# Radio Controlled Soaring Digest

October 2012 Vol. 29, No. 10

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**Front cover**: Photo by Jeremy Fursman. David Webb's 3.8m Xplorer 2 at a recent Seattle Area Soaring Society contest. David gives the details for this X2, along with a photo of his red 3.5m X2 in "More about the front cover..." on page 46.
Nikon Coolpix S9300, ISO 125, 1/200 sec., f13.0, 54.0 mm



**Back cover:** Mike May's beautiful SZD-9 Bocian.
Nokia 6710s (camera 'phone), ISO 100, 1/156 sec., f2.8

# R/C Soaring Digest


## October 2012
Volume 29 Number 10

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# In the Air

The RCSoaringDigest Yahoo! Group gained member 2,500 on August 26th. This is by far the largest group in the Hobbies Crafts > Models > Radio-Controlled section.

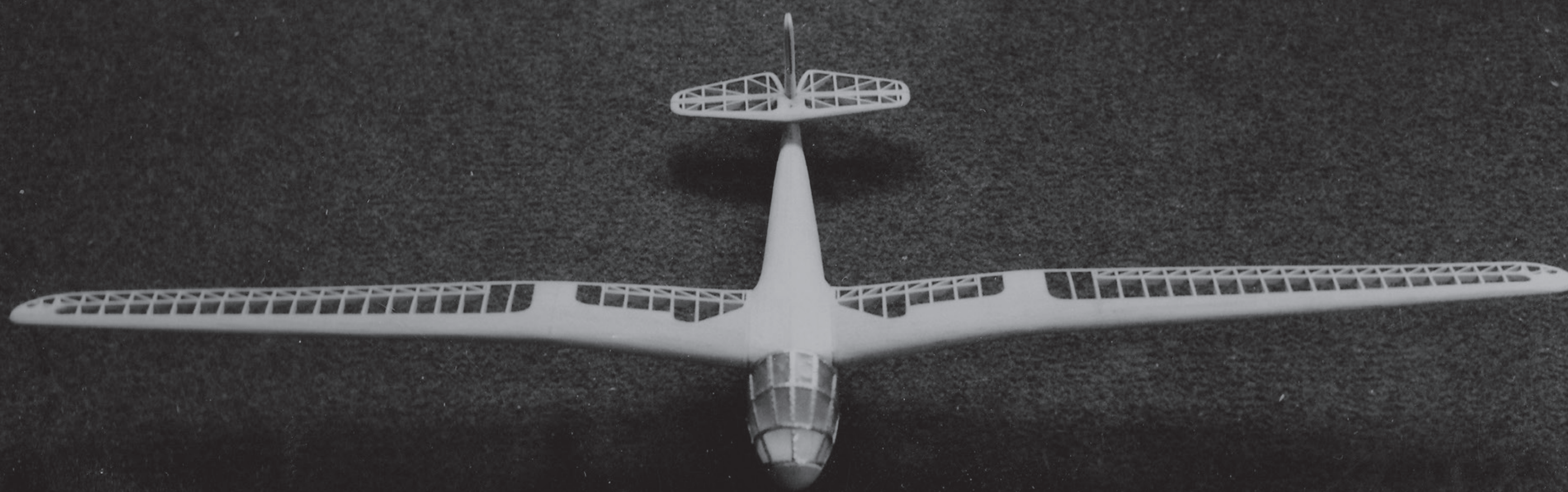
From: Alex Hewson, me3d_lx@hotmail.com


We are holding an International Invite Dynamic Soaring week/month here in Christchurch. I say week/month as people from overseas will be coming and going all month of December, and as dynamic soaring is a wind dependant form of flying, it is a "when you can come, come" type affair. So far we have Joe Manor (Mr. Dynamic) confirmed as coming for the whole month, and two or three other Americans tentative. The aim is to have fun, have a go, or just watch some good pilots in action.

Time to build another sailplane!

# Slingby Gull II

Vincenzo Pedrielli, vincenzopedrielli@gmail.com
Photos by Christian Fitze



Thirty years ago my friend Frederic Fisher, during his first visit to London, bought Norman Ellison's "British Gliders and Sailplanes" book which covered most of the famous sailplanes built before 1970. At that time it was the most complete and comprehensive book dealing with English vintage gliders, Martin Simons's books having not yet become available.

Among all those beautiful machines his eyes were captured by the Slingsby type 14 Gull II. It was love at first sight. Even so, he wondered how, with such a long wing and relatively short fuselage, it could have flown properly. Frederic was particularly fascinated by the wide canopy which reminded him of that of a model bomber he used to see when, as a child, he visited his old aunt Olga.

Ten years later he decide to build the Gull II in 1/6 scale and he started designing the fuselage cross-sections, cutting and assembling them to match the tail plane. Whilst building, he realised he was missing many details, so he decided to ask for help from Chris Wills and, with his wife Regula, they paid a visit to his home.

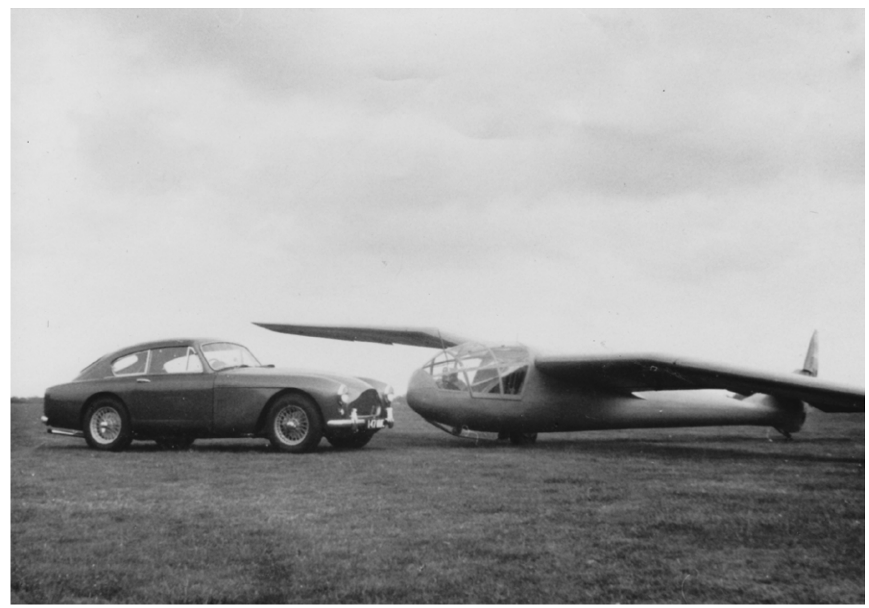
This was a great idea as they got a lot of useful information from Chris and, even more important, some pictures of the sailplane. One of these pictures was in colour, so he could see the original colour scheme.

From then on Frederic communicated with Chris by mail and obtained further information about the wrecked Gull II, stored in a military warehouse in the airport at White Waltham.

Meeting some difficulties in finding reliable information about the wings, he temporarily abandoned the Gull II construction and in the following years started working on new projects like Teichfuss's Supergrifo and the Australian Pelican II. So, for a few years, the Gull II project was laid aside until the English *Airplane Monthly* magazine printed an interesting article about the Gull II with a perfectly detailed 3-view drawing. The wing problem no longer existed and construction could start again.

Frederic asked his friend Karl Pelz, an excellent German model builder who had already done many things for his Model Museum in Trogen, to build the Gull II wings.

Two more years went by and suddenly the interest and the enthusiasm for the Gull II exploded again and he restarted



*Archive photos courtesy of Chris Wills*


GULL 2


*Above: Frederic sets up the radiop prior to the first flight.*

*Opposite page: Cockpit "glass" from a plastic salad bowl, Oracover yellow fuselage covering. Incredible cockpit interior detailing, complete with pilot. First launch.*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GULL 2

work to finish the model. With some difficulties, due to its round cross section, Frederic completed the fuselage with yellow Oracover film.

It was actually for him great fun building the large canopy. How did he do it? No need to make a mould despite the rounded shape of that canopy. Plastic salad packaging material did a fantastic job by simply cutting tiny pieces to follow the spherical shape of the canopy.

Finally, after such a long gestation period, Gull II was ready to fly and looking like the original full sized machine. The great pity is that Chris Wills did not see it, as he passed away on 4th May 2011. Without his help Frederic would probably not have been able to complete his project.

On 22nd July 2012, his beloved Gull II took to the air. The weather was not ideal, but his skilled friend Christian Fitze performed a superb radio controlled maiden flight. No doubt now that the Gull II was in those days an excellent sailplane, despite its long wing and short fuselage.

# ALTITUDE F5J

*Getting to altitude in F5J Thermal Duration (TD) contests and consequences for propulsion and strategies*

Marc Pujol, marc.pujol1@free.fr



## Getting to altitude in F5J

F5J is a new Thermal Duration category in radio-controlled activity. You have 30 seconds to get to the altitude you want with electric propulsion. If the altitude reached is lower than 200m, then a penalty of 0.5 points per meter gained with the motor is applied. If the altitude reached is over 200m, a 3 point penalty is applied per meter over 200m. Of course there are a few other things to be noticed in order to avoid zoom, etc. This is the first time in our discipline where the airplane has time to reach its altitude. It is then the occasion to change our standard behavior and to explore new strategies.

Look at F3B, F3J, F3K airplanes: The one who may win is the one who gets to the highest altitude or the one who climbs the fastest. So these airplanes have very thin profiles and are capable of quite high speed. They are also robust (F3J & F3B). This leads to high technology airplanes and, as a consequence, very expensive ones.

The new discipline makes things different. So let us make a few calculations in order to predict the propulsion power required and let us try to establish a few possible strategies.

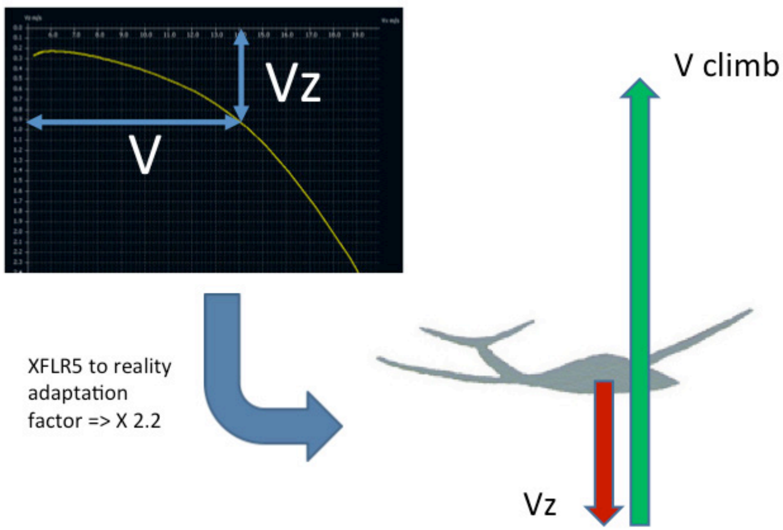
## Energy / power aspect

Getting to altitude means potential energy and kinetic energy. The first one means getting to altitude where the second one means reaching a defined speed.

$$Energy_{mechanic} = 0.5 * m * (h / t + V_z)^2 + m * 9.8 * (h + V_z * t)$$

Where *h* is the altitude to be reached, *V* is the climbing speed, $V_z$ the sinking rate of the airplane at the flying speed, *t* the time get to reach the altitude, and *m* the model mass.

To determine sinking rate, we have to perform the following rational:



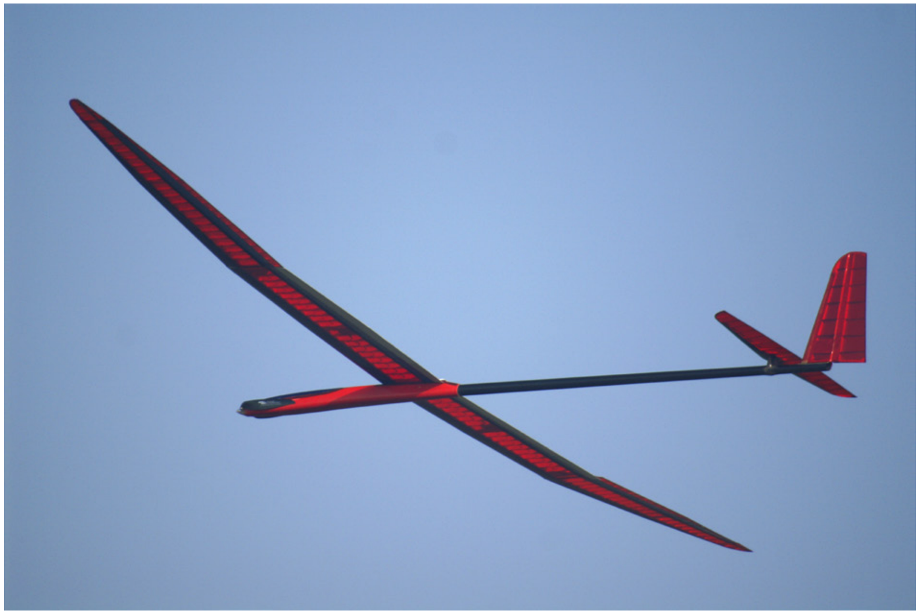

*Rational to apply to compute required motor* power.

Let us first define the speed of the airplane. Thanks to XFLR5 you can estimate the airplane polar and thus determine the associated sinking speed associated to the flying speed.

Unfortunately, XFLR5 doesn't integrate the fuselage and all of the interaction between the wing and fuselage, tail and fuselage, etc. It could not model all the construction defects made, fences, etc., that contribute to increased drag. XFLR5 is then very optimistic. We have to take an adaptive factor to transform such theoretical sinking speed into a more realistic one.

Several measures made on airplanes show us that a factor of 2 to 2.5 can be taken (let us choose an average of 2.2). This is quite impressive but don't think that a 4m airplane can have a minimum sinking rate of 0.25m/s. It, in reality, flies with a sinking rate about 0.55 to 0.65 m/s.

Note: Don't think measures are very precise. Even the real glider polar are quite difficult to establish and if you look at measures made the dispersion is impressive (+/- 50%). So never trust graphics shown by constructors. They are advertisements! As an example, differences in sinking rate due to temperature, air moisture, and altitude can be very high.



*The Genoma, my first F5J airplane (fully homemade), 3.65m span for 1.9 kg. A Thermal Duration airplane that can also make any aerobatic figures. And it climbs at 23m/s.*

I personally had such experiences with the Genoma. I made a full flight early in the morning at a sinking rate of 0.32 m/s and, in other days, the rate was established at 0.65 and 0.8m/s. So be very careful with data.

After this small personnel remark, let us make a few calculations: Getting to 200m in 30 seconds means that the airplane has to climb at 6.7m/s (vertical rate). This means that a standard airplane can fly gently and reach this altitude without problem. No need to have a "speed" airplane.

As an example, measures were made with the Genoma airplane (1.1 kw engine for 1.9 kg airplane). The climbing rate is established at 23 m/s and flight is of course vertical.

Between a standard "Easy glider" and a monster such as the Genoma, there is quite some margin isn't there?

If we take the average mass of 1.9Kg, a $V_z$ of 1.5m/s (corresponding to a 15m/s speed flight) and a propulsion efficiency of 0.5, this means that the total electric energy involved is about 4900 Joules.

Let us transform energy into power:

*Power = Energy / Time*

For F5J, the airplane can climb during 30 seconds.

So this means that the electric power involved is 4900/30 = 163W (electric).

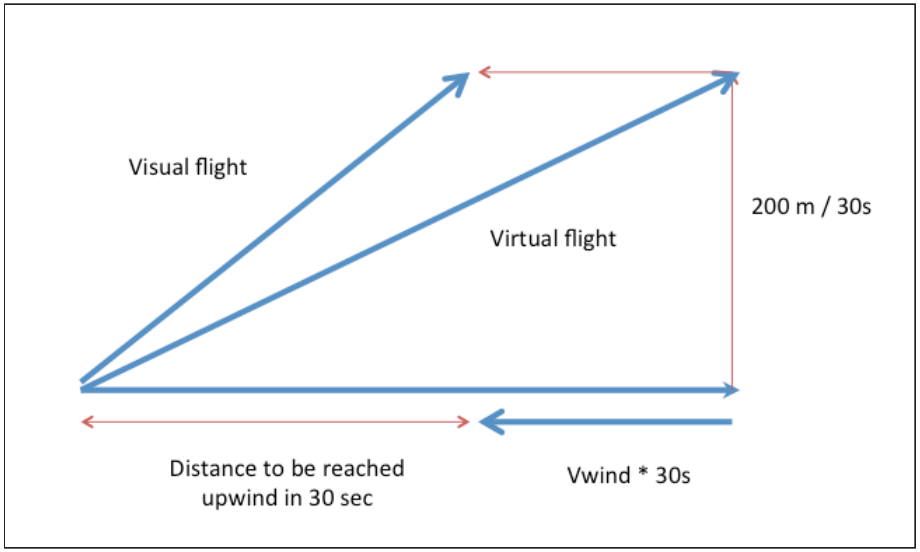
As we can see, the required power is far less than the ones we usually use for any F3x or F5x airplanes even if they are smaller. This new category really requires us to change our mind and think differently.

Let us complicate the problem a bit.

## Let us try to reach a defined point over the field

As the engines are quiet powerful and light, why not to take such opportunity to reach a defined point "X" meters further upwind.

We have then to take into account the wind speed in order to calculate the real distance the airplane has to cover in the air.




Distance covered is :

$$D_{covered} = \sqrt{(D_{upwind} + V_{wind} * 30)^2 + (200)^2}$$

Numerical application:

$V_{wind}$ = 8m/s,
$D_{upwind}$ = 300m.

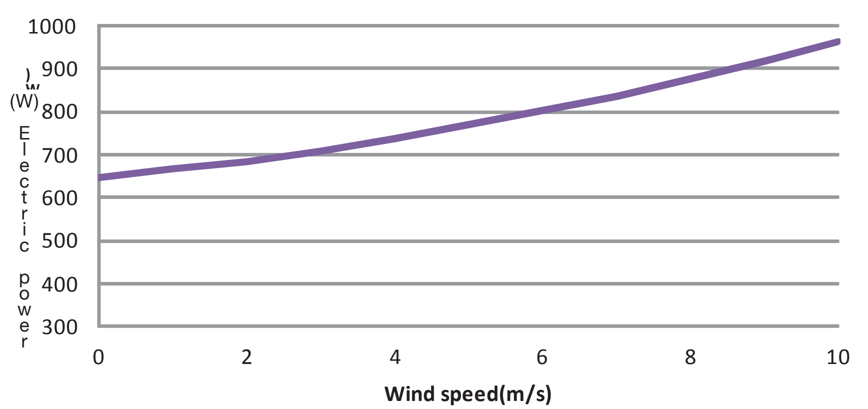
This requires the airplane to cover a real distance of 580m. The speed required to get to altitude and reach the distance upwind is about 19 m/s.

As you can see, this is quite fully feasible, but of course will require much power to compensate for the additional gliding sinking rate.

## Power involved to reach this location

Reaching such 19m/s speed will be quite difficult for a small airplane (2m) except if the power involved allows the airplane to climb vertically. In this case, the lift is no longer important. Only the drag is to be considered.

For a 4m span airplane the sinking rate is still about 3 to 4 m/s.




*Propulsion electric power required to get to 200m altitude in 30 sec. for a defined wind speed in order to reach a defined location upwind*

The involved power is then 23000 / 30 = 766W (electric). We can then make a graphic, as in the adjacent column, to better understand the issues (ex: depending wind speed). And of course, with a ballasted airplane, things are also different.

We can then predict that a 4m airplane will adopt something like a 700 to 800 W electric motor. This is fully feasible with less than 150 g (geared motor + electronic command).

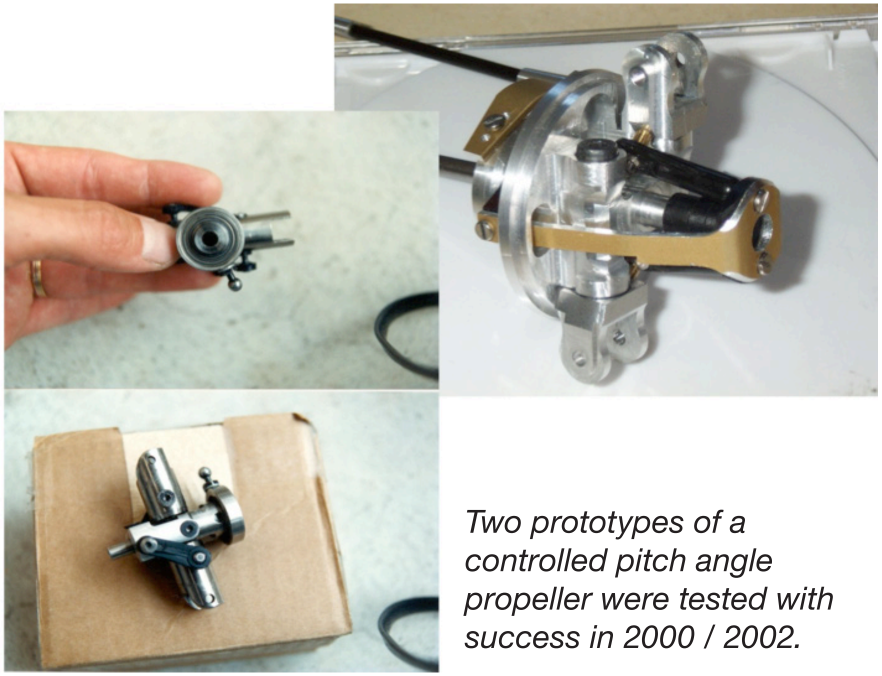
Note: Caution! Those 750w are those at 23m/s speed. In this situation the propulsion set does not work in the same condition as if the airplane was at the speed of 15 m/s. The propeller is either well adapted at 15 m/s or at 23m/s but not at the two flight speeds. If the propulsion set is well adapted for the 15 m/s speed, at 23m/s, the propeller is running with very less load. The power delivered by the motor is then reduced...

As a conclusion, except if the airplane is equipped with an in-flight controlled pitching angle propeller, it will be difficult for the airplane to reach a point 400m upwind with high wind conditions.

Two prototypes of a controlled pitch angle propeller were tested with success in 2000 / 2002. The use of such a complex device will potentially be adopted for F5J class airplanes. We will see if this is really a must.

As you can see in the photos on the next page, a controlled pitch mechanism already exists. These were made more than 10 years ago and have been tested with good results. Acceleration is quite impressive for horizontal flight. In less than a second, the airplane is passing from the “low” speed to the new “high” speed that is the balance between the propeller work and the motor work.

This then opens new strategies for F5J disciplines.



*Two prototypes of a controlled pitch angle propeller were tested with success in 2000 / 2002.*


*A 2 m airplane with a 200 W brushless motor and a controlled pitch angle propeller. This was in 2002.*

## Potential new strategies for F5J discipline: the “Z climbing” strategy

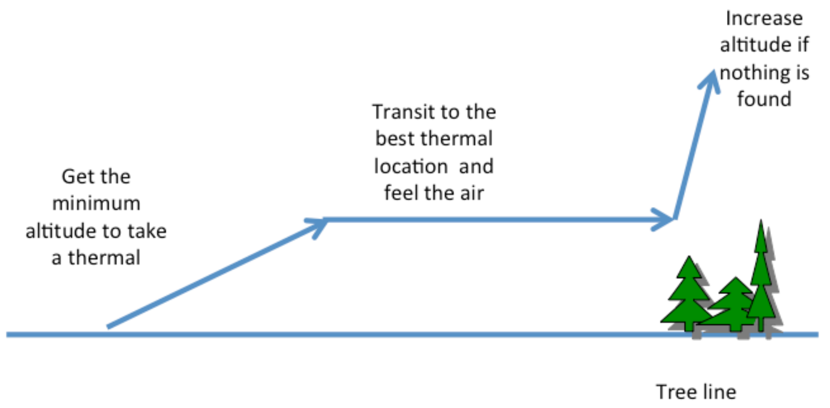
First of all, F5J allow 30 seconds to get to altitude. That for sure has to be used. It is free flight time and it has to be used to:

1. Get at the right altitude,
2. Get at the right place,
3. Find the lift.

If the pilot had analyzed the field, it can have defined that the best thermal area is placed a bit upwind.

Depending upon when the flight occurs, he can also define the minimum altitude to be reached.

He can then make the following flight:




*The "Z climbing" strategy.*
*One of the new ways of getting altitude for F5J.*

Just after the launch, the airplane will try to reach the minimum altitude to catch a thermal. Early in the morning this is potentially over 100m, but during the afternoon, this is potentially at a lower altitude (50m or even less).

Then, the pilot will continue to reach the best location he thinks where the thermals are without getting much altitude. Of course, this will be potentially done at higher speed.

When this location is reached, and if no thermals are found, the pilot can take the remaining time left to get more altitude.

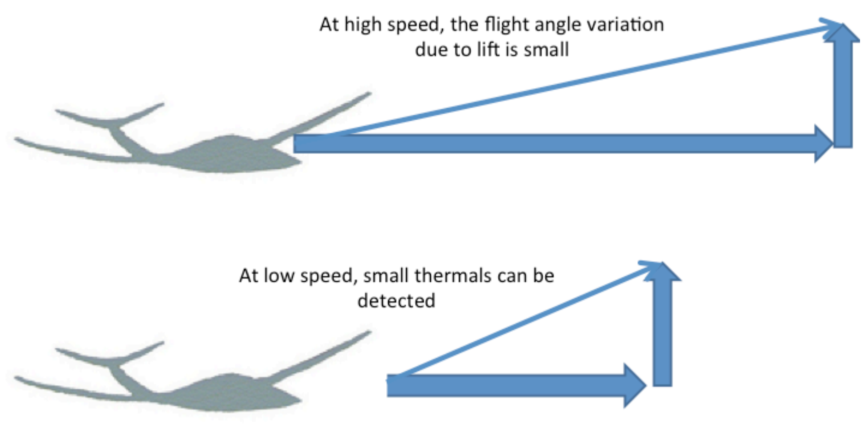
## Advantages and drawbacks of such a strategy

Advantages are:

- Minimum altitude which means scoring optimization
- Success to reach a defined point
- Feel the air during the flight in order to catch thermals, if any
- Optimize climbing time using the full 30 seconds to reach higher altitude if no thermals are found
- Enlarge the flying field up to 400m upwind or even more

Drawbacks are:

- Requires bigger propulsion set than that required to reach only 200m in 30 seconds.
- High speed will require stronger wings and thus heavier airplanes. For such "Z climbing" strategy, airplanes are more expensive.
- High transition speed will lead to reduced thermal detection ability. It is a matter of speed vector addition as shown on the next page, and also a question of time in the lift (ex: if a airplane takes three seconds to pass through a 24m large lift at 8m/s, it takes only one second at 24m/s). There is then a maximum speed limit that we could not overpass if we want to "feel" the lift during this sub-phase. This then also means less distance to be covered.
- High climbing rates do not allow detecting lift easily. This is the same issue as for speed, but here things are vertical. If climbing at 7 m/s a 1 m/s lift can be easily detected, at 20m/s, you cannot see things as well.




*Feeling a lift during flight is a matter of speed. At high speed a 1m/s lift will be very difficult to detect. This is not the case when gently climbing up to 7m/s speed.*

- Thermal detection requires an airplane that flies without any stick action. The airplane attitude change must be due to the air movement, not due to stick action. The pilot must then be very well trained when traveling at high speed.

If the pilot wants to search for thermals during the climbing phase, it will not be possible to apply this “Z climbing” strategy and / or go very far away from the starting zone. A gentle 7m/s climbing rate at 8 to 10m/s speed is sufficient. And then, a small motor is the solution.

*Genoma (foreground) and Genoma*$^2$ *shown together for comparison. The design, construction and flying of the Genoma*$^2$*, specifically formulated for F5J, will be covered in detail in the next issue of* RC Soaring Digest.


But if the pilot knows where thermals are, more powerful motors might be interesting to enlarge the flying field, especially upwind. And in this case, the “Z climbing” strategy or something close to it may be applied.

I apply such type of climbing strategy in the following case:

300 m from the starting point is located an open sand quarry. Thermals are there for sure! It’s only a matter of time to fly there and minimum altitude to be reached.

The “Z climbing” strategy is for sure not the only possible strategy. It has been provided to show that the new F5J category is very different from any other Thermal Duration events.

As you can see, it opens new possibilities and thus requires us to change our way of flying and inventing new competition strategies.

This of course leads us in developing new abilities.

Have fun flying F5J!!!

# Les Ailerons first ALES event

Dany Brazeau MAAC #81249, executive@lesailerons.ca

On August 18 2012, Les Ailerons club in Lochaber Québec Canada hosted its first ALES (Altitude Limited Electric Soaring) contest.

We had 12 pilots mostly form Gatineau Quebec and Ottawa Ontario. All the pilots had ALES experience except Mike Gratton with his Radian Pro (and he performed well).

We used the ALES Scoring Spreadsheet that we downloaded from <http://www.tailwindgliders.com> and it worked flawlessly. We flew in three groups and completed seven rounds.

Doing 10 minutes was really hard that day. The thermals were hard to find and the wind was strong. More than 50% of the time, we couldn't to any target points due, again, to the wind. Fortunately nobody crashed their models. I personally found the launching process hard.

Here are a few highlights of the contest:
- Gudmund Thompson did manage to do six landings out of seven.
- Aurèle, John, Bernard, Dany, Gudmund, Jeff and Brian did manage to do at least a round with over nine minutes of gliding.
- On round 7, group A, the best time was 3 minutes 45 seconds. That's a good indicator of how hard it was to stay in the air.
- As for me, I messed up ALL my landings. I was too afraid of crashing my plane.

We hope to redo this event next year and have even more pilots.

Special thanks to Alain Rioux and his wife Lauraine for entering the contest results into the computer, collecting the money and ordering pizza for the group and to Mike and Alex Gratton for all the nice pictures that they took.

## Les Ailerons ALES August 18, 2012

| Pos | Name | Points | Model |
|---|---|---|---|
| 1 | Dick Mills | 6724 | Super Ava Pro |
| 2 | Gudmund Thompson | 6635 | Pulsar 3.2 |
| 3 | Aurele Alain | 6547 | Gracia |
| 4 | Brian Buchanan | 6436 | Gracia |
| 5 | Bernard Arseneault | 6383 | Champ 3.3 |
| 6 | Dany Brazeau | 5761 | Prelude |
| 7 | John Blenkinsop | 5735 | Grafas |
| 8 | Jeff Dessert | 5716 | Pulsar 3.2 |
| 9 | Martin Jetté | 5453 | Avia |
| 10 | Michel Graton | 5232 | Radian Pro |
| 11 | Paul Penna | 4916 | Avia |
| 12 | Jean-Claude Terrettaz | 4287 | Magic Asw28 |

Thanks to our sponsors (all the pilots had a gift):

| | |
|---|---|
| Soaring Circuits | Esprit Model |
| Icare / Icarus | Air Age Media |

Title page: The 12 pilots ready to glide.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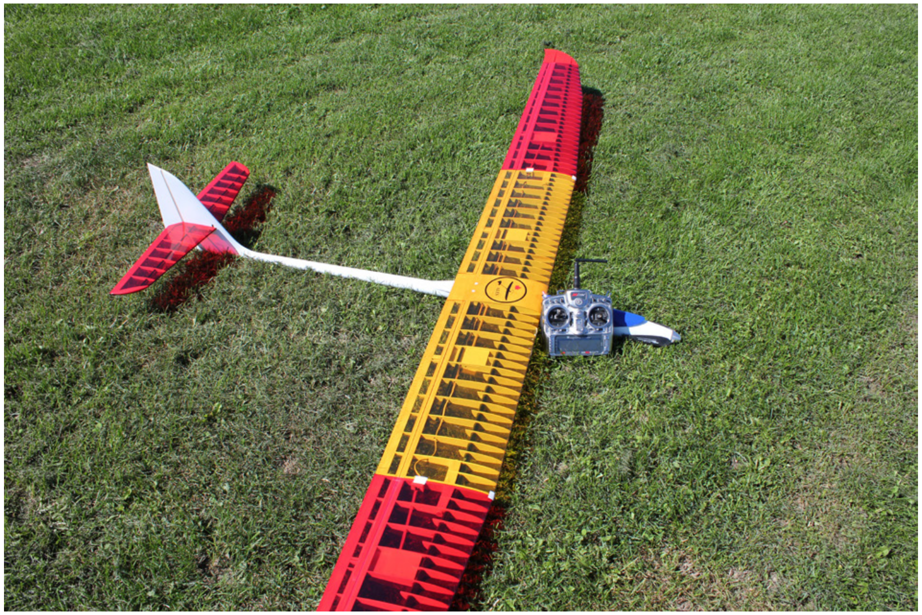


SHADOW

# Photo Album

## F3J World Championships Johannesburg, South Africa August 5-12 2012

Piet Rheeders, piet.rheeders@gmail.com


Klipdrift


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SWE-41308

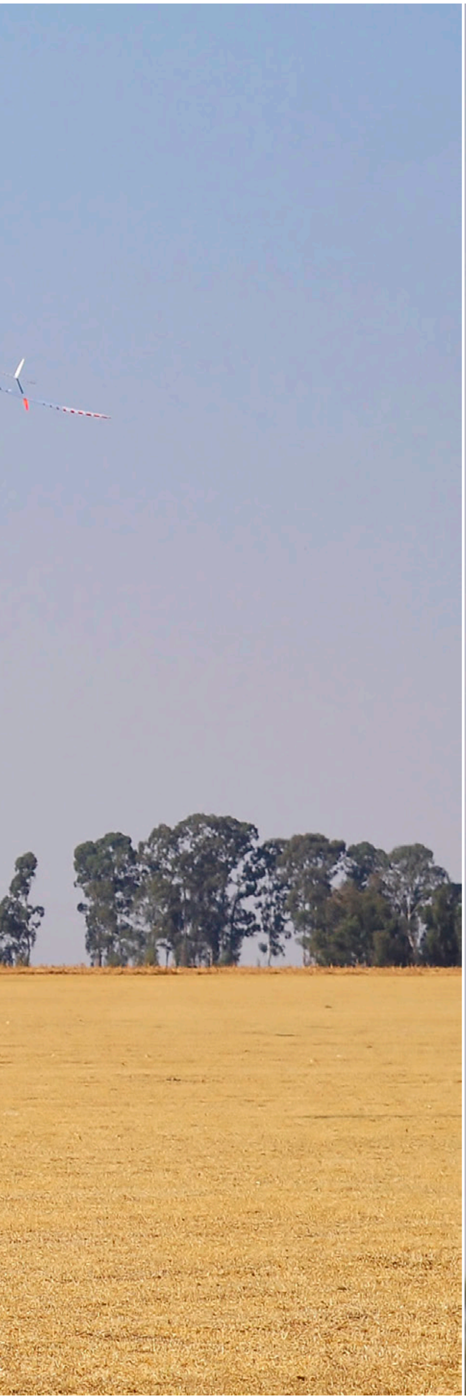

ХРУПКОЕ!


Xplorer


Xplorer
Xplorer


Xplorer
Xplorer


HORIZON
09




2.4GHz
51


HORIZON
HOBBY
12


RSA 2726
Xplorer


Xplorer


HORIZON
HOBBY


HORIZON
HOBBY
16


Canon


HORIZON
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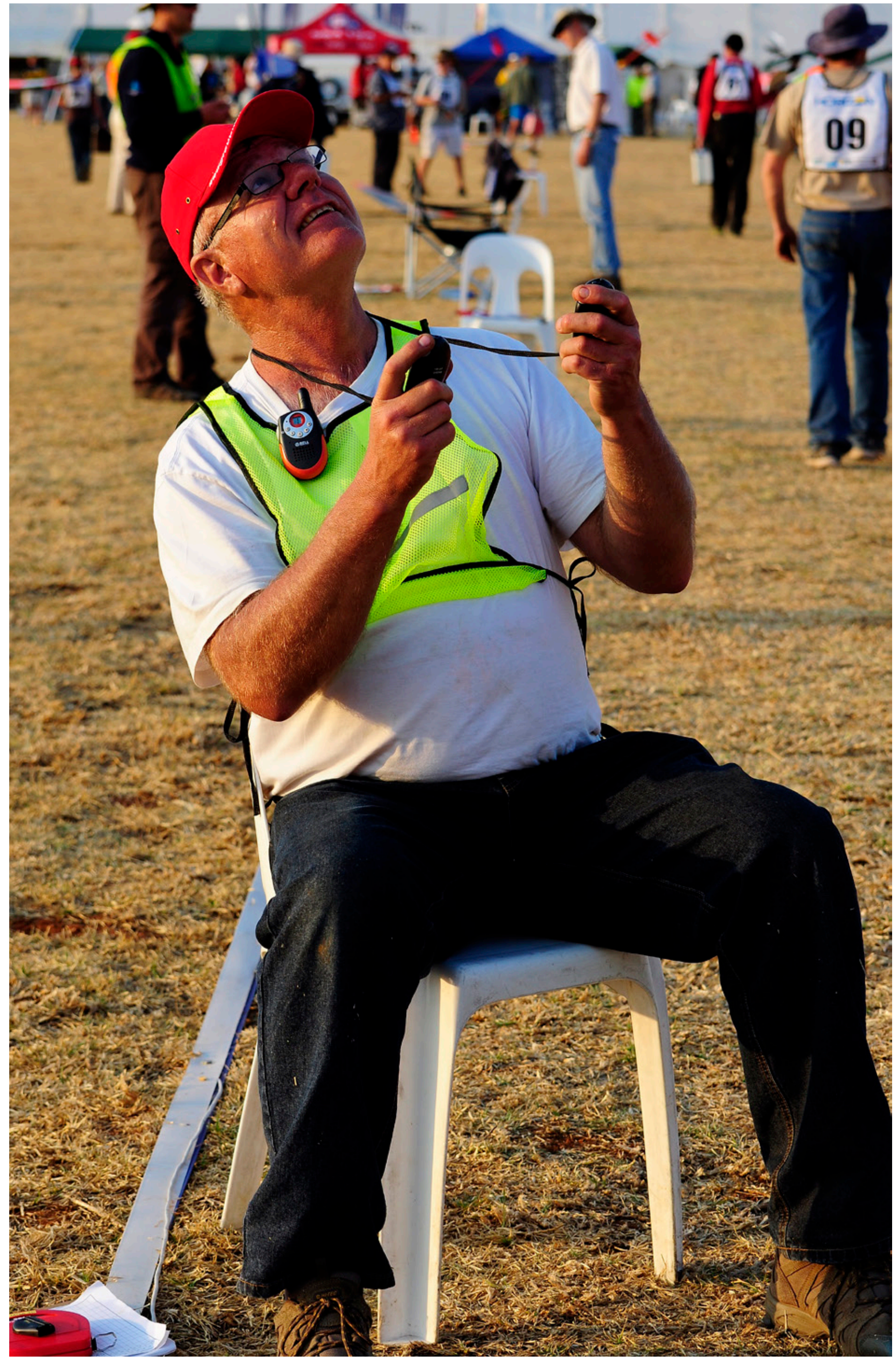
Graupner JR


7:36


SPEKTRUM
HORIZON
HOBBY
46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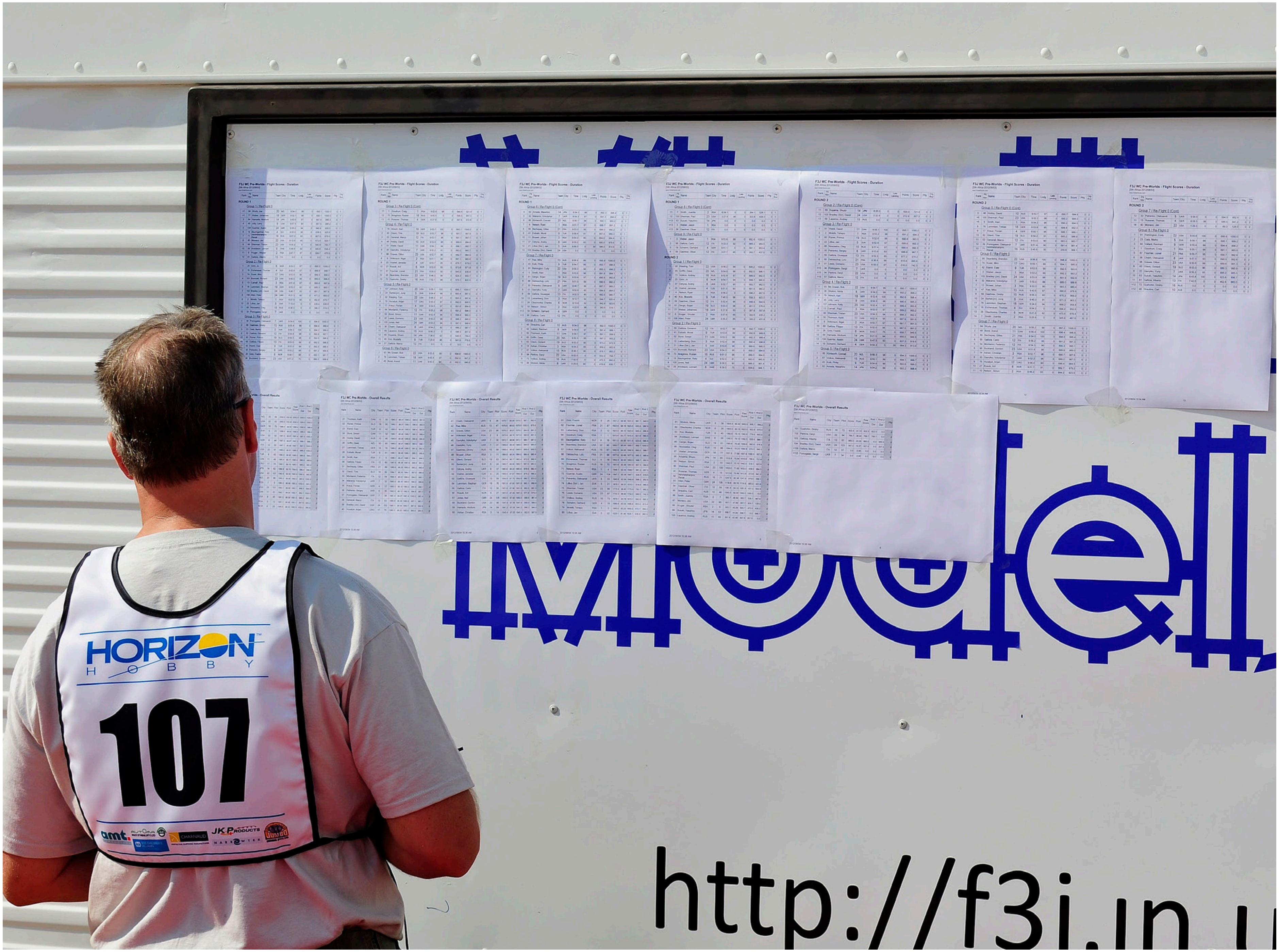

HORIZON HOBBY
107
http://f3i.in

# More about the front cover...

David Webb, webbsolution@gmail.com

The plane pictured on the front cover is my 3.8 meter Xplorer 2. This series was a unique run made by Nan for national team pilots. They have come in around 56 oz which is really quite amazing for a super lite aircraft. The majority of the weight savings on this SL version is in the fuse. Nan leveraged extremely light elevators and rudder surfaces as well as a complete spread tow carbon layup.

This plane did indeed fly at the World Cup in South Africa and even though it is not meant for wind speeds of over 3 meters per second I had to use it at 8 meters / second and it was flawless.

The main difference between the Xplorer 1 and Xplorer 2 is the new airfoil which delivers much more energy retention and wind penetration. This new airfoil really covers ground easily. There was no platform change between the designs so the plane basically flies like the old one but faster and with a little more of a performance edge. The difference is indeed noticeable. Before getting my hands on this model I had hand launched and specked out with an older X1 a grand total of two times in seven years of flying. After receiving this model in July of this year I think I have done it six times. It's like a giant DLG.

*A shot of my red 3.5 X2 from along the wing with the BC sod farm and mountains in the reflection.*

*My Pike Perfect Electro soaring with the rocky background of the Sciliar, at Alpe di Siusi, Italy.*
*Francesco Meschia, francesco.meschia@gmail.com*
*Nikon D70s, ISO 200, 1/800 sec., f7.1, 200mm*

# Lockheed Super Constellation 1049G

Kevin Farr, kevin@fvdv.co.za


The August issue of *RCSD* presented coverage of the Black Eagle Trophy PSS Festival 2012, hosted by Two Oceans Slope Soarers, Cape Town, South Africa.

There were several large highly detailed models flown during the event, including Steve Meusel's Grumman Bearcat, Hans van Kamp's Howker Hunter, and Malcolm Riley's DC-3/Dakota. A fourth spectacular model was Kevin Farr's Lockheed Constellation, Super G version, completed just in time for the event.

Kevin documented his Connie build in detail on the TOSS blog <http://toss.co.za/index.php/tossblog>; the high points of the construction process are covered here.

# Fuselage

I have taken on construction of the Connie build on a weekly basis over the last year, hopefully ending up at the same date and time as the Black Eagle Festival.

Lets start at the beginning. A traditional build this is — balsa, foam core and Oracover.... Simple, light, and a pleasure to work with.

In the end I am aiming at 4 Kilos or less on the 2.3 meter wingspan with the fuselage being balsa planked on an open structure, the wing being of foam core and balsa covered.

Here we go!

The fuselage was constructed using a built-up jig, centre lined. This was originally going to be a 2-part fuselage - made building it easier, anyway.

Above left: Front end jigged up and lined up to ensure all supports are square.

Above centre: Tail end of fuselage takes shape in its own jig.

Above right: Stringers are added to the bulkheads. Here the aft end starts to get the stringers applied while still in the jig to ensure absolute plumb line-up. CA works a treat here, just make sure your line up properly before applying.

Above left: Adding the little bit where the bus drivers sit.

Above centre: Interior shot of the aft fuselage.

Right: And walla! One fuselage out the respective jigs. Lots of wood bits, CA holding it all together.

Looks reasonably straight, four bolts holding the respective halves more or less in the same place at the same time.

Elegant Tuna!

# Fuselage

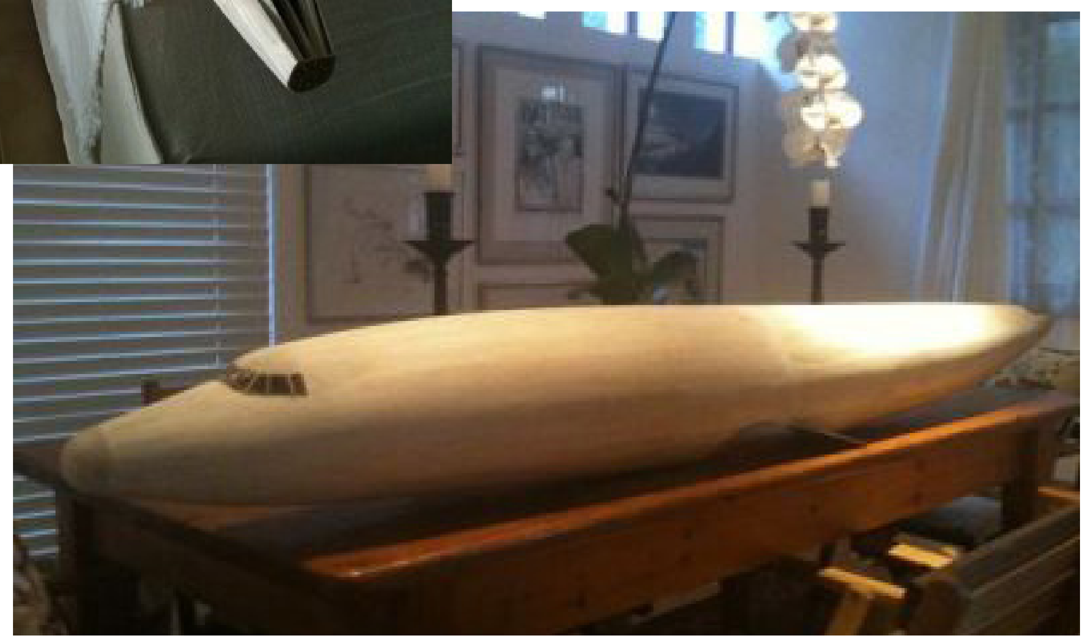
Most of the building of the fuselage complete and so we get to add the planking to the skeleton.

Planks are 20mm wide out of the 100mm standard planks, by 2,5 mm deep as we will sand down to 1.5 mm after liberal doses of lightfill are added. Lightfill pretty much weighs the same as balsa so no need to be scared of a liberal application.

Right: Planking the right hand side with 20mm x 2,5 mm planks and using a balsa stripper to keep the planks uniform in size.

Above right: And then the left side is planked, supplemented with lightfill, and sanded down with 80 grit paper to ensure that the lightfill and balsa even out at the same time. Final finish will be with 150 grit.

Left: Checking out the front connected to the tail after planking of the tail section (covered on opposite page).



Above: Planking the latter half of the beast, starting at centre top, then centre side as planking dictated till two halves meet, to stop any “pulling” in either direction.

Right: Added the nose made of 10mm balsa sandwiched cross grain for strength and sanded to shape. The cockpit area is filled in and the planking sanded to a smooth finish. Time to join the two halves!

# Fuselage

So now to the joining of the two halves, and the addition of the wing saddle and the wing fairings.

Above left: Wing saddle area covered with 1mm ply to take the shape as created by the formers. Note the bolts holding the two fuselage halves together

Above: Rear saddle area added and holes drilled for the wing bolts to attach to the pre-0attached claw grip bolts in the fuselage. Two front ones still to be done.

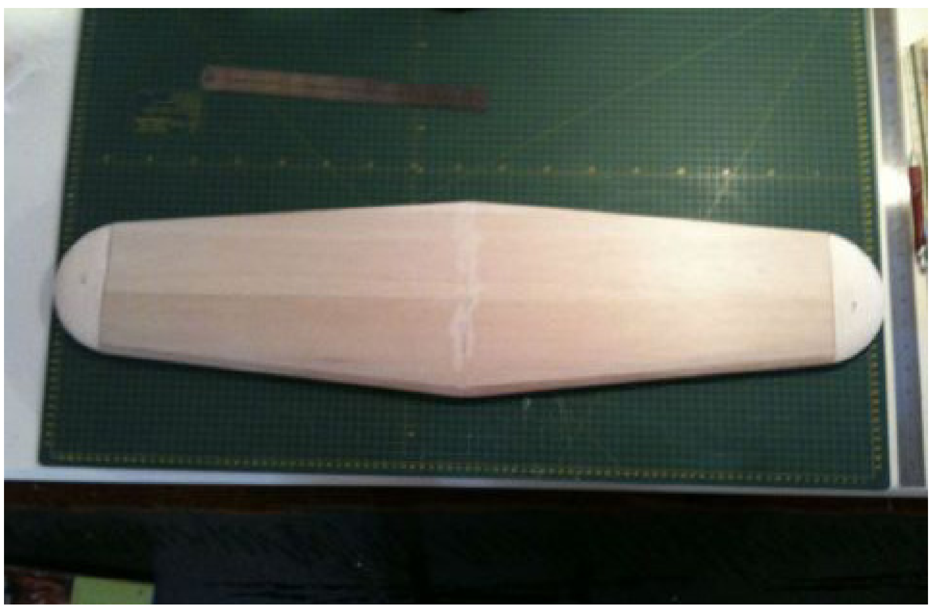
Left: The fillet for the wing fairing being formed onto the 1mm ply that was sticking out from the wing saddle in the last photo. Solid balsa at the front, planking in the middle...

Above: ...and these solid balsa back fairings that lead to the wing trailing edge. That took some serious work and reference to the real thing to work out. Literally hours on each one.

Above right: More and more like the real thing, fillets sanded in and complete.

Right: Right side fillet in place, contoured, spot filled and sanded.

# Tail

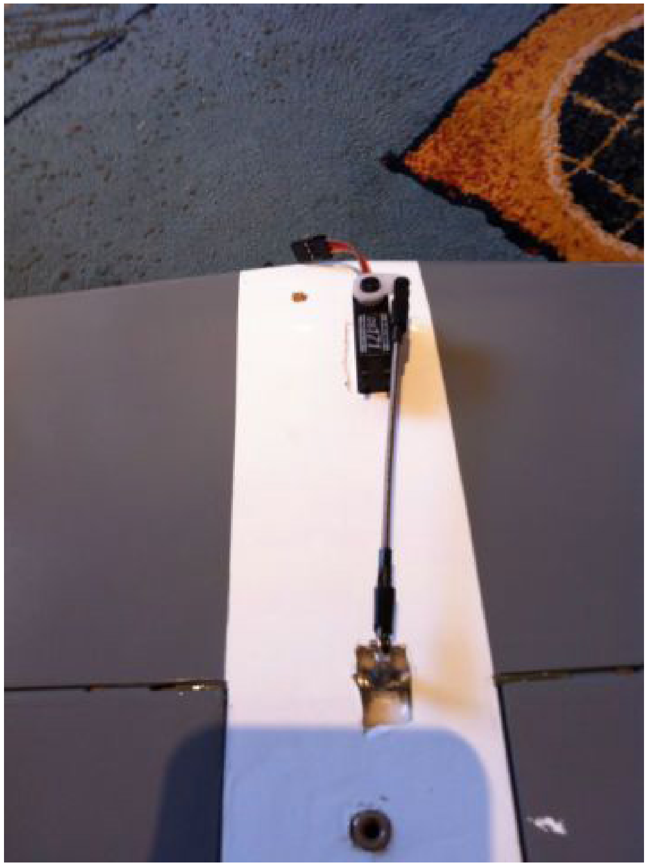


The horizontal surface is foam core and the vertical stabs are solid 6mm balsa shaped to the tri-fin configuration.

Above left: Two outside vertical stabs and the center stab, with cross balsa at the top and base to stop warping and a thin CA applied 1.5mm ply on the leading edges, just to stop those fine twig induced nicks.

Above: After skinning the surfaces with 2.5mm balsa, the stab is replaced in the foam saddle and two carbon rods were applied across the joint.

Left: Adding balsa tips with 1mm ply sandwiched between two 6mm balsa sheets Meranti leading edge in place and sanded down, first using a hand plane to hone the edge, then 60 grit sandpaper and then much lighter paper to get edge to take nicely. Basic surface complete and awaiting the vertical stabs.



The vertical stabs were added to the tail with carbon dowels through the verticals and into the horizontal, then all wood glued together.

The real trick to the tail section would be to somehow get the servo set into the base of the tail section, and so negate the need for a long fuselage push rod. This would mean creating an internal control horn system that cannot be seen as well as using knuckle joints for the Robart hinges and so making all mechanics “disappear” as it were. In the end this little piece of trickery took far longer to resolve than expected, but the final result is pretty convincing.

Left: A metal gear slimline servo, pushrod and elevator linkages were placed at the base of the stab to fit...

Below left: ...inside this wee little hole to the right hand side of the main fuselage keel.

Above: And so the tri-tail is completed.

# Wing


Time to start the wing. At 2.3 meters this was going to be a large job and thanks to Jeff and Steve, eventually the cores were cut very close to the original Constellation profiles. I kept the outer core saddles for compression of the cores to the balsa later on.

Above left: 100mm x 2.5mmbalsa sheets being glued together - 3 sheets at a time

Left: Pile a bag load of books on top and leave to cure overnight and then sand flat with 60 grit paper.

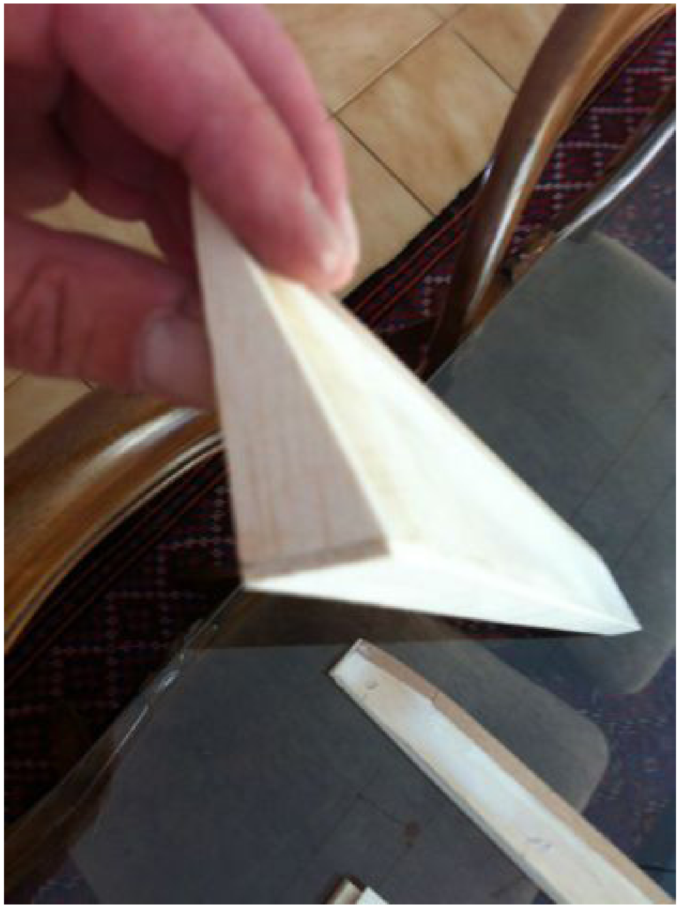
Above: Nice tight vacuum doing the job and pulled the balsa in really well. This method was used on the center core, but I had done the outer panels the traditional way of leaving them sandwiched under a ton of books in-between the saddles that they came from. Still think the vac-bag came out just that bit better.

Above: Center wing panel being joined with servo lead holes in place.

Above right: Right outer wing panel after control surfaces were cut free and servo wells cut out. The wing profile has a rather large 16 percent ’foil so getting the balsa to get to the leading edge was going to be fun, but the meranti leading edge negated some of the leading edge issues.

Right: Joining the outer panels to the center core with the dihedral in place. Due to the dihedral in the wing, the center panel would have to be separate from the outer panels with a dihedral cut on the joint and then to be “bandaged” with a light ’glass coat and 12 hour epoxy.

# Wing control surfaces



The control surfaces were cut free and the servo bays cut out, all previously drawn up on tracing paper from the original foam cores, then placed over the balsa to ascertain position of servo lead channels and servos bays.

10mm was cut from the trailing edge and then 0.5mm ply was placed at the trailing edge to give a good clean strong trailing edge where balsa would normally fail.

# Wing control surfaces

Opposite page above left: Back plate of balsa add to leading edge and outside edges of the flaps and ailerons so that no foam is left open. This aids the Orocover later on.

Opposite page above right: Flap is base hinged with CA hinges. Hard points were added from light balsa before adding the back plate of balsa to the trailing and leading edges respectively. Hinges were then added at 45 degree angles to ensure that they were not just hanging onto the skins.

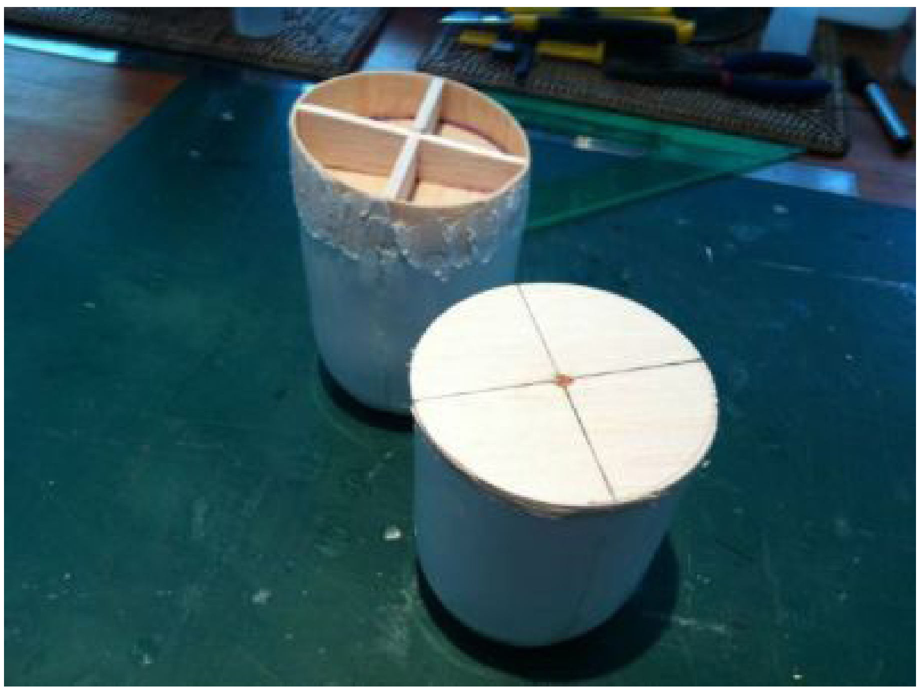
Opposite page, lower right: Ailerons get a center hinge hole for the robart hinges as well as a light balsa "knuckle" added to the leading edge to slot into 0.5mm ply casing on wing trailing edge.

Right: Shows aileron deflected downward.

Right below: Right wing flap in neutral position. Notice the meranti trailing edge which creates a tougher and sharper trailing edge.

With the wing and all control surfaces finished, everything is ready for covering and spray paint work.

# Nacelles

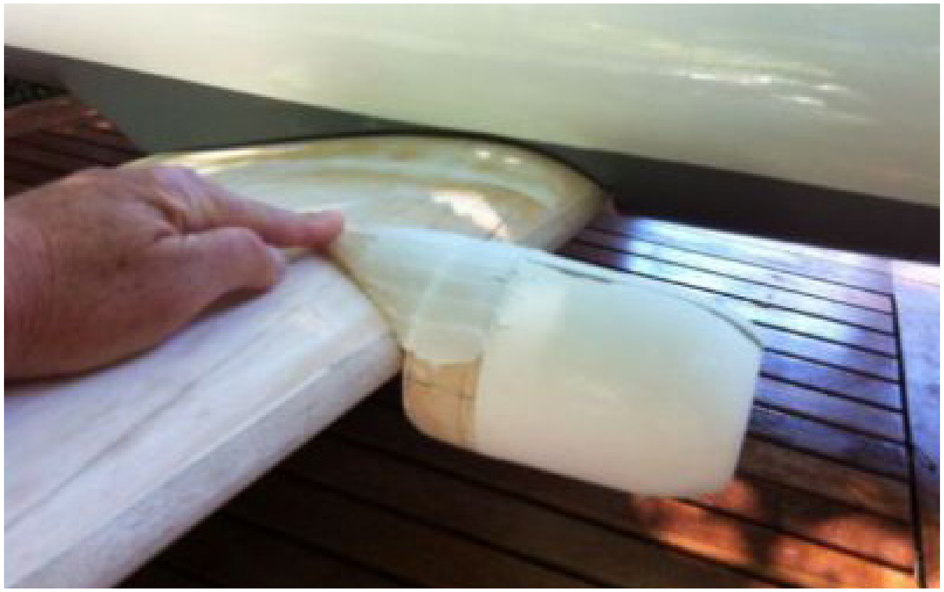


This part was fun - and not for the faint hearted... four times every thing and boy can that be tedious, so be careful when choosing a PSS subject with time restraints, as things like nacelles can chew up some serious time based on the amount of repeats required.

Above left: The only parts that were purchased as molded on the entire plane were the nacelles and the air intakes. Expanding foam adds strength while keeping it light.

Above: One week later and the magic mushrooms have risen and dried, ready to be cut and shaped.

Left: Backing up the foam to ensure a nice base for the extender/ joiner made with former and 2.5 mm balsa curled around the shape.



Above left: And so we have the wing edge 10 degree ready for stage 2.

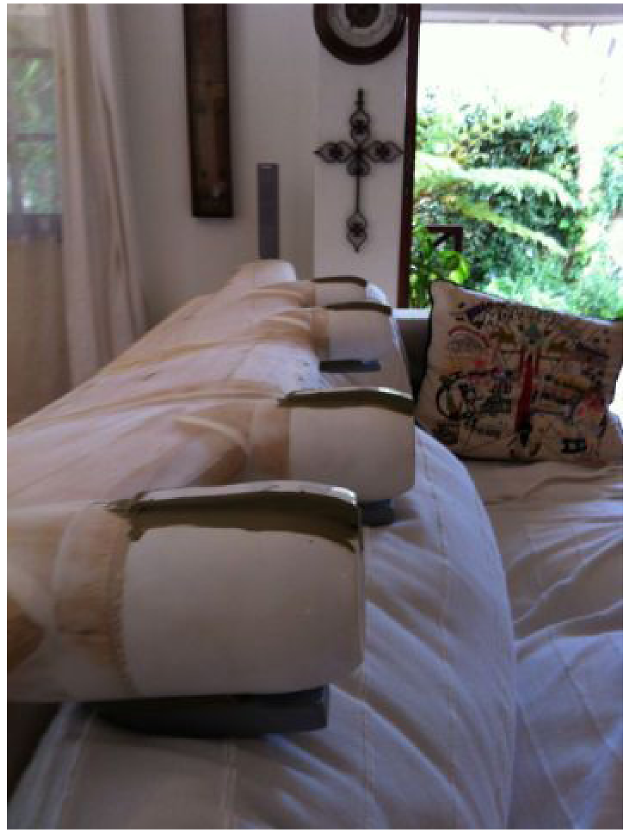
Above: Placing a piece of sandpaper on the wing and vertically sanding a 3mm sheet to get the wing shape,
then using a jigsaw to cut the shape and finally sand down to get the nacelle shape as accurate as possible for flaring into the wing via the leading edge.

Left: ...and Bob's your auntie, it all fit - kinda. Do the same for the base, solid balsa as these are likely to take a hammering when landing in the Fynbos.

# Nacelles

Left: Completed nacelle fit to wing. Matches 10 degree leading edge sweep and wing lower surface contour.

Above: There were four stages to the construction of the lower air intakes at the base of the nacelle. These were made up of three pieces of mold and took some time to work out. Balsa joined with CA reinforced the inside and then Combifill was used to cover the joints. Sprayed with base coat, sanded again until flush and then a final coat of base coat was applied. Dowel pegs were added to assist the grip in those bush landings.



Above left: Add the air intakes to the nacelles and combifill the joints. Good friend combifiller, but can be heavy, so go gently with it.

Above center: And do the same for the top air intakes.

Above right: Engine nacelles complete. The lower intakes installed, contoured, and with base coat applied.

And after much sanding, joint filling and general make good we virtually have the complete engine nacelle make up x 4. Phew!

# Covering and Detailing

Above left: First the tail was covered in white. I find that Orocover, etc., work best when you apply say 300° heat to get the basic bind and then shoot up to 400° heat to get all the wrinkles out, and believe me, with enough patience you can.

Best to apply, get some wrinkles out, go have a cup of tea and let the shrink cool down, and then have another go, and you will be pleasantly surprised at how the wrinkles clear out of Dodge Something to do with the hot/cold thing that allows the shrink to stretch better and better every time you do the hot/cold thing.

Left: Another view of the covered tail.

Above: The covered tail is trial fitted to the fuselage. Lookin' good!

Finally, I get to the decal stage of the project, and to be honest the part I enjoy the most. Would love to paint pretty planes all



day long... if somebody else would just build the bleeding things.

First set of decals I did at work were off our stock standard high end printer. Ran home, decalled an entire side of the fuselage and then went to put it in the shed... and that's when a rain drop hit it and the decals smeared in an "oh so not pleasant" sort of a way. So back inside to take them all off and go to plan B...Find a professional printer that has solvent based digital printer and get them done there.

In the end a nice thin film, hard as nails print and nice and easy to apply. So watch that the prints you get done are in fact solvent based on the clear film or you could have a bit ob a bleed on the go.

Above and right: The completed tail with decals applied.

# Covering and Detailing

Covering the fuselage amounted to a 12 hour stretch — from 5:00 in the morning till 5:00 in the evening. Basically barrel wrapped in five separate pieces from tail to just behind the cockpit.

The trick is to try and get the joins even, which I failed miserably at doing as the fuselage just never has a consistent shape to it. Ever. So in the end I settled for the best I could get. The nose cone was fun - cockpit done as a separate piece, and tail area of fuselage done as a smaller separate piece.

Adding the little fiddly bits based on images of the actual aircraft.

Above left: From the right front, fuselage covered with Oracover and tail fitted. Very sleek.

Above right: Front view of the covered fuselage from the left side. The tail is more clear in this image. A beautiful aerodynamically clean shape.

Opposite page left: Sprayed the nose and added windows with black vinyl. Underpart of the fuselage sprayed at this point as well. Seems best to spray Tamiya primer as a key coat and then go with whatever colour works best.

Above: I found the grey of the Oracover to be too light and so went with a spray - normal old fashioned hardware shop spray paint and the two seem to work well together.

Also found that normal insulation tape - cut to a thin strip - works very well for getting around corners and shapes when masking off an area. Not too sticky - not too loose.

I like to work with contrasting tape to paint colour so I can see the spray area better then a thicker strip for bind and finally whatever cover you want too use for the rest of the area. Once the paint is dry the insulation tape comes off like a dream.

# Covering and Detailing

The spinners were driving me nuts as there are a specific shape so I eventually found some that were of the correct proportion. Slightly longer than normal, I had to backfill all the prop openings and spray to aluminum finish... x4.

Then I had to create the sleeve that the spinners come out of, that covers the motors. Luckily found a molded bit of plastic from servo trays and backfilled with balsa. Then borrow Andy's drill press, fit with a toothed circle cutter, and try like hell to center the hole in said plastic bits x 4...

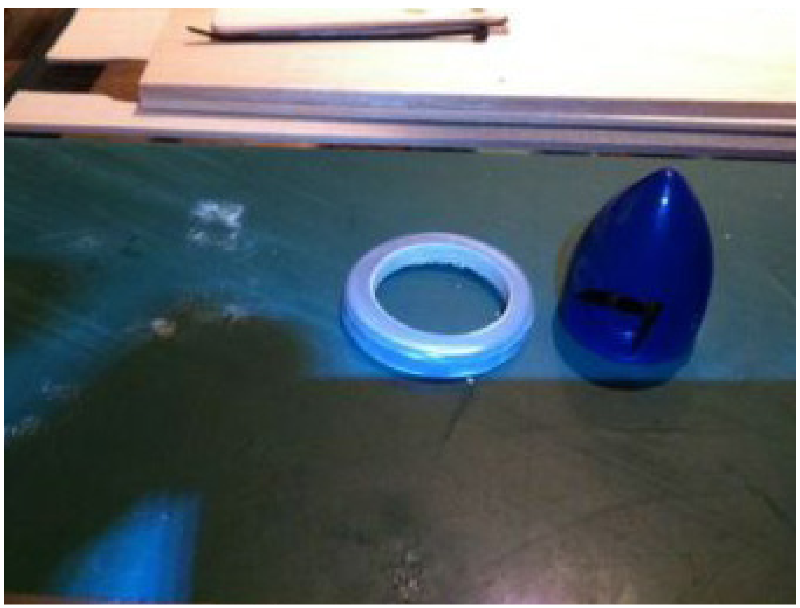
A few whiskeys later and this was a cinch.

Boy did this take time, but in the end came out all right me thinks.

Left: In the drill press.

Left below: Sleeve and spinner.

Below: Completed nacelle with upper and lower air scoops, sleeve and spinner. Three more to go.





Above: Tip tank painted and with decals applied. These were carved out of foam, and then glassed. I was very particular about their shape. Most of the models I have seen make them round, and the plans called for that, but the more I studied the real plane the more the tip tanks took on a differing slightly goldfish sort of look and feel. So after about a week of working the glass out the final product looks pretty close to the real thing.

Right: Completed wing. Wiring, servos and linkages installed. Completed nacelles attached, faired, and painted. TWA decals applied. Tip tanks need to be added as in photo above.

# Covering and Detailing




This page: Various views of the completed fuselage. Covered, painted, decals applied. Ready to go fly!

Opposite page: Kevin and his recently completed Lockheed Super Constellation 1049G at the 2012 Black Eagle Trophy PSS Festival.

Just out of interest, the Connie's wing on the actual airliner was based on the P-38 Lightning wing as they both came from the same Lockheed stable and the P-38 showed extraordinary gliding capabilities during wartime. So there seems to have been a natural evolution with the wing platform carried to the airliner business.

# Completed!

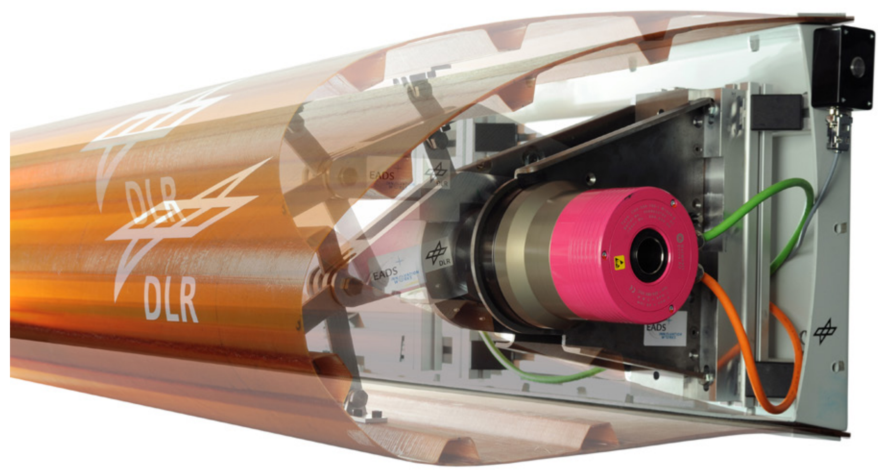
# Flying

Above: Launching for the maiden flight. The PSS festival was a blast. After hiding under trees for an hour the rain finally let up and we were able to send out the big birds. Steve first with his Bearcat, then myself with the Connie in at 5 kilos and then Mally's large and very impressive Dakota.

Opposite: Kevin's Lockheed Super Constellation 1049G in flight at the 2012 Black Eagle Trophy PSS Festival. Boy what fun, nerves all a jangle, adrenaline through the roof.


TRANS WORLD AIRLINES
TWA

# MORPHING LEADING EDGE REDUCES DRAG



Some years ago Joe Wurts talked about leading edge droop to increase lift, particularly during launch. How the required mechanical control system would work, and balancing increasing weight and complexity against theoretical performance gains were two major considerations, and so far as we know were never resolved.

So when we saw a recent item in Gizmag <http://www.gizmag.com/morphing-leading-edge/24068/> outlining a morphing leading edge we were intrigued, to say the least, and immediately thought of sharing the concept with *RCSD* readers. — B²

Condensed from Gizmag

Passengers looking out the window of a passenger plane will likely have noticed slats on the leading edge of the wing, along with the flaps on the trailing edge of the wing, being extended during takeoff and landing. These leading edge slats provide the lift necessary at low speeds, with the gap between the wing and the slats directing air from the underside of the wing to the top. Unfortunately, this gap also generates a lot of noise. A team of researchers has now developed a morphing leading edge that eliminates the gap and reduces noise and drag during landing.

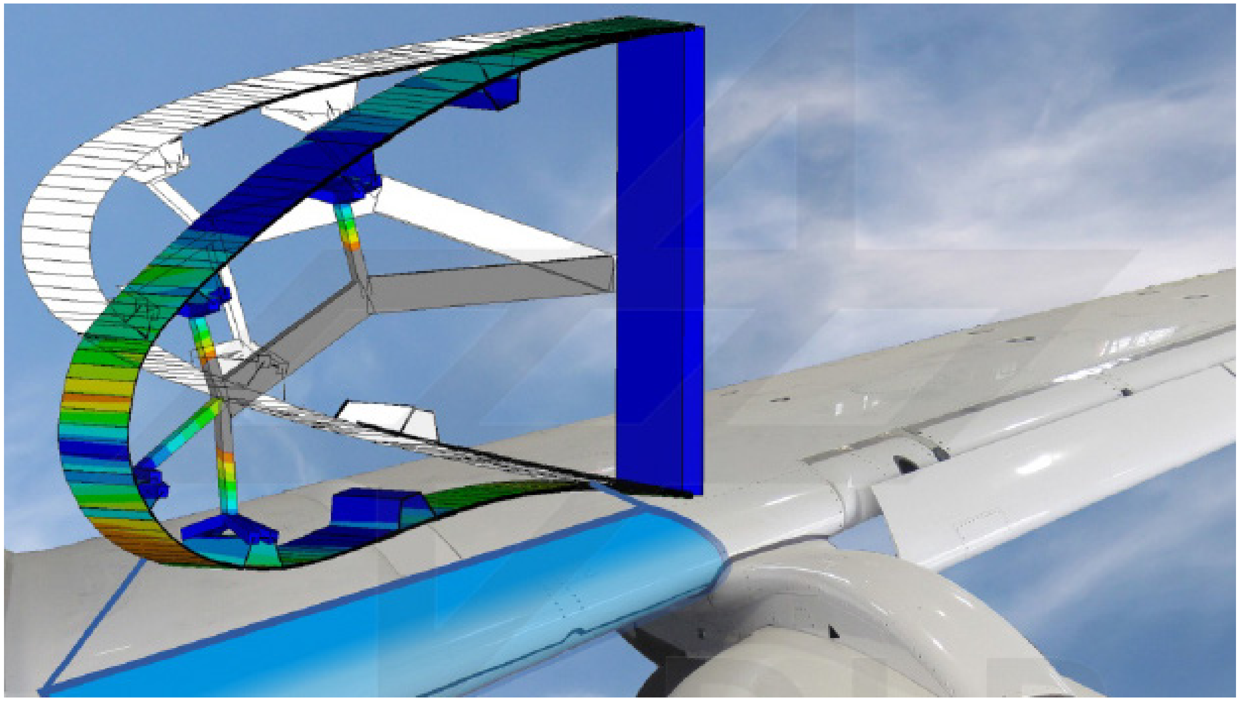
The "smart droop nose" developed by researchers at the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) working with partners Airbus, EADS Innovation Works and Cassidian Air Systems, literally morphs into a different shape during takeoff and landing so that no separate slats – and no gap – is necessary.

In developing the new leading edge, the researchers faced a number of challenges. "On the one hand, the structure needs to be very elastic, to enable it to morph to the required shapes, but on the other it has to be very rigid," said DLR Department Head Hans-Peter Monner. Ultimately, the leading edge must bear around one third of the weight of the aircraft during landing."

The material also had to produce wing surfaces that are as flat as possible to achieve laminar airflow. Concentrating on the glass- and carbon-fiber reinforced composites typically used by the aviation industry, they found that glass-fiber reinforced material best fit the bill.

The droop nose design concept also sees the skin on the front edge of the wing curved, rather than stretched to minimize the stress placed on the material. Individual layers are then placed on top of each other so that the skin creates a structure with a customized rigidity distribution. The leading edge then morphs into the desired shape using actuators and support elements integrated along the wingspan.

Condensed from the DLR web site
<http://www.dlr.de>

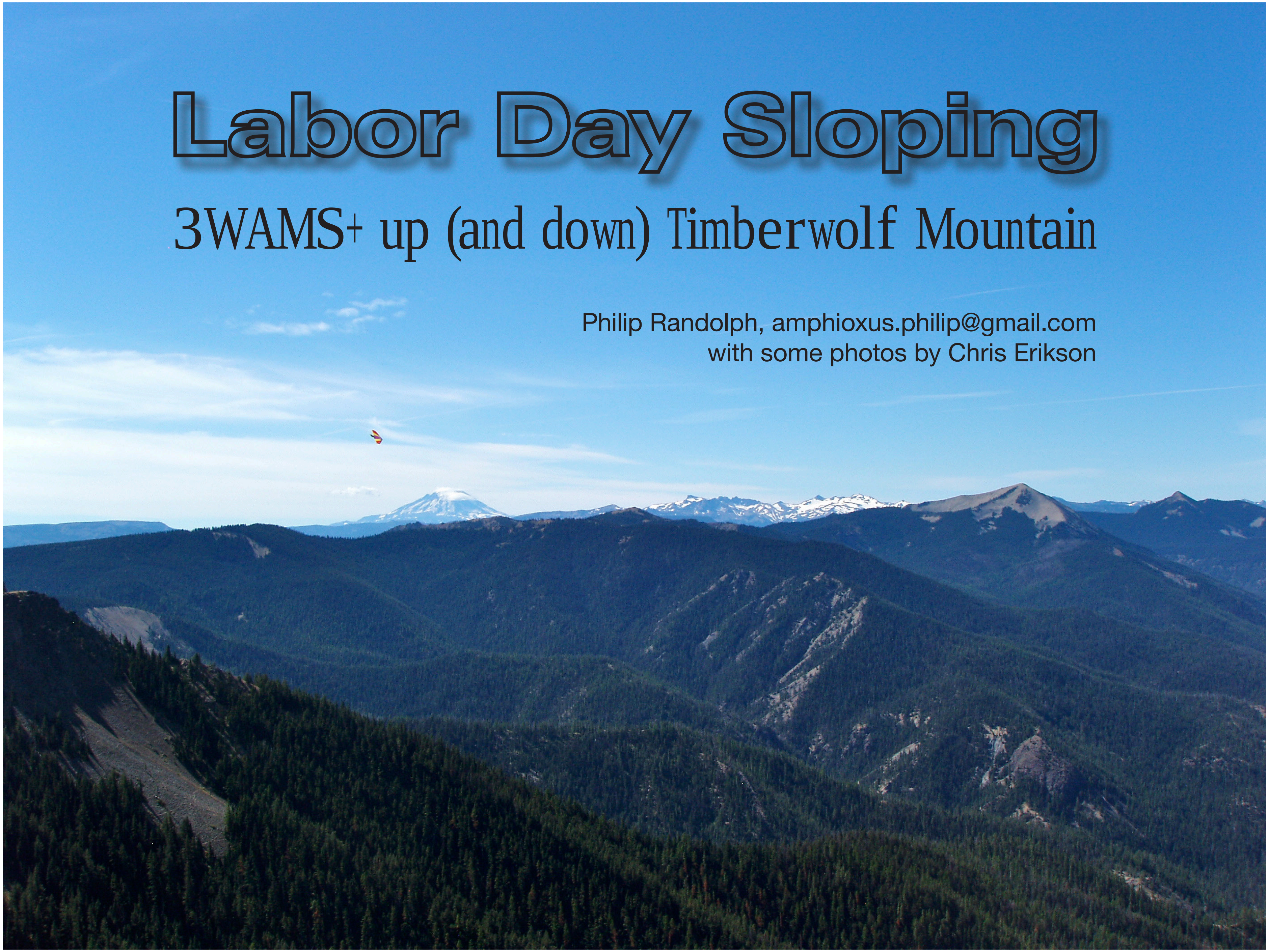


Researchers at the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR), together with partners Airbus, EADS Innovation Works and Cassidian Air Systems, have been carrying out research to reduce the aerodynamic drag of aircraft and have developed an alternative to the traditional leading-edge slat. A morphing leading edge is expected to replace slats to create an innovative high-lift system. This construction significantly reduces drag and noise during landing.

Tests were carried out between 27 August and 7 September in one of Europe's largest wind tunnels at the Russian Central Aerohydrodynamics Institute's (TsAGI) Zhukovsky research facility south of Moscow. In the wind tunnel, the system's operation and performance were tested under realistic conditions.

Normally, the flaps on the trailing edges of the wings and the slats located on the leading edges are extended during take-off and landing to provide the necessary lift at low speeds. "The smart droop nose morphs itself during take-off and landing in such a way that no separate slats are necessary. The leading edge can be lowered by up to 20 degrees with virtually no loss of lift," explains DLR project leader Markus Kintscher from the DLR Institute of Composite Structures and Adaptive Systems in Braunschweig.

In the concept of the droop nose, the skin on the front edge of the wing is just curved, not stretched. This stresses the material as little as possible. The scientists position individual layers one on top of the other, in such a way that the skin creates a structure that has a customised rigidity distribution. The leading edge morphs into the desired shape via integrated actuators and support elements along the wingspan, thus achieving very high stability. Soon, the new wing leading edge will be further developed to meet industrial requirements such as lightning protection, de-icing and the ability to withstand bird strikes.



# Labor Day Sloping

## 3WAMS+ up (and down) Timberwolf Mountain

Philip Randolph, amphioxus.philip@gmail.com
with some photos by Chris Erikson

Herein: Transmission fluid on road. What guys talk about. Ms. Bawdy Freedom Flutter. The Swedish String Theory Bikini Team. Vehicular resurrections. That toy airplane flying stuff. Lost pTorodactyl. Three trips down talus. Dust boy. Philip tied to the roof of Chris's Datsun with ropes.

Well, four WAMS, as intrepid slope explorer Chris Erikson is bringing his intrepid six-year-old, Jake, who will do pretty well flying Chris's EZ Glider. Steve Allmaras and I are planning to meet them Friday evening at a campsite below Bethel Ridge. That's southeast of Mount Rainier, in the Cascade Range of Washington State (upper left corner, USA, North America, third rock out). Steve is driving. 2000 S-10 4WD, automatic transmission, soon to be without fluid.

Weather: Clear or mostly clear all weekend.

Steve and I get up to Bethel about 2 PM. From the road up to the microwave tower, you can drive east along the basalt cliffs of a giant bowl, for miles, till you get down to Highway 12. Except for the rutty place left by the insufferable mudders. We get to that after a mile or two. The ruts are huge. Insufferable mudders with big tires. Mudders are them what likes to tear up wet dirt roads with big 4WD rigs and chews tobacco and drinks Budweiser and has no ancestors. We turn around. The road is so bumpy my left foot goes to sleep a little more than usual since that hit and run driver. Won't last. Back stuff.

We get back to where the road hits the top of the cliff. Steve gets out a Boomerang (48" EPP chevron). The wind is mostly blowing straight in, and this is one of the few spots where we could walk downslope for a recovery. We eat lunch. The wind dies. Thermal variability. The wind reverses. Phooey. (Phooey is a mild exclamative interjection indicating annoyance and disappointment.) Trouble is just starting.

*Title page: Mt. Adams, Goat Rocks, Steve's Herring*

We drive down from the ridge on this microwave spur road, and stop at its intersection with Bethel Ridge Road, which actually goes around Bethel Ridge (so why is it so-called?). We're headed for a campsite on another spur road. We never get there. Steve pushes on the accelerator. No go. He shifts out of 4WD. The engine revs. The truck stays. He gets out. "There's a huge puddle of fluid in the road. It's red. It appears to be transmission fluid." Steve understands these things because of his Ph.D. in aerodynamics.

So we push the truck across the gravel main road, park by a small meadow surrounded by alpine fir. It leaves another gallon of fluid. Bother. (Means about the same as Phooey.)

*Tranny fluid blooper threatens the trip. Jake and flying device.*

Steve actually has cell reception. He lets Chris know where we are. A bunch of calls. A tow truck will arrive in the morning. AAA. Even the Chevy dealer's service department is closed for the Labor Day weekend. The truck will be stranded in Yakima till at least Tuesday. That means Steve's wife will have to drive across Saturday to pick us up. Bother.

Chris and Jake arrive about 9 PM. Chris and Steve agree that the leak is from a hose atop the bell housing. We camp in the meadow. Jake is rapidly asleep in the back of Chris's Datsun 510 wagon, aka 'deathmobile.'

What guys talk about: First and foremost we dis the other CEWAMS, since they are out of earshot. "They are just a bunch of pantiwaists who are only willing to show up when the weather is bad." Similar truths.

Now, mostly we fly EPP chevrons and deltas. Chris says, "A standard planform will generally beat a tailless in performance. It fights pitching moment with a horizontal stab that is small compared to all that elevon area." Then we're talking about YB-35s and YB-49s, those big flying wings developed by Jack Northrop.

Philip says, "Steve, are there any situations in which a tailless will outperform a standard planform?"

*Philip ready to launch his Javelin, Jake and Chris, Lazarus (resurrected S-10) Saturday afternoon.*

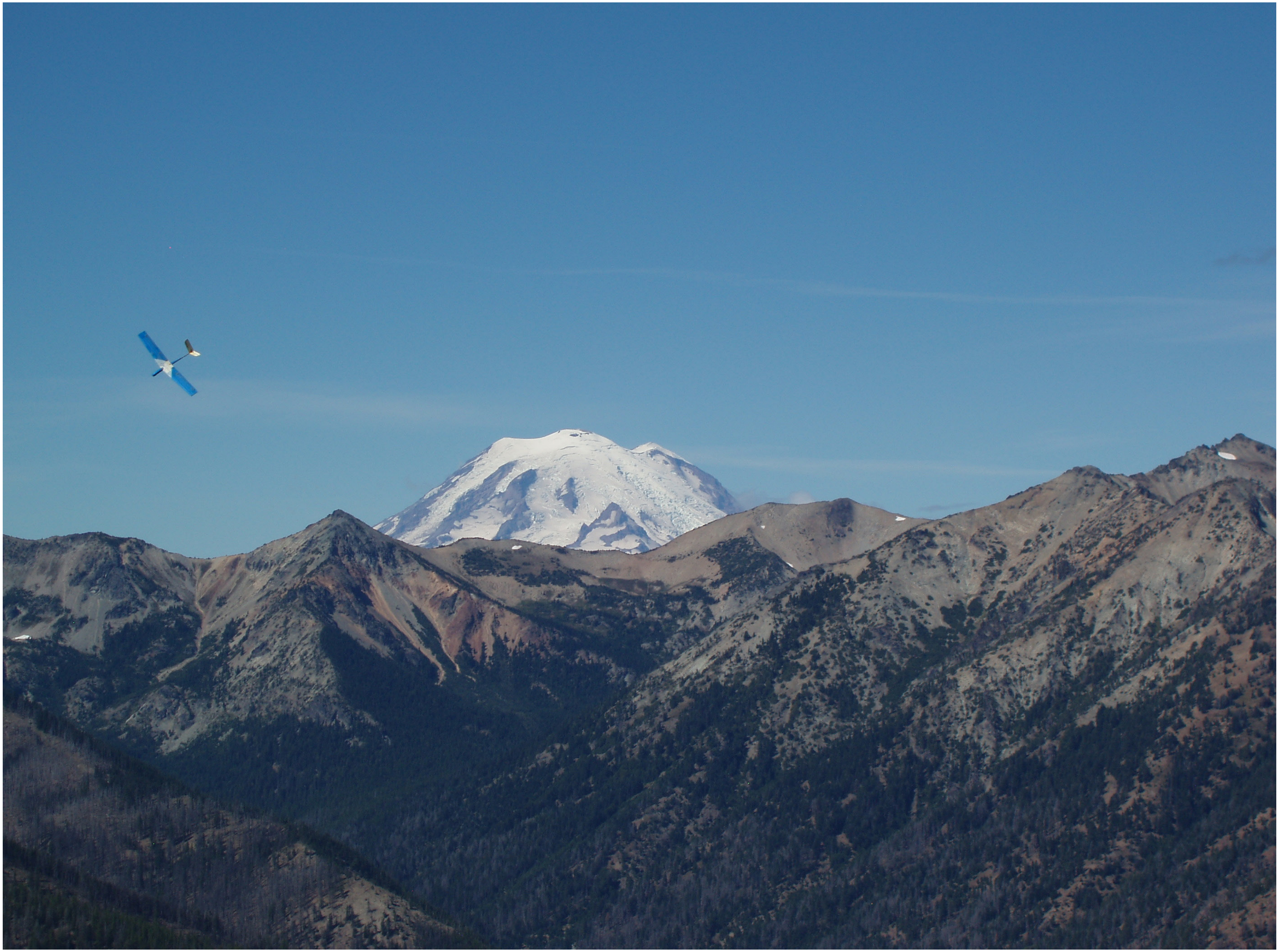
*Javelin and Jake late Saturday afternoon.*

*Remember those caps with the arrow through the guy's head? Or: Philip flies his Javelin though Steve's head, after which Steve temporarily lost his ability to discuss aerodynamics. Photo by Chris Erikson*

*Chris' Datsun at the Saturday evening Timberwolf campsite.*

Steve says, "Jack Northrop and his designer, Bill Sears, developed an equation for the range of a fuselage/ wing configuration. The equation was a cubic and had two extrema: a flying wing config and a more conventional looking planform. They assumed the flying wing gave max range and the conventional gave min range. And then they were off designing their flying wing configs, culminating in the XB-35 and XB-49. A university professor that was not affiliated with Northrop Corp. revisited the equation and determined that the flying wing actually gave min range and the conventional gave max range. Northrop and Sears never admitted their mistake (if they in fact made one)."

Steve continues, "There probably are narrow situations where tailless excel. But high-aspect-ratio flying wings have a problem with 'Bawdy Freedom Flutter.'" (Later I looked her up on the web, to try to understand what Steve was talking about. She's a dancer at a bar near the Lockheed Skunk Works.) Steve says something about, 'Zagi flutter.' (Zagi sounds like she is from Egypt?) Steve says, "Our little chevrons do that at high speeds. The center and tips develop a counter-phugoid vibration that escalates unpredictably." (So was Steve trying to make analogies between our foamy flying wings and erotic dancers? A Youtube vid shows Miss Bawdy Freedom Flutter doing an escalating counter-phugoid



*Jake and Super Scooter in the Sunday sun. Photo by Chris Erikson*

*Jake "rescues" Philip and Steve. Photo by Chris Erikson*

flutter, as well as gyrations, in patriotic bits of red, white, and blue.) Steve says, "It can tear a flying wing apart. It's also very difficult to model. The cure is to stiffen the wings, but that adds so much weight that flying wings lose out to conventional planforms." (Looking back, it appears Steve might just have been talking aerodynamics, in which case he probably meant, 'Body Freedom Flutter,' referring to the lack of damping effect on wing flutter by a lack of fuselage mass. I eventually figure these things out.)

Chris rattles off a list of delta-wing fighters and bombers, plus the Concord. Steve explains that the lower aspect-ratio wings are stiffer, and that the aircraft bodies help damp flutter.

Philip says, "Our chevrons sure are convenient. Pull the plug and throw."

Chris: "And they're so much harder to break."

Steve: "Yeah. I thought I'd have to build a new fuselage for my Super Scooter. It was shredded. I got it back together with Gorilla Glue." Typical of Steve, it now looks immaculate.

Philip: "Steve prevented me from napping on the way over by driving the scenic route by Mount Rainier. I'm crawling into my tent."

*Javelin and Mt. Rainier. Photo by Chris Erikson*

Saturday morning:

From my tent, I hear Steve say, “There is frost on my windshield. I was cold last night.” Me too. The forecast was for 49° at Naches. With another 4000' altitude, I had figured 40°. Not. I should know to always bring an extra bag to 5000'.

Breakfasts. Coffee. Me, decaff. Jake wants Chris to play tag. Chris: “Not now. I’m eating my hot dog.” Jake: “Daddy, I think you don’t need a hot dog.”

Jake has a lidded cardboard box. Chris explains that it contains Jake’s late pet, Cindi, who was a cat.

Big dirt bikes, adorned with camp gear and riders, start drifting by. The smallest is a 650cc Triumph. The biggest is a 1200cc BMW (yep, dirt-bike layout!). They’re riding gravel roads from Southern Washington’s Columbia River Gorge to Canada. Must have been a write-up in some biker rag. Five groups, totaling sixteen riders, pass.

The tilt-bed tow truck arrives. Jim. Personable guy about to retire. He has Jake operate the hydraulics of the tilt bed. Great. But he charges for a round trip, when AAA is supposedly one-way.

The service bay doors of Bob Hall’s Yakima Chevrolet are open. They say, “We’ve only got a couple lube techs, but we’ll put it up on the rack and see what we can see.” A young guy explains that whoever replaced this transmission didn’t properly clip a cooling hose into its upper regions, so with some vibration it just popped out. Bloop all over the road. 7-plus quarts, a couple stops, and we head back up. Chris is pleasantly surprised to see us at Timberwolf. He says, “Jake is a bit upset because we just buried Cindi.”

Timberwolf:

We set up camp a quarter mile down the ridge. We leave Chris’s Datsun, my tent. Steve drives the planes and RC gear up. I walk up with Jake. Chris will follow. He tells us (yes, this will be relevant) to watch for his cell phone, which he may have left on the top of his car.

The lift is great. Steve flies his Boomerang. Chris flies his 48" EPP delta, that he hot-wire cut. I fly my 48" Sonic, JW airfoil. I’ve finally made the crow for the center flap work. It zips around fast.

Later, as the lift glasses off, I fly my old 60" EPP vee-tail Javelin, which stays up when the rest don’t. Beat up, several times rebuilt, not fast, but I like how it flies.

Camping. Many elk track, and what looks like bobcat? I wake briefly to the slow crunches of elk hooves. Unless it was someone from the truck that Steve and Chris heard, about 2:00 AM, stopping just beneath us. In the middle of the night wispy clouds appear. Well before dawn it gets warmer.

Sunday, and lost plane:

The lift starts out light, but will increase through the day. Steve flies a Chinook, and Chris puts his EZ Glider up. After a while, I honk at the horizon on my old cornet. A couple younger women (well younger than my sixty-three) show up. Lisa and Lana. Twins. They’re after crystals. Before Chris found Peg he was always talking about how the Swedish String Theory Bikini Team might join us. Not. L&L wander off to find crystals. They find some. One dull chunk looks like it’s from a small geode. Lisa says, “We’ll take it home and dip it in crystal cleaning acid, and it will shine.” A couple more big-dirt-bike guys show up for the view. I start outfitting a doomed plane.

Steve: “What’s your ETD?”

Philip: “Twenty minutes.” It’s more like an hour, during which the guys hassle me. But it’s too short. I’ve cut corners.

Suggestion: Unless you’re awrful durn gud, it is inadvisable to fly planes which you can’t afford to destroy or lose from Chris Erikson rock piles. Hence the following:

I’m stuffing a LiFe battery into the ugliest, fairly heavy, vee-tail fuselage. Way back when fuselages were scarce, someone brought it to a SASS meeting. (Seattle Area Soaring Society.) Homebuilt thing. It looked Kevlar brown. It wasn’t. If I had whacked it against a post I could have figured out from the mess that it was fiberglass. Its maker wrapped the tailboom fiberglass around a mandril, and the pod's glass around a plug, with big overlaps, and some cuts to get the plug out. Narsty. But I thought it was Kevlar, so I stuck a vee tail on it, an HS81MG servo, a big NiMH battery, a venerable Hitec 555 receiver, and a 48" foam wing. I called it 'Rock Bouncer.' After I figured out it was fiberglass, from snapping the boom off, I patched the boom back on and covered it all with an additional layer of Kevlar, 'tape bagged' with 2" PVC tape, which shrinks with heat. I stuck a hand-me-down, 4' wing on it, and flew it at Table Mountain. It flew, but not with performance a Boomerang couldn't beat. So I put it on the shelf for four years.

I've got a pile of wings feet deep. Thursday before Labor day, I spotted a DLG wing that Tor Burkhardt bagged before he developed an allergy to epoxy. 60". Two little HS 55 servos. The top side was painted with eagle feathers. So I drilled it to fit on the Rock Bouncer fuse.

Up on Timberwolf, I pop the simplest program into my JR 9303; elevator, ailerons, a bit of differential. No presets, which is a fatal mistake. $Bother_1$. I have extra lost-model alarms. I neglect to put one in. $Bother_2$. I leave its old dead battery in, for balance. Jake looks at the feathers, and says, "Is it a pterodactyl?" Steve says, "It's a pTorodactyl."

Jake wants to play with rope. So we tie a couple scraps together. See the photo of Jake pulling Philip pulling Steve, in a pretend mountaineering rescue. Then Jake tries to get Philip to play tug-of-war, but Philip starts tossing loops around Jake, till his feet are circled by half-a-dozen coils. Whereupon turnabout is attempted. Philip trying to walk with one foot entangled. At the end of the trip, Jake, having learned important stuff, will bungee Philip's elbows behind his back, so that Philip has to chase Jake with little forearms sticking out from his waist like a zombie tyrannosaurus rex.

I chuck the pTorodactyl off Timberwolf's steep ridge into gentle but nearly vertical lift. Oddly, I have to trim a lot of left aileron in. Twist? But immediately, it's amazing. It flies like a dream. Way fast. SD 7037 airfoil. Chris says, "That's the same airfoil we use on the Scan Eagle." That's a UAV, by Insitu, which was gulped by Boeing. "It's a fast foil."

So I fly it for about an hour. It screams around, tears up the sky. Tor installed little winglets for discus launch. Steve explains that to make winglets actually improve performance requires precise engineering, for a fairly narrow speed range, usually cruise. But they look good. To stop it from booming up into the clouds, I have to give it a lot of down trim. Which is how I lose it. Bother. Also, I don't do my best thinking once there's a crisis.

I get it a little low, down the ridge. Chris says, "There's lift out there. You can find it. Off to the left." Long passes back and forth, and It's further and further down. Chris says, "If you're going to put it in, aim it for one of those open talus slopes." He means, "So you can find it." I do, way down and off to the left. Chris's advice, to go looking for lift, rather than just putting it in, isn't bad, though that's how he lost a 6' Delta with video gear some years back off Rampart Ridge, just east of Snoqualmie Pass. But I've forgotten about all that down-elevator. Bother. To save its impact, I pull the stick back in the last seconds, and to make sure it's down, I push the stick low and to the left.

After, I question my skills as an RC pilot. It's been twelve years in this sport, and I'm flying like I'm sixty-three. Which I am. Then I realize the main pilot skill I'm deficient in is preparation. Now there are guys out there who are truly expert fliers. Up Bandera Mountain I watched Adam Weston do a touch-and-go off the top of a boulder with his Encore, which he then caught. I'm far from that class. But Adam is also an expert at preparation. To make myself better, I start making up the checklists in the following sub-article.

Talus:

I put on my hard leather boots, and head down the talus slope for a rocky outreach. Talus is granite shards at what is known as 'the angle of repose.' That means steep. I pick my way down, often on all fours, sometimes aided by a fir branch. Little clumps of heather here and there, wildflowers where a bit of dirt pokes up, lichen (that symbiosis between a blue-green algae and a fungus) on rocky outcroppings. Mostly the basalt is a few inches to a foot across. Some steps are fairly solid, some start a slide of a foot or two, under the pressure of a boot. In a patch of one-inch scree I glissade, boot skiing. The sounds of shifting basalt, sometimes clunks, sometimes a death rattle, often wind chimes.

Above, at an angle, I watch Chris's EZ Glider and Steve's Lumberjack tear the sky. I cover a lot of slope.

Sixty-three, with a left fifth metatarsal (foot bone) that always hurts, after I broke it a couple years ago, the center of that same left foot still numb from the hit-and-run driver who tail-ended my truck late last year, 220 lbs. (The Pemco adjuster exaggerated, approximately, "Your doctors worked on strengthening your core. At 235 lbs and 5'8" your weakness was a contributing factor. 235 lbs is somewhat overweight." Was she trying to demonstrate that Pemco discriminates against fat people? Or weak people? Gawrd.)

*Philip's tent at dawn Monday morning. Time to go down the talus a third time.*

Three hours and a couple miles of talus traverses later I get back to camp, guzzle water, make a sandwich, and go up to where the guys are still flying. I pant, "I have to apologize for hogging all the fun." Chris says, "You missed some booming lift." Six-year-old flies: Steve says, "Chris got Jake on the buddy box, flying the EZ Glider, twice, some hours apart. The first time he didn't do real well. The second time he flew quite well. Can neurons form that fast?"

A bit later, Steve and I head down the easy, upper slope. Chris is actually strong at talus, and has the boots, but he's Jake-bound (no, not with ropes). Steve's partly cloth boots are not talus proof, so he parks on a small outcropping and scans with big binoculars. I cut across a talus chute and down to a huge outcropping. We each scan. On the side of an outcropping, a couple hundred yards north, there is a semicirclular series of brilliant gold splotches. Rocks, sticking out of shadow, glowing in the sun, as it nears Mt. Rainier? I want to go down further, to check a couple possible bright spots, but the shadows are creeping up the valley. At least, getting back up, the top of the ridge above the outcropping is mostly dirt, so I don't have to scramble talus where steps up are accompanied by a slide down.

Dinner. The usual mix of steaks and burgers and dogs passed around. Jake watches Clutch Cargo and Princess Mononoke on Chris's laptop in the Datsun. It seems an integral part of this sport, that one does his best to get planes back. I go to bed early.

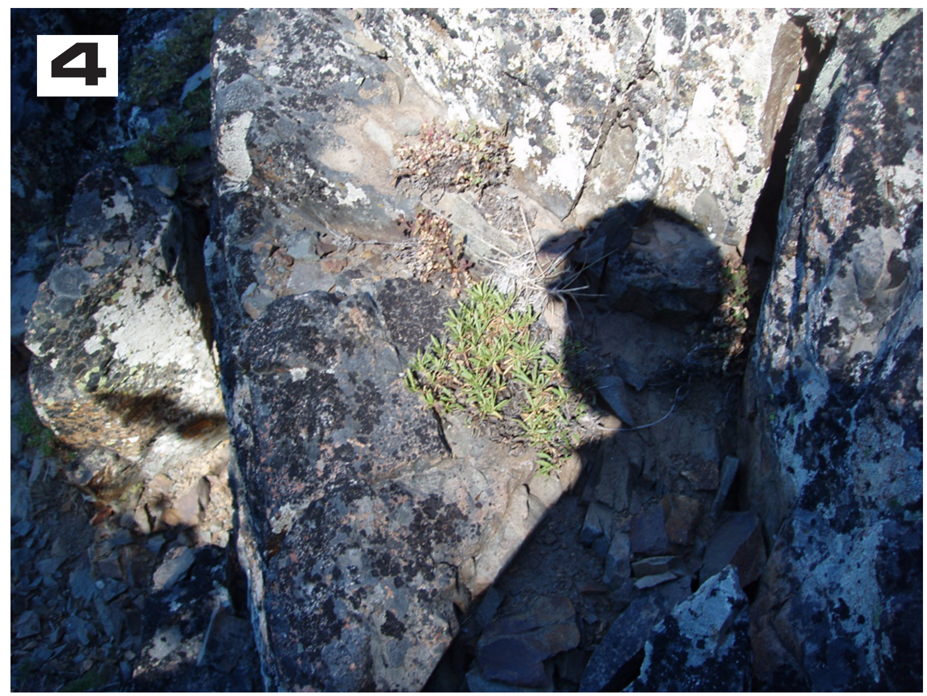
Up in pre-dawn. Down the talus again. I'm impressed that I still have the stamina to do this. Way down, and way up. Breathing hard. Heart thumps way fast. I spurt upwards for five or ten or twenty feet, stop for a few breaths, and go again. It's a lesson from my high-school friend, Robert Jongeneelan, ninety pounds, who would swarm up a rope. I asked him, "Why do you climb so fast?" He said, "Why waste a lot of energy just hanging there, going slow?"

*Mt Rainier, moon. 8 AM Monday.*


1


2


3


4

The same here, that to move slowly takes energy. I zip, stop, breath, go. Longer pauses to catch breath. Above where I am sure the plane isn't, I get a partial second wind. I cut up between two outcroppings. On the basalt are splotches of brilliant gold lichen—what I had thought were splotches of sunlight the previous evening. Up to camp, where Jake is kicking dust, and covered with it. I pant out, "This was good for me. I needed the exercise. I'm George Bushed." That should cut it, out here in the red half of the state. Steve says, "You should crash your planes on purpose more often." Right. He gives me a Gatoraid.

Between still huffing and gulps of yellow electrolyte, I tell Jake, "Once upon a time, there was a papa who had to take a kid named Jake back to his mama. But Jake was so covered with dirt his mama thought he was just another dirty field, so she rented him to Farmer John. Farmer John got his tractor and plowed furrows in the dirt all over Jake, and planted seed, and tried to grow corn, but all that came up were corny stories." Chris rolls his eyes and says, "Oh gawd." Jake says, "No he didn't," and looks at me like I am so nuts, which at least indicates his intelligence and capability for accurate perception.

And it's past time to leave. Jake announces, "Philip, let's tie you to the top of the 'little car' and take you home. We'll tie you with ropes." Repetitions. Insistence.

Philip says, "So I can be a toy?"

"No! So you can be a pet, like Blackie. And Pumpkin." (Those persons are cats.) "You can take the place of Cindi." I say, "Cat's are people, too."

Now, you'll all remember that Chris puts his cell phones on top of his car, drives off and somehow runs over them. Chris has the Guinness record for number of times running over his own cell phones. So I say, "Okay." I climb up on top of Datsun Deathmobile. (Yes, I did, part way. But tall story begins here:)

Jake ties me on. Unfortunately, the knots aren't quite up to snuff. Jake gets into the car, and Chris too. Chris drives off, and Jake too, but Philip falls off, and Chris runs over him.

Those Eriksons are always leaving stuff on the tops of their cars, and trucks, and SUVs, and are always running over them. Too bad. But like with my pile of wings, there are more Philips where that came from.

## Philip's (embarrassing) Mountain Sloper's Checklist, or, "Doist as I list, not as I didst."

Preventing loss:

- Use a loud lost-model alarm. (I had a couple spares, I could have stuck one in. I didn't.)
- Tape an address sticker on, with a phone number. (I didn't.)
- Figure out a way to quickly get you plane trimmed to minimum sink (examples below). This means identifying its minimum sink trim. And that means some field testing, probably in light air.
- Use presets, if your radio has them, to set up for thermaling (minimum sink) and for penetration. (I didn't.) When a plane is far below, you can't see it well enough for good thumb control of elevator. You'll probably porpoise or stall, which will lose you altitude. You won't be able to see it well enough to use your thumb to control the elevator. It needs to fly itself, with only gentle aileron controls, for turns.

*Opposite page: (1) Down Talus, Monday morning. Last night's binocular perch is to lower right. (2) In center is last night's binocular perch. (3) Same perch from below. (4) Little guys making a living*

*Boots, ala Goya. They were shiny before the talus.*

*Jake is Dustboy. Photo by Chris Erikson*

- If you don't have presets, at least count the number of down-beeps you give it from minimum sink. (I didn't. I also could have just given it a bunch of up-beeps, till it was rising.) On a radio with a sliding trim tab for the elevator, you can set your endpoint adjustments (servo centering) so the trim tab is centered for minimum sink. In a pinch, you can slide it back to center. Or you may be able to cheat. You can mechanically trim your plane for approximate minimum sink. Then fly it with your radio in function mode, so you adjust its pitch trim via elevator 'endpoint adjustments' or servo centering (whatever your radio call this). If you need to get back to minimum-sink trim, hitting the 'clear' button should do it.

- High skill alternative: Chris Erikson has incredibly steady thumbs, with very fine control. He sets his rates high, and still flies smoothly. But he also prefers to fly his planes close to 'thermal' mode. To keep them down in big air, or to keep them from zipping upward during a high-speed skim over sage, he holds forward on the stick. If he's way down, all he has to do is let the stick go to neutral, and his planes fly close to minimum sink. Few RC pilots can fly this way.

• When putting your plane in, make sure it's down. Once you think it's down, hold the stick low and left and count to ten. I didn't count. It's possible I thought it was down, gave it up-stick for gentle landing, traded speed for altitude, held the down-

*Rainier from the chute.*

and left stick too briefly, all of which may have put it into some goofy aerobatic maneuver, followed by a glide off into distant forests. Though I didn't see any of that, so maybe not.

• Actually follow your own checklist. (Bother.)

Retrieval:

• Don't go down dangerous slopes. (I did. I also, about eight years ago, went 50' up a tree, with spikes, to retrieve a plane I couldn't give away. Well, I finally gave it to Chris, who has a big shop. There it sits.)

• Take a picture of where it went down, with your smart-phone or camera. (I didn't.) Cameras have better memories than Philips.

• Use a buddy system, or radios, or cell phones.

Retrieval gear, for talus slopes or long walks:

• Day pack.

• Two-way, hand held radios, charged. (Ours weren't.)

• Water and energy bars.

• Binoculars.

• Boots. For talus, they need to be tough leather, and well above the ankle—not those little fabric and suede things. Mine are over 7" high. See photo.

• Gloves.

• Helmet. (Should have had.)

• Extra clothes.

• Flashlight.

• First aid kit.

• Climbing rope. For steep retrievals where a belay is possible.

kewl art designs .com

# Detailing 2 Meter Foamies

Thompson Smith, studiors@mac.com

I have two foam 2 meter ST Model sailplanes; a DG-1000 and a 2 meter ASW-28. Both are detailed with my graphics, covered fuselage ( DG-1000 is Minwax & cloth, ASW-28 is Medium CA & cloth ) and the DG-1000 has a working spring fixed suspension.

Detailed build threads for these two machines are at RCGroups.com.

ASW-28:
<http://www.rcgroups.com/forums/showthread.php?t=1494472>

DG-1000:
<http://www.rcgroups.com/forums/showthread.php?t=1304520>



*Above: ASW-28*

*Above right: Sample sticker sheet*

*Right: Detailed 2 meter DG-1000*

Sticker sets for four 2 meter gliders are available for sale through my web site <http://kewlartdesigns.com>. Currently avaiable are sets for the ASW-28, Radian(!), ASK-21 and DG-1000. (The DG-1000 set is reproduced in reduced size at the upper right.) These sets can be personalized in either red or blue with your choice of registration numbers and tail letters.

Sets are priced at $29.95 plus shipping and handling, an emailed PDF for printing on your media is $15.00.

<http://kewlartdesigns.com>


SZD-9
ZS-GDN
BOCIAN