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Soaring Digest

September 2008

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Front cover: Kevin Farr's P-38J is the product of a conversion from power to a PSS. As you can see in the accompanying article, beginning on page 21, Kevin's model is extremely well detailed, adding to its realism in the air. In this photo it looks like a real P-38J making a low level pass across the harbor. Make sure you take a look at the video Kevin mentions toward the end of his article.

FujiFilm FinePix S8000fd, ISO 64, 1/640 sec., f4.5, 81.7mm

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If you've been keeping up with the DS speed records, you may be familiar with the names of the pilots setting those records. What you don't see in the speed record spreadsheets is the tremendous amount of work that goes into the design and production of those record-breaking models. Here's a behind-the-scenes look at what goes into the design of an airframe capable of 365 mph. By Steven Seim

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A report on the maiden flights of Peter Wick's newest plank for dedicated slope soaring.

Back cover: Steven Seim/CyberModelle F3J *Personal Best* for summer 2009. Optimized Drela section suite. Movement of the canard "whiskers" is coordinated with that of the stabilizer.

R/C Soaring Digest

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In the Air

This issue is noticeably smaller than the norm. Seems like everyone is out flying. We do have a number of major articles and columns in the works, and they should be starting to appear with the October issue.

We always end this small column with "Time to build another sailplane!" Since December, our building room has been in a nearly continuous state of construction turmoil. Our granddaughter, Alyssa, just turning 13, decided she wanted a Supra, but teenage finances being what they are, she's taken on the task of building one herself. The story is a long one, and she's been keeping a diary and taking photos as this project has progressed. First flights of the Supryssa are scheduled for August 20th, and her write-up of the experience will appear in a future issue. Highlander, HOB 2x6, Supryssa... What's next on her building table?

With the school year beginning shortly, our own construction projects are about to start up again as well. After finishing the Redwing XC, we've decided our next construction project will be an enlarged Windlord. Ken Bates' design has already been produced in our workshop in a two meter version, but Ken's recent build thread on RCGroups and his placing at the NATS has us eager to build another. A 124" span and about 2300 square inches for this one, so there should be no problems with visibility.

Time to build another sailplane!

365 to 1

Steven Seim, sseim@comcast.net



Aside from the connections and influences that resulted from being born on a SAC base in the mid fifties, for tens of years I've closely followed a number of small, dedicated communities of storied and self taught engineers that have produced extraordinary work, often documented in ways as ad-hoc as the community itself.

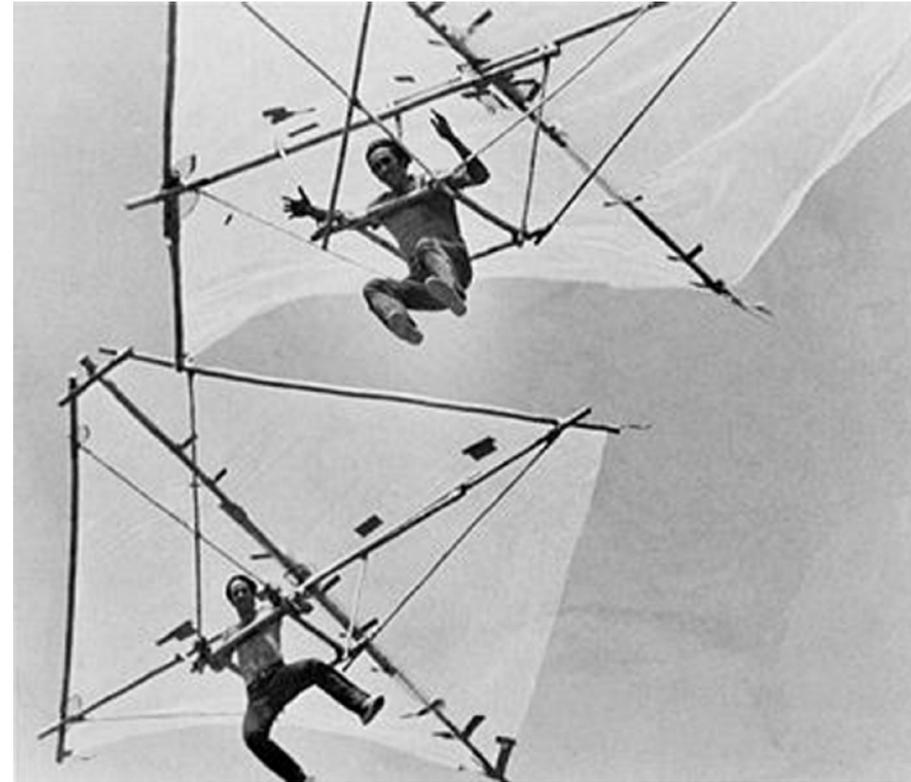
"Low and Slow" covered the work of folks that brought hang gliding to its current form. *Mother Jones* had an alternative vehicle newsletter 30 years before hybrids became mainstream, and here in the Pacific Northwest slope soaring took a tangent path in the mid to late 70's still unmatched; open field soaring saw designs plus mixing mechanics ahead of their time, and a couple of folks dedicated to lightweight portable models produced designs now routinely copied within a full FAI model category as well as launch techniques the norm worldwide.

Today there is a small, tightly knit community that is experiencing unprecedented success as a result of consistently reaching ahead of the norm, a very small group in southern California headed for the most part by two

individuals heads down and exclusively dedicated to Dynamic Soaring. Their reach into the new, their extension into that beyond their own immediate experience, their knowledge and people circles plus the results they have collectively pulled into their own worlds made real far beyond expectations is what I refer to as "***The step beyond the next one.***"

Working with what are now traditional wire cutting methods and approaches to design and fabrication have resulted in DS models that can easily exceed 200 mph, but over a very short period of time speeds have exploded, and this time the one who's been watching does not play the part of witness alone.

On June 4th this year Spencer Lisenby flew the *Kinetic 100* to 365 mph as verified by witness and radar, and



A classic image from "Low and Slow."

Jason Lilly saw his *ThunderTaker* fly to a verified speed of 358 mph. Both built a cooperative and participatory design and building environment that resulted in model speed accomplishments

Dynamic soaring at very high speeds is wholly unique and addicting. The sounds created when a clean model strikes the oncoming wave are fantastic. Jason Lilly is holding the model, and Spencer Lisenby has the transmitter. Jack, a Jack Russel Terrier, is a known figure in this DS community.

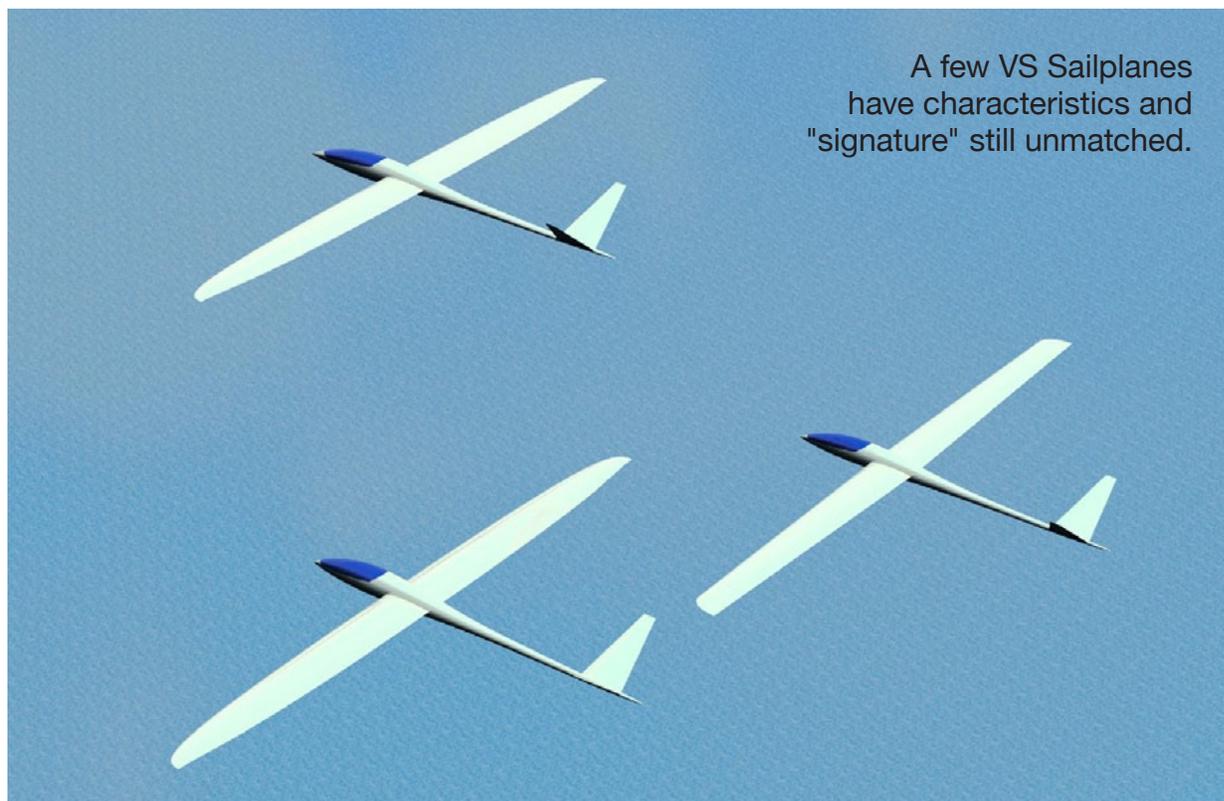
that compare to Scaled Composites barnstorming their way to 368k feet in a machine built from materials available from the Wicks and Aircraft Spruce catalog, and again in direct comparison, the artifacts will soon be available for sale, and have application beyond DS soaring alone. An unusual story.

A couple of years ago I received an email from Spencer, asking if I would be interested in putting together a 60" span

model designed exclusively for dynamic soaring.

"Yes, I would be."

Up to that point I'd been noodling stuff for the most part for myself, like these 55" solid balsa wings with foam inserts and integral spar (right), DLG and eight foot wings with foam fish inserts (next page), and building drawing/CAD/CAM experience, CAD being my favorite after-hour activity.



Machine carved solid balsa wings with integral ply spar and AG 45 section.



DLG *SunToucher* wings and stab of mixed foam, balsa and foam, AG 45-47 airfoils.

The *Pond Commuter*, a turbine powered play on the *Pond Racer*. Uses Roncz sections.



Spencer had two main wing airfoils from two separate designers crafted specifically for the project. The tail called for an existing HN section, the 311s. He sent this CAD drawing as a reference.

He does not think much of it and to a point would be reticent for me to present it, but showcasing or comparing CAD acumen is not the point, it is this: a minimum amount of information can often say volumes. Aside from being an alternate step to working with hand drawn sketches scanned and sent as jpegs with photos to reference, all the information to design and draw the model was present, and that's the key. With the 60" span model he also included a proposal for a 100" model at the same time that had his passing interest.

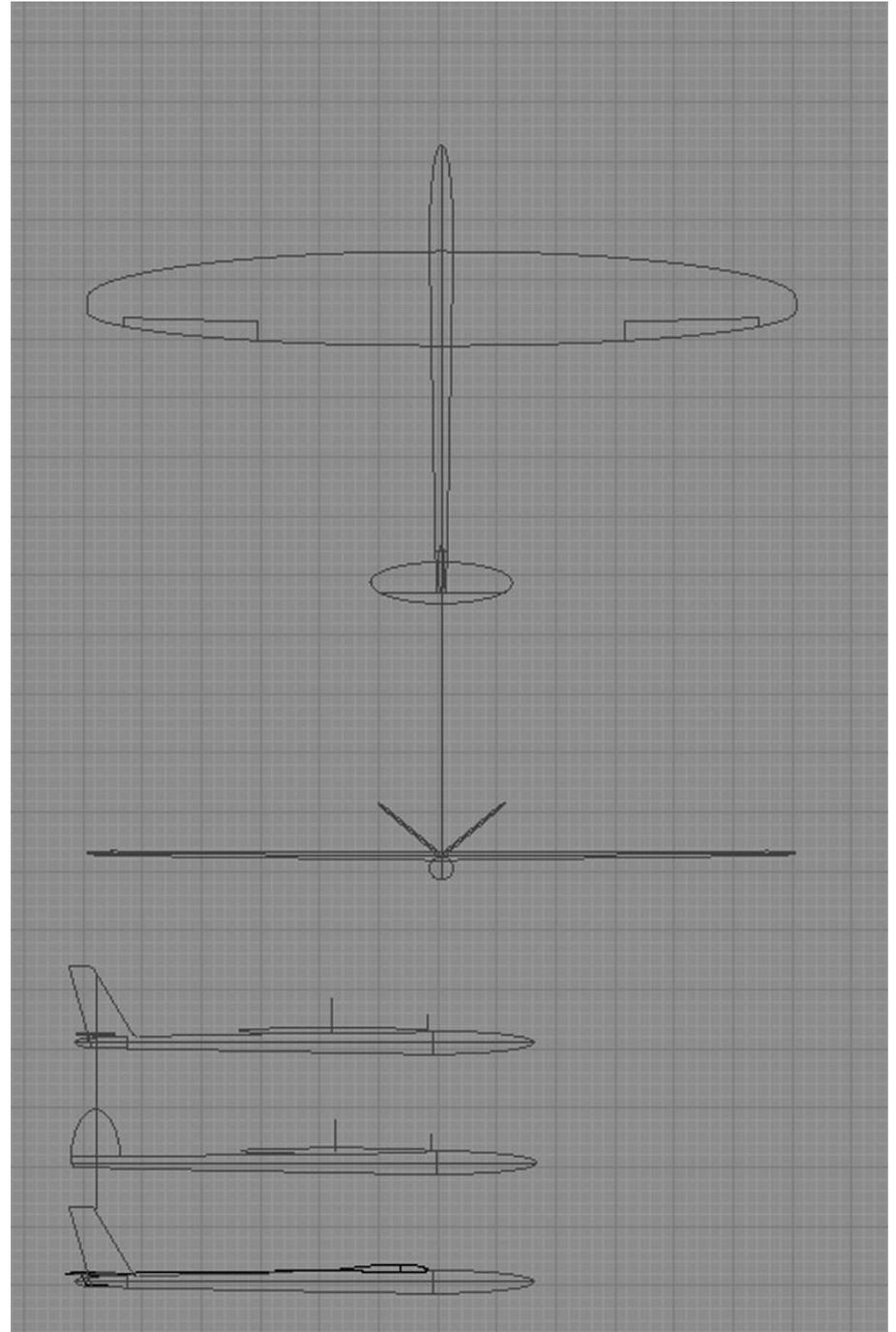
I cleaned up the 2d line art, converted it to a full 3d model and usable surfaces that evening and sent this back.

I detected a cranial explosion at the other end that appeared remotely optimistic as well as sounds normally associated with Olympic floor gymnastics, and we then set to work.

I suggested longer moments, wing planform changes and all that stuff, and he came back with suggestions, corrections and design elements of his own. We then bantered fillets, canopies, hatches, covers, angles of attack and all that stuff. Changes were often made in real time with the phone clamped between my shoulder and ear while working the keyboard and mouse, and we experimented with real time file sharing as well.

We had to get terminology straight right away; and that was interesting. "Hinge alignment" was one. As opposed to a top aligned surface, a "hinge aligned" surface is one where the hingeline is flat across the span.

Spencer's initial reference drawing for a dedicated 60" DS glider. Cleaned up converted to 3-D results in the image on the opposite page



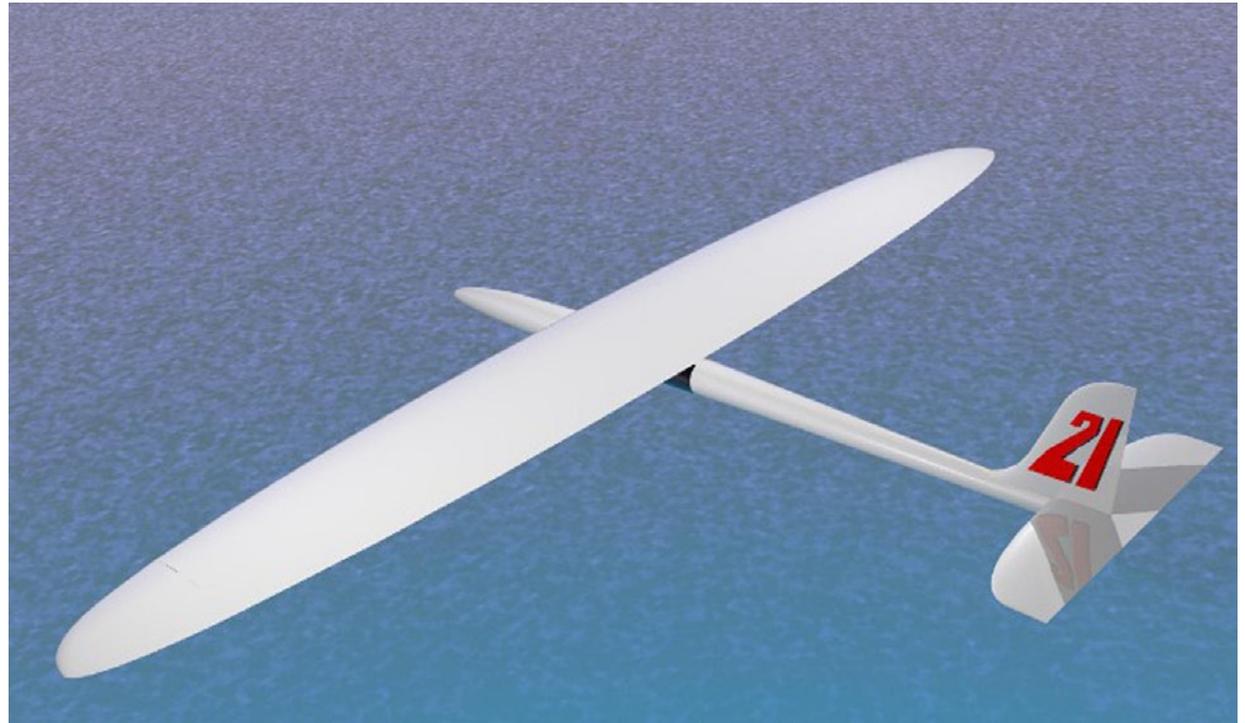
The approach to the drawings had to be covered as well. Instead of setting angles of attack as some kind of arbitrary relationship between the stab and the wing, the aircraft is drawn as it would appear in level flight, and all relationships are based on that line.

The biggest design breakthrough came when Spencer said in passing that he wished the model could have a T-tail. Why not? The F-104, the CT-114, the *Javelin*, the 727, tons of successful powered aircraft and sailplanes have T-Tails. I sent a follow up suggestion and it was game over.

What we settled on is depicted on the next page. Stylish and clean, using a modification of the wing root section upper surface curve as the most minimal fillet.

As the drawings moved forward the banter became more intense and more than fun. Nearly every conversation resulted in “aha!” breakthrough ideas which in turn demanded a new level of design and drawing quality specifically matched to step up to the needs of a pilot already extremely knowledgeable about DS flight and the requirements to keep a model together at very high speeds and long lived.

So much was new for the both of us. Spencer was the patron providing a specification and from there full freedom to move within it. The biggest sell was associated with angles of attack on the



First *Kinetic 60* rendering, based on Spencer's original proposal on the opposite page.

wing and stab, and their alignment with the fuselage.

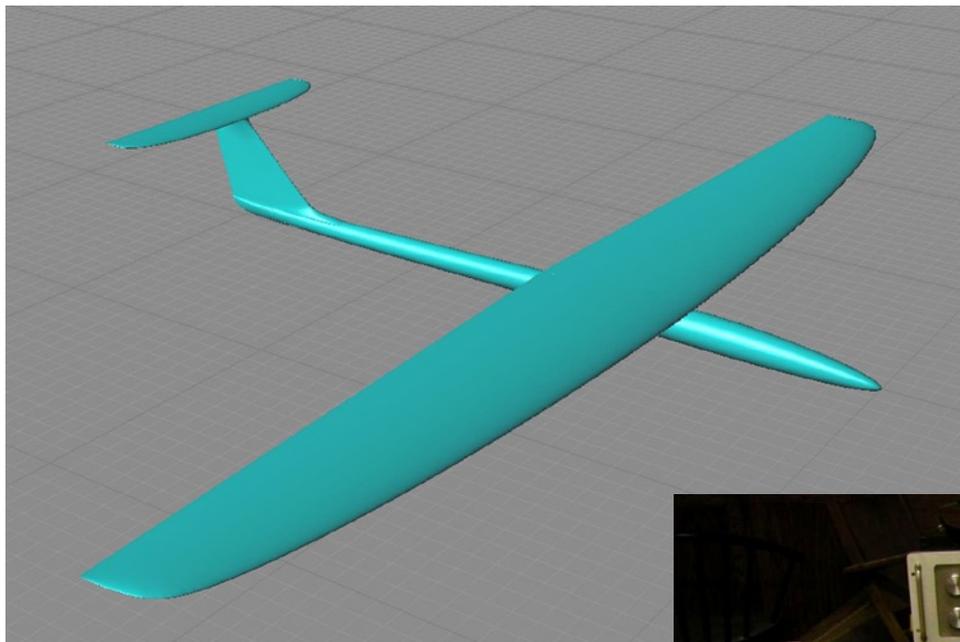
I'm not much into math. I understand what to do and what the computer presents as a result, but I'm not so much interested in the process and theory behind it. That's what friends are for to a point. These results I compare to my own models and flying experiences, but the aggregate is not much of a base to convince a customer that my own

thoughts on incidence is worth putting into expensive and time consuming molds right from the start.

So the first big production hurdle was to prove it all before committing to full on plugs and molds.

Easy. Rapid prototype it.

Carve a prototype that can be built and flown such that any suggestions can be incorporated before making permanent molds.



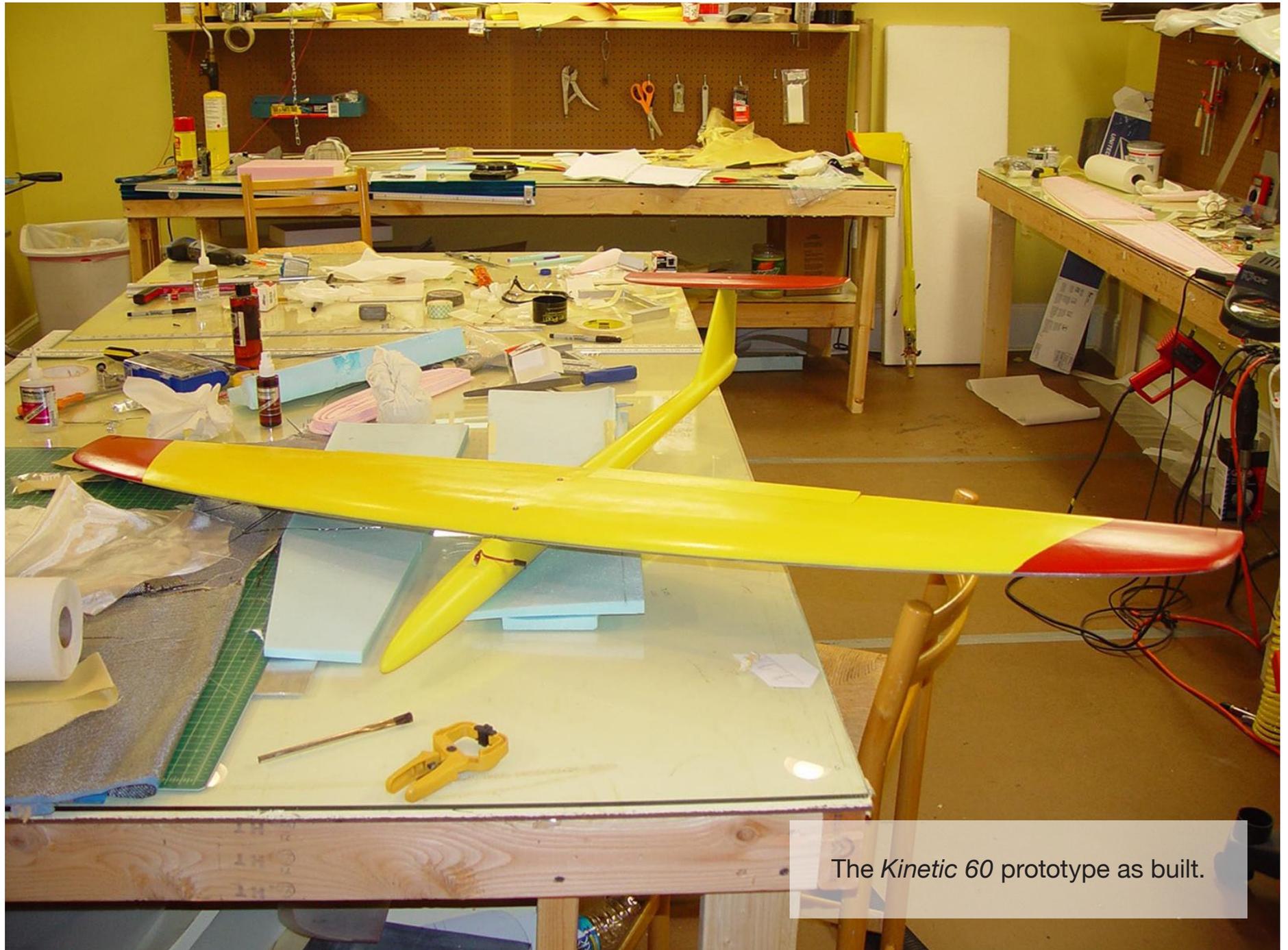
Final *Kinetic*, with T-tail, ready to carve and build.

The *Kinetic 60* rapid prototyped.



The prototype parts came off the machine as this. I provided a second smaller stab as there was a suspicion that the proposed was too large to begin with.

The model was machine carved from two pound foam with two layers of 0.26" aircraft ply embedded into the wing block prior to carving, secured with urethane glue into a precision cut slot for the tightest fit. This results in a spar that conforms to the shape of the wing and greatly enhances the capping properties of the vacuum bagged skin. Machine carving does not produce the crust a hot wire does, and this again aids skin adhesion.



The *Kinetic 60* prototype as built.

The prototype was assembled and flown to 200 mph.

The first question I asked was, "Tell me where the elevator is in relationship to the stab. Is it level? Did you need to trim it up or down?" The answer was no. This confirmed all incidence angles and put all questions to rest...

The decision was also made to opt for the second of the two custom wing sections and scrap the first.

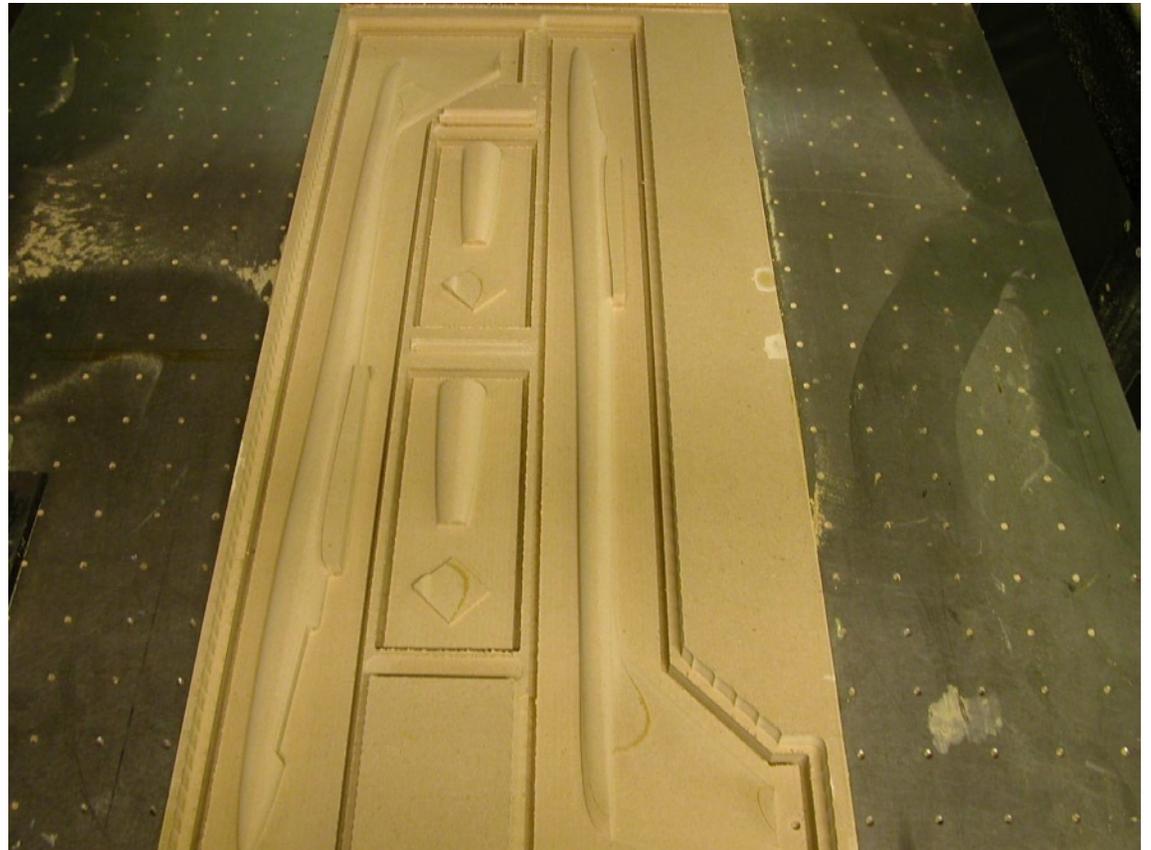
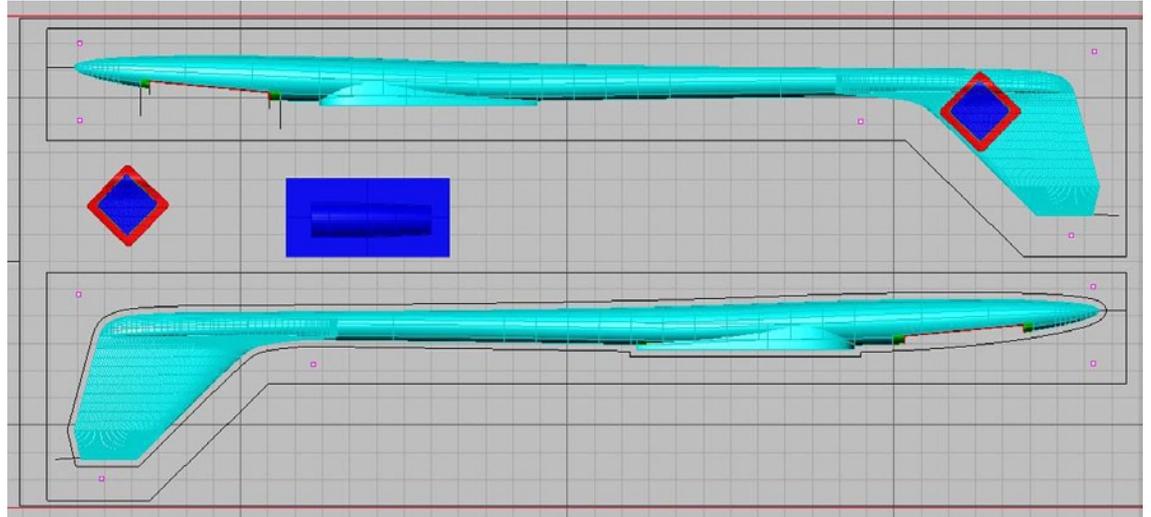
One final suggestion from Spencer was to build a very strong seat for the stab that takes the form of a fin flare. Using the rudder section at a specific point, the thickness was increased until the desired width was reached. Again simple, stylish and effective. Time for molds.

The mold plugs were carved from MDF, immediately sealed in thinned shellac and shipped. Noteworthy were the wing servo covers that used the wing lower surface as the parting plane, and the slave motor hatch incorporated into the vertical fin.

The 60" *Kinetic* was produced and the bar for that sized model was immediately

The *Kinetic 60* fuselage, canopy, and fin slave motor cover sent to the robot for carving.

The completed *Kinetic 60* fuselage, canopy, and fin plugs. The right fin has a recess for the slave motor cover.





The first molded *Kinetic 60*, an immediate record breaker.

shoved to new world record speeds for that class. 288 mph is the current high water mark for it, where previous models stayed well under 200.

Attention was almost immediately diverted to a 100" version which used the 60" wing molds as tip panels, a clever and cost/time saving idea. A center panel based on the current model geometry extended the span to 100", and a thicker center section airfoil was produced

for the project by the original section designer.

Accounting for the joiner parts and keeping the aggregate wing aligned was a great drawing challenge, but it paid off and the carving results again worked well.

At the nearly the same time Jason Lilly contacted me with a proposal to enhance the *ThunderTaker*, a 130" span model of his own design already a great performer.

Jason was much more rigid than Spencer with his specifications in that he wanted specific design elements maintained, and the requests again stretched our abilities to design, draw, machine carve, and communicate in ways such that misinterpretation is impossible.

We stretched the fuselage, changed the main wing section, modernized the planform, and added exotic fillets to the wing, plus a special fillet to the underside

of the stab to support it strongly. Jason also requested a most unusual double tapered fuselage behind the equipment bay to support the slide off nose, a challenge.

The result, though, is a nose cone that “clicks” in place, and works very well.

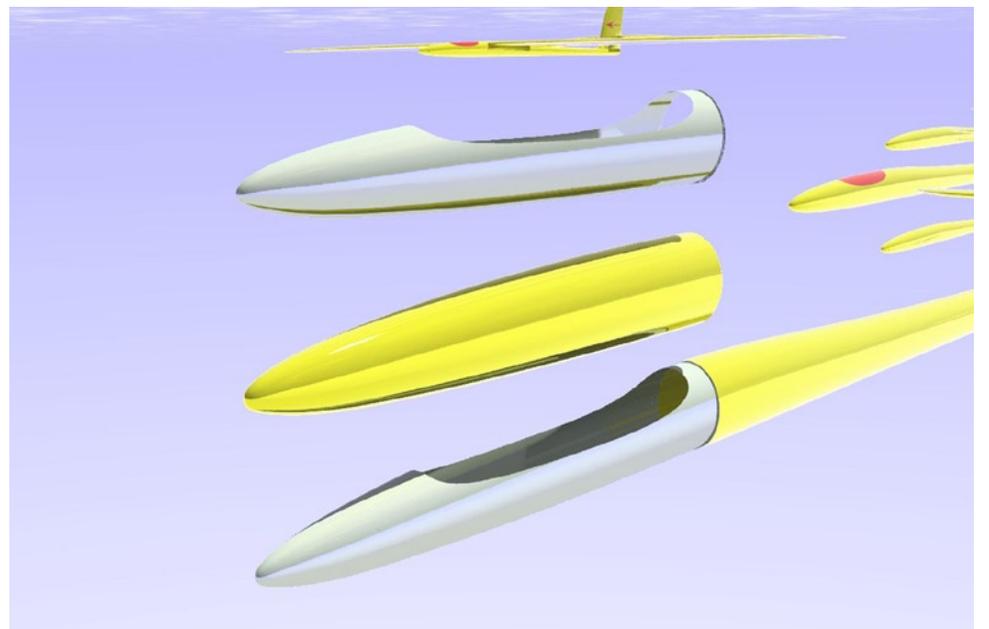
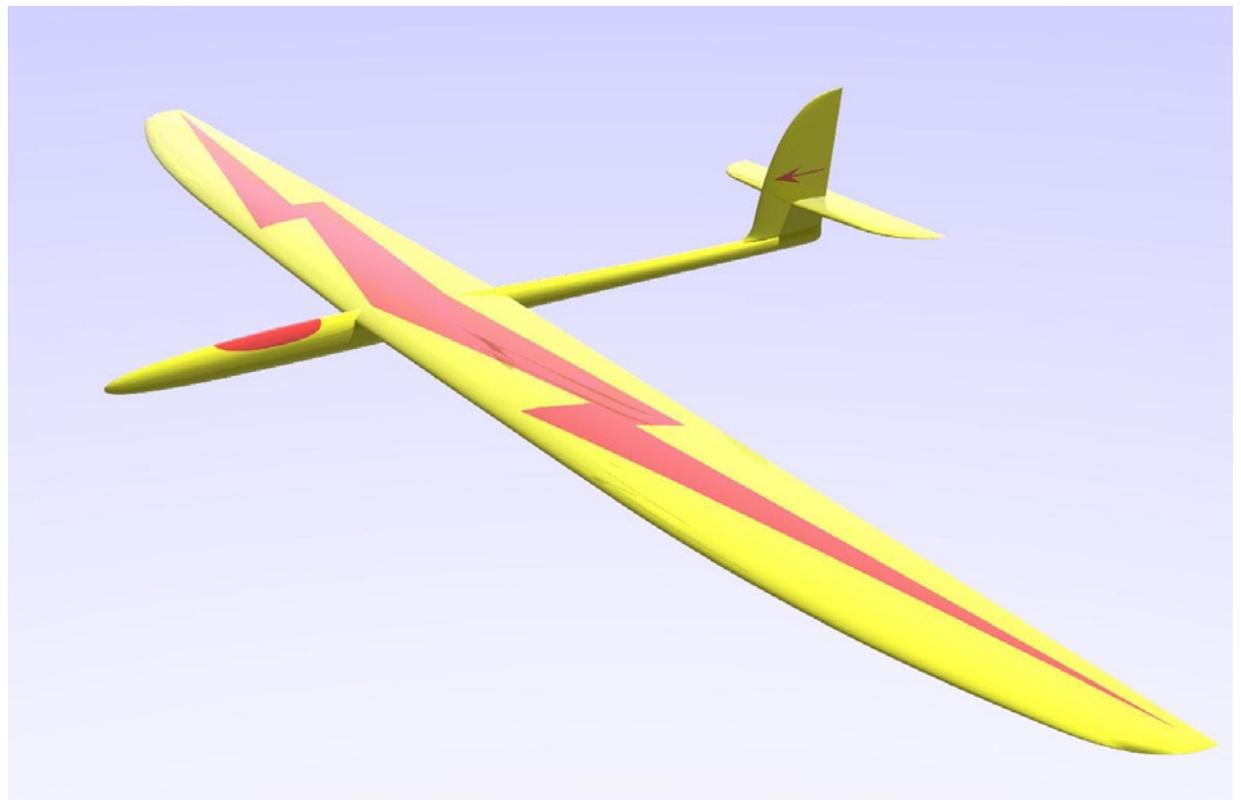
The MDF plugs for both the *Kinetic 100* and *ThunderTaker* were carved in a single session and shipped.

They were beautifully prepped and converted to molds, and the rest is the history that it is. Speeds immediately leapt beyond 300 mph.

I was walking into a classic Pacific Northwest late summer breeze with my ex when my phone rang. It was Spencer and Jason calling from a mountain top where the winds were clocked over 54 mph. Both were screaming like beaming children into the phone over the wind roar to tell of the days speeds and accomplishments. What a recording that would have made. A permanent memory.

The finished *ThunderTaker* ready to decompose to parts.

Jason requested a double tapered forward fuselage that worked out very well.



The *Kinetic 100* claimed the “over 60 inch” speed record on its maiden flight, and subsequent versions built with higher modulus carbon have pushed the *Kinetic 100* to where it is now, a point where customized radar equipment is required to officially record what the model is likely doing — 365 mph for now being the acknowledged record speed.



The *ThunderTaker* and *Kinetic 100* fuselage bodies were cut in a single session.



Jason and Spencer are master mold makers. Their wants to account for the joiner assembly in the plugs/molds was very clever and well thought out.



The *Kinetic 100* on the bench. Records fell on the maiden flight.

The *Thundertaker* constantly follows the *Kinetic 100* step for step, and the first model was purchased on the field after its first flight for a jaw dropping sum. The fellow literally pulled a checkbook out on the spot. The summit effect it had on Jason was enormous. A quest fulfilled.

Where Jason Lilly had first considered the *ThunderTaker* as a model for himself alone, multiple copies have been made, and he may still produce a limited production run. The *ThunderMaster* is a dream sometimes bantered and already partially fleshed out. I do enjoy drawing.

Spencer is currently heads down in arranging full-on production of the second generation *Kinetic 60* and *Kinetic 100*, both revised and even more streamlined than the originals. Molds for both are just getting started. (Spencer can be reached at sll914@live.com.)

The new 100" version is dedicated to DS flight, but the 60" version is very well suited for front side slope soaring/racing when built to lighter weights, and this may be an available option.

I often think of the 100" *Kinetic* form factor as being applicable to F3f and F3j/F3b class models as well. Drawings already exist.

Did I mention I really like drawing?

Just starting though is a third wholly dedicated Unlimited class DS project at 120" span for Mike Simon, the *Boomslang*.



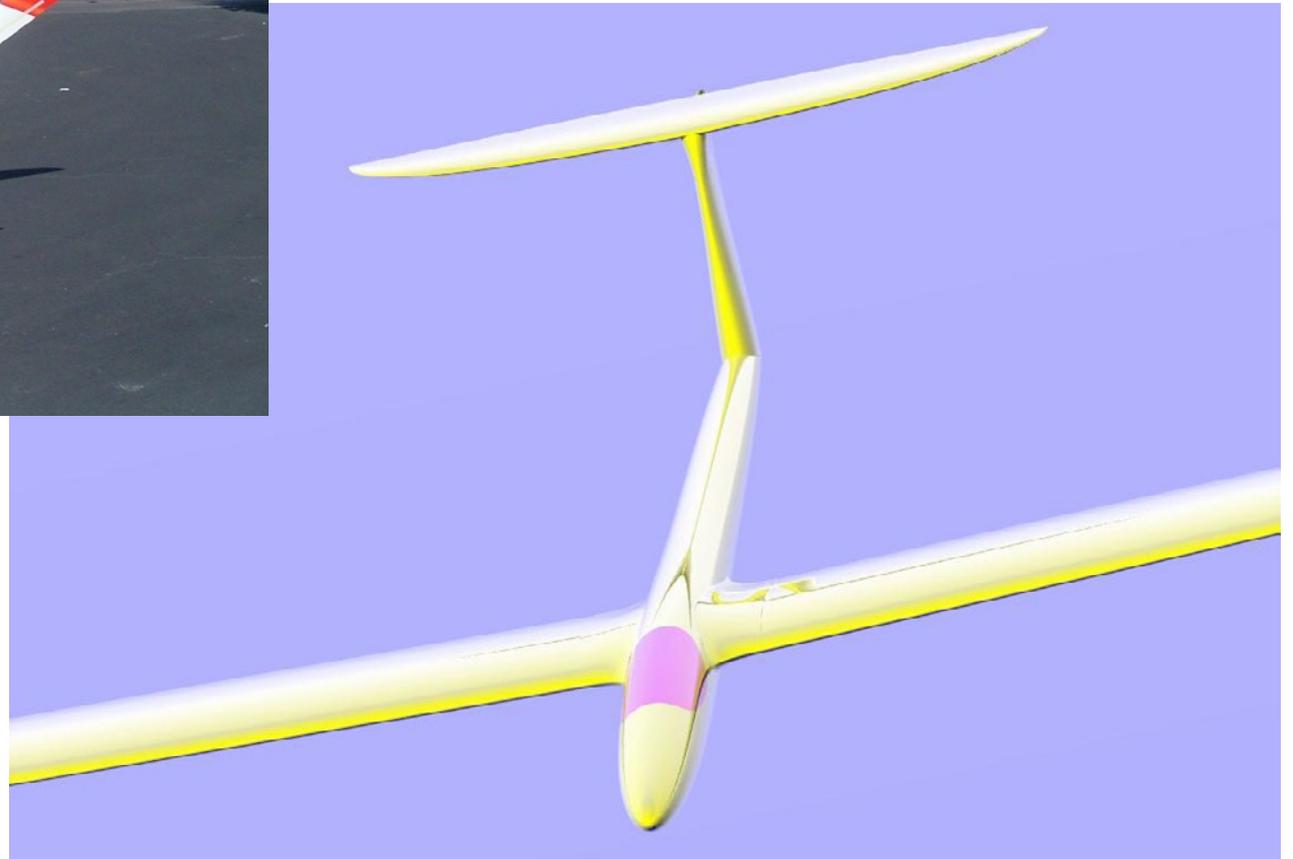
Spencer Lisenby coming up from the recovery area after capturing the record speed on the *Kinetic 100* maiden flight.

Spencer unbound after the record breaking flight.

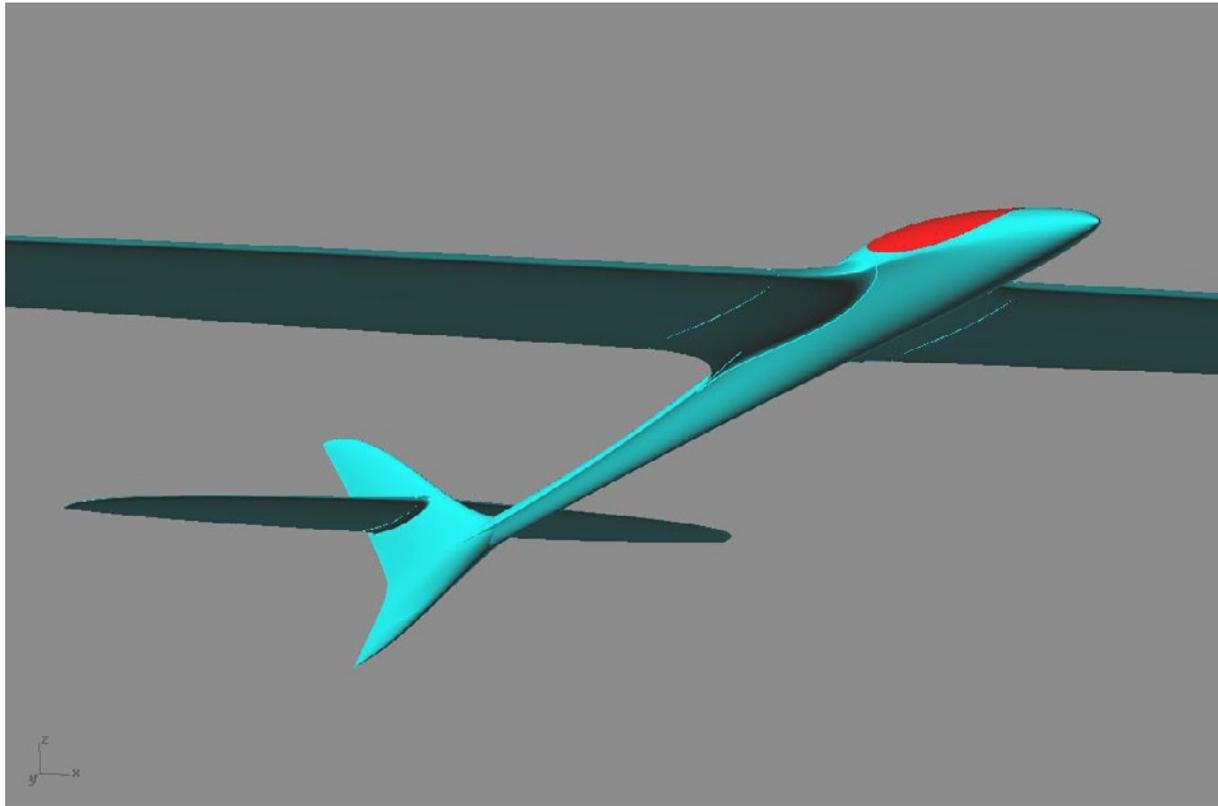




Jason has not stopped with the *Thundertaker* as is. He now pushes the paint scheme for each model tremendously with each copy.



The 120" span *Boomslang II* for Mike Simon. Molds are being cut now.



The 78" span *Discovery*, just started. RG15/14.

Mike's observations and experiences are pushing his own spec into what could likely be a new dynamic soaring paradigm. The result is very aggressive and bold while again striving for the absolute utmost in cleanliness. Molds are just getting started.

There is still an air of unbelievability to all this, and it's wonderful. This level of DS dedication and passion is such that the exclusivity and "rogueness" of the community in California will likely

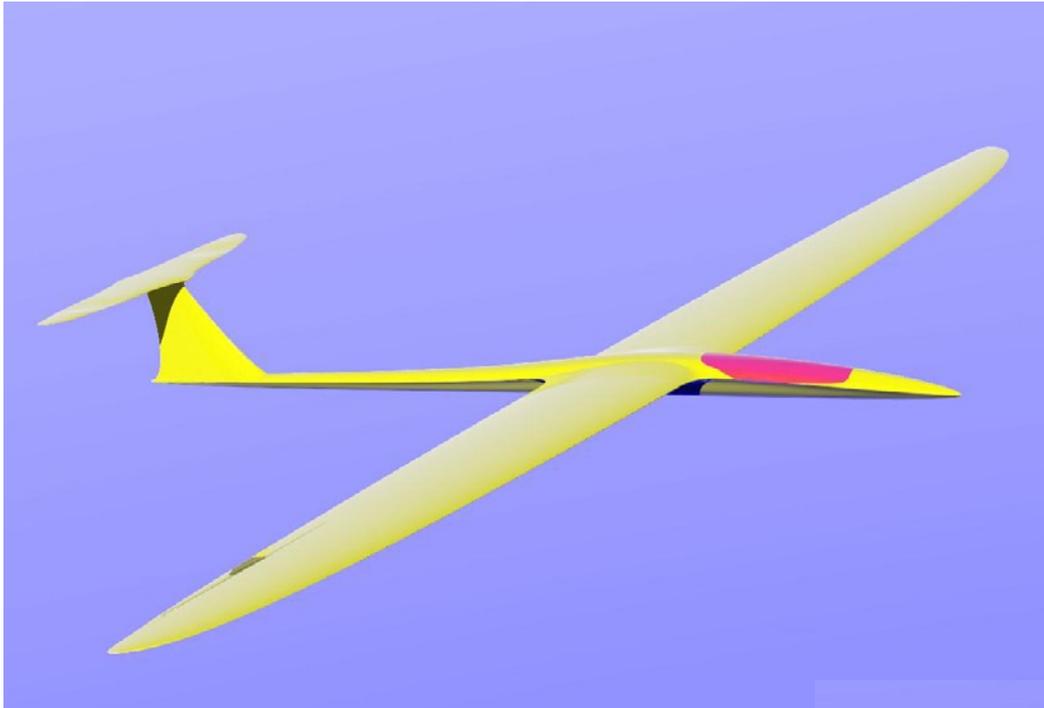
be maintained. There will be no "Fds." <grin>

This group is to model soaring what the dogtown crew was to skateboarding, but this time the crew will likely stay as it is, keep its niche status and last.

As for me, my traveling for that software company I work for in Redmond Washington has come to a close for now, and with the off-loading of a few customer drawings to others for machine

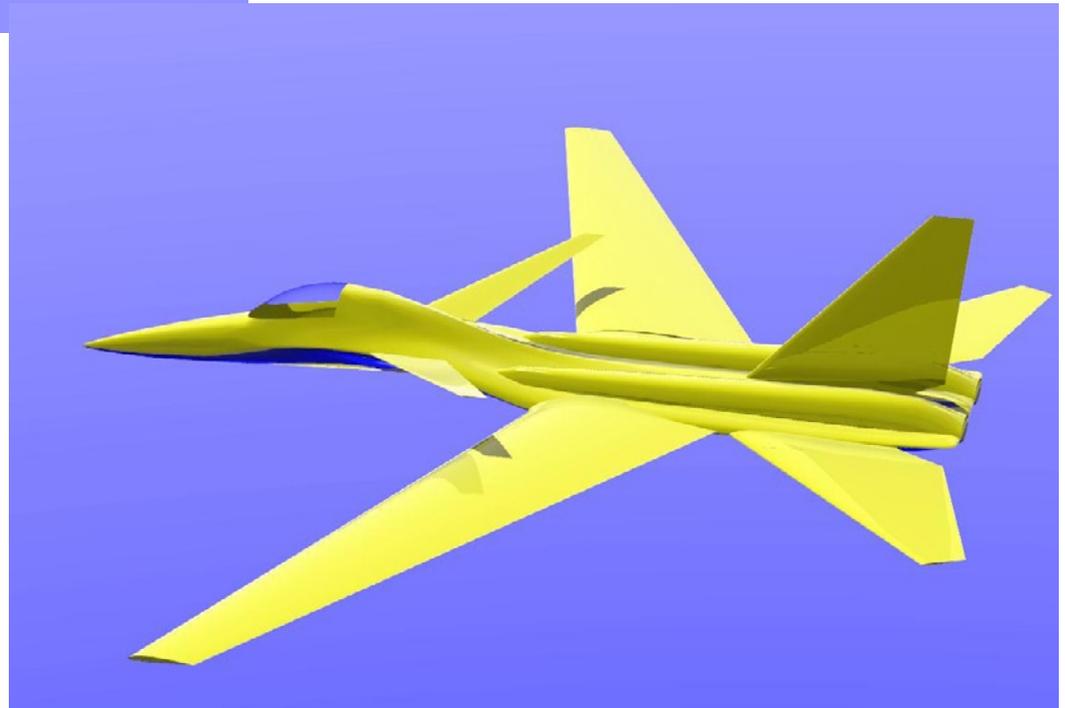
carving I can return to carving up my own stuff at long last.

There is so much to do; a DLG I call the *SunToucher*, a 2 meter PSS XP-79 glider (or electric!), an F3j model I call *Personal Best*, and a slope glider called *Discovery*, the *SlopeJet*, my own 144" span Unlimited class DS model called the *Enemizer*, an 8 meter "full scale model" with canards for aerotow, and a dedicated ultra high speed DS flying wing known as the *ClovisPoint*.



The new stab and wing section suggest the 144" span *Enemizer* is likely capable of 500 mph.

The two meter *SlopeJet* has canards and stabs that work together. HN sectioned.



I'm also working to get my web site up; www.cybermodelle.com. For now I keep a work log somewhat updated on www.stevenseim.spaces.live.com.

This article has to be a bit out of the norm for *RCSD*, and I'm grateful to Bill and Bunny. Thank you.

I would indeed like to cover a project "thought-to-flight" through the process I refer to as "hand made by machine."

As for those I've been watching all this time, thanks to you as well. The influence is deeper than you might first think and much appreciated.

More to come. ■

P-38J *LIGHTNING*

Converting an ESM kit from “power” to PSS

Kevin Farr, kevin@fvdv.co.za

Sometimes you just want to do something different.

So while pondering the nature of my glider fleet, I took into account that we here in the Southern Peninsula area of Cape Town tend to fly gliders that have been identified as tough, reliable and proven performers on our none too easy slopes.

Our club, Two Oceans Slope Soarers, has a very decent collection of varied and tried and tested planes that match that criteria and can be viewed at our club website <www.toss.co.za>.

Most notably our slopes have fynbos bush with rocks in between creating fairly tricky landing areas that take some practice to get right.

Generally we are short of slopes that have long rolling approaches at the back and smooth landing areas. It's more a trick of picking a bush and attempting to hit it, rather than gliding in and sliding for



some distance. This makes flying glass and hollow moulded planes a little more challenging.

I approached Andy Emery at Hobby Warehouse, and after much discussion, digging in boxes, questions, doubts and finally excitement, I settled on taking a P-38J Lightning power kit and decided to get it on the slope.

The P-38J Lightning kit is no longer being produced by the Chinese manufacturers (ESM), so any spares would be out of the question.

The wingspan is 2.2 meters and the length comes in at 1.65 meters with the wing panels being foam core balsa covered, and the body and twin booms are all glass construction.

This promised to have at least a slight chance on the slope due to its solid construction.

Not a small model by any means, I nearly had a hernia just getting the box into the house.

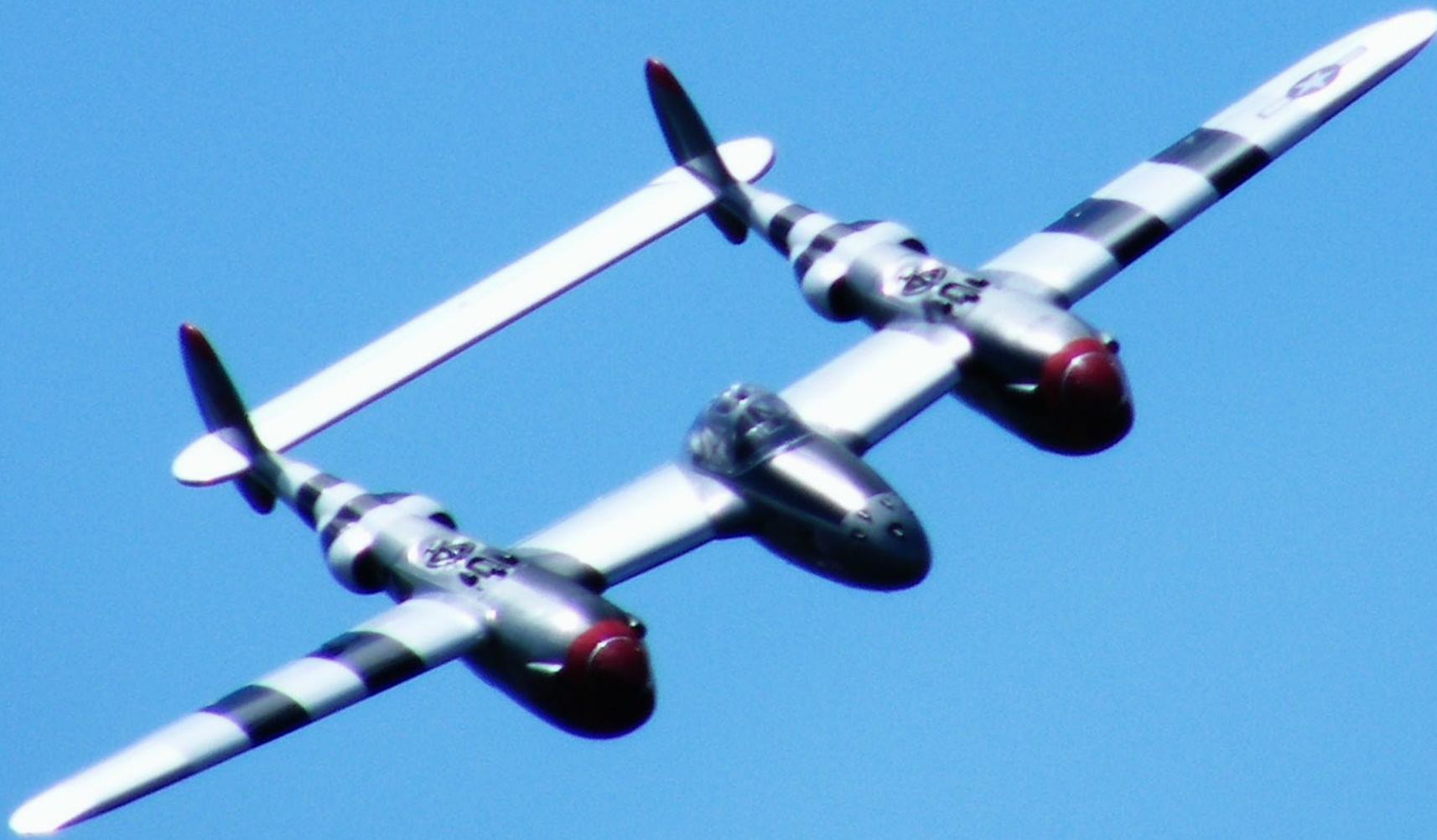
All that boom area and bulk in the main body had me worried that it would just end up being like a bus in the air.

The build up was easy enough as the model is well put together, and the finishes, while not being perfect, were well within standards for a mould of that size.

Not being a great builder, I still had a blast setting it up, main pod first, then









the two inside wing panels and finally the two boom configuration. A spirit level and plenty of epoxy sorted out any misalignment in the boom structure and elevator, with an incidence meter adding the final measure.

I had a concern for the engine cowl area that was extremely thin glass, so I filled both with expanding foam spray. The end result is great. Strong and hard like a brick, it is advisable to keep this weight well forward of the CG of the plane as it is not the lightest fill possible, but the ability to fill and sand reasonably smooth allows for epoxy applications once dry.

In the P-38 Lightning's case this was a great way to get functioning weight and strength ahead of the CG, as the motors would normally have created that weight and were now MIA.

The elevator servo was a bit of a problem as the kit had supplied wires that were supposed to run aft of the central pod to the centre of the elevator on a pull-pull system.

In a bush landing that was going to prove an absolute tail ripper, so I buried the servo leads in the tailplane and mounted a single elevator servo in the middle of the tailplane. The result was far more efficient response and nothing that could catch or be beaten to death as it made for the ground.

CG was set at 96mm from leading edge and about 700 grams of lead was stuffed into the nose cone to get the weight as far forward as possible. The total model weight was 5 kilograms and I was sure that getting this baby up and going was going to take some decent wind and lift.

Final build up stages included calling her "Beautiful Lady" as per nose art found on the net, including a somewhat naked lady, then the addition of the extremely well made canopy with pilot and instrumentation inside, the addition of fake cannon mounts to the front, short enough to not be torn off in a bushy landing, and completion of all the servo, battery and receiver installation.

Finally the day arrived to throw the beast off a cliff. A smooth South Easter at 30 kilometres an hour beckoned. We ensured that all surfaces were working, and two happy club members volunteered to give it a toss.

As with any sizeable brick thrown off a cliff, the initial dive for the ground is amazing. Skimming just above the fynbos with about 30 centimetres to spare, the model finally got enough airspeed half way down the slope to generate lift and take off.

The climb out was a relief and the flight characteristics awesome. The P-38J Lightning is stable, surprisingly quick, and beautifully elegant in the sky. <<http://www.youtube.com/watch?v=aRq-9EsUVAk>>

A few tweaks on the settings, a few good runs across the slope, and it was time to land. Even with the full blown crow braking this plane still keeps coming at you with some serious intent. Patience has to be the name of the game in slowing down its ample energy.

A unique shape to have on the slope, the P-38's bulk is enhanced by the twin boom configuration that covers a largish area and at this point has no bad habits, such a tip stalling on landing or in flight.

Slow rolls are really slow and realistic as the twins booms rotate over the central pod.

A great addition to any fleet of planes, it is certainly fun to fly and very realistic in flight patterns.

I see they have a B-25 Mitchell bomber in the hobby shop as well... Wonder how that will fly?

Cheers







CAN YOU TEACH AN R/C PILOT TO SOAR?

By Peter Carr WW30, wb3bqo@yahoo.com



My flying buddy, Rich Skellen, has flown models since he was in high school. There was a long period of inactivity while he went off to Case Western University to get a degree and then do a bit of traveling. I asked him about the choice he made of going to college or continuing to fly models and he agreed that models should have taken priority.

Nevertheless, he returned to my home town and I showed up sometime later. We began flying together again and his old skills returned very quickly. He had already mastered the mysteries of the winch and was very good at hitting the landing tape. Still, the period in between remained something of a problem.

His radio was on old 72 Mhz frequency so I installed a Kraft Series 73 rig on the 53.xx Mhz band and some really fast servos. This made the old Oly II perform much better. Rather than being blown around by the wind Rich could go where he wanted. The next step was to show him where to go.

As I mentioned before, Rich could ping and zoom the launch, correct for side gusts in flight and make excellent landings. Once in a while he would bump into lift and could circle in the core. These were “chance” meetings so it was time to explain thermals to him!

Thermals are easy. Their origin and formation are another matter. We discussed the dynamics of differential

air temperature, differential heating of objects on the ground and sun angles. All this was very interesting but at the end there was always the question of finding a thermal.

So, naturally, I took Rich to the local slope. The view from the ridge makes it easy to see treelines and wind movement. We sat in the grass and flew

big thermal ships in the light lift. Pretty soon a small thermal made its way up the hill and we followed it back over the ridge. After we both flew back into the ridge lift we talked about what had happened and why. On several more flights we also bumped into thermals. This helped to reinforce the concepts.

The other day I was out flying the Solar Powered Oly II in some very good conditions. The clouds covered most of the sky but a nice round blue hole developed in the layer. I moved the Oly II into the hole and watched as it started to get small. I explored the edges of the hole and found that lift was pretty good everywhere. The sun was glinting off the chrome trim tape on the wing leading edge so it made for a truly beautiful sight. After landing I wanted to describe the flight to Rich and found that it was very difficult to put into words. There was a direct connection from my brain to the sailplane with no thoughts about thumbs, sticks, RF link or servos. I was comfortable with the ship and the conditions. That connection took many years to learn. You can imagine just how many years it took! Flying is now fun without the work of thinking out the process.

So I decided I can't really teach Rich to thermal. The best I can do is go fly with him, yell "I'm in lift" and let him teach himself. It's like the brain needs to build up a library of experience that can be called up to fit the situation. The more he flies, the more he experiences, the better he will be at finding and working lift. Explaining the variables only goes so far. The rest has to come from being there and doing it.

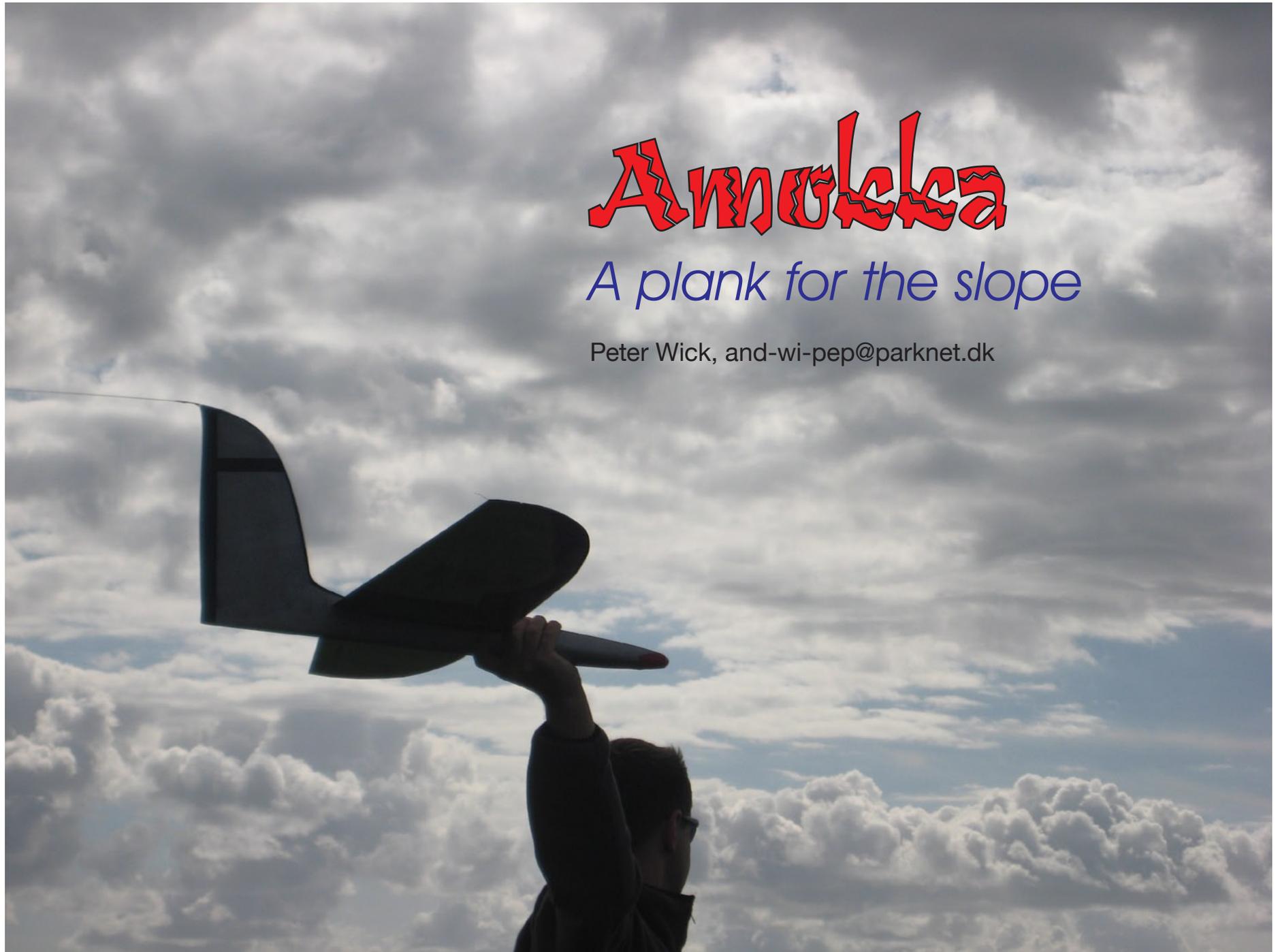
And so I have the happy task of going out to fly with Rich, chasing lift and enjoying the day. The sky is the teacher. I'm just there to assist and enjoy. ■



Amuleka

A plank for the slope

Peter Wick, and-wi-pep@parknet.dk



Dear plank “fans,”

Finally I was able to maiden my Amokka plank which took several years in designing, CAD work and some moulding.

It had its maiden flight in very strong winds (14m/s) and about 60 degrees off the ridge.

But anyway it punished all the people who think that planks are hypercritical.

All in all it was very uneventful. The Amokka (span: 1,96m, several airfoils along the span) was very precise to fly and flew where you pointed it.

There was actually not one critical situation during the whole afternoon, except when I tried the butterfly, which made the plane dive quite dramatically. Well there has to be some ratings to be adjusted.

It behaved so nicely, that I was almost thinking to raise the taper ratio next time!!!

Speed was good, but difficult to judge, as there was no comparison. Energy retention was astonishing, much better than what I have earlier experienced from other planks.

The only thing which could be more aggressive was the F3F turn. Usually I was amazed how planks were able to do this. Amokka did it smoothly, but there was not enough “bang” in the corners.

On the other hand, the CG was on the safe side and I changed it only once,

which made the turns already much better, so there is hope.

Unfortunately there was no video, but here and on the next page are some rather low quality pictures. ■





