
Radio Controlled
Soaring Digest
June 2015
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dream-flight

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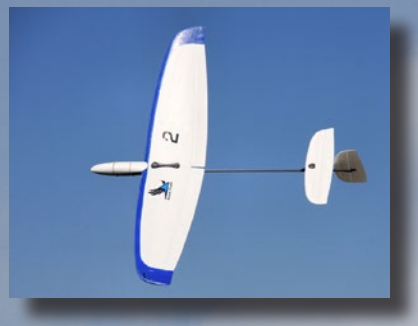

Front cover: Dave Garwood's Libelle flying over Lake Erie during the North Coast Glider Games in May 2015.
Canon EOS 40D, ISO 200, 1/1600 sec., f7.1, 113mm

Back cover: Magnus Hedlund flies his Pike Perfection "around the moon." Photo by Krister Bergenfeldt using Magnus' camera.
Nikon D750, ISO 100, 1/800 sec., f2.8, 200mm

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In the Air

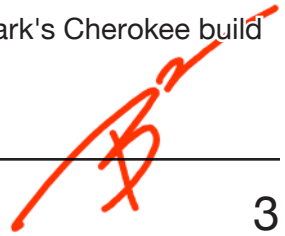
We are very impressed by some of the sailplane designs which have recently appeared and are soon coming to market. Two of these models appear in this issue of *RC Soaring Digest*.

Michael Richter uses his degree in mechanical engineering to design RC sailplanes. His Weasel and MiniWeasel are primarily slope machines, and the original Alula was also a good flatland flyer. (The newest version, the Alula TREK, is coming soon.) The most recent release from Michael is the Libelle which is both a sloper and a flatland flyer. After reading Dave Garwood's review of the Libelle, starting on page 4, it's obvious Michael has once again produced a kit you can quickly turn into a sailplane which provides more fun than man was meant to have with an RC model. A bit different than the Weasel and Alula in that it has a tail, the Libelle serves as a very capable machine for "experts" and as a good starter plane for the newcomer.

Also in this issue is the Remec Design Jonker JS1-C "Revelation." The design process and the prototype's very positive flight report are detailed beginning on page 23. The finalized models will be lighter and therefore even better performers. For additional photos of this model, be sure to check out the slide show <http://www.remec-design.com/joomla/index.php/js1/js-slides> on the Remec Design web site <http://www.remec-design.com>. For more information on the Jonker JS1 itself, see the Jonker web site <http://www.jonkersailplanes.co.za>.

Time to build another sailplane!

[Due to editorial time constraints, Part 2 of Al Clark's Cherokee build will appear in the July issue.]



dream-flight®

libelle™

RC discus launch glider for EVERY ONE!

Dave Garwood, dave.garwood.518@gmail.com

CONCLUSIONS:

1. The Dream-Flight Libelle is a remarkably well-designed small sailplane, shipped in a superb high-quality kit.

2. The Libelle works well to introduce hand launch soaring. It is not a contest level DLG model, but it launches high enough to find thermals and flys very well when circling in lift.

3. For me, the Libelle works best as a light-air, and small-hill slope sailplane. It penetrates wonderfully, outperforming many other sailplanes on a gently sloped hill. It is buoyant and responsive, and can make use of slope lift on a surprisingly small hill.

4. The Libelle is rugged, but parts do break from time to time. Many can be repaired successfully.

5. It's easy for me to recommend the Libelle to newcomers to soaring, both for those who want to try hand-launch thermal soaring, and for those just starting in slope soaring.

DISCLAIMER:

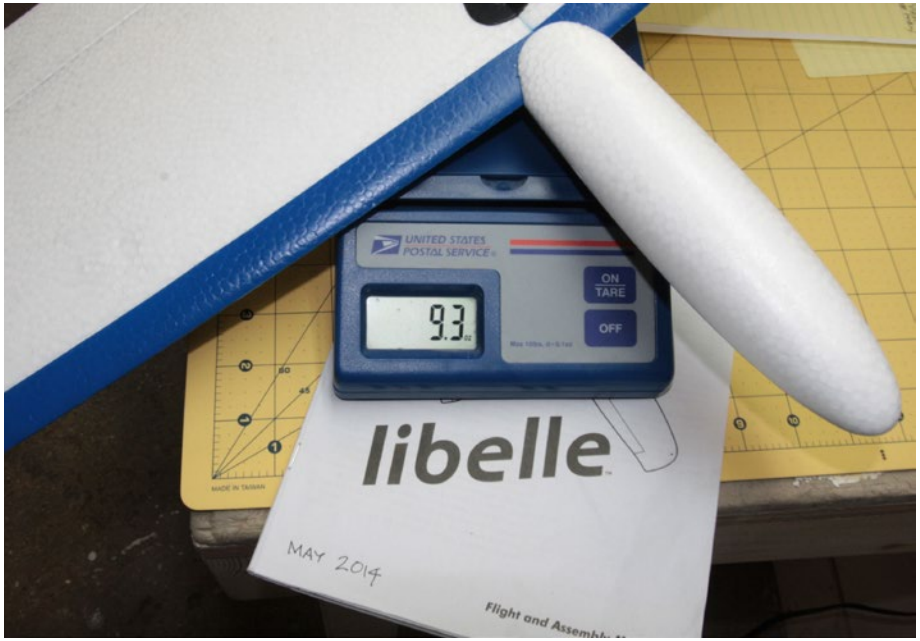
I have flown with designer Michael Richter and consider him a personal friend. I have greatly admired his manifold design skills and production engineering capabilities for years, ever since I first built and flew his Alula and Weasel slope soaring sailplanes. (Dave's Dream-Flight Alula kit review appears in the February 2013 issue of R/C Soaring Digest.)

Dave hand catches his Libelle on the shore of Lake Erie.

COMMENTARY:

I have built three Libelles and flown them for nearly a year. I find the kit exceptionally well designed, and the materials well selected. It is pleasing to work with the high grade hardware included in the kit.

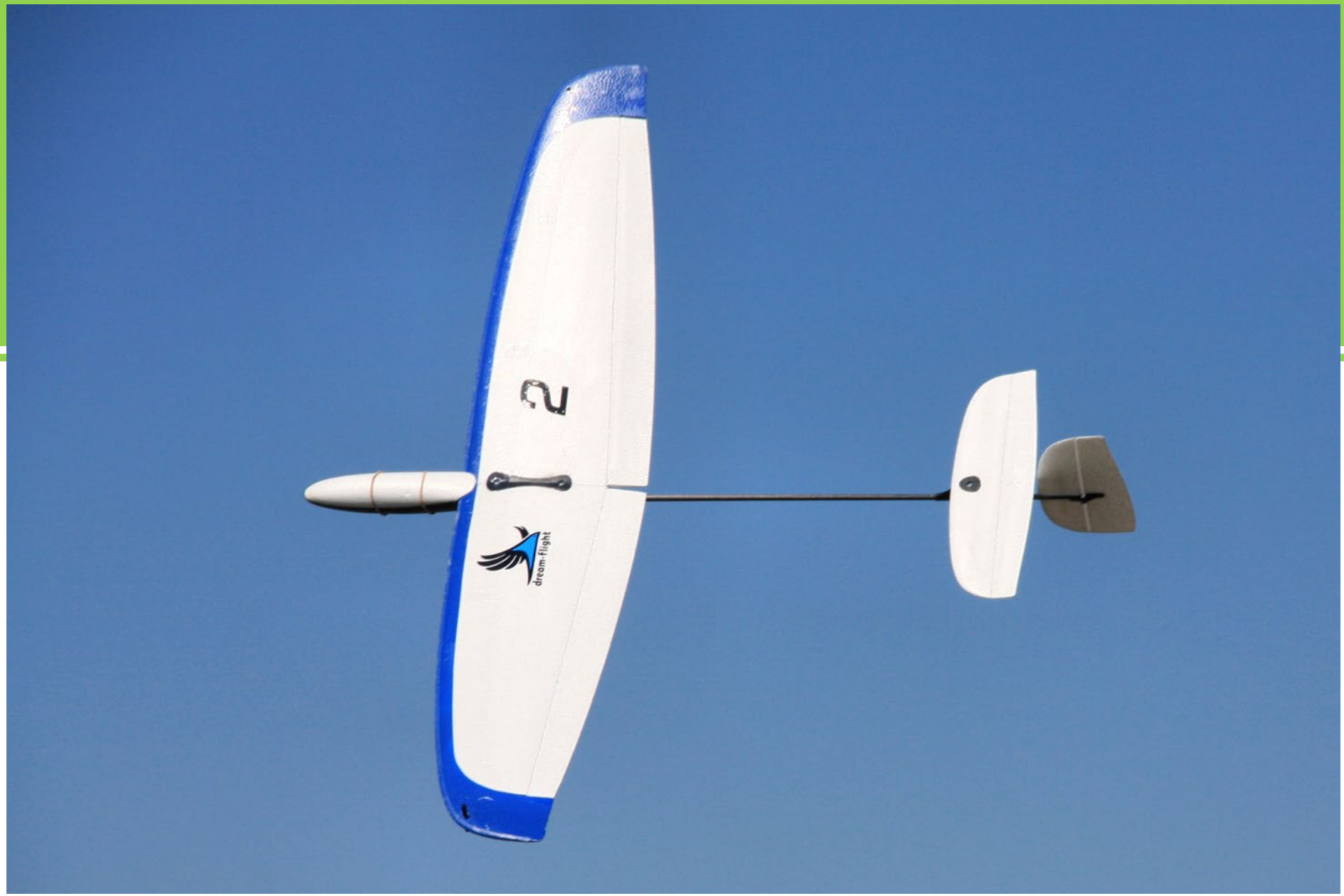
The instruction manual sets a high standard for model airplane kits - detailed, clear, and easy to follow. Those who have seen the Alula and Weasel instruction manuals will know what to expect. All can look forward to reading and using this one to build the kit quickly and efficiently.



Above left: Kit contents including molded foam wings halves, vertical and horizontal stabilizers, high-grade hardware and a superb instruction manual.

Above: One of Dave's Libelles awaits another outing.

Left: *Each of Dave's three Libelle builds weighed less than 9.5 ounces (270 grams) with a little paint on top and bottom.*



Libelle in flight. Photo taken at Perry Park on Lake Erie during the North Coast Glider Games in May 2015.

This shot of the Libelle against the sky shows off its sleek lines and planform similar to conventional RC-HLGs.

Contrasted by a bright sky, the slight transparency of the foam makes the fiber reinforcements, including the spar system and stress spreaders at the wing root, stand out clearly.

Dave's three Libelles on the bench, ready to go out flying!

My personal preference is to use Welder Adhesive glue and epoxy glue instead of CA glue, and since I don't mind letting a glued assembly set up overnight, my build times are closer to three days than three hours. I have heard of Libelle airframes being constructed in 45 minutes on a picnic table at the slope.

I think it's safe to say this kit will go together quickly and rapidly for most builders. For personalized markings, rattle can Krylon paint worked fine for me after an alcohol wipe-down.

I have installed the Dream-Flight recommended components as well as other servos and battery packs. All worked fine for me. Each of my three builds weighed less than 9.5 ounces (270 grams) with a little paint on top and bottom.

Libelle launch performance on my my first few sidearm launches fell short of my expectations. I had flown carbon-and-Kevlar DLGs and the Libelle launches seemed puny to me. I asked a flying buddy at the field flying a Kennedy Composites Blaster 2 to try, and the wings fluttered during his muscular competition type launch. Flutter can be very hard on control surfaces.

I installed the Dream-Flight wing-stiffening decals and wing stiffness improved but the flutter was not completely eliminated on very hard launch. I mentioned all this to designer Michael Richter and he send a detailed reply presented here as a sidebar.

Subsequently, I ceased my pursuit of moon-shot launches, and concentrated on flying, just as Michael suggested. As Dave Thornburg taught us, "You learn more about your sailplane and yourself under 50 feet than over 50 feet." My relaxed DLG launches now average 50-

Hills like this one, with a gentle slope, are readily flyable with the Libelle.

60 feet, arm sore no longer. The Libelle really does fly well.

As pleasant a flyer as the Libelle is on the flatland, and as much of a peak experience it is to catch a thermal down low and ride it to speck height, in my view the model really comes into its own as a light air slope plane.

Wouldn't we all like to have a slope soaring hill ten miles from our house? I do, and it has a lovely view of the Mohawk River out front, but it needs a rare wind direction, one we don't get more than a handful of times each year.

Eleven miles from my house is a picturesque valley facing a prevailing wind, but limited in the sailplanes we can fly there because of the very gentle slope out front. Even the Dream-Flight Alula, my standard for light lift conditions, gets blown back easily when the wind is up. Enter the Libelle. BLAMMO - nailed it. Penetrates out far. Stays up in exceedingly light lift. Handles gusty wind. Catches and climbs in thermals blowing through. Handles great. Handles. Just. Great. I'm in love with this plane on the slope.

Four (motorized) flying buddies have had their first slope flying experiences on this underwhelming little hill with this superbly designed and great flying sailplane. The Dream-Flight Libelle is a truly cool sailplane.

COMMENTS FROM MICHAEL RICHTER

Dave,

I'm really happy to hear you are getting more stick time on the Libelle and getting some good testing in. Thanks for sharing with the new guys.

As for discus launch, we want all our customers to realize this is NOT a competition glider and should not be treated as such during launch. There is a point of diminishing return as one increases launch force with the Libelle. If you want to attempt throwing out your arm out from the get go, then by all means start with a stiffer, less forgiving airframe and put everything you've got into it (you will regret it the next day!). The decals do help, and make the launch a bit straighter.

Also, encourage your friend to try a slightly more vertical launching method, and ease off the gas a little. Many of our customers are reporting getting 100+ feet using some practiced technique and tailored launch settings for their Libelle.

The philosophy here is to encourage people to ease into the DLG technique, and the foam airframe is a very good jumping off point for this. Sure, you can try to launch it like something with composite molded wings, but it's simply not engineered for that.

The Libelle was designed for an entry-level price point, skill level, and launching method; however, due to the modern design and manufacturing methods afforded to us, we were able to optimize the aerodynamic design, resulting in a very efficient and playful design that is ABSOLUTELY capable of

Michael and son Kelby flying a beach slope.

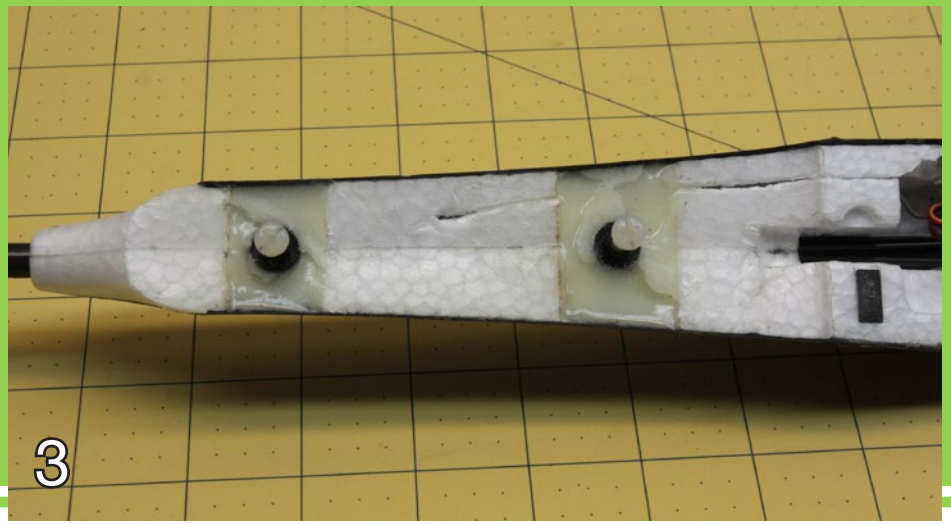
catching a small thermal from a light launch at low altitude. If the pilot overdoes the launch, which we encourage against, the glider will let him/her know... encouraging them to back off a little and take it easy. As if to say, “Relax, focus on flying,” buddy.

We spent a lot of time on the “Flight and Assembly Manual” and we encourage Libelle pilots to pay close attention to pages 21, 24, and 25. These give some advice on the discus launch and flying technique. We want fledgling DLG pilots to take it easy to prevent injury and focus on the flying technique, which is more of the “game” in my opinion than the heaving part (since most of the contest gliders are so refined for launch already). The launch instead is focused more on when and where to launch.

With a proper molded competition aircraft, decent pilots can almost launch as high as the pros, but it’s the flying technique and finesse that always wins the contest. I’ve seen many people focus on the launch so much from the beginning, and this is great way to set themselves up for disappointment with the Libelle (especially if they are coming from the contest train of thought and expect a 150 foot launch). What happens is they lose track of how efficient the Libelle is and how little launching force it actually requires to get to thermal altitude, while it may not be the 150+ feet they can get with their carbon DLG.

Bottom line, The Libelle is an entry-level sport DLG that doesn’t break the bank and allows one to test spots where they wouldn’t dare chuck their competition DLG.

— Michael Richter



LIBELLE REPAIR LOG:

1. Loose vertical stabilizer. Make mount stiffer and stronger with either a bit of fiberglass cloth and epoxy, or some carbon fiber tow and epoxy.

2. Torn rudder hinge. Re-hinge with the tiniest amount of Welder Adhesive glue along the break and let set up overnight. Or use 3M Blenderm tape.

3. Loose wing mount bolt receivers. If slightly loose, dribble in some CA glue. If very loose, remove some foam and fill with epoxy mixed with milled fiberglass. The epoxy connects the mount bolt receivers to the sides of the pod for strength and stiffness.

4. Cracked fuselage pod lower section. Strengthen with a layer of light fiberglass cloth held in place with epoxy.

The is a great flatland flyer as well.

RESOURCES:

Dream-Flight website:
www.dream-flight.com

Libelle DLG thread on RC Groups:
www.rcgroups.com/forums/showthread.php?t=2092524

Libelle Links -- Reference
www.rcgroups.com/forums/showthread.php?t=2133608

Hand Launch Technique thread on RC Groups:
www.rcgroups.com/forums/showthread.php?t=1725624

Handlaunch Master Class 1 instructional video:
www.radiocarbonart.com/handlaunch-master-class-1/

League of Silent Flight (LSF)
www.silentflight.org

Dave's three Libelle builds all weighed under 9.5 ounces (270 grams) with paint on wing top and bottom, but without the wing stiffening decals. Layout of onboard electronic components in the pod. Dave found that a top-pin receiver is easier to fit than an end-pin receiver.

LSF DURATION FLIGHT WITH LIBELLES

Three New York Slope Dogs decided to fly their new Libelles for a group one-hour duration slope flight attempt as described in the League of Silent Flight (LSF) Soaring Achievement Program.

We expected an aileron sailplane to be more entertaining than a polyhedral ship - the better to keep the pilots alert and entertained. The DLG capabilities of the Libelle would enable the pilots to clear a tree line averaging 25 feet high on launch.

All was cool the first half hour, flying, chatting, and enjoying the experience.

In the second half hour, boredom and eyestrain became factors we had not thoroughly anticipated.

Suddenly, one Libelle went down into the woods. The pilot had been “flying the wrong plane” and his went down uncontrolled.

New York Slope Dogs Joe Chovan, Terry Dwyer, and Dave Garwood after LSF One-hour slope duration flight. That tree line 150 feet behind the pilots is about 25 feet high. A DLG sailplane handily clears the obstacle and gets up, out and into lift.

Not long after, another Libelle headed for the trees below - having exhausted the battery pack.

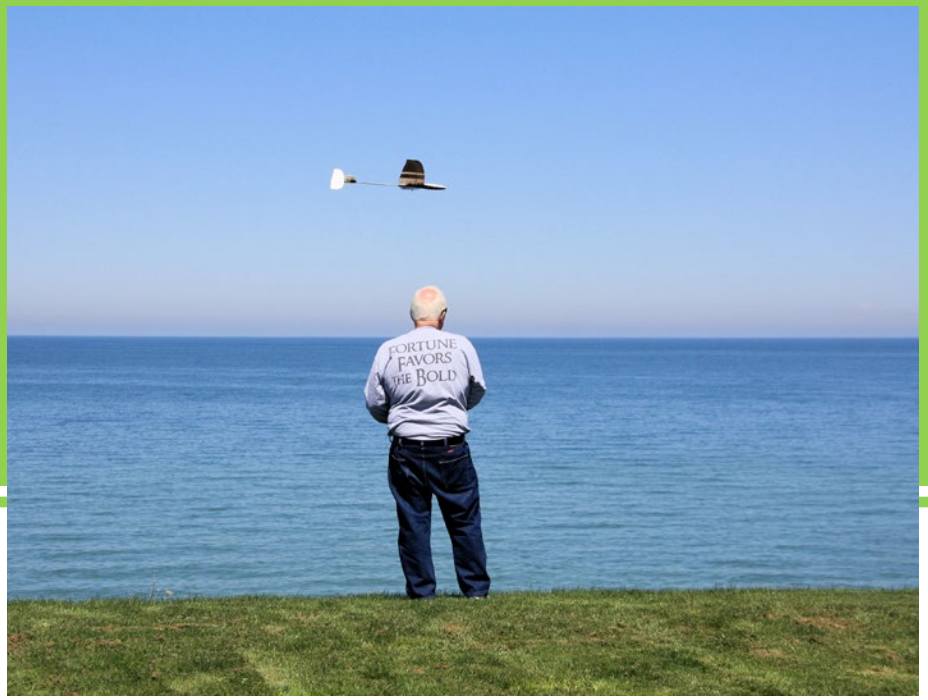
Both of the downed planes were recovered, one by an on-foot search, and the other returned in a few days by neighboring children.

There is no question that we will repeat the attempt, and we are so much wiser now.

Tips for duration flying success:

- Paint bold and distinctive markings on the wing underside when planning to fly in a group.
- Attend to charging the flight battery pack in preparation for a duration flight.
- Make sure you have an agile and fun sailplane to fly, like a Libelle.

Todd Herbinger launches a Libelle over a very gentle local hill.



Dave at Perry Park on Lake Erie, May 2015.

Lou Maturo winds up for a DLG launch at the very gentle hill made soarable with the impressive penetration capabilities of the Libelle.

Above left: Dave at Perry Park on Lake Erie during the North Coast Glider Games in May 2015.

Above: 17. Dave with OFB Joe Chovan with Libelles at Perry Park on Lake Erie during the North Coast Glider Games in May 2015.

Left: Lou Maturo ventures out far over the very gentle hill made soarable with the impressive penetration capabilities of the Libelle.

Tom's Tips

A great little sander

Tom Broeski, T&G Innovations LLC, tom@adesigner.com

There are times when my orbital sander is too big, or hand sanding too difficult.

Here's a little sander that I use in that situation, mostly to sand and polish old clock crystals, my small wooden clocks, and small plastic parts.

However, it is great for lots of things. It is especially useful for sanding balsa that is hard to hold or you only want to take off a tiny bit.

It is sold as the Neutrogena Healthy Skin Rejuvenator (it sands your face - "the anti-aging power treatment").

It is battery operated, has two speeds, and really vibrates well. It is hook-and-loop and comes with some fine face sanding pads. I just cut out some various grit disks using a craft punch and work down to whatever microns I need.

I can sand pieces that would be near impossible to hand sand by laying small parts on sponge foam.

I got mine at a local drug store, but I'm sure they are available on-line. I think the best deal is eBay or Amazon with free shipping.

Neutrogena Healthy Skin Rejuvenator (sands your face - "the anti-aging power treatment").

It is battery operated, has two speeds, and really vibrates well.

It is hook-and-loop and comes with some fine face sanding pads.

I just cut out some various grit disks and work down to whatever microns I need.

Sanding a thin piece of balsa.

A very thin piece of walnut burl veneer. Nice smooth back for gluing in an inlay.

Here's a craft punch I use to punch out the disks.

JSI-C Revelation, FES 1:25

Is there anything left for the "big" ones?

Uroš Šoštarič, uros.sostaric@siol.net

Photos by Aleksander Sekirnik, Rastko Kos and Uroš Šoštarič

“Which model would you like to make?” Matjaž Remec, who is already making models Windex and Extra, asked me in August 2013. He wanted to send something new to the market. For me, there was no doubt: “Jonker, the bigger, the better,” I answered. Matjaž and Rastko Kos, who has been constructing models with Matjaž for a while, liked the idea.

With the aid of Erazem Polutnik we received basic plans from Jonker Sailplanes. At the same time we examined Erazem’s JS1-C 18m, which was useful for improving our basic understanding of the airplane.

Before beginning with the development of “Jonker,” Rastko and Matjaž had to finalize their CNC milling machine. Given the size of the model, the useful deviation of the machine was determined to be 200x800x300.

Soon the first parts started to arrive. At the same time, Matjaž proved himself by building a wooden base and the stone mason brought a granite panel with all the necessary holes for affixing the parts. In November the first 2-D shapes were being milled.

At first there were some concerns regarding the scale of the model. Should it be 1:3 or 1:2,5? At that time there was a newcomer on the market in the scale of 1:3, making the decision for the 1:2,5 scale easier.

This meant that the spread of the model JS1/21 was going to be exactly 8,4 m. Rastko’s task was clear.

The body with the directional tail soon got the right shape. Matjaž immediately started milling the prototype of the front part of the body from Styrofoam. The prototype was meant for possible corrections.

At the very beginning of the project, it had been decided that the model will have a possibility of being electrically driven in the nose of the body, the so called FES (front electric selflaunch/ sustainer).

Because of that the nose of the body had to be adjusted to the drive and the elliptical body had to be transformed into a circle in the first few centimeters of the body and then again transformed back to the ellipse.

Left side female fuselage mold.

Lay-up of Kevlar with carbon fiber reinforcements in place.

Completed fuselage.

Of course the basic version remains as the basis. It will also be possible to remove the front part of the drive and install a classical nose.

Matjaž quickly milled the model of the body from the MDF material and additionally finalized it with polyester putty and two-component color. That is how we prepared the model for making the mold.

We could hardly wait for the first body to be finished. Making such a large body was a true challenge. At the same time it was necessary to resolve quite a few questions regarding the materials, colors, and defining the correct ratio between the weight and sturdiness of the body.

The first body we made was a success, with one small exception: it was quite heavy, but also very sturdy.

By the time the second body was finished, the ratio was more appropriate.

The body weighed 2,5 kg which is in the safe range. It could have been lighter, but then it would have lost on the sturdiness, which we did not want from the prototype.

The body was completely made out of Kevlar fiber and strengthened with unidirectional carbon bands. The joint (stitch) of the body is invisible because it was colored and polished.

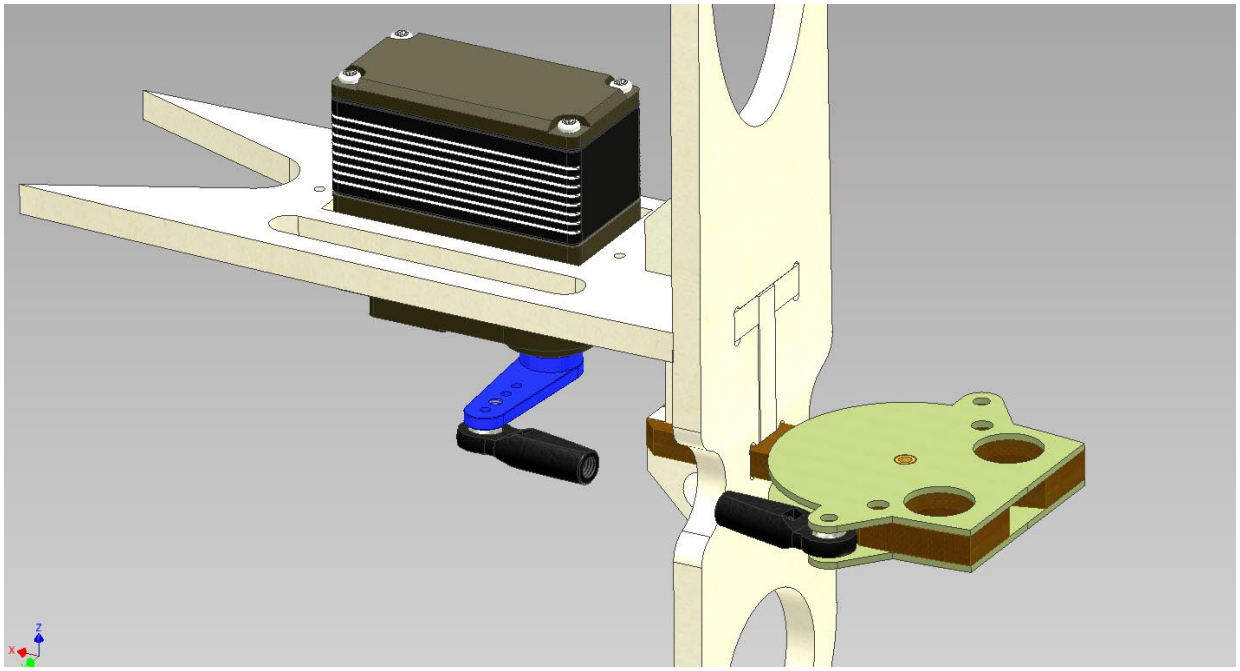
Once the body was finished, we had a better idea of how large the finalized model would be.

Before Matjaž started making the wings, he made a frame for the cabin, while the cabin itself was made by a German company.

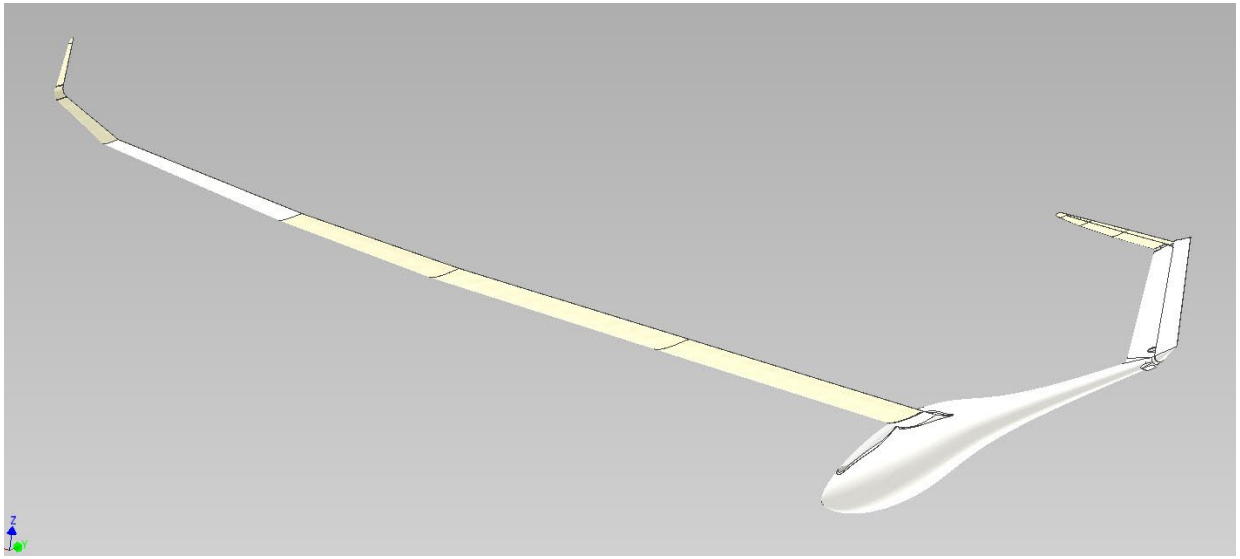
The making of the rudder and the horizontal tail followed. Rastko constructed an upper and lower part with a bearing in the pivot center for mounting the rudder. Moreover, the mounting of the rudder is very similar to the mounting in the real “Jonker.”

The wings... The aerodynamics and the construction were a challenge. The slenderness stands out and it was a serious question how to make such a large model fly with only an 86mm width of the wing profile on the transition to the “winglet.”

We discussed the issue with our modelling friends and everyone had their own solution. We wanted “thermic” wings with a profile that is not too thin and with a suitable strength.



Computer diagram of the rudder servo installation.



Computer model of the JS1-C showing the long slender wings.

The finished wings showing off their mirror-like surface.

Above Left: The basis for the manufacture of the mold for the wings was been made perfectly.

Above: Making the first wings was a big challenge, but we managed.

Rastko found the descriptions of cross-sections for a large model of the Arcus on Dr. Quabeck's web page. He then proceeded to use a combination of HQ-DS on the wings and HQ-Acro at the end of the wings.

Rastko explained: "I started a new project in the XLFR program, imported the coordinates of all projected HQ profiles and defined the geometry of the wing and of the horizontal stabilizers.

"According to the polar calculations of all the profiles, the program calculated first polars of the model, that compared to my other projects (Windex with a 5,4m and Apis with a 6m spread) promised very good flying characteristics.

"Because I had some doubts regarding the construction angles, I tried my luck and emailed Dr. Quabeck, the author of the profiles. He responded to my email and answered my questions, which gave me the confidence to continue."

Rastko continued with the 3-D construction, while Matjaž and his father quickly progressed with milling the basic model.

Their construction was often faster than Rastko's; which, of course, is due to owning a CNC milling machine.

The spring of 2014 was the most intensive period of the development and the construction of the prototype. Rastko and Matjaž did not even have

the time to meet; Rastko kept emailing Matjaž his constructions, Jože then processed them with the CAM program and built them on the milling machine.

The wings were a success. We mostly were looking for an excellent trailing edge and the area of the wings.

Rastko calculated the complete static, constructed the carriers and all the transition passages among the separate parts of wings. The complete wings were built in the CFK technology where no stitches can be seen after the final polish.

Due to the model size in connection with the lack of appropriate traction models, we were planning the FES drive from the very beginning. With the FEMA chassis, where the wheel has a diameter of 152 mm, we gained enough height to use a 20 inch propeller. Rastko agreed on a specification for the electrical drive with Andreas Reisenauer and ordered it there.

We were quickly coming close to the final assembly of the model. In the middle of June 2014 Matjaž finalized the model that now needed to be equipped.

With this type of a model there is a significant amount of demanding equipment that needs to be done: from the chassis, the electrical drive, telemetric, all the drives of the control surfaces and the remote control mechanism.

Rastko mainly took over this task and spent a large portion of his vacation in Matjaž's workshop.

The drives on the control surfaces are in the classical version. Of course, it is possible to build in the RDS connections on the wings and wing flaps.

One of the tasks to be completed was the installation of the electro motor with a reduction. After our experience with the Apis model, we agreed on a 6 degree downward thrust angle.

The cabin opens forward, as with the gliding model. Rastko prepared an excellent opening mechanism with a shock absorber.

The only thing left unfinished was a cabin, but the control panel is a superior product of Josef and is a replica of the LX Nav instruments.

Because I knew I was to take over the debut flight I wanted to be up to date and cooperate on the final assembly. Many servomotors (five on each wing half) were yet to be finely tuned, the phases

The control panel is a replica of the LX Nav instruments.

The completed model

of the flight in the transmitter had to be programmed in the various combinations (take off with a motor, flying, landing…).

And finally the day of the debut flight of our model arrived.

At the start of the engine, the model nicely accelerated and lifted in the air after about 20 m. The angle of takeoff was slightly too high, so I corrected it with a couple of clicks down trim during the motor flight.

I switched off the motor at the height of 300 m and transformed some of the speed into height while slightly turning.

I did not use wing flaps during takeoff because I wanted to maintain speed and we were unsure of how the model would behave.

During ascent the collapsible carbon propeller Freudenthaler 20x13 spins with the speed of 7.400 spins per minute with an average consumption of 75 A (12s LiPo). The model has been nicely lifting with the speed of between 5 and 6 meters per second.

With the battery capacity of 9.000 mAh there are five options for lifting between 350 m and 400 m, with still some reserve left.

Due to greater safety, we have moved the center of gravity. T

he model had a slight downward tendency, which I corrected with a few clicks upwards.

The model glides well and is responding to all control commands. Significant dihedral of the wings allows flying in extended circles only with the steering rudder. Coordinated flying is nicely balanced between direction and tilting.

The Jonker JS1-C is absolutely majestic in the air.

The Jonker JS1-C, complete with pilot, is truly a work of art and incredibly realistic.

Matjaž Remec (producer), Rastko Kos (constructor), Uroš Šoštarič (test pilot and idea) and on the far right is my son Andraz Šoštarič.

Technical data:

Wing span	8.400 mm
Span of the elevation of the tail	1.014 mm
The length of the fuselage with rudder	2.840 mm
The length of the fuselage excluding rudder	2.770 mm
Area of wings	198 dm2
Weight (prototype)	24 kg
Wing load (prototype)	121 g/dm2

Wing profiles:	
HQ DS-2,25-13	centroplan
HQ DS-2,25-12	end of trapozid 1
HQ DS-2,25-12	end of trapozid 2
HQ DS-2,25-11	end of trapozid 3
HQ DS-2,25-11	end of trapozid 4
HQ ACRO-2,5-12	end of trapozid 5
HQ WINGLET	end of trapozid 6
HQ WINGLET	end of trapozid 7
HQ ACRO-0-10	elevation tail

Retractable chassis:	Fema with wheel 152 mm
Back wheel:	75 mm

Electric drive:	“FES” (Reisenauer):
Electric engine:	Scorpion - HK 5020 - 710 KV
Regulator:	Roxxy BL Control 9120-12 120/150 A Opto
Drive batteries:	LiPo, 12s 9.000 mAh
Transfer:	Super Chief 4:1 Planetgetriebe polygon 6x7
Propeller:	RF 20 x 13 CFK

I also tried all the basic aerobatic elements and the model behaves very well in all of them, despite its size and having been built for a different purpose.

The height is sensitive to trimming, even one click is noticeable on the plane’s characteristics, while maintaining the center of gravity on the safe side.

The landing happens without any problems since the air brakes are working excellently and can be adjusted during landing depending on the speed of descent.

The brake on the chassis is necessary since the landing occurs at the speed of about 50 km/h, which is why a significant braking distance is needed. In short, the satisfaction of the whole team was visible and we were all relieved after many months of work and the invested effort.

The project brought a lot of joy to everyone involved. The complete team (the builders Matjaž and his brother Jože, the constructor Rastko, and Uroš, the idea initiator and the test pilot) learned a great deal.

More information is available at <http://www.remec-design.com>.

Radian modifications

Paul Parker

From the May-June 2015 *AucklandSoar Newsletter*
http://www.aucklandsoar.org.nz

Permission to reprint received from
Brett Robinson, brettrob@orcon.net.nz, Editor

After my first Radian was damaged, beyond repair in my eyes, I thought I'd better get a new one ordered.

However, I under estimated Tony Gribbles' repair skills and I have been flying the damaged Radian ever since and the new model sat gathering dust.

I then came across a Paul Naton article on modificationss to improve the Radian and I decided to try some of the ideas that he was suggesting on my new Radian.

We all know about the tendency to loop under power and this model's constant flirting with porpoises, and Paul Naton puts forward some fixes for these problems which I decide to try.

According to Mr Naton, the Radian comes out of the box with a lot of up elevator built in due to the decalage angle being "wrong" and that this could be corrected by lifting the leading edge of the horizontal stabilizer. The dimension suggested was between 5 and 6mm, but this had to be determined by checking the decalage of the model. Not having an incidence meter, I merely levelled the wing by measuring the height from a datum (flat work bench) to the centre of the airfoil (estimated) at the leading & trailing edges of the airfoil. With the wing airfoil "level," I then measured the height from the datum at the leading and trailing edge of the stab. Sure enough, the leading edge was 5mm lower than the

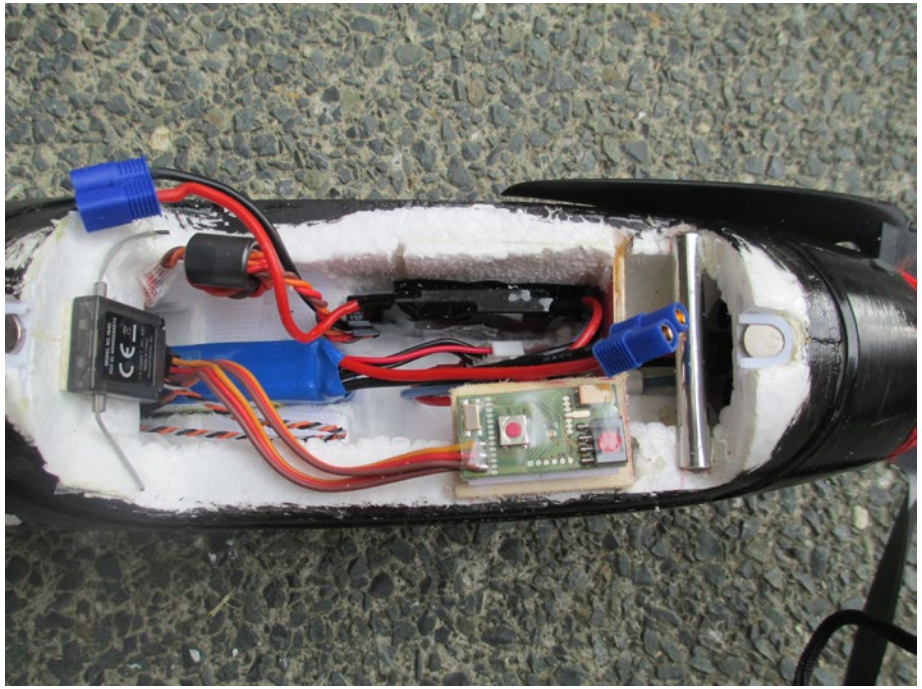
trailing edge giving the built in up elevator condition.

To correct this I simply un-screwed the stab mounting and repositioned it with the leading edge 5mm higher, thus setting the stab parallel to the wing airfoil.

Along with this modification, Naton recommends changing the CoG from the "out of the box" 63mm to between 80 -100mm. As a beginner, the 80mm CG is recommended and this is what I aimed for when setting up the model.

To achieve the 80mm I need to get some weight into the tail even though I dropped the battery size down to an 850 mAh instead of a 1300 mAh.

Adjustment to horizontal tail mounting angle to achieve recommended decalage.



Cockpit interior is relatively open with Velcro-mounted ESC and new "shelf" for altimeter.

Rather than add dead weight, Naton strengthened up the tail area with plywood inserted in the tail / fuse area, more stiffening, and finally some lead. Not having a Dremel tool to slot the fuselage to take the plywood, I simply epoxied some lead into the fuse under the tail and added some tape for durability. Final CoG is around 83mm.

So that is pretty much what I took from the article,.I dispensed with covering the wing in tape as I didn't see what this would achieve, and decided that fitting flaperons would not allow me to compete in a Radian ALES.

I did make some other changes apart from those above are and they are as follows:

- Dubro fittings at the horns.
- Heavy clear tape on the leading edge for protection.
- Web tape over the wing cut-out section and at the rear of the fuselage.
- Epoxyed in the tubes that the control wires run through into the fuselage to stiffen.
- Fitted a bulkhead behind the motor and added some stiffening.
- Removed the plastic battery mounts and opened out the slot between the fuselage halves to take a Velcro-mounted 850 mAh battery.
- Velcro mounted the ESC and fitted a small "shelf" to mount an altimeter on Velcro and give me easy access to it. The altimeter is a #2 Basic <http://www.rc-electronics.org>.
- Closed up all forward facing ventilation holes in the hope of assuring accurate altimeter operation. Short motor runs should prevent over heating?

• Remove all decals and apply my “standard” paint scheme and varnish to harden foam and weatherproof.

So now all that’s left is to fly it. I have read different reviews as to the decalage and CoG modifications. Some are full of praise and others flew the model straight into the ground! I will probably make the test flight with some up elevator trim and the altimeter disconnected until I get the feel for the aircraft.

Test Flight Easter Sunday

Only a skeleton crew of Aneil, Ted, Tony and myself at the field and once the first rain shower passed I decided to have a few flights with my old Radian. No surprises there and a good time was had by all. With gathering rain clouds I thought it best to get the new modified Radian in the air.

The wind strength was low and steady, but I was expecting it to increase as the rain clouds moved in. I dialled in some up trim and sent her on her way.

My initial thoughts are as follows:

Climb was true with no tendency to loop. I did give some up elevator but there was plenty of movement in the elevator remaining, so next time I will launch with the elevator trim at neutral and give more up. Seemed strange NOT to be pushing the stick forward and fighting a loop!

I got to altitude and noticed if I pointed the nose down I had to use the elevator up to return to level flight rather than just

let go and let the plane fly itself level. More responsive in pitch but requires more “flying” and will not get itself out of trouble.

Rudder response is not as sensitive as on my old Radian which is a good thing.

Speed. This model seems to fly faster than the old one. It came whistling over my head, had not heard that with the old one.

I managed to land with no drama and with rain imminent we all packed up.

Summary:

First impressions are good. The modified Radian flew quicker and straighter with no hint of porpoising or looping on climb-out. It does need more pilot input.

Mr. Naton also promises more visual clues to rising air, but I was unable to confirm that during this flight.

Conclusion:

With just the one flight it feels a better aircraft than the stock Radian. I’ll see how we go.

Lam Aviation

Advanced Aileron System

http://lamaviation.com/

The Lam Aileron Innovation

Aero-engineers have long struggled with the inherent competition between conventional flaps and ailerons for space on the trailing edge of the wing.

The mutually exclusive relationship between the two dictates that installation of large flaps for good slow-speed performance mandate small ailerons with less roll control authority.

Alternatively, large ailerons result in small flaps. Previous attempts to accommodate large or full-span flaps have included spoilers, flaperons, and tailerons, accompanied by their many compromises and disadvantages.

Lam Aviation's inventive aileron uncouples the traditional mutually exclusive relationship between flaps and ailerons. With the Lam Aileron, ailerons and flaps can each be of any span, including full span, and their separate functions may be mixed for additional modes of operation, such as speed brakes.

The design works by combining the functions of both flaps and ailerons. Two panels, one on top of the other, can deploy as a single aileron unit.

The upper aileron panel only goes up from the neutral, streamlined position. The lower, auxiliary "flap" panel can go both up and down from neutral. The panels operate independently or together, which means they affect the air flowing over the wing as an aileron for roll control, or as an aileron and auxiliary flap to provide downward, whole-wingspan deflection, greatly enhancing low-speed operations such as for landing.

In addition, the aileron/flap separation can be mixed for effective use as speed brakes or drag rudders.

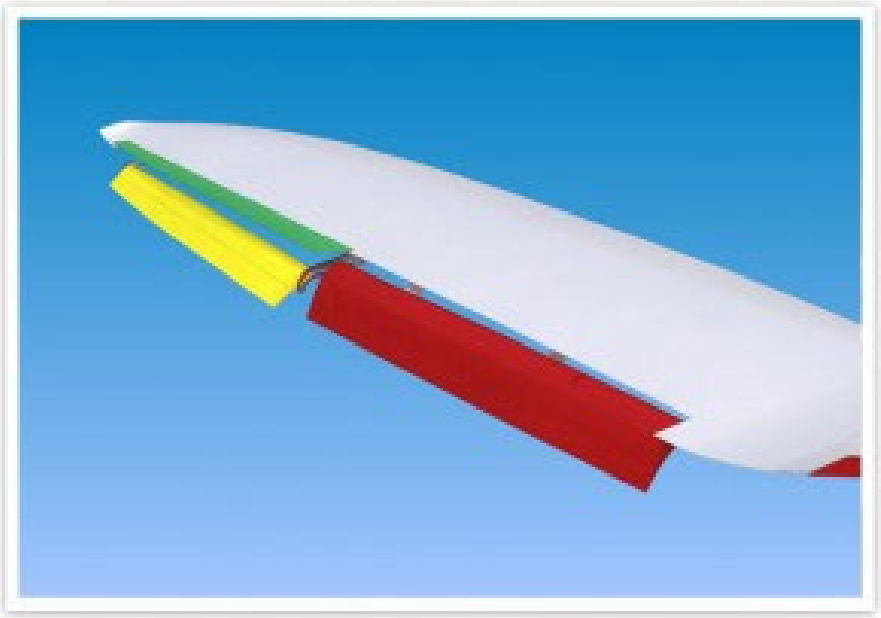
Lam Aileron History

The Lam Aileron was conceived by aerospace senior research scientist Larry Lam, who worked for Lockheed, McDonnell-Douglas, Hughes, and Rockwell during his illustrious career before passing away in March 2010.

Larry and his son, Michael, co-founded Lam Aviation, and have partnered with designer Greg Cole of Windward Performance to refine the Lam Aileron, which is currently in flight-test evaluation on a Cessna Corvalis airframe.

How the Lam Aileron Works

The Lam Aileron replaces the conventional aileron with two panels approximately one on top of the other on the trailing edge of the wing. Both panels are deployed as a single unit upwardly only as an aileron. The upper aileron panel is deflected upward only from the neutral position; while the lower, auxiliary flap panel is capable of both upward and downward deflections from the neutral position. The upper panel is deployed independently as an aileron and the



Left wing – lower Lam Aileron auxiliary flap panel (yellow) deployed in combination with main conventional flap (red) to form full-span flap with upper Lam Aileron panel (green) deflected upward for a left turn.

Left wing – upper aileron panel (green) and lower auxiliary flap (yellow) panels comprising the Lam Aileron deflected upward together as a unit for a left turn at cruise with the conventional main flap (red) in its stowed or neutral position on the left wing.

lower panel is deployed independently as an auxiliary flap.

Deflecting the Lam Aileron (either the upper aileron panel by itself or both the upper aileron panel and lower auxiliary flap panel together) upward on one side only provides a rolling moment.

Upward deflection only for roll control makes the entire trailing edge available for downwardly deflected surfaces such as flaps.

This new aileron design releases flaps and ailerons from their traditional interdependence for sizing on the trailing edge and eliminates the compromises between slow flight capability and roll control authority that follow while improving flight handling characteristics.

It also allows the usual separate functions of flaps and ailerons to be mixed for additional operations such as speed brakes or drag rudders.

We have presented this information in RCSD *as an item worthy of investigation for builders of large scale sailplanes and for those designers endeavoring to perhaps achieving better roll and speed control during the landing pattern. With the computerized radios now available, programming the necessary servo travels for various flight modes would pose little problem.*

UPDATE

NASA Successfully Tests Shape-Changing Wing for Next Generation Aviation

<http://www.nasa.gov/press-release/nasa-successfully-tests-shape-changing-wing-for-next-generation-aviation>

NASA researchers, working in concert with the Air Force Research Laboratory (AFRL) and FlexSys Inc., of Ann Arbor, Michigan, successfully completed initial flight tests of a new morphing wing technology that has the potential to save millions of dollars annually in fuel costs, reduce airframe weight and decrease aircraft noise during takeoffs and landings.

The test team at NASA's Armstrong Flight Research Center in Edwards, California, flew 22 research flights during the past six months with experimental Adaptive Compliant Trailing Edge (ACTE) flight control surfaces that offer significant improvements over conventional flaps used on existing aircraft.

"Armstrong's work with ACTE is a great example of how NASA works with our government and industry partners to develop innovative technologies that make big leaps in efficiency and environmental performance," said Jaiwon Shin, associate administrator for NASA's Aeronautics Research Mission Directorate at the agency's headquarters in Washington. "This is consistent with the agency's goal to support the nation's leadership in the aviation sector."

AFRL began work with FlexSys in 1998 through the Small Business Innovative Research (SIBR) program. AFRL and FlexSys developed and wind tunnel tested several wing leading and trailing edge designs for various aircraft configurations through 2006. In 2009, AFRL and NASA's Environmentally Responsible Aviation (ERA) project agreed to equip a Gulfstream III jet with ACTE flaps designed and built by FlexSys, incorporating its proprietary technology.

ACTE technology, which can be retrofitted to existing airplane wings or integrated into entirely new airframes, enables engineers to reduce wing structural weight and to aerodynamically tailor the wings to promote improved fuel economy and more efficient operations while also reducing environmental and noise impacts.

"The completion of this flight test campaign at Armstrong is a big step for NASA's Environmentally Responsible Aviation Project," said ERA project manager Fay Collier. "This is the first of eight large-scale integrated technology demonstrations ERA is finishing up this year that are designed to reduce the impact of aviation on the environment."

Flight testing was key to proving the concept's airworthiness. The test aircraft was flown with its experimental control surfaces at flap angles ranging from -2 degrees up to 30 degrees. Although the flexible ACTE flaps were designed to morph throughout the entire range of motion, each test was conducted at a single fixed setting in order to collect incremental data with a minimum of risk.

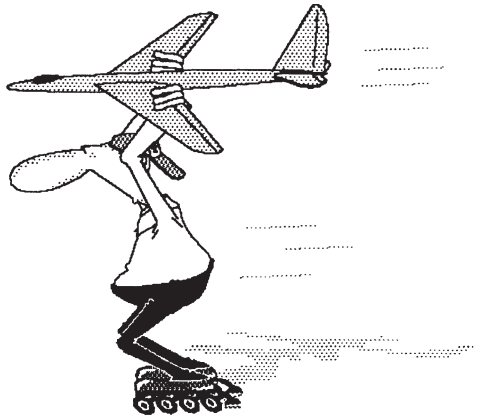
"We are thrilled to have accomplished all of our flight test goals without encountering any significant technical issues," said AFRL Program Manager Pete Flick, from Wright-Patterson Air Force Base in Ohio. "These flights cap 17 years of technology maturation, beginning with AFRL's initial Phase 1 SBIR contract with FlexSys, and the technology now is ready to dramatically improve aircraft efficiency for the Air Force and the commercial aviation industry."

All the primary and secondary objectives for the test were successfully completed on schedule and within budget. The results of these flight tests will be included in design trade studies performed at NASA's Langley Research Center in Hampton, Virginia, for designing future large transport aircraft.

For more information on NASA's research in next generation aircraft, visit: <http://www.nasa.gov/subject/7565/future-aircraft/>

Gordy's Travels...

The rants of a mad sailplaner?



Dorks, Skegs, Electric Launch, and Mixed Launch - Advantages Earned / Convenience Rewarded

Gordy Stahl, GordySoar@aol.com

A recent thread on RC Groups lamenting the unfair and indelicate "dork" landing technique caused me to take a look at the results after the event was over only to find that the non-dorkers hardly made any landing points versus poking the 100.

So Dorking had nothing to do with the results. It didn't affect one person who'd complained, as they weren't close to the pilots who might have dorked.

The pilots who complain about contests being decided too much by landing skill, who are the most vocal about removing landing rewards, because it's they who haven't worked on their model energy, glide path and steering control.

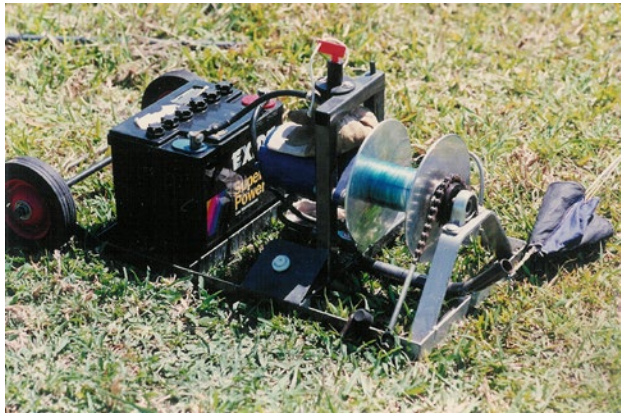
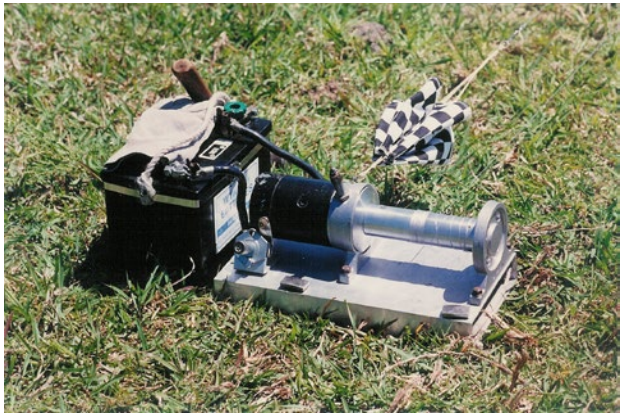
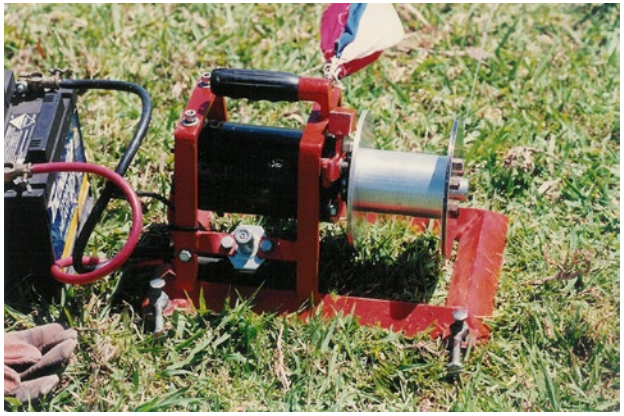
They complain that the dork is not landing but in fact crashing the model which takes no skill, since the model doesn't "stop" on the spot, its "stopped." The flight is interrupted, not ended. There is always that added bit of dramatic reinforcement to the argument that, "more often than not the $3000 model is picked up in pieces." This is often referred to as "Gordy's sound of a screen door slamming landing!"

The reality is this, our competition models are designed as tools for the task. Putting the nose on the spot right at the moment is understood as the model's job, so the structures are made with that task in mind.

The grace with which a dork landing is executed depends on the pilots study and practice, so yes it varies from "ouch" to applause, but that's part of the hobby, too.

Those of you who don't dork, often as not slide into yourselves or your timers because you haven't learned a repeatable landing pattern which uses up energy prior to reaching the spot, and which sets a predictable path to the spot.

So the alternatives end up to miss the landing area, smash the model down, or attempt to jump the wing as it slides past. (You can read about the 20 second landing pattern used by most

Winches are all of similar design! Photos by Bill Kuhlman

top landers, in Gordon's *Model Aviation* column, or my article in *RCSD*).

Those pilots who do dork have learned to control the energy so that nose-in landings don't hurt their models. We do a practiced and repeated 20 second landing pattern, every time, over and over.

The fantasy perpetuated by novice ALES pilots of a "kinder," "more scale like," or "gentler" dumbed down 50 point box tape are in fact (yes, witnessed by all landing after landing) are best described by this question, "How can you tell the difference in a Euro F5J pilot's landing and a USA ALES pilot's landing? The Euro pilot is healthy enough to clear his model's wing as it slides past."

The current ALES no skeg rule is dangerous and should be ended as it is repeatedly proven unsafe at event after event. Some sort of anti-slide device should almost be mandatory.

More ALES pilots have lost landing points or flight points for hitting themselves or timers or others this past season than many seasons of TD or RES... and more nice planes damaged by ankles.

Mixed Launch TD is not the same as ALES and TD.

ALES allows the pilot to drive around for the 30 seconds of motor run. He can chose either to go up or go driving around for the 30 second motor run. In a Mixed Launch TD event, the Electric Launch emulates the winch launch sailplane's path.

Consider this: the winch is the "launch motor" for TD sailplanes. That motor is off regardless of altitude before the model passes the line created by the turnarounds.

I'll repeat that so that you can picture this in your mind. A winch launched model is off the winch line before its travel passes the boundary created by the turnarounds.

So in Mixed Launch TD events, the Electric Launch sailplanes should attempt to have their launch motors OFF in a similar place.

Now in reality if the Electric Launch pilot has sized his power system correctly he won't be able to be off that soon. If he has sized his launch system to blaze vertically, he'll have no problem going up to altitude before his model approaches the line created by the turnarounds.

Winch Launch models can launch higher than the Electric Launch 150m altitude limit!

A practiced launch pilot can launch higher than the rest of the field. Sometimes a lot higher. It doesn't make his launch unfair, the opportunity is there for all pilots to take advantage of during their own launches. Often the highest launching winch pilot will be the winner of the round. ***Not because he launched higher*** but because he has worked on his soaring skills, launching being only one of them.

Regardless of Winch or Electric Launch systems, the goal is to get the pilots up to a similar starting altitude, NOT in a fair or equal way but to a similar altitude. At that point its up to the pilot to engage his piloting skills - to find lift, and then stay with it for the task time.

Winches earned the assumption of relative consistency of speed and torque.

Does anyone know why the clock starts with the release in ALES? It's because the motor run is part of the task. Pilots can use their motor to get to the altitude limit **OR** to drive around in hopes of stumbling across lift. Strategies include driving straight ahead with hopes of getting as far up wind as possible on a windy day.

At a recent Mixed TD Launch event in Florida where the rule was "go to the turnaround then you can go where you want for the rest of the motor run."

One Electric Launch pilot posted on RC Groups that he realized his E-launch sailplane set at 150m was getting out launched by the top winch launch guy, so **he replaced his 3-cell pack with a 4-cell pack** so that he could zoom higher *like the winch launched models.*

The misunderstanding created by the altitude limit switches is that the launch is about "fair," but it isn't, it's just about starting the flight.

Winches are all of similar design!

Years ago it became clear that some winch design uniformity was needed on the launch line. If you had six winches set up, it was glaringly clear which was a dog and which was a beast. Yet no "rule" was created to force power uniformity in winches.

That took care of itself because guys didn't want to end up at an event with a dog or a beast, so everyone started building their winches using the same motor, motor winds and similar drum geometry. That made it likely that regardless of which launch station you were assigned to, you didn't think twice about the winch in front of you.

So let's consider this idea for a moment - **Is it the same?**

After all, the winch launch guys don't hook up a bigger battery in order to gain a higher zoom, they have to use the same motor/battery each time. They can gain a higher zoom through technique.... if they have developed the skills through work and practice and study.

So is the guy who put a bigger battery in his Electric Launch sailplane in order to gain an altitude advantage **the same** as the Winch Launch guy who has practiced technique, done a few

hundred launches and studied articles on the subject?

The idea of no zooming in Electric Launch came about because guys tried to use loopholes and high power to gain an advantage. You'll note that I didn't say "to win," because zooming never produced an advantage in their scores, just in the launch.

It is the same with other urban myths about Electric Launch, there definitely are advantages, just none that affects a contest score.

The goal of Electric Launch sailplane TD task pilots was to replace the winch with a more convenient system that didn't need the acreage.

Simple common sense makes it clear that no thermal sailplane pilot ever wanted to futz with motors, props or batteries, but as we aged and fields began disappearing due to development, an alternative way to get the models up high enough to start a flight was clearly needed.

The idea that there is an advantage to zooming an electric launch is reasonable, but in fact of little value unless the pilot hopes that just altitude will get him his time.

Those E-launch guys in the past who did zoom didn't win, they tried to use motor power to gain some time.

The winners were the guys who developed patience to stay in the lift they found at any altitude for the whole task time and then used pilot skills to put the nose on the 100 point spot, right on the second.

E- Launch Sailplanes DO have advantages over Winch Launch Sailplanes!

So while an E-Launch pilot is stuck at the 150m motor shut off altitude, he does have some real benefits over the Winch Launch ships.

If the wind shifts and the winch launches are downwind, most winch launch pilots will be challenged to make 150m, while the E-Launch ships ALWAYS get a full launch altitude. The Electric launch pilot doesn't have to do the study, setup, the many hours of launch practice a winch launch pilot needs to do, and that's literally hundreds of winch launches to hone the technique in order to get more than 150m.

The advantage of a Winch Launch has to be earned and executed but it is available to all pilots who want to do the work. The advantage of an E-Launch sailplane is that with no effort or skill, its pilot will always start his flight at full launch altitude.

To those Winch Launch pilots who think that Mixed Launch isn't a good idea.... that ship has passed. There will be more and more TD pilots showing up with E-launch ships as the pilots get older or feel they aren't up to the effort it takes to master winch launching.

We are seeing new pilots at comps that we never would have met because they have never owned a winch, and or have no flying site with room to set up a winch, but have always wanted to come fly events. Refusing to allow Mixed Launch is posting a sign stating that those pilots, friends who can't do winch launches anymore... aren't welcome to fly with you.

The DerbySoar in Louisville Kentucky on June 26 & 27 will be the first true Mixed Launch TD event ever held. I decided it was time for a major RC soaring event to try Mixed TD Launch.

Likely I and all of RC soaring will learn more about how to best mix launch systems at TD events and our hobby will stem the current decline in participation, maybe even turn that trend around.

Got suggestions or comments?

Feel free to send them to me at GordySoar@aol.com

See you in Louisville at the DerbySoar or along one of my future travels!

— Gordy