C model gliders based on real gliders produced in Slovenia.

There was no other possibility then to copy the real gliders in composite technology. He is already much known for producing R/C gliders like DG-600 (wingspan 4250mm, ¼), DG-1000s (wingspan 5000mm, ¼) and also DG-300 (wingspan 3750mm, ¼ aerobatic version).

After making bigger and bigger gliders he wished to produce even a bigger one. He decided to produce the new Slovene glider Apis (described by Boštjan Pristavec) in size 1:2.5 with wingspan 6m (fuselage length 2.5m).

At that time I already knew Vlado very good and he invited me to the project at the very beginning. I was thrilled and accepted his invitation. In February 2008 we already had first designs in Autodesk Inventor.

After first designs I started considering about aerodynamics. Helmut Quabeck (http://hq-modellflug.de) and his knowledge was very helpful in deciding the right wing airfoil. According to his knowledge I decided to use his latest HQ-DS airfoil for wing and symmetrical HQW-0 airfoil for horizontal stabilizer.

Different programs for calculating the center of gravity showed that the horizontal stabilizer surface should be bigger according to original size. All of this had unpredicted consequences.

My friend Mitja Glusic helped me overcome the fear of XFLR program (http://www.xflr5.com/xflr5.htm).

With this program I made all important aerodynamic calculations like airfoil and aircraft polars, plane geometry, wing design, etc...

In the meantime Vlado was working on fuselage male plug. Together we took drawings for producing parts for main wing and horizontal stabilizer plugs to our friend Gerhard Bruckmann (http://www.modellbau-bruckmann.at).

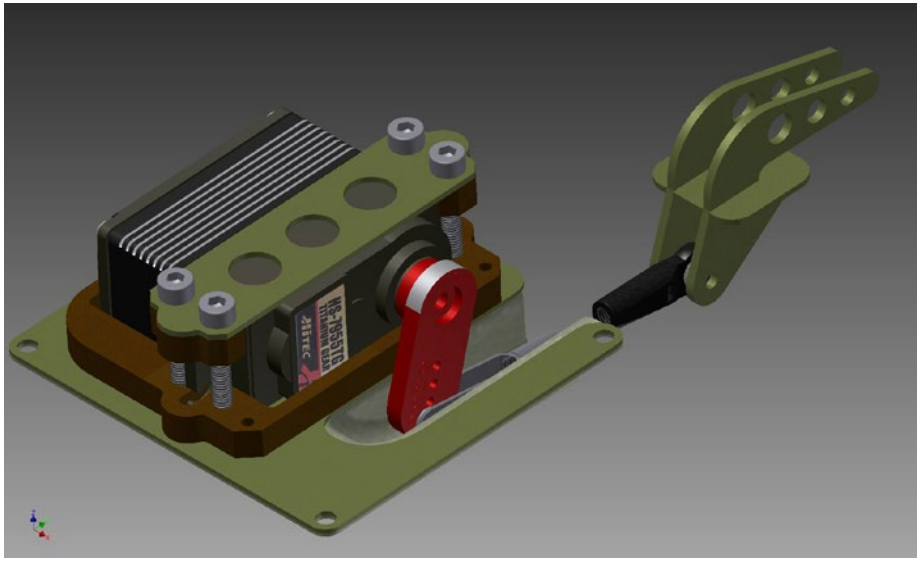
For finishing main wing and wing adaptors plugs we used laser cut templates from 1mm stainless metal plate.

There was a lot of work to be done.

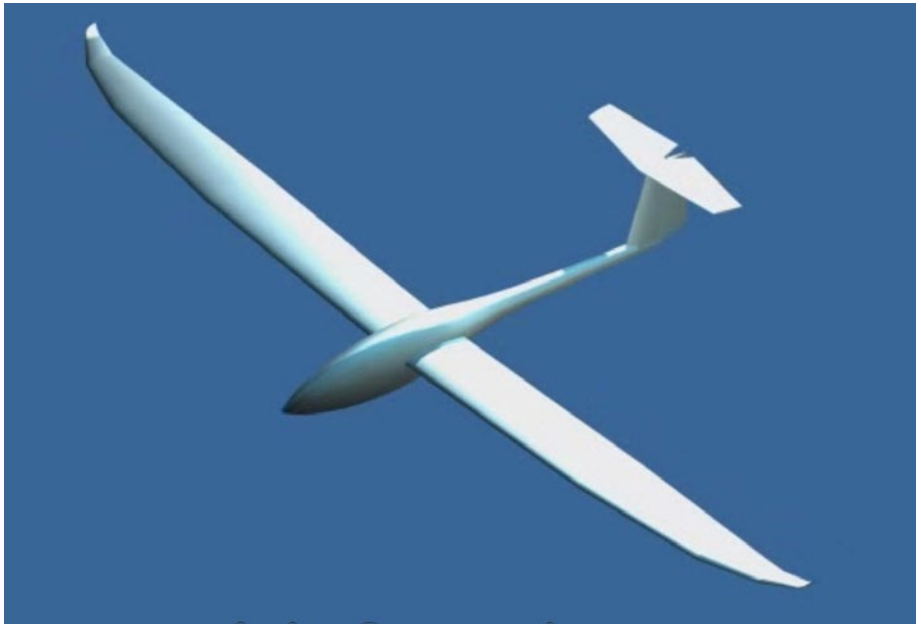
Marko Kljajic was already helping Vlado and together they were working on plugs, molds and preparations for first products.

Meanwhile I was working also on other projects and keeping a close eye on the Apis project. I was preparing the right electronic equipment for Apis. Because the model is produced in size 1:2.5 I was able to use standard size servos 20x40mm due to big wing depth. At the very beginning I suggested Vlado to make divided surfaces for flaps and ailerons contrary to the real glider which uses flaperons. Aluminum molds for servo covers were trusted to Luka <mailto:info@ls-cam.si> on which were later constructed servo holders. Again all servo parts were constructed in Autodesk Inventor.

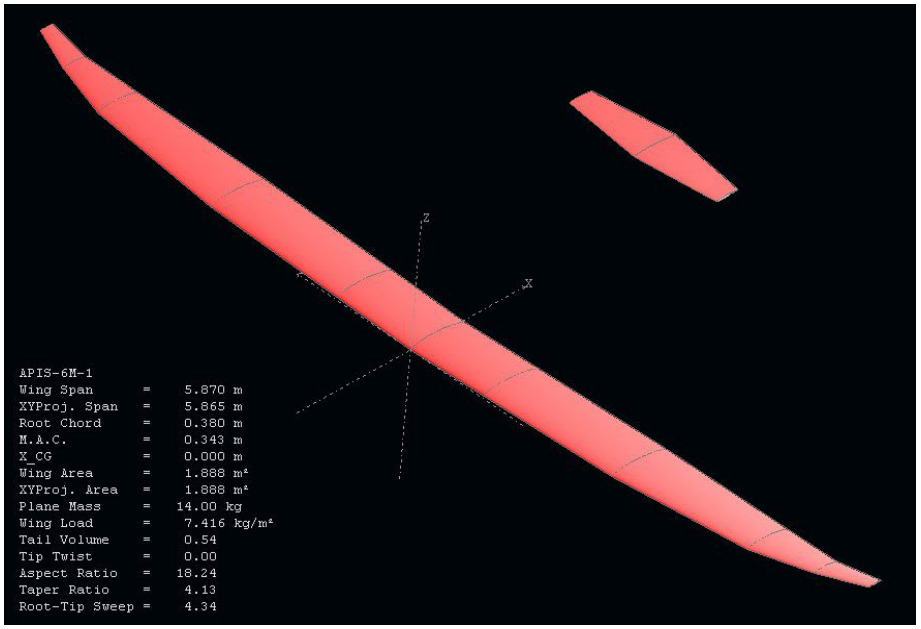
Due to constant orders for DG models we were running behind planned schedule. Finally Vlado brought the model to me for final assembly in December 2011. Unfortunately even my schedule for final assembly was past overdue. All servo frames and covers still needed to be milled. My work shop is quite



Even on the thinnest part of the wing we can easily mount standard size servos.



Apis 6m - Preview



Print screen of basic model characteristics from XFLR program.

Spoilers 500mm from German manufacturer Schambeck <http://www.klapptriebwerk.de>.

First aerotow with Citabria S5 at Krsko by Boris Sekirnik

Checking center of gravity before first flight.

small (6 x 2m) for such a big model that is why I had to build part by part. There was a lot of bumps and hits of parts while assembling.

The pressure for maiden flight was growing every day. I had to invest all my efforts to the model to be finished on time. After a big storm we gathered in Ligojna airfield on Monday, 9th July 2012. Before first flight I check the correct position of center of gravity. With the help of XFLR program I set the CG 160mm from the leading edge.

The first start in aero tow was very good and with no problems. The first flight was excellent and the CG seemed to be right. I have already imagined flying Apis on our next aero tow meeting in Krsko where other more experienced pilots could fly it and tested it. Unfortunately I broke the fuselage on our second landing outside the runway. Broken fuselage was superbly repaired without marks by Marko.

Apis and its constructor, Vlado Kobilica.

The Apis was prepared for our next aero tow meeting in Vipava. In Vipava I have moved the CG back to 150mm as advised by my fellow pilots. I have also mixed some elevator input with raised spoilers. With these two settings I improved flying and especially landings which only raised my confidence that the model turned out very good. Apis was also tested by Janko Cajhen and Sašo Šantelj who gave good flight reports. I can now say that I had some problems while landing because Apis is a different story comparing to my DG-600 and DG-1000. The spoilers from German manufacturer Schambeck are really really effective and work brutally.

The whole team in a group photo with Apis.


K3
K 3
S5-KKK

First flight at domestic airfoild in Lesce (U. Šoštarič, J. Cajhen).

Apis landing with raised spoilers.

We can say that the tests are officially done when the model flies at the home airfield. We had an incredible beautiful afternoon when morning mist disappeared at our home airfield in Lesce. Apis was also flown by Uros Šoštarič and we can now say that the project was a success.

What to write at the end? Even though it took some time to finish this project I can see it was worth it. Slovenian hobby enthusiasts have one of their own scale Slovenian model. Because of its size the model flies in very positive range of Re-numbers therefore excellent flight characteristics are achieved. Divided surfaces of flaps and ailerons can change the aerodynamic characteristics of wing airfoil which leads to good manoeuvrability and aerobatic performance. The only thing left to be done was to make the proper size of horizontal stabilizer. Some may have noticed that the horizontal stabilizer is not fully proportional with the size of the rest of the plane. This happened when I was calculating the correct size according to the real plane. Little more size was gained when the horizontal stabilizer was produced. I have already agreed that new mould will be done so we can produce the new horizontal stabilizer with more realistic size.

At the end I must thank Rafael and Janko Cajhen for encouragement and documented first steps of the project.

Opposite page: Apis in the sky

Above: No landing problems for Uroš Šoštarič

Left: Just before touch down.

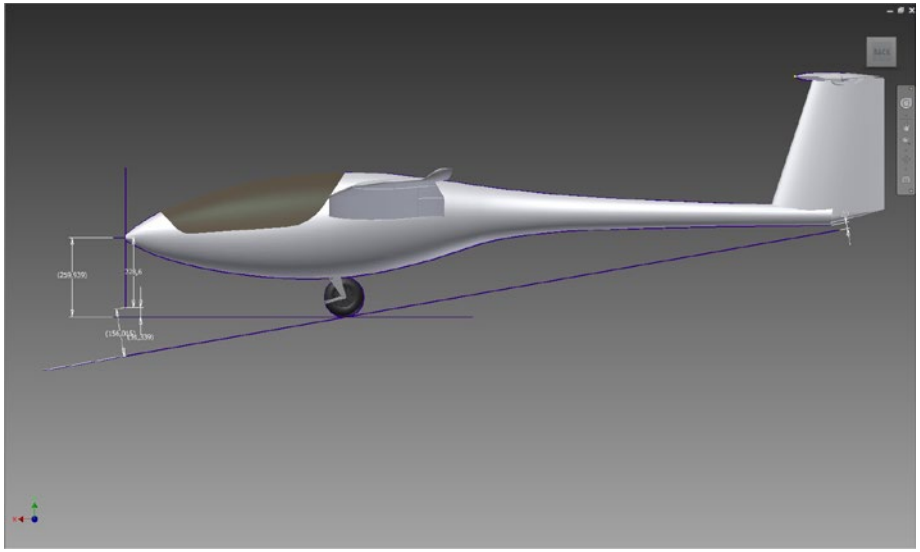
First flight impressions about the new model by Uros Šoštarič

Vlado and Rastko asked me to make a few flights with the Apis to which I couldn't say no. I wanted to fly the Apis on the domestic airfield in Lesce which is also the airfield for model hobby club Alpski modelarski klub (http://www.alpski-modelarski-klub.si/). Vlado Kobilica is a member of this club. I own both Valdo's models, DG-600 and DG-1000 so I am familiar with his models.

In first flight phase, aero tow I haven't noticed any bad behavior of the plane. Apis doesn't need high speed for take-off. Because the plane generates lift even with small flying speed take-offs are a piece of cake. The take-off is done fast and smooth. I recommend using a few mm down throw of flaps.

Apis has good flight stability and maneuverability thanks to responsive ailerons and rudder. The elevator is a bit sensitive because of the big horizontal stabilizer size. Apis can be flown very slowly thanks to its large wing area and control surfaces. Apis has small wing loading and misses the inertia which can be seen in high speed passes and aerobatic flights. Of course this can be corrected by flying the model in Speed flight mode. Apis is also very competitive in thermal soaring. Thermal flight mode and Apis can soar in narrow thermals.

First aero tow of Apis Electro.



Apis Electro design.

First start with electric motor. The model has enough distance from the ground.

APIS technical details:

Scale:	1:2.5
Wingspan:	6m
Length:	2,54m
Weight:	13kg (prototype 14kg)
Wing airfoil:	HQ-DS-2,5 – 12%
Horizontal stabilizer airfoil:	HQW-0,9%

APIS Electro technical details:

Wingspan:	6m
Weight:	15.5kg

Enough power for take-off and good climb rate.

Landings are done very easily. Because the Apis can fly very slowly it doesn't need big landing area. For landing I used both spoilers and flaps which made landing even easier. The model also has built in ballast tubes to add extra weight. Unfortunately we haven't tested the model with ballast. This and slope flying waits for us in the future.

Those who have flown the DG-1000 from Vlado know how good this model flies. Vlado made Apis to fly even better in different flight phases. I already look forward to fly Apis in Livno where we will try to reach high altitudes thanks to its good visibility.

Janko Cajhen and Rastko Kos have designed and produced the electric version of Apis glider, Apis Electro. The model has mounted electric motor in the fuselage nose. This version allows the model to take off without tow plane and dolly trolley.

Janko and Rastko have changed and improved the current version of Apis by reducing the size of horizontal stabilizer and improving aspect ratio. With Vlado Kobilica they decided to make CFK wings which could hold 3.5kg of ballast. Because the model needed bigger distance from the ground they mounted bigger landing wheel (M2.5)

Maiden flight was done by Janko Cajhen on Mala Ligojna airfield near Vrhnika on 4th July 2013 in aero tow. Tow plane Swiss Trainer (3m, 17.5 kg, DA 120) was piloted by his father Rafael Cajhen. Even though the Apis weighted 15.5 kg the wing loading was still quite small 82g/dm^2. The model took off in just 10 seconds.

After first trimming the model flew excellent with no bad habits in all flight phases previously programed in the radio. Even basic aerobatic figures were done excellent. After the first start of the motor we could see that it was mounted correctly. Landing was done precise and without a problem.

After a short test flight it was time to take off from the grass runway with electric motor.

The expectations were high for the pilot Janko. Janko put full throttle and with a little elevator input the model took off after about 8 meters easily without the tendency to change flight path (climb angle or direction deflection). The climb rate at full throttle is from 7 to 10m/s. The electric motor doesn't produce too much noise.

The electric equipment consist of electric motor Reisenauer RS 378.25.13 pL, planetary gearbox SUPER CHIEF 5:1, battery 12S LiPo Gens Ace 5.2 Ah, speed regulator Robbe Roxxy Control 9100-12 HV Opto, folding propeller Carbon RF 20x13 CFK, elevator down throw - 6°, maximum motor rpm 35.000, propeller rpm 6.900 and current consumption 65 A.

Telemetry CS Data Vario from WsTech is also on board and measures GPS data, true airspeed with pitot tube, voltage, current and capacity of batteries.

In the next few days several more test flights were done. Because of high Re numbers (wing chord at root is 380mm) the models flight characteristics are excellent. Even with full elevator deflection the model doesn't tip stall but only lowers the nose and gains speed.

As said before all aerobatic figures can be done easily and smooth. Even at high loads the wings don't bend. Apis is very sensitive even to small thermals when flying in thermal mode. The model takes off independently from the ground without elevator input at full throttle and continues to climb. With this battery we can have one flight to 500m and another three flights to 400m.

Experiences show that this superbly built glider Apis has problem free take offs and flies excellent. What more could a hobby pilot wish for?

Split Scimitar Winglets

GIZMAG.COM

<http://www.gizmag.com/united-airlines-split-scimitar-winglets/31587/>

<http://newsroom.unitedcontinentalholdings.com/2014-02-19-United-Airlines-is-the-First-to-Fly-with-New-Fuel-Efficient-Split-Scimitar-Winglets>

<http://www.swamedia.com/releases/southwest-airlines-launches-new-era-of-fuel-savings-and-emissions-reduction-with-its-first-aircraft-featuring-split-scimitar-winglets>

A pre-certified Split Scimitar Winglet installed on a United Boeing 737-800 during the testing phase that began July 2013.

If you think that you've been seeing some funny-looking airliners in the past couple of months, you're not imagining things. On February 18th, a United Airlines Boeing 737-800 made the world's first commercial flight by an aircraft equipped with fuel-saving Split Scimitar Winglets.

Regular blended winglets are now quite common on commercial aircraft, as they improve aerodynamics and thus reduce fuel consumption. Made by Aviation Partners Boeing, the Split Scimitar Winglets reportedly do an even better job – when retrofitted onto United's existing Next Generation 737 Blended Winglets, they should reduce fuel consumption by two percent per aircraft.

The airline plans to add the new winglets to its entire fleet of 737, 757 and 767 airliners. By doing so, it estimates that it will save "more than 65 million gallons [246,051,780 liters] of fuel a year,

United technicians at Orlando International Airport install the new Split Scimitar Winglet on a Boeing 737-800.

equivalent to more than 645,000 metric tons [710,991 tons] of carbon dioxide and $200 million per year in jet fuel costs."

Retrofitting Split Scimitars into existing blended winglets involves adding strengthening spars, aerodynamic "scimitar tips," and a large ventral strake (the bit that points down).

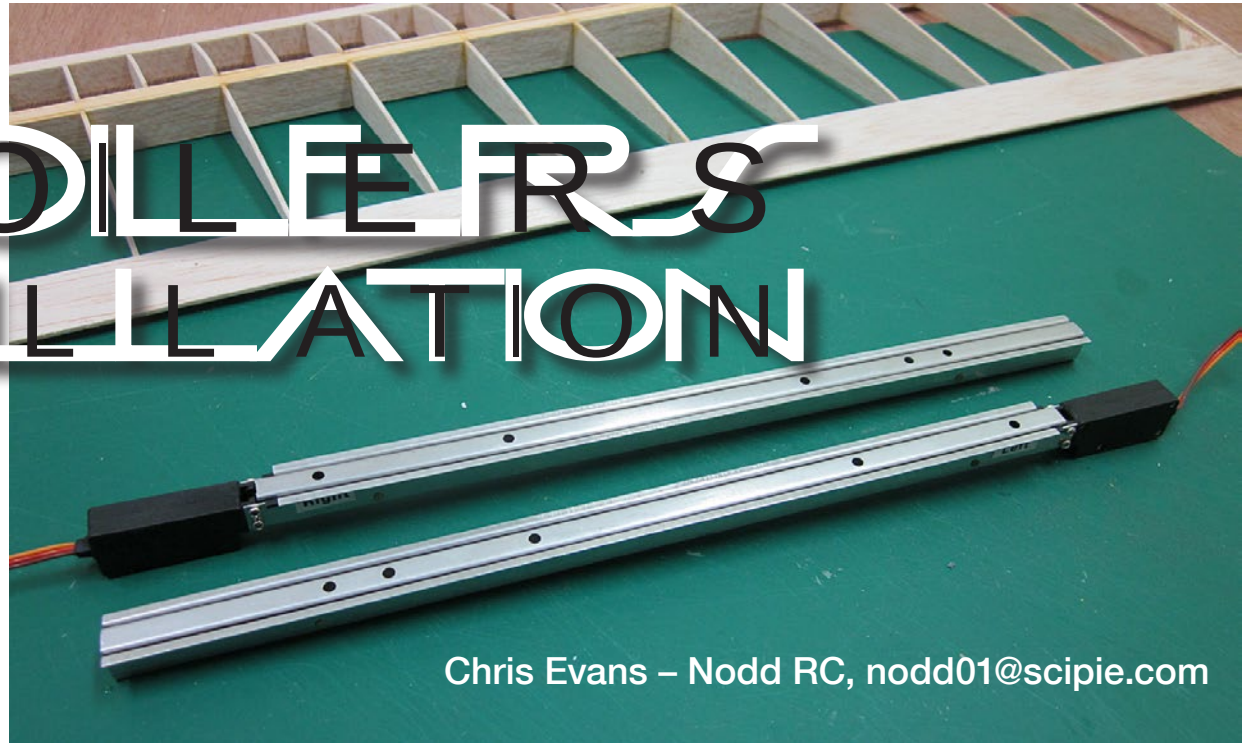
...Southwest Airlines announced that it had also started using the Split Scimitar Winglets on one of its 737-800s. The company plans on retrofitting 52 existing planes, and having the winglets pre-installed on 33 new aircraft.

Numerous other airlines have placed orders for the winglets, so expect to start seeing them on a runway near you soon.

Retrofitttting Blended Winglets to Split Scimitars involves adding strengthening spars, aerodynamic "scimitar tips," and a large ventral strake.

Right: N8624, a Boeing 737-8H4(WL), is the first Southwest Airlines aircraft to have Split Scimitar Winglets retrofitted.

E-SPOILERS INSTALLATION



Chris Evans – Nodd RC, nodd01@scipie.com

I've been using e-spoilers in my sailplanes for a few years now with good results. I had a couple of extra e-spoilers leftover from a review (See "HobbyKing Servoless Spoilers," pp. 48-51, *RCSD* May 2013) and decided to toss them in an old Great Planes Spectra that I'm refurbishing...

For those not familiar with e-spoilers, they're basically your standard blade type spoiler except instead of a linkage that attaches to a servo they come with a built-in motor that raises and lowers the blade.

See Photo 1

The advantage is they're super easy to install as there's no fiddly linkage or servos to mess with...

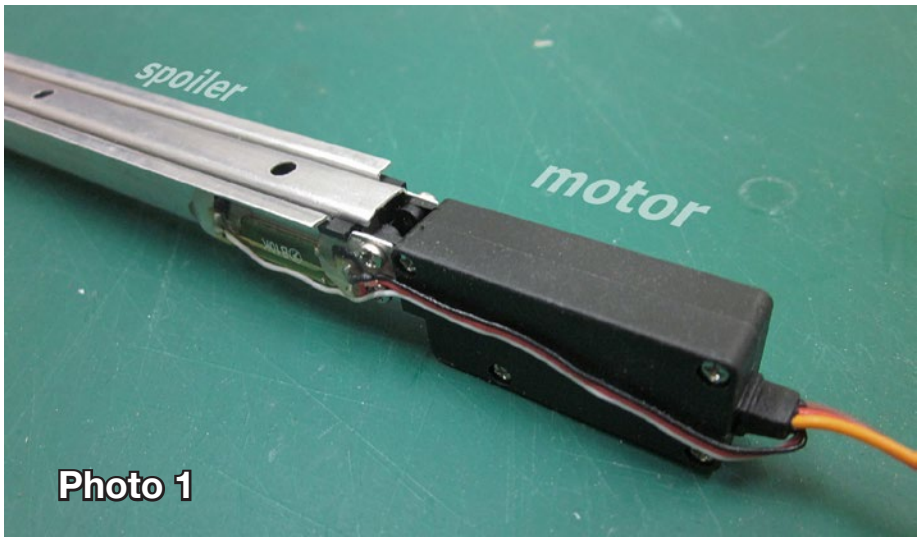


Photo 1

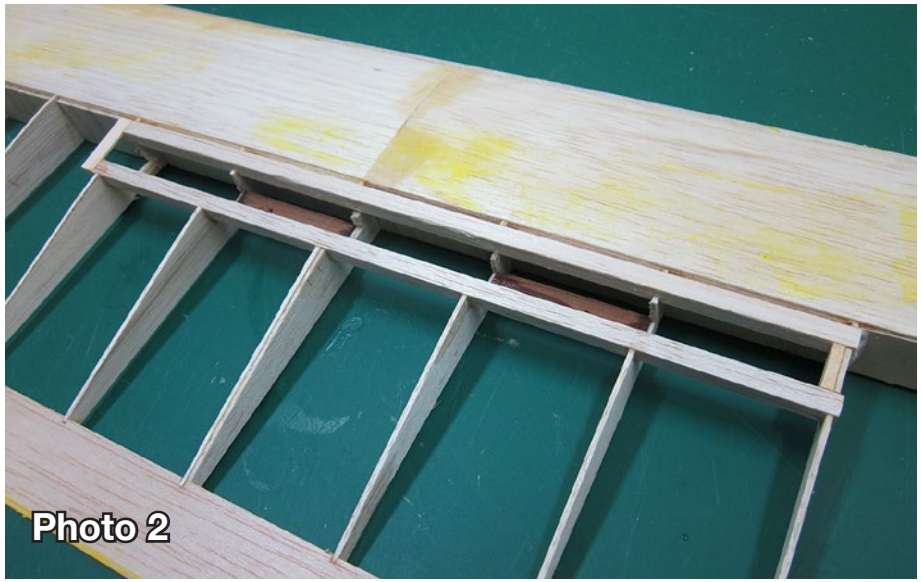


Photo 2

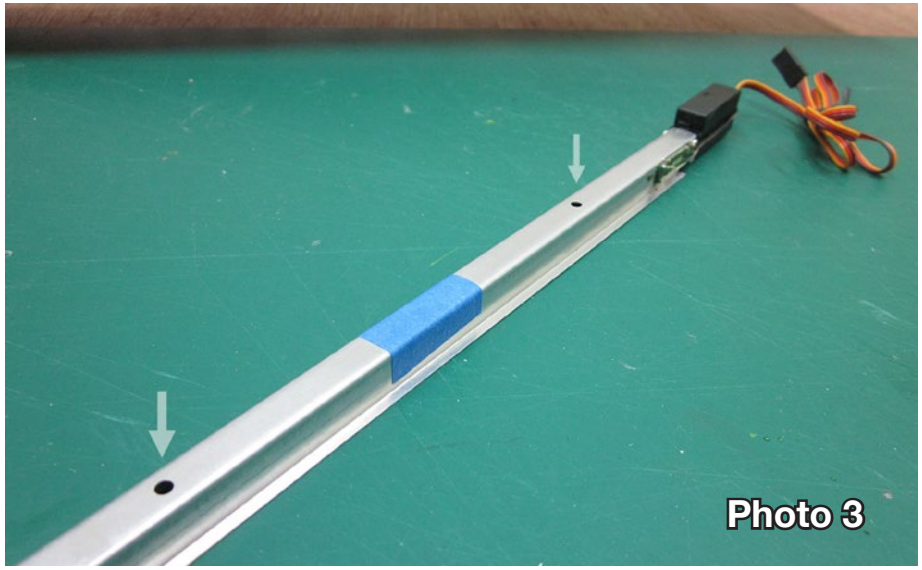


Photo 3

In preparation for installing these I notched out a few ribs and created a frame to support the covering around the spoiler's hole...

See Photo 2

A popular misconception about these e-spoilers is that they should be permanently glued into the airframe. You can certainly do that but if a spoiler ever goes bad, you'd be hard pressed to get it out of there.

(I know I've come close to turning the radio on when the wing was up-side-down on my work-bench. That would be a sure way to strip/fry the motor in these.)

So as you may notice there's a pair of screw holes which can be used to mount these instead of using glue...

See Photo 3

This cross section shows how I notched out the ribs, added a balsa frame either side of the spoiler and screwed it down to a hard-wood mounting block...

See Illustration 1

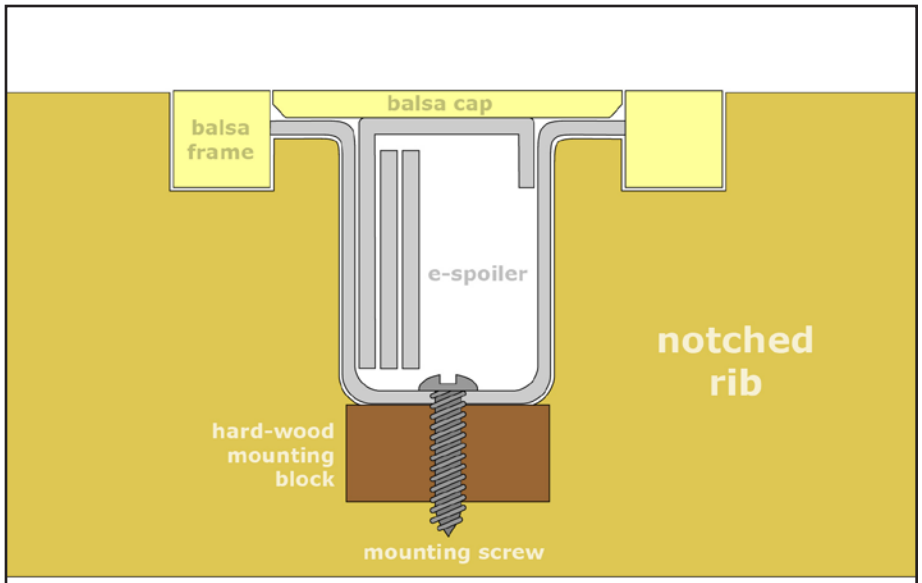


Illustration 1

Photo 4

Viewed from the wing's underside you can see I've used two screws to secure to spoiler to the wing. By deploying/ opening the spoiler you can gain access to the screw-heads...

See Photo 4

Added a strip of balsa to the top of the blade and sanded flush...

See Photo 5

Deployed position, that's looking good...

See Photo 6


Photo 5

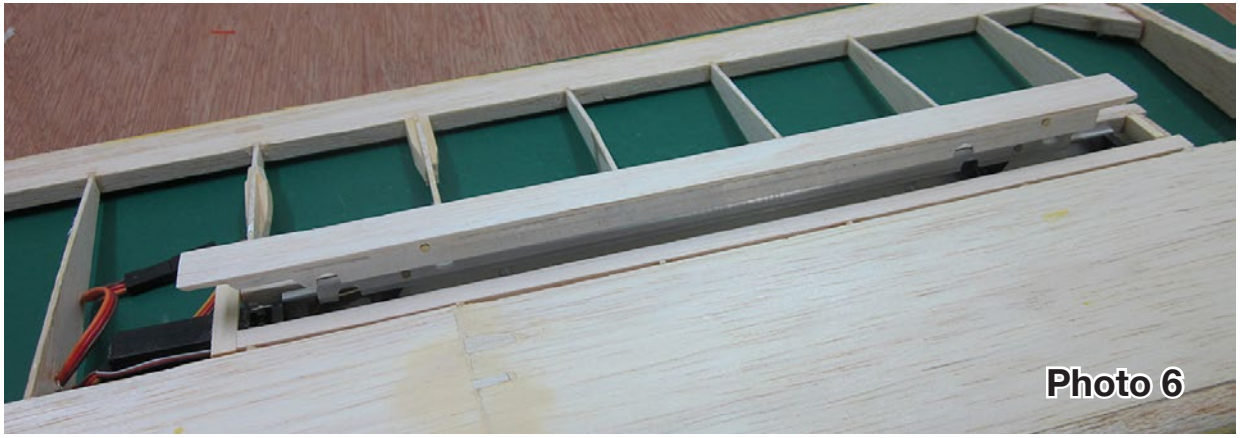
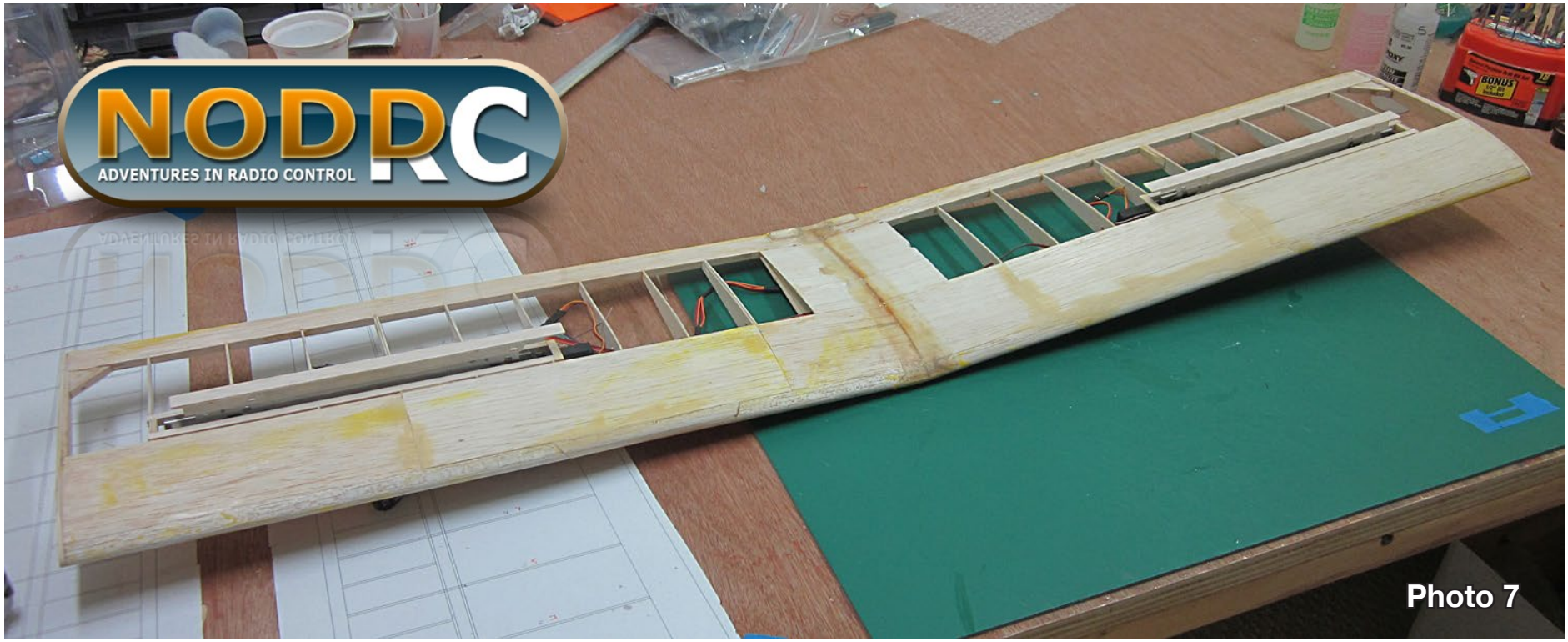


Photo 6



The Spectra wasn't designed with spoilers in mind but as you can see adding a pair was really quite painless. These should come in handy next time I'm stuck in a booming thermal...

See Photo 7

For whatever reasons, I've come across a fair amount of opposition to e-spoilers from the sailplane community. Rumors about how if you exceed the travel limits of the blade the motor immediately smokes and burns up. Well, I can tell you the two brands I've used (Hobby King shown here and the Esprit Models Mpi version) do not appear to burn-up if you attempt to exceed the travel limits. The motor simply shuts down when the blade is fully retracted/deployed. Now granted, you can ruin these fairly easily if you block the blade's normal travel, but as long as you don't sit on top of your wing while opening, these that shouldn't be an issue. Just take care not to restrict the blade in any way when it's moving. After two seasons using e-spoilers I've had zero problems.

Given the ease of installation and the fact these can be readily replaced if need be, I think e-spoilers are a great addition to the hobby.

No more messing around with fiddly linkages. Woohoo!

Esprit Models:
<http://www.espritmodel.com/airplanesailplane-electric-spoilers.aspx>

HobbyKIng:
<http://www.hobbyking.com/hobbyking/store/__41304__Glider_Spoiler_Servoless_Left_and_Right_Pair_USA_warehouse_.html>

Burnham Aerotow

Christchurch New Zealand, 22-23 March 2014

Scott Chisholm, Scott.Chisholm@airnz.co.nz

Photos by Scott Chisholm, Peter France and Graeme Phipps

Peter France

Graeme Phipps

The Burnham Aerotow was the second event for 2014. This year it's planned to have five events throughout New Zealand's south island.

Saturday started off cool and windy. The turn out was good with four pilots travelling from out of town to fly at the event.

Aerotowing is still in its early stages in the south, and the interest levels are showing good signs for this to be a very well supported event in the future.

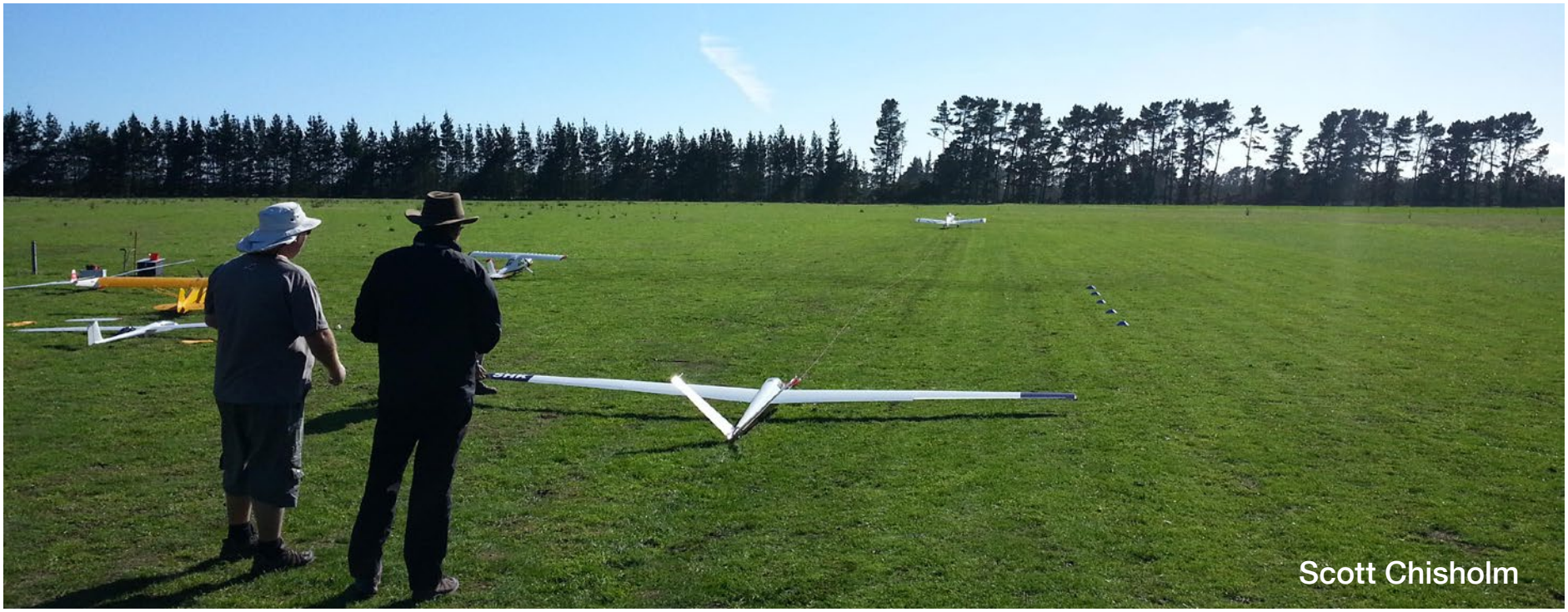
As the paddock was lined with trees on every fence line, there was quite a lot of chop early on for the pilots to contend with whilst on tow and on the landing approach. This meant people were somewhat slow to really get into their days flying. We were lucky as the morning went on the conditions improved and people became happier to give it a go, as the wind backed away there were light thermals to be had right throughout the day, making for some enjoyed 10 minute to 20 minute flights.

Christchurch local Andrew Palmer was one of the tow pilot team doing a great job with his big DA120cc powered Hangar 9 Pawnee. Another tow plane with a slight difference was Jeremy McLean's electric powered Piper Super. The model has a tone of grunt pulling any of the models up with ease. Between Jeremy and Andrew they were to be the two main tuggers of the day. Peter Hewson provided tow support with another DLE powered Hanger 9 Pawnee flown by his son Alex in the morning.


Scott Chisholm


Scott Chisholm


Scott Chisholm


Scott Chisholm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Graeme Phipps

Scott Chisholm

Peter Hewson: Pawnee 1/3 scale tug, Discus 2C 4.5 m glider
Peter Deacon: Super Cub (DLE55) and 4m ASW 28-18, plus my 3.1m Graphite (electric)
Allan Knox: SHK 5m, T31 small, Alchemist OD Thermal. (and some electrics)
Andrew Palmer: Pawnee 33%, assorted gliders
Alex Taylor: large towplane, Jantar, ASG 29, and some cloth to sew on to Andrew's shorts
Steve Fish: 2.2m 35cc Wilga tug, 1/5 scale 3.4m 1/5 scale Minimoa, Radian. Orion E
Alex Hewson: DG300
Peter France: 4m electric glider
Reg Williams: 4m glider
Corrie Hoult: glider
Neal Blackie: glider
Peter Graham: Jouster glider
Jeremy McLean: ¼ scale Piper cub tug, K8 glider
Dave Griffin: ASW 22


Graeme Phipps

On the glider front there was a wide range of modern glass ships right through to a few old style wooden ships. The wingspans ranged from Allan Knox's 2.6m Slingsby T31 through to Dave Griffin's 5.5m ASW22.

One model that had a great presence on the field was Allan Knox's 5m SHK. Allan built this model from scratch and his attention to detail is first class. The model looks great both on the ground and in the air. The performance Allan gets from the model is impressive, it just show's you don't always have to go buy a big glass ship. This is one of the remaining disciplines in soaring where people can build to a good standard easily without having to buy in the latest technology to stay competitive.

Great to see Andrew Palmers EMS KA7 take flight; this was the first meet for the model. I was lucky enough to get a loan of it for most of the day Saturday and I have to say it flies great.

Everyone flew right through the day enjoying the light thermal rides whilst the very relaxed social mood of the day provided for some great light banter by all.

At the end of the day it was decided to give some dual aerotowing a go behind Andrews Pawnee. Dave Griffin's ASW22 and Scott Chisholm flying Andrew's KA7. The sight was something to see with all three pilots smiling every bit of the way.

The next challenge was spoken about to strap 10 radian in tow which will be a great goal (Maybe).

A Saturday evening social was held at the Famous Grouse pub in Lincoln, where everyone enjoyed the stories of the day and catching up with friends from away.


Scott Chisholm

Sunday's weather was slightly worse with a stronger wind blowing. This meant very few pilots were keen to take a tow. Some like Peter Dakin and Allan Knox did, they were first away behind Andrew's Pawnee.

Both came back from their flights noting that it was windy and rough above. Coffee was taken and most called it a day then.

Allan and Andrew decided to have a go at some towline aerobatics. Allan pulled out an old thermal model and took a tow rolling along the tow. Even Andrew got into the action rolling the big Pawnee as well. Awesome stuff!

Special thanks goes to Peter Hewson and the team at Christchurch Radio Fliers Club - they did a great job of hosting the event with hot and cold drinks throughout the weekend and BBQ lunch each day.

Aerotowing in New Zealand is a growing group and the events are proving popular in both the north island and the south. New Zealand still has a small soaring population with maybe 40 pilots nationwide that come and go to these events. The next aero tow is to be held in Blenheim in the month of July.

Kevin Farr about to launch at Signal Hill near Cape Town, South Africa, and pondering the wisdom thereof.

First Flight

Chuck Anderson, chucka12@outlook.com

Last year, I added an electric motor to one of my RES sailplanes to fly in an ALES contest. While test flying after the motor installation, a new Radian flier asked why I bailed out of a thermal and landed at less than five minutes.

This got me thinking about an article about the first flight and trimming for the novice flier.

Most articles about trimming sailplanes emphasize maximum performance and are of little use to the novice just trying to get his first sailplane flying.

Some novice fliers I have observed never complete trimming their thermal soaring models because just flying is good enough for what they want to accomplish.

I continue test flying and trimming until the model is stable enough to work distant lift with minimum control corrections.

The Electric LilAn

The primary objective of the first flight for novice fliers should be to get the model back on the ground without damage to make any necessary adjustments.

A successful first flight starts in the shop with the initial setup followed by formulation of a flight test plan before the first launch. It is tempting to take off for a long flight if the model is flying reasonably well, but it's better to be sure everything is functioning properly before heading out into the wild blue yonder.

For sailplanes, I set the CG to 30% mean aerodynamic chord for the first flight. Nose heavy is safe as long as there is enough up elevator power to flare for landing while a tail heavy untrimmed model may not survive for a second flight.

For sailplanes, the tow hook should be at the forward edge of the recommended location. Tow hook too far forward results in a poor launch, while too far aft can produce a pop off and crash. A hand

completed. A broken towline or winch malfunction can happen at any time and a new untrimmed model can be a handful so be prepared to abort the launch and land straight ahead. Experts do this automatically without thinking about it.

The first flight should be limited to an altitude where you can clearly see what the model is doing. Leave the zoom until after initial trimming has been completed.

After release from the towline, do preliminary trim settings and slow

Over the years, I have found a log can be invaluable in evaluating events leading up to an incident.

Initial setup involves setting control throws and CG location. Rudder, ailerons, and elevators can usually be set to zero deflection by simply eyeballing them to be parallel to the fin, wing, and stab.

Setting all moving stab zero is a little more difficult and I set it parallel to the bottom of the wing for the first flight.

I set low rate control throws to the recommended deflections and high rate at 50% more and make the first launch in low rate.

glide will usually tell if the stab is close enough for the first flight. These are the first steps I use for the first flight of a new model.

Have an experienced flier throw the model for the first launch and be ready to react to any deviation from a good launch. The novice flier might even have an experienced flier pedal the winch or even make the first flight on a new model.

First launch should be conservative until the stall behavior is known and initial trim

the model down to check stall characteristics.

If a wing drops in the stall, fly the first landing at a safe air speed. Once a safe landing speed has been established, deploy spoilers or crow. If the model needs large elevator corrections for a smooth glide, make the landing without spoilers or crow.

If these preliminary checks are satisfactory, then you can chase thermals, but I prefer to land and write

Charlie Baer ready to launch.

down everything I have observed before I forget everything that happened.

After the first flight has been successfully completed, I record observations and make any necessary adjustments and corrections before the second flight.

Early flights concentrate on setting control throws and adjusting linkages to center the transmitter trims when the model is trimmed for level flight. When the model is trimmed reasonably well, I move the CG until the model flies the way I prefer.

After the model is trimmed to my satisfaction, I move the tow hook aft until I get a good launch. My article "The Three Abilities" in the April 2008 *RCSD* tells how I trim my thermal soaring sailplanes. Experts often take trimming one step further to optimize performance, but many of us do not benefit from trimming for performance instead of stability and control.

I did not do this for the Electric LilAn because eight sailplane versions have been built over the last seven years. I simply copied the transmitter settings of LilAn 4 that I usually fly to the Electric LilAn and set the CG at the same distance aft of the wing root leading edge.

I clamped a four foot long square aluminum tube to the bottom of the wing and set the stab leading and trailing edge equal distances from the tube for the first launch.

First launch was kept low enough to clearly see the model.

After trimming for level flight, I did a stall check to check for tip stall. The model was in reasonable trim so I opened the spoilers to check elevator compensation. If elevator compensation had not been satisfactory, the first landing would have been without spoilers.

I keep a log of all flights in a Word file on my computer. The logs of the first few flights are very detailed about adjustments, trim, and control response until the model is trimmed out. Log entries then gradually decrease to weather conditions and flight times until they finally become just a list of the number of flights each day unless there is an event worth recording.

Over the years, I have found a log can be invaluable in evaluating events leading up to an incident. I suppose this is a result of 32 years of keeping detailed notes while conducting wing tunnel tests. It works for models, too.

Charlie Bair launched the Electric LilAn on its first flight and I climbed to about 200 feet altitude to set trim and check handling quality. Since I could restart the motor, I didn't have to climb as high to be able to complete initial checks. Altitude was limited to about 200 feet for the first climb to better observe the model while evaluating trim and control response under power and gliding flight. A final full power climb was made from about 25 ft altitude to 300 feet before landing to check motor, ESC, and battery temperatures.

Two more flights were made that day. The second flight was a full power 30 second climb followed by a steep descent to a landing to measure motor temperature immediately after touchdown. The third flight was a 25 minute thermal flight after completing trim and control response tests.

A second day of testing was required to set the throttle-elevator mix to give a comfortable climb under power. At this point, the Electric LilAn was essentially trimmed out because all the real setup was copied from LilAn 4 that had several hundred flights.

In 2006, the prototype LilAn II was ready for its first contest in less than 10 flights, but it still took almost 50 flights before CG location, tow hook position, and dual rate settings were finalized. Each succeeding LilAn has required fewer flights to complete trimming for flying in distant thermals.

This is the log I recorded before the second flight of the Electric LilAn. I could have climbed out in the weak thermal but I wanted to check motor temperature and record my observations while they were still fresh in my mind.

Cloudy with temperature 81 and light NW wind with occasional strong thermal gusts. Turbulence made it a bad day for testing so flying was confined to adjusting trims and checking motor temperature.

Flight 1. Charlie threw model and I started at half throttle. Model would not climb so slowly added full throttle and model climbed a little steeper than I liked for initial launch. Rudder very sensitive until I had model stabilized in a fairly steep climb. Leveled off at about 200 feet at part throttle. Controls very sensitive at part throttle. Cut power and controls became less sensitive. Had to add three clicks of up trim. In a weak thermal so let Charlie fly model for a minute. I took the transmitter and climbed to about 300 feet at full power. Had to hold a fair amount down elevator to maintain a good climb angle. Checked thermal turns in buoyant air. Good handling. Good stall check. Charlie says it is flying like a LilAn. Set up for a normal pattern. Spoiler-elevator mix good. Smooth touchdown at about 5 minutes.

Checked motor, ESC, and battery temperatures. The battery and ESC OK but the motor felt hot. Measured the temperatures with IR temperature sensor a few minutes after landing. Battery and ESC were 92 degrees and the motor was 113 degrees. Let motor cool for about 10 minutes and checked motor temperature at 10 second intervals through a 30 second full power run with canopy off. Temperatures were 85 before starting, 90 after 10 seconds, 98 after 20 seconds, and 108 after 30 seconds at full power.

The first Montague Glider Festival will take place at/near Siskiyou County Airport at Montague, California, from June 7 through June 15, 2014. The Festival has evolved from the Montague Cross-Country Challenge; it consists of three separate events: Scale Aerotow (June 7-8), GPS Racing (June 9-11), and FAI Cross-Country June 12-15).

This is the 17th event organized by Dean Gradwell and his friends. Judging by the meticulous execution, friendly and generous hospitality, and superb yet challenging flying conditions of the previous 16 contests, this will be a most notable soaring event in the US.

Concurrently with the RC Festival, Siskiyou County Airport will host a full-size vintage glider fly-in.

A WWII Glider — in the Buff!

Rand Baldwin • March 14, 2014

http://www.soaringcafe.com

<http://soaringcafe.com/2014/03/ssa2014-a-wwii-glider-in-the-buff/>

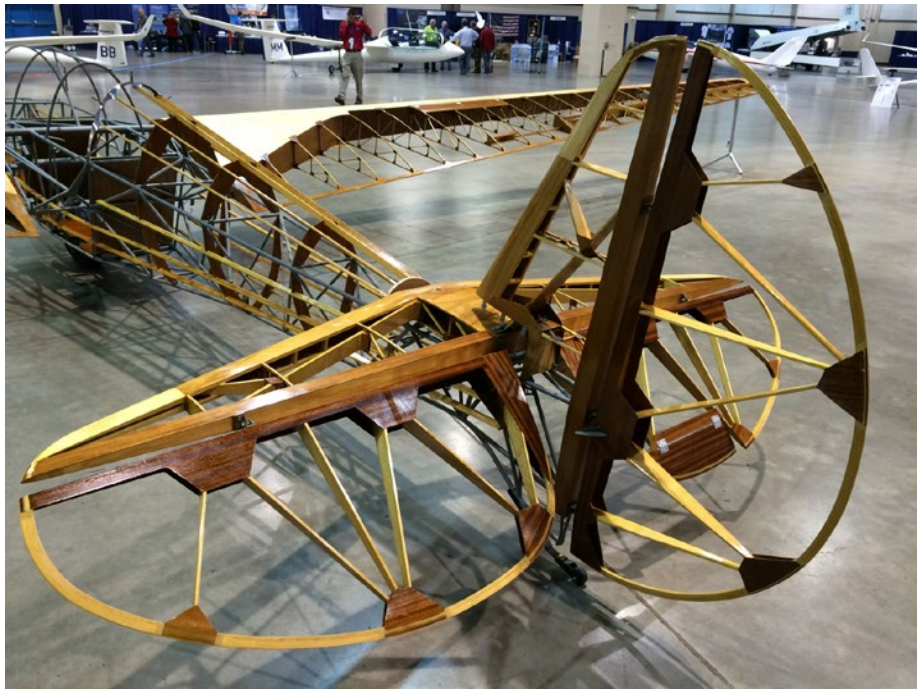
Our video tour of the SSA 2014 exhibit hall <http://soaringcafe.com/2014/03/ssa2014-a-video-tour-of-the-exhibit-hall/> included a short clip of the beautiful, naked Laister-Kauffman TG-4 glider on display there.

We were wowed by the craftsmanship and elegant handiwork that went into creating this classic World War II trainer.

And so, we decided to feature it here in all its glory.

The L-K TG-4 was designed as a trainer for pilots who would fly large cargo gliders. The one pictured here is serial number 151, built in 1943.

Video walk-around at: <http://www.youtube.com/watch?v=WkbRSkKENhw>



2014 Spring Soar-for-Fun

Cumberland, Maryland

Pete Carr WW3O, wb3bqo@yahoo.com

This is the building at the flying site. There is no commercial electric service at the site so a solar panel on the roof charges 12 volt batteries. This gives a 12 volt source for charging model radios and batteries for electric powered ships.

Jim Dolly host and owner of the slope site asks for divine intervention about the low overcast at Fridays pilots briefing. It worked as the afternoon flying session was sunny with excellent lift.

Jim Dolly, owner of the slope site at Ol' Knobbley Hill south of Cumberland has expanded the activities to three per year. The opener was March 21st through 24th at the tail end of the worst winter in recent memory. Many of the pilots remarked that they hadn't flown since late November of last year. The idea is to run a 4-day event so that at least a couple of them would be flyable. That was the case with the March dates as the second two days were forecast to be very cold.

The location is a mountain meadow with a hill facing due west and a clear slope down to a valley about 1200 feet below. The edge of the meadow has a line of low scrub trees that generates an amazing amount of turbulence. This makes landings a real challenge and requires either a bungy, winch or aero-tow to get clear of the chop and into the great air. While a short bungy or winch can be set into the wind, aero-towing is done across the wind and along the slope.

Title page opposite: The 16 foot span wing tows up behind the Carbon Cub tug. The wing has no yaw control, only pitch and roll so fine course corrections can be tricky. The tow was uneventful and the wing flew great.

The 16 foot span wing being assembled. There is a 3200ma battery and 2.4 GHz receiver in each half of the model. The two receivers are bound to a single transmitter for redundancy. Two servos power each control surface of this monster.

This 16 foot span wing is ready for tow. It uses 200+ oz servos, two per surface, along the trailing edge. Total weight of the wing is about 35 pounds.

In spite of cross wind tows the big sailplanes and tow tugs have very little difficulty with the conditions.

There were three Horizon Hobbies Blanik sailplanes on the field that had flown there last fall. These are fantastic ships that tow easily, are quite big and show up well at distance. The belly wheel makes them very good at landing and pilots report very little continuing maintenance requirements with the models. They street-price at about a thousand dollars for the ARF model so are a relatively inexpensive way to get active in aero-tow.

While the quality of the scale sailplanes on the field was absolutely wonderful it was the homebrew flying wings that stopped the show this time. These are a clear example of the results of three guys, some beer, a paper and pencil.

The story goes that these three guys had flown Mongos, which are about 12 foot span wings and didn't think that they were quite large enough. The resulting drawings were for a 16 foot model consisting of four 4-foot span panels. Working from the dynamics of the Mongo it was decided to double up and use 2 servos per control surface together with 3200 ma airborne packs and 2.4 GHz receivers. The yellow model actually had a complete radio system as described in each side of the model with the two receivers bound to a single transmitter.

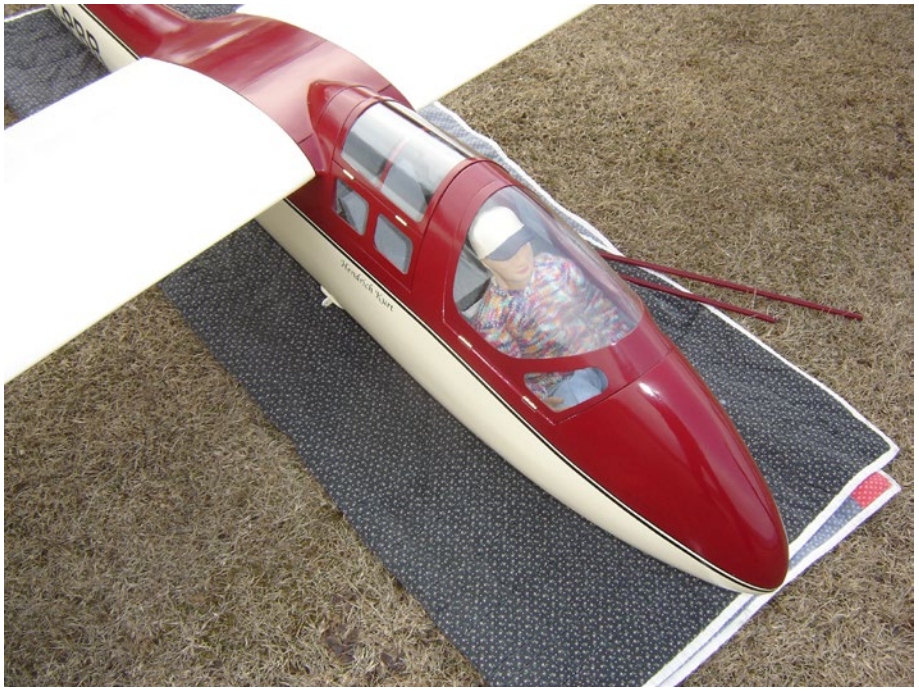
Each servo had over 200 inch ounces of torque and used a carbon fiber pushrod to connect to the control arms at the surface. While this might seem a bit of overkill, the first flight of the ship proved that the designer's caution was well placed.

These flying wings have no rudder control, using ailerons and elevator only. This could have been a problem on aero-tow, especially in the cross wind conditions mentioned earlier. The Carbon Cub tug is very adequately powered so pulled the 35 pound wing without a bit of trouble.

Both pilots were very experienced so the initial tow was a non-event. The wing came off tow in level trim and proceeded to work the slope lift in good form. After a period of testing some aggressive maneuvers were tried at which time the trailing edge of the ship began to flutter. The ship then returned to level flight and was set up to land. Once on the ground it was found that the fiberglass pushrod on one of the ailerons had come apart where the all-thread attached to it. The remaining servo was able to control the surface as long as gentle commands were used. The completed flight was the first of the day for the wings, all of which performed really great.

This wing uses two servos for each control surface and spans 16 feet. There was 10 pounds of lead needed to balance the model. Evidently there is a computer program available that figures the correct CG given the dimensions and airfoil specified.

A 12 foot span flying wing is assembled and ready to fly. These wings are made from four pieces of foam and the vertical stabs attach at the section joints. That's a very nice feature.



Above left: The pilot figure of this model wears a handmade knitted shirt against the cold at altitude. The workmanship of the pilots outfit is excellent and very unique.

Above: The wood instrument panel and gauges are works of art in this vintage sailplane. The hinges of the canopy are especially strong and nicely installed.

Left: This is a recording video camera inside a custom housing. The lens is on the side where it captures the dismay of the pilot while the model is working the lift. The camera and housing can easily be moved to different aircraft.

Opposite page: This trailer is what the well organized modeler should have. The slide-out drawer is a great use of space and the work surface means no more working on your knees.

I asked one of the pilots about how the center of gravity was determined. There is evidently a computer program that determines that after the dimensions of the model are input. The results speak for themselves as only very minor trim tweeks were needed at altitude.

The yellow wing had tip plates similar to a Zagi while the others used plates at the panel breaks. In every case there was no noticeable wobble in the flight path no matter where the plates were placed. That may mean that the plates had little effect on the models stability.

Jim Dolly, our host for the weekend, has spent a lot of time and money on the road going up into the site. It has helped that several new homes have been built on the road recently which spreads the work. Still, as the site has catered to larger sailplanes and tugs the trailers and trucks needed to ship them had made the road rather hard to drive. Jim's work has made the trip up the road a joy to use.

Opposite page: This Discus 2 was one of the smaller scale ships on the field. The pilot figure has a complete parachute harness and with hat glasses and gray beard which mirrors the modeler!

The pilot doll in this model has a rather unique grin and I asked about it. It was custom made in the likeness of the model builder and there was definitely a resemblance!

Resources;

<http://www.highpoint-aviation.org>: web site for the Cumberland Maryland slope site.

<http://www.horizonhobby.com>: one source for the ARF Blanik sailplane.

<http://www.chiefaircraft.com>: another vendor for the ARF Blanik sailplane.

<http://www.mcmaster.com>: web site for McMaster-Carr Inc. high quality hinges for canopies and control surfaces.

Review

FMS Fox 2.3m PnP

Dan Ouellet, dan@danosoft.com

The FMS Fox is a Fun, Must-have Scale-looking rendition of the full scale Fox sailplane G-CFOX!

First Impression

This model looks good! Both up-close and in the air! It seems to fly in a scale-like manner, and I am having a blast with it!

FMS specializes in affordable high quality scale models. Their molding is second to none. The finished foam is smooth without any visible molding marks or defects.

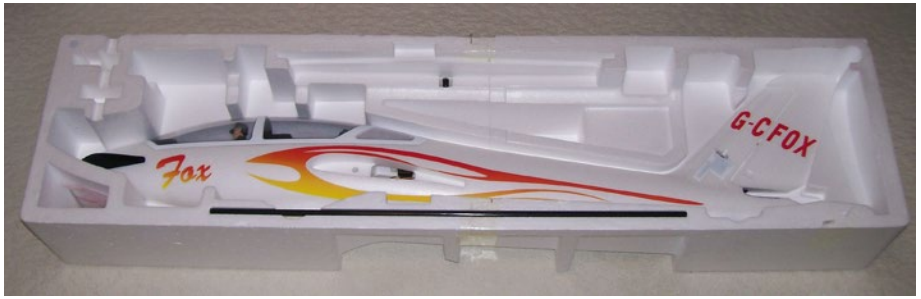
There is very little to do to get the model in the air. The decals are already applied. All that remains to be done is to bolt-on the horizontal stabilizer, mount the linkage rods, install the receiver, adjust the control surfaces, program the transmitter and charge the battery.

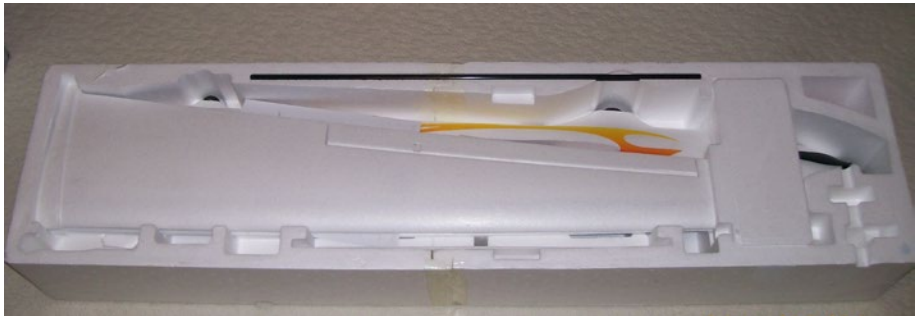
Unboxing and Assembly

FMS pays attention to its packaging to ensure that the model arrives safely, and it shows. After unpacking, all looked good.

There were no visible damage, warping or dents on any of the components.

The “kit” came complete including the required hardware: control horns, linkage rods and screws. Assembly was quick, since there is so little to do.





Having read the manual the previous night, I unboxed the Fox Friday evening, and had everything ready for the maiden flight that night. The longest step was programming my radio.

The review model being “Plug and Play,” I used one of my existing 2200 milliamps 3-cell 30C LiPo batteries. The battery fits perfectly in the model bay, but it is probably heavier than the one that would come from the factory in the ready-to-fly version. To get to the recommended “40mm” Center of Gravity, I had to use two ¼ ounce weights at the far end of the tail.

Custom Programming

I believe that I can use all the help I can get, and I like to have the radio do as much of the work as it can. Therefore, when setting up a model, I always perform some custom programming. Here are the functions I elected to program while setting up the Fox.

To help control the landing approach, I configured the wing with dual aileron servos and setup spoilerons on the 3-position flap switch. The 1st position is programmed for normal ailerons, the mid-position is set for 35% up on both ailerons, and the 3rd position is set at 70% up.

To minimize abrupt changes when deploying the spoilers, I programed in a slower servo speed. Typically, I start with a 2 second delay for full deployment and adjust from there according to the model behavior.

While chasing thermals, I will often fly my gliders either high, far away, or both! Therefore, I like to set up a mix in my radio between the ailerons and the rudder to minimize my workload. Normally, on a glider, I will start with

a 50% mix and adjust from there by observing how the model flies.

The manual did not recommend any servo rates or exponential settings. To archive a smother flight, I definitely want dual rates, and like a lot of exponential. This translates to about 40% exponential with most of my gliders, a setting that works well for me. So I configured my full rates to 100% on all servos with 40% exponential. Then, I configured my low rates to 65% on the ailerons and elevator, and 80% on the rudder with the same 40% exponential.

Maiden Flight

The Fox's maiden flight was on Saturday, February 22, 2014, at the Seminole Radio Control Club facility in Tallahassee, Florida. I could not have asked for a better day. The weather was in the mid-60s, clear sky, light and variable winds coming out of the northeast.

The manual recommends to launch the Fox by "running several meters to accelerate yourself" and "throw it horizontally." I translated this to mean a firm level throw while running fast! With my bum-knee, I was not too sure about the "running fast" part, since I can barely walk normally.

Therefore, I tested to make sure that the model had sufficient power to launch underhand in a nose high attitude of 35~40 degrees, while standing still. This looked like it was going to work well! At full power, the Fox wanted to pull out of my hand on its own.

Since it was the Fox's first flight, I enlisted the help of Robin, a fellow club member, to launch it using this technique. This allowed me to keep both hands on the sticks, just in case I needed to react quickly. On my command, Robin released the Fox. It gently pulled away from his hand, and accelerated smoothly to what looked like a good climb speed.

I just had to hold a little down elevator to maintain the climb angle and not lose any airspeed. I leveled out the glider at about 200 ft. and reduced throttle to the off position. It was easy to establish what looked like a good glide, and I just needed to add two clicks of right aileron trim and seven clicks of up trim to maintain the glide hands off.

Wow! This is fun!

A few minutes of flying to get comfortable with the Fox showed me that it prefers a faster airspeed, comparing to most of the other foam gliders that I have flown. It has a lot of penetration, good energy retention, and is not too difficult to thermal in moderate lift.

It was now time to test the spoilerons and find out what to expect before coming in for the first landing.

What a delight to discover that applying the spoilers did not cause any unexpected characteristics or require any trim changes. In the mid-flap position, the models just started to settle without any speed change while keeping the same deck angle. Nothing was really apparent except that it just descended more quickly! The full flap position resulted in a slight slowdown and a noticeable increase in the decent rate.

All in all, a very smooth transition and predictable approach.

This is a good thing, because the Fox glides well and would otherwise require a very flat and long approach to land normally. Without the spoilers, it would have taken a while to bleed off airspeed; and if coming in too fast, would have seemed to float forever!

Therefore, I proceeded to make a landing approach by “tapping on the brakes” on base, and going to full spoilers on final. It worked like a charm, and I was able to touch down right in front of me on the main wheel in a good “two” point attitude. ;-)

Altogether, my timer showed that I used about 3 ½ minutes of “full” power for the maiden flight. Total fly time was approximately 15 minutes. According to my charger, it put back in 1100 milliamp to recharge the battery pack.

Therefore, a 2200 milliamp battery can safely supply about 5 minutes of “full” power – enough for about ten 30 seconds climbs to 500 ft. With a little luck finding thermals, it should be very easy to stay up 20~30 minutes per flight, possibly longer.

Trim Flights

I used the following three flights to zero-in my programming and further explore the flight envelope of the Fox.

I wanted to take out of the radio the trim adjustment made during the maiden flight. Noticing that the port side (left) aileron position could move downward slightly, I shortened its control rod ½ turn. Then, I extended the elevator push rod by two turns. This was as close as I could get with mechanical trim. Further adjustments were finalized with sub-trim.

To alleviate having to hold down pressure to keep a constant angle while climbing at full power, I programmed a slight throttle to down elevator mix in my radio. This makes for smoother acceleration without noticeable ballooning, unless the airspeed builds up, and helps me maintain the correct climb speed.

To maintain a constant heading during steep climbs, the Fox requires a lot of right rudder, therefore, I added a throttle to rudder mix.

As I got more comfortable with flying the Fox, I noticed that I could slow it down somewhat. Re-trimming to reduce the glide airspeed 3~4 mph still left good energy reserves and did not introduce any bad tendencies, such as tip stalling. This helped in thermals.

At one point, I found a moderate thermal which quickly took the Fox to over 1,000 Ft. What a blast! That particular flight lasted close to 30 minutes, and used less than four minutes of “full” power.

Test Model Specifications

Wingspan:	2320mm (91.4”)
Length:	1290mm (50.8”)
Weight:	1150g (40.6 oz.) w/o battery
Battery:	Glacier 2200 mAh 3-Cell 30C LiPo
Receiver:	Spektrum AR6210 6-channel Full Range
Transmitter:	Spektrum DX8
Distributor:	Diamond Hobby LLC <http://www.diamondhobby.com/>

Web page: <http://www.diamondhobby.com/airplanes/fms-2300mm-fox-pnp>

Conclusion

The FMS Fox is a Fantastic Motorized Sublime glider that should be in any hobbyist’s hanger! It is a relatively easy to fly, all around glider that stands out at the field! Best of all, it is reasonably priced at only $189.00!

What else can you get to have so much fun with so little money?

Soaring Symmetry

Kevin Farr, kevin@fvdv.co.za
Photos by Noel Cochius

Hermanus South Africa, November 2013, at a place called Volmoed where we were staying.

During an early morning power flight session at the camp my Sky Climber was set upon by male and female Yellow Billed Kites protecting their nesting site some 500 meters away.

The symmetry just begs belief and points to why we slope soar.

Photographed by Noel Cochius while I flew the Sky Climber.