Radio Controlled
# Soaring Digest
November 2016
Vol. 33, No. 11

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**Front cover**: Adam Fisher's photo of a FlyFly 4m DG808s against a cloudy sky.



Back cover: Euphoria in the Fall, a photo by Roland Goudreau. Panasonic DMC-ZS20, ISO 100, 1/1000 sec., f5.9, 51.5mm

# *R/C Soaring Digest*

November 2016

Volume 33 Number 11

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Contact bsquared@rcsoaringdigest.com
http://www.rcsoaringdigest.com
Yahoo! group: RCSoaringDigest
FaceBook: https://www.facebook.com/RCSoaringDigest

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# In the Air

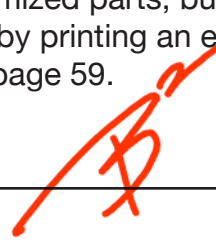
Following a several year hiatus, the Annual Christmas and Gift-giving list makes a reappearance. We hope you'll find something you or someone else needs, wants or desires within the list.

It's been several years since we made the trek to Visalia from here in the Puget Sound area, and we very much miss attending the Central Valley RC Fall Soaring Festival. For readers with the same attachment to this annual event, Eric Puchalski used his Canon EOS Digital Rebel to capture literally hundreds of images over the three day run. We've chosen roughly 100 of those for publication in this issue using a photo album format. Enjoy!

In the southern hemisphere, Rex Ashwell has published another of his newsletters. Text and photos combine to provide an interesting portrayal of soaring scene experiences and happenings in New Zealand.

3D printing (additive manufacturing) is one of the newer technologies available to model builders, and *RCSD* has published several articles on the topic over the last few years. As with any new technology, what started as a rather primitive process has quickly been improved upon. While prices for basic units have fallen as availability has grown, 3D printing with a wider variety of materials, including metals, can be achieved with machines which cost more than many modellers can afford. Most of us would be suitably impressed with our ability to print servo frames, control horns, and other customized parts, but Tomas Gallovic takes it to a whole new level by printing an entire airframe. Be sure to check out his article on page 59.

Time to build another sailplane!




VISALIA
FALL


SOARING FESTIVAL
SEPTEMBER 30 - OCTOBER 2
2016


2008
CVRC
FALL FEST
VISALIA, CALIFORNIA
JSP


Futaba
Futaba


SHADOW


SCORES



Raffle Staff. Photo by Joe Nave

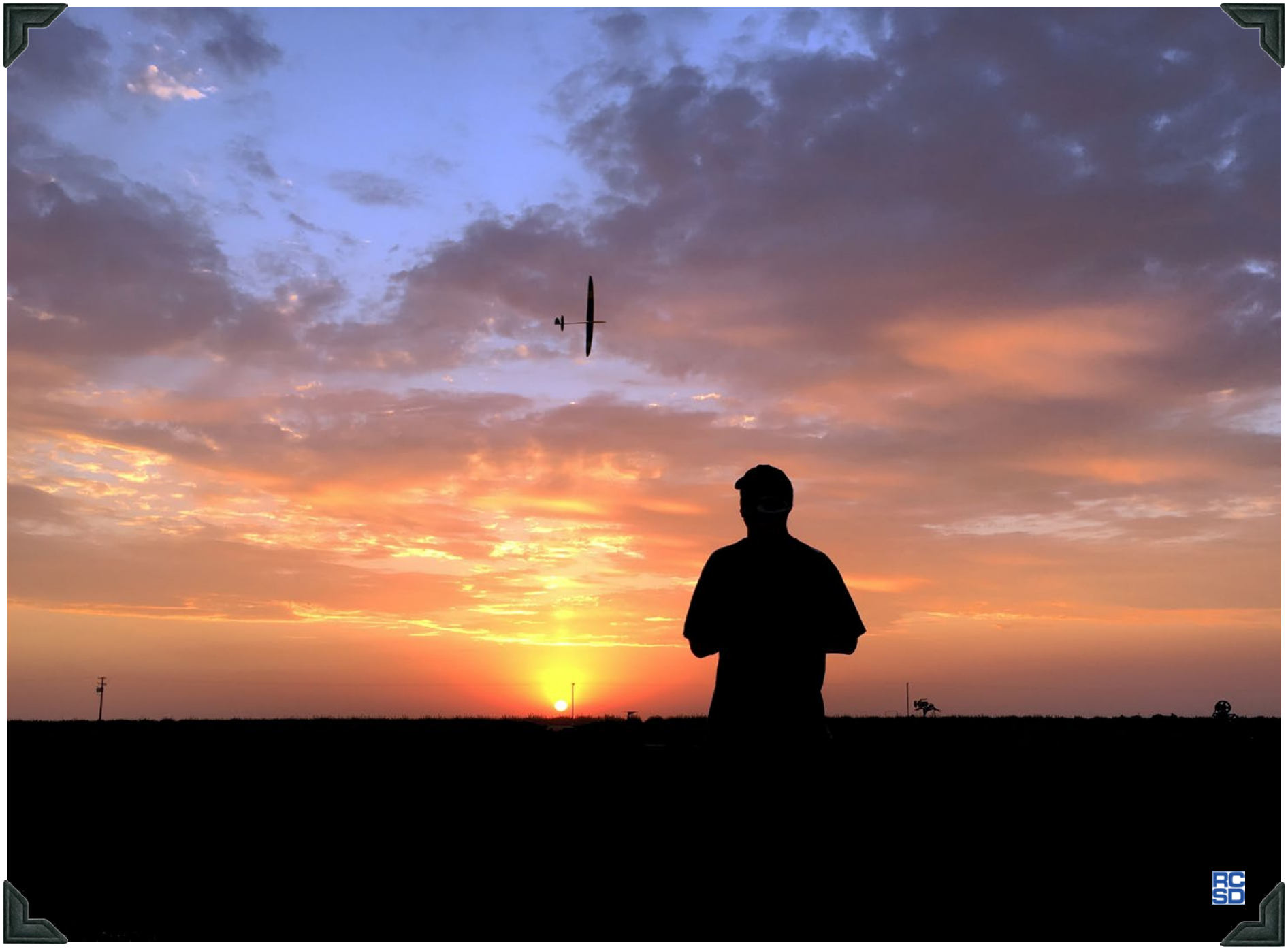


Clockwise from upper left:

- Open Class Winners
- RES Class Winners
- 2M Class Winners
- Woody Class Winners
- ALES Class Winners

Photos on this page and opposite by Joe Nave





# An incredible story from Italy!

Guillermo Di Gennaro, LV-GDG, info@ingdigennaro.it

*This is where it all started.*

I am a fan of aerotow...

But in the middle days of the week I have fun with F5J models I have an Aladin produced by Reichard Models. <http://www.reichard.cz/en/models/electric-gliders/aladin/> / <http://tinyurl.com/jsr5rgy>

With a span of 395cm, it's an excellent model for thermals, not very expensive, and perfect for flying at sunset on middle summer days.

On August 13, I went to take a flight. It was a perfect day with exceptional conditions.

I made a flight of five minutes, 10 minutes, 30 minutes, 45 minutes, 1 hour... one hour and a half and I was in heaven...

Unfortunately, after two hours of flight the batteries were over and the model was lost.

For four days (four hours in the morning and four hours in the afternoon) I went looking for it. Everywhere.


*The FaceBook posting. Model found!*


*Recovered and ready to fly again.*

I asked people. I drew a map. And nothing at all. The model was not found.

Unfortunately, missed!

I was very upset!!

In August I went on vacation to the sea side with my family (Marcella, Sofia and Catherine). Time goes on and I forget everything, even the model.

In October (almost two months later!) I was at a meeting near Ferrara (Italy) and a friend sent me a message with Facebook pictures. The model was found in the middle of a field.

It was found about 1,000m fom the launch point.

I went to pick up the model the same night with the certainty that the model was destroyed or everything was ruined from rain, hail, wind and summer sun.

But Incredibly, the model was in PERFECT condition! (The battery was dead, but nothing else.)

The next day, with charged battery, I had an excellent flight of one hour !!

Do not you think it's incredible??!!

*Supra at “the bluff,” South Australia. Adam Fisher used a RunCam2 to capture this image.*
*<http://www.hobbyking.com/hobbyking/store/__97437__RunCam2_FULL_HD_1440P_4MP_120_Degree_FPV_Camera_w_WiFi_Orange_.html>*

# WITSIESHOEK 2016

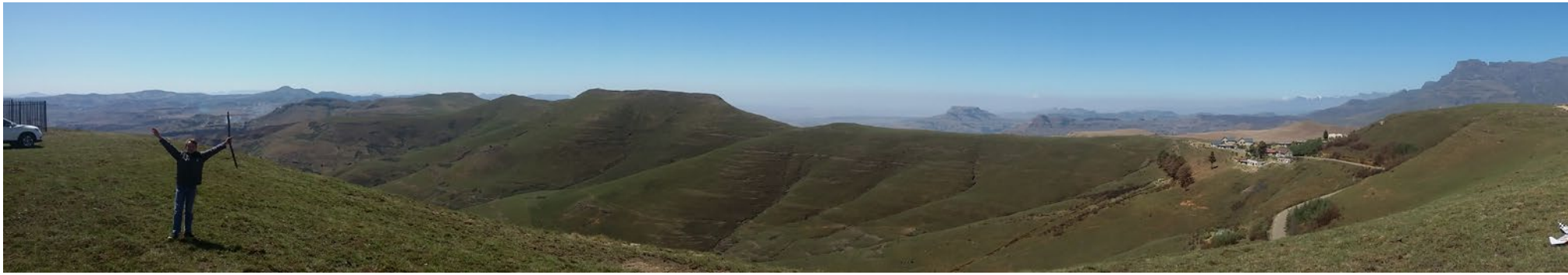
**Evan Shaw, evanevshaw@gmail.com**
**Photos by Evan Shaw, Michelle Goodrum and Piet Rheeders**

*View of the Resort*
*Piet Rheeders*

We host an annual slope soaring event on September the 24th each year at Wietsieshoek Mountain Resort in the Northern Drakensberg called the Lamegeyer Slope Soaring Weekend.

The South Africa resort is situated deep in the Northern Drakensberg mountain range close to the rural town of Phuthaditjhaba in QwaQwa, on a spine of rugged slopes stretching out northwards from the main Drakensberg range. The Resort is close to 2200 meters above sea level and is well know for the hiking trails, rock climbing, camping, bird watching and scenic beauty and tranquility. The endangered Lamegeyer Vulture (Bearded Vulture) are endemic to the area and pay a daily visit to feed on bones put out for them each day.

September was chosen because the prevailing winds are normally very strong



*Panorama view with the resort in middle.*
*Michelle Goodrum*

and either blow from the West or East during that time of year and the spine of ridges run North/South so there is a very good chance of getting some flying in. In the four years of running the event we have always been blessed with good winds.

Apart for normal slope soaring there are also several good DS sites available within walking distance of the Resort. So even the speed junkies are catered for.

When the winds drop there is a huge grassy area just behind the resort for HLG and electric gliders and sometimes there is a light breeze blowing up the valley for the lightweight floaters.

So all conditions are covered and any self respecting pilot will bring along a whole range of models for the varying conditions.

This is also a favorite event for the whole family and wives and kids love coming with to relax and enjoy themselves in the really comfortable Resort.

The event is already planned for the 23rd to 25th September next year.

So if you plan on joining us, remember to book early as the resort is very popular with hikers and sightseers alike and fills up quickly.

Visit the web site <http://www.witsieshoek.co.za/>

*Above: Sentinel Peak - Northern Drakensberg - View from just behind the Wietsieshoek Mountain Resorts chalets. Piet Rheeders*

*Opposite: Witsieshoek from the air, photographed by a camera mounted on the back of Evan Shaw's "Shadow." Flying just before sunset and looking down on Wietsieshoek Mountain Resort with the back of the main slope silhouetted in the background.*

*Piet Rheeders launching his electric Tsotsi. Amphitheater shrouded in cloud with the Sentinel Peak visible on the right. Piet Rheeders*

*Bradley Wilkinson having just caught the “ELF.” Piet Rheeders*

*Rhodney Goodrum launching Errol's 60" OD Electric glider. Piet Rheeders*

*Above: Evan Shaw's "Dotty," an own-design 'wing, made from old F3B glider wing tips glued together, mounted on an old fuselage front-end with a glassed foam fin. Piet Rheeders*

*Right: Evan checking "Dotty" after it's lightning fast arrival. It's impossible to slow these 'wings down for landing. Luckily no major damage. Evan Shaw*

*Evan Shaw launching his "F&F" (Fast & Furious), a one meter span electric version.*
*Photos by Piet Rheeders*

*Evan Shaw about to launch the “ELF” HLG. Piet Rheeders*

*Above: Craig Goodrum and Errol Whatmore setting up the MiG with Rodney looking on.*
*Michelle Goodrum*

*Right: Craig on the controls with Errol launching his EDF MiG.*
*Evan Shaw*


*MiG away! Norbert Rudolf is on the right of the photo launching his 6m "SB10." Michelle Goodrum*

*The Fox undergoes a last minute system check by Evan Shaw. Brandon Leach and kids looking on.*
*Piet Rheeders*

*The 3,5 meter Fox with the Drakensberg Mountain Range in the background. Devils Tooth clearly visible just in front of the glider's nose. Piet Rheeders*

*Above: Banking against the clouds.*

*Right: A good shot of the underside color scheme.*
*Photos by Piet Rheeders*

*A very happy pilot after a successful maiden flight ending in a perfect landing. Piet Rheeders*

*Sunset at Wietsieshoek after a fantastic day of flying. Evan Shaw*

# The Soaring Scene #05

Rex Ashwell, rex.ashwell@xtra.co.nz

Dateline: New Zealand

Once again we have enjoyed a relatively benign winter, nonetheless I think most are looking forward to gradually increasing temperatures now that Spring is here. It's a great time of year although frequently windy around the country which can make for difficult flying days. Glider pilots know that as long as it's not raining there is a fling style to suit whatever weather we have. If it's relatively calm DLG is perfect, a bit of activity in the air signals soaring conditions and wind calls us to the slopes. To paraphrase a common saying, "there is no unsuitable weather, just unsuitable models" and if it's raining there is always the building board.

## Aerotowing

July the 16th was to be our final Soaring Saturday until January as the owner of Quaildale would be running stock on the area we fly from for the remainder of the year. As this is the only nearby site that we can aerotow larger gliders from we have been lucky to be able to have monthly access to what is a great flying site. Not only is there lots of unobstructed space but we can get a Notam issued to allow flights up to 2000 feet (600 metres) and we have found the area to be relatively calm when it is uncomfortably windy at Bankhouse.

This was the case when the usual suspects turned up hoping for a good day of flying. Half a dozen local glider guys, were joined by Sam Laidlaw and Phil Jordan from Nelson and also by a few from the BMAC power fraternity - Alf with his Zero, Chris with a large Cub, Noel with a Hurricane and Daryl with a variety of smaller models, hence the number of vehicles in the photo below. In addition we had a few spectators turn up during the

course of the day, which was good to see as Quaildale is a bit off the beaten track.

The weather was calm and fairly cool, so after the initial flights were over we decided to fly the ALES 123 NDC event which was scheduled, the reasoning being that the wind would probably get up as the day wore on and it didn't seem likely that the temperature would climb a great deal. The results of that contest are tabled later. Having got NDC out of the way we started towing with Peter Deacon's Extra and Carl McMillan's Big Stick available as tugs. Gliders were my 4.5 metre Discus, Sam's 4 metre Duo Discus, Peter Graham's 3 metre KA-8, Ken's 3 metre Sting and several smaller models. As usual not a huge number but enough to keep us happy.

And why wouldn't we be happy, in the middle of a period of rough weather we were unexpectedly enjoying a beautiful Winter day. We all had several successful flights but for some reason the day ended with a series of incidents that damaged a number of models. Earlier in the day Sam burnt out his retract

servo by using the well known technique of sitting the model on it's belly then turning the radio on. Of course, un-noticed, the gear was selected down, couldn't overcome the model's weight so stalled and cooked itself - damn! Next up was Ken - we had just finished the ALES event when he decided to have another flight. The motor tearing itself and the bulkhead it was attached to out of the fuselage made an amazing sound. Not a good sound but amazing!

Phil Jordan had several flights with his FPV glider and, not to be left out of the drama group, managed to get lost just as his battery started to run down (at least that's what we assume happened) and was unable to climb back to an altitude where visual contact could be re-established. The cry of "I've crashed, somewhere!" initially caused some mirth until we all realised that he actually had no idea where the model was. Later extensive searching could not locate it so Phil had to go home empty handed. Fortunately the farmer found it that same day so Phil had to come over from Nelson the next day to retrieve all his gear, luckily relatively undamaged.

To finish off the afternoon Peter and I totally fouled up a tow launch which resulted in two broken wings on the Discus and a badly damaged fuselage on the Extra. Other than to say that neither of us operated our releases nearly quickly enough I think the less said about this the better. Have you ever noticed that when your jaw drops open in astonishment your brain no longer functions? The vision of my big glider bounding from wingtip to wingtip closely followed by the tug smacking into the ground will haunt me for some time. That sort of spoilt what was an otherwise great day of flying.

## Competition Results

There were a couple of late results from the June NDC schedule, Phil being in Australia when the rest of us flew ALES 200 but able to fly the event later in the month. Just Pete and I flying Radian, which was a pity because the conditions were quite good as the scores show. All these flights were at Bankhouse on the 25th of June.

Event #182 ALES 200

Phil Elvy MFNZ #11020
Flight 1 - 4 min 47 Points - 287 Landing - 50 Total - 337
Flight 2 - 7 min 13 Points - 433 Landing - 00 Total - 433
Flight 3 - 6 min 18 Points - 378 Landing - 35 Total - 413
Final Score - 1183

Event #184 ALES Radian

Rex Ashwell MFNZ #10746
Flight 1 - 7 min 00 Points - 420 Landing - 50 Total - 470
Flight 2 - 7 min 06 Points - 414 Landing - 50 Total - 464
Flight 3 - 7 min 05 Points - 415 Landing - 50 Total - 465
Final Score - 1399

Peter Graham MFNZ #10777
Flight 1 - 6 min 16 Points - 377 Landing - 00 Total - 377
Flight 2 - 5 min 25 Points - 325 Landing - 25 Total - 350
Flight 3 - 5 min 18 Points - 318 Landing - 25 Total - 343
Final Score - 1070

At Quaildale we flew ALES 123 early in the day. It was cool then with a light NE breeze and while there was some lift around it was very patchy. With just 123 metre climbs this can be a difficult competition as, although the target time is only 6 minutes, if you don't find some air fairly quickly you can be back on the ground in no time. The bigger models seem to be less suited to the short climb so Peter Graham and I stuck with our Radians.

Event #188 ALES 123

Rex Ashwell MFNZ #10746
Flight 1 - 6 min 03 Points - 357 Landing - 50 Total - 407
Flight 2 - 6 min 04 Points - 356 Landing - 25 Total - 381
Flight 3 - 4 min 55 Points - 295 Landing - 50 Total - 345
Final Score - 1133

Peter Deacon MFNZ #10441
Flight 1 - 4 min 28 Points - 268 Landing - 50 Total - 318
Flight 2 - 4 min 15 Points - 255 Landing - 50 Total - 305
Flight 3 - 3 min 43 Points - 223 Landing - 50 Total - 273
Final Score - 896

Phil Elvy MFNZ #11020
Flight 1 - 3 min 30 Points - 210 Landing - 25 Total - 235
Flight 2 - 5 min 32 Points - 332 Landing - 25 Total - 357
Flight 3 - 2 min 59 Points - 179 Landing - 25 Total - 204
Final Score - 796

Peter Graham MFNZ #10777
Flight 1 - 4 min 15 Points - 255 Landing - 00 Total - 255
Flight 2 - 4 min 01 Points - 241 Landing - 25 Total - 266
Flight 3 - 3 min 47 Points - 227 Landing - 00 Total - 227
Final Score - 748

Ken McMillan MFNZ #10988
Flight 1 - 3 min 08 Points - 188 Landing - 00 Total - 188
Flight 2 - 4 min 23 Points - 263 Landing - 25 Total - 288
Flight 3 - 3 min 40 Points - 220 Landing - 50 Total - 270
Final Score - 746

## A New Model

Here's Phil Elvy's report on what was required to build his new 2 metre electric glider. He was stepping into new territory with this model but carried it off well. As you will see from his text, building a competition model is nothing like screwing together your average foamie - you have to think about every step. It was worth it though as initial flights with the Magic show a lot of promise….as long as you keep a close eye on it, because the cross section is very small and the model can really get along.

# Reichard Magic 2E Build

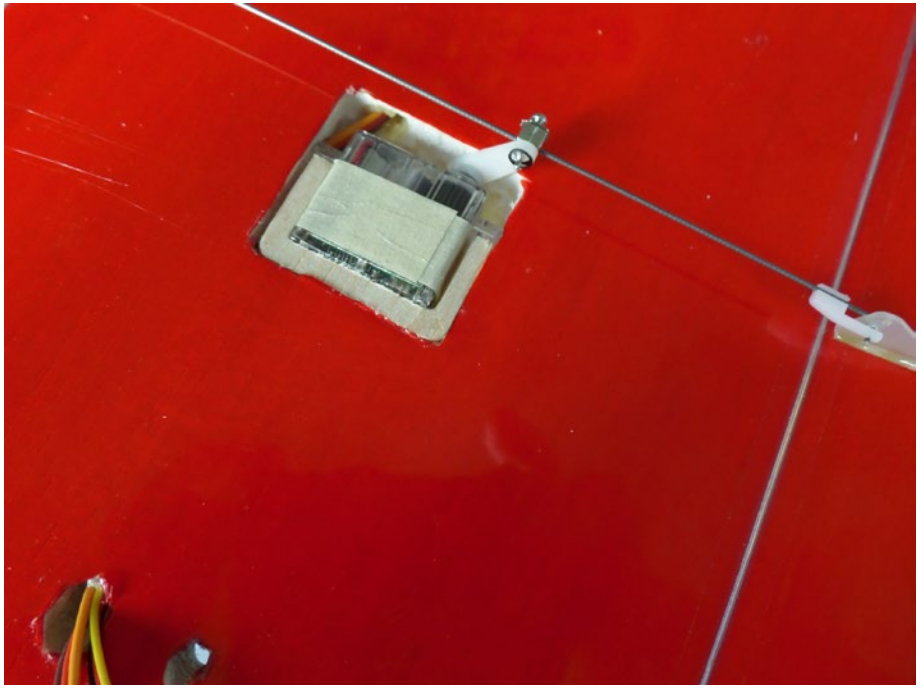
My foamy Phoenix 2 metre just wasn't up to good thermal soaring so I have been looking for a 2 metre composite glider that I could fly on club days. I have a 2.8 metre Prelude which is just a bit too big for normal Sunday flying. After a lot of research I finally settled on a Reichard Magic 2E F5J/ALES (ARF) from Esprit Model in the USA:
<http://www.espritmodel.com/magic-2e-f5j-ales-arf.aspx>

Magic 2E F5J/ALES (ARF) Esprit have a good website that describes the models very well and also recommends and supplies the associated components. I went with what they recommended - an AXi 480 2217/16 motor, Hitec servos for the ailerons and flaps, Futaba servos for the rudder and elevator (obtained elsewhere), a 10 x 6 folding prop and I'm using a 3s 950 mAh Lipo and a 30 amp ESC.

The model components consisted of a carbon fibre fuselage pod (described as fibreglass on the website), two piece foam core balsa sheeted wings covered in Ultracote, carbon boom and covered balsa tail feathers. The control surfaces were all pre-hinged with tape. There was a set of instructions that comprised of one A4 page of text, very nondescript and hard to follow, plus some photos so I was pretty much on my own. This caused me to ponder a lot before I glued.

I started with the wings. Two leading edge locating pins needed to be fitted to the wings, then marked and matching holes drilled in the fuselage. The holes to run the servo extensions to the ailerons and flaps were too small to allow the servo plugs through so I had to cut the plugs off, run the wire, then solder them back on. Instructions said to glue the servos in, which I didn't want to do in case they ever needed to be removed, so I glued tape to the wing and wrapped it around the servos. Supplied packers fitted around the servos which made them nice and tight. No servo covers were supplied but the linkages definitely required protection on landings. I tried a couple of

*The carbon fuselage*



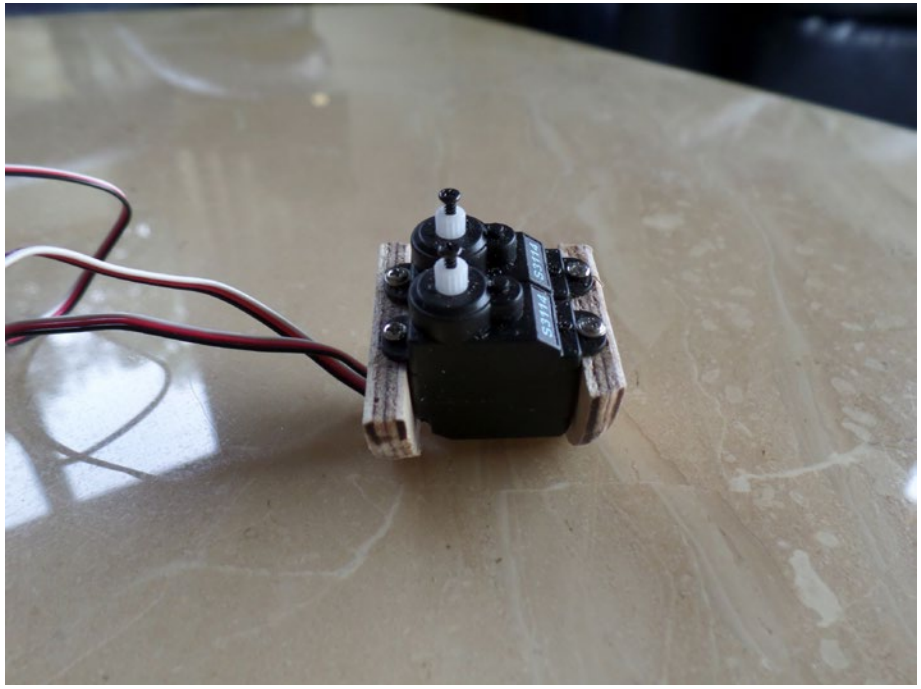
*Wing servos fitted*

sizes from Hyperflight but they were not suitable so I ended up making some fibreglass covers.

Next the horizontal stabiliser and fin. The hori stab simply screwed onto a base plate which was glued onto the boom. The base plate held two blind nuts to accept the screws, so holes had to be drilled in the boom to accommodate these. I fitted the wings temporarily to ensure that the tail feathers were square. The fin was attached using a pin - a carbon pin was supplied but I used a piece of pushrod to make it stronger. This was drilled vertically through the boom so that the fin and tail skid slid onto the pin and were glued. I used two pins to make this assembly stronger and prevent twisting. Drilling the locating holes in the fin without punching out the side was quite tricky.

The rudder and elevator use a pull string/torsion spring control system which I hadn't come across before. The springs were easy to fit but I was concerned that the kevlar string supplied might rub on the boom and fray, as it was not a straight run from control horn to the servo arm, so I elected to replace it with craft wire. The elevator wire runs straight through the boom while the rudder wire comes out the side of the boom. The servos are attached to bulkheads which are then glued to the fuselage. I had to make these as the ones supplied were too small. I made the cutout for the servo wires large enough to let the plugs pass through in case I ever need to remove a servo.

I pondered over the motor mount for some time as the instructions called for 2 degrees of right thrust. How on earth do you measure this with any accuracy? In the end I allowed a



*Rudder and elevator servos mounted to bulkhead to be glued into fuselage*

*Rudder already fitted and showing elevator and elevator mount*

smidgeon (technical term) of right thrust. The only way I could figure to fit the mount was with the motor and spinner installed to ensure it was square with the front of the fuselage. I have glued similar mounts in before but this one seemed more difficult to get sitting correctly. I used slow setting epoxy which took a couple of hours to harden which didn't help (or maybe I fluked my previous one).

The fuselage canopy was to be held in place with a micro magnet at the rear and a screw in the front which meant undoing the screw to unplug the battery. I fitted a piece of pushrod to the front of the canopy which just hooks under the fuselage and used a button magnet at the back. As the fuselage is carbon I had to use a Rx with a long enough antenna to go outside the skin. Fortunately I had a Lemon Rx (I'm Spectrum) which has two nice long antennas which go out each side of the fuselage.

Ready to fly the all up weight with the battery fitted is just 705 grams. C of G was a little nose heavy so some weight was added to the tail. The maiden flight was uneventful and the initial impression was that I am going to have some fun with this model and it could yet be my preferred glider for ALES events. The AXi motor gives it plenty of grunt and it will easily get to 200 metres in 30 seconds. I only had one flight on the day but was able to trim it out before the wind got up. So far I am pretty impressed.

I did have some issues to take up with Esprit. One of the Hitec servos was faulty and was quickly replaced by them. Things

*Finished Reichard Magic 2E*

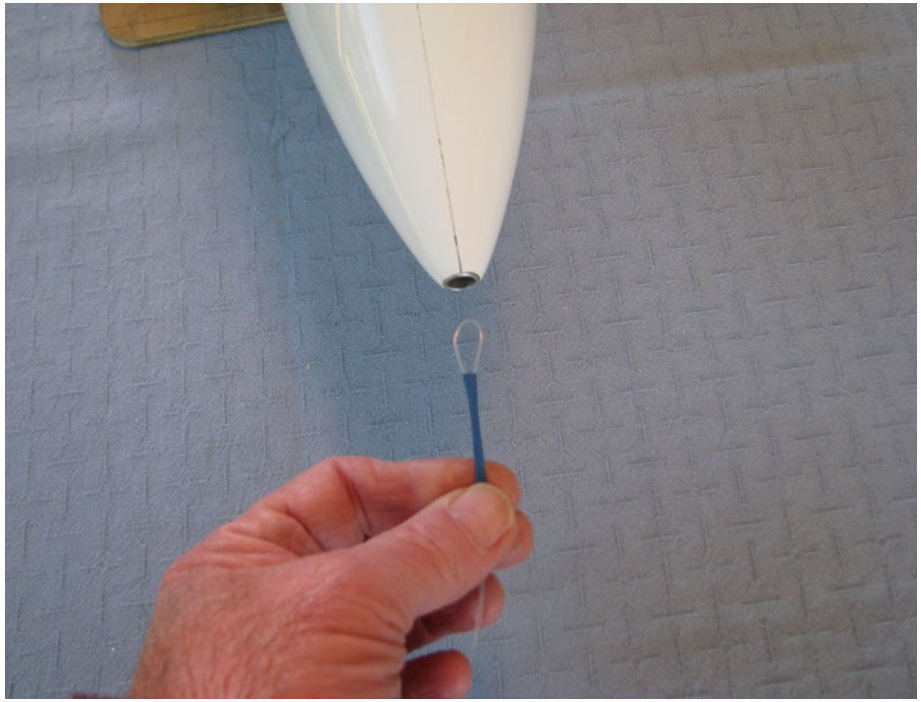
didn't go so smoothly with their recommended 36 mm spinner, which was  bigger in diameter than the front of the fuselage. I took this up with them and was told that all the components were specifically matched and all I had to do was trim the fuselage back. To get the diameters the same would mean trimming 8 mm off the front of the fuselage which would mean the supplied motor mount would then be way too small. When I asked them to check their stock, thinking they might agree that they were supplying the wrong size, I got no response. I have now fitted a 34 mm spinner which matches perfectly. It was disappointing that no servo covers were supplied and I wouldn't fly this model without them as the aileron linkages are too exposed during landings.

— Phil Elvy

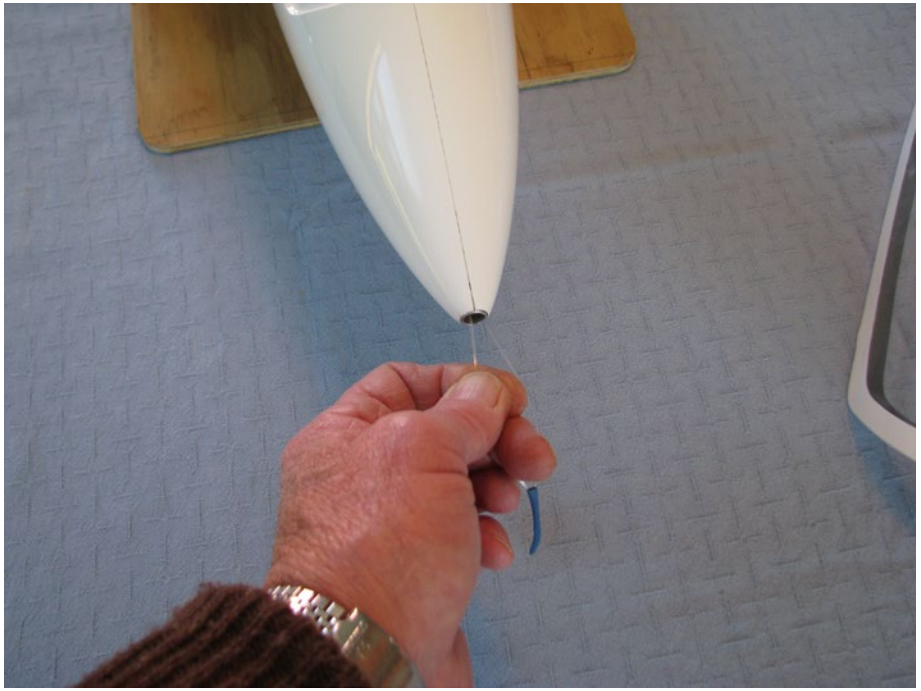
## Tow Loop Improvement

When I first started aerotowing a couple of years ago all the local participants were using a simple loop of monofilament as the connection between the glider and the towline and this seems to be what most still use. It's a low cost and simple answer to the problem but one that I've always struggled to connect to my gliders, especially if I'm in a hurry.

The problem is compressing the loop down to slide into the tow release tube - it does it's best to escape all the time or the resultant loop twists sideways and doesn't want to hook up. I use the Hobby King tow release units and if the loop doesn't slide into place properly the hook can close on the monofilament, pinching it in place without hooking up and sometimes nicking the nylon.



*Slide the tubing to make the loop smaller*



*Once secured, slide the tubing back and check the connection*

I've come up with a low tech solution that has worked faultlessly for me and thought to share it with anyone else having similar problems.

As you can see in the photos, all I've done is to slip a couple of lengths of heat shrink tube over the monofilament loop.

Make sure the tow plane end has the heat shrink covering the knot, then once it's shrunk it won't move.

At the glider end you can slide the heat shrink towards the end and tighten up the loop to make it easy to slip into the release unit. Once it's secured, slide the heat shrink back and do the normal check to make sure the loop is properly secured and not pinched by the hook.

## Slope Soaring

I'm pleased to see that the days are starting to lengthen as we move into Spring and I'm looking forward to the "slope soaring season." Not that there is anything to stop us slope soaring at any time of the year but in recent times several members of both BMAC and MAMS have got together after work on Wednesday evenings during the daylight saving period and flown at Meadowbank. Normally we get up to half a dozen pilots and it would be good to see that number increase.

Meadowbank is a beautiful site and being able to drive to the top of the ridge is a great bonus. Depending on the wind strength a wide variety of models can be flown with the Radian and Phoenix being popular.


*The JW60 kit unboxed. It looks rudimentary but there's more to this than meets the eye.*


*Carl with the JW 60 and ready for the slope*

Carl McMillan has a JW60 kit underway and it will be interesting to see how this model performs. It's a 60 inch span foam wing designed by Joe Wurts, hence the name, to be suitable for dynamic soaring as well as general flying. Alex Hewson clocked 244 mph with one of these a couple of years ago but I can't imagine that Carl has anything like that in mind.

## Club Competition

There are a lot of our club members who fly electric gliders but only a handful that indulge in any form of competition, primarily NDC. This always seems a pity to me as there is a great sense of achievement in reaching the target set in a simple competition. Recently the regulars flew an NDC round under the X5J rules. This is a really simple format that requires no extra equipment, just an electric glider and a timekeeper, and I think it would make an ideal fun event for us to fly one club day.

The rules are simple - you have a 10 minute window to fly in, you can run the motor for as long as you want and restart it as often as you like, but only the gliding time counts toward your score. At the end of the flight there are points awarded for a spot landing but if you have restarted the motor or are still flying when the 10 minutes has elapsed you cannot score landing points. That's it!

These are the results from the recent round that we flew and as you can see the format makes for close scoring. It wasn't an easy day to make a 10 minute flight and most required at least one motor restart, which explains the scarcity of landing points.

You can see from the flight times that most climbed for around 30 seconds before gliding and if a restart was required it would be for 10 seconds or so. I think I had three short restarts on my last flight - not good!

This is not that different from the way most fly on a casual basis, it's just spiced up a bit by having a target to aim for. There is no need to have 4 flights, a couple would be enough. I reckon we should be able to have at least 10 people flying this so give it some thought and be ready to have a go when we come up with a date. It's not difficult, it's not cut-throat, it's just fun. These are the results from the last NDC round that we flew in this format - you can see how close the scores are.

Event # 190 X5J Unlimited Class 0

Peter Deacon MFNZ #10441

| | | | | |
|---|---|---|---|---|
| Flight 1 - | 9 min 14 | 554 points | 00 landing | 554 |
| Flight 2 - | 9 min 31 | 571 points | 15 landing | 586 |
| Flight 3 - | 9 min 30 | 570 points | 40 landing | 610 |
| Flight 4 - | 9 min 26 | 566 points | 20 landing | 586 |
| | | | Total - | 2336 |

Rex Ashwell MFNZ #10746

| | | | | |
|---|---|---|---|---|
| Flight 1 - | 9 min 20 | 560 points | 00 landing | 560 |
| Flight 2 - | 9 min 16 | 556 points | 00 landing | 556 |
| Flight 3 - | 9 min 21 | 561 points | 30 landing | 591 |
| Flight 4 - | 9 min 15 | 555 points | 00 landing | 555 |
| | | | Total - | 2262 |

Peter Graham MFNZ #10777

| | | | | |
|---|---|---|---|---|
| Flight 1 - | 9 min 16 | 556 points | 00 landing | 556 |
| Flight 2 - | 9 min 17 | 557 points | 00 landing | 557 |
| Flight 3 - | 9 min 21 | 561 points | 35 landing | 596 |
| Flight 4 - | 9 min 11 | 551 points | 00 landing | 551 |
| | | | Total - | 2260 |

Phil Elvy MFNZ #11020

| | | | | |
|---|---|---|---|---|
| Flight 1 - | 9 min 15 | 555 points | 00 landing | 55 |
| Flight 2 - | 9 min 35 | 575 points | 00 landing | 575 |
| Flight 3 - | 9 min 25 | 565 points | 20 landing | 585 |
| Flight 4 - | 9 min 00 | 540 points | 00 landing | 540 |
| | | | Total - | 2255 |

Ken McMillan MFNZ #10988

| | | | | |
|---|---|---|---|---|
| Flight 1 - | 9 min 12 | 552 points | 00 landing | 552 |
| Flight 2 - | 9 min 19 | 559 points | 00 landing | 559 |
| Flight 3 - | 9 min 26 | 566 points | 40 landing | 606 |
| Flight 4 - | 6 min 02 | 362 points | 00 landing | 362 |
| | | | Total - | 2079 |

## Big Stuff

Old friend and ex basketball and volleyball team mate Dennis Hipperson sent me some photos of his current pride and joy. I understand that his Cirrus was a $9000 purchase which required very little work to bring it up to standard. Those of you who have models worth more than this may want to pause and contemplate a little at this stage. Dennis, who is also an aeromodeller from way back as well as having a long history as a glider pilot, is now retired and living just North of Melbourne, Australia.

## YouTube Stuff

I am generally saddened to see a nice model crash. It's a lot easier to take when it's someone else's model of course and when it's on YouTube the reaction can vary from astonishment to hilarity. Here are a few recent examples of collisions with the planet:

<https://www.youtube.com/watch?v=JJKqN6Ez2iI>
Large Scale RC Turbine GLIDER::::CRASH - YouTube
I imagine this model would have rivalled Mr Hipperson's Cirrus in monetary value, but not any more…. even the pilot died. When you need a trailer to carry the wreckage away it counts as a major crash.

<https://www.youtube.com/watch?v=AVqYETusy9k>
Duo Discus glider crash. - YouTube
Somehow these guys managed to contrive a disaster from a relatively minor launch problem. Some lessons here are that if you are going to have a team launch your model they all need to launch at the same time and never forget that gravity doesn't magically stop working even after contact with the ground.

<https://www.youtube.com/watch?v=Mn3ERRayuV4>
RC Glider Crash Landing Competition - YouTube

This crew have made a game out of crashing. Using a hole in the ground as a target is a fairly original idea I suppose but diving your model into the hole seems like asking for trouble to me. There are some very tough foams out there.

— Rex

*This one of Roland Goudreau's favorite photos, his Osiris RC-HLG against a dramatic cloud bank.*

*Panasonic ZS20, ISO 100, 1/250 sec., f5.5, 35.6mm*

*The newer Osiris Mk2 is now available from Icare, 890 d'Anjou, Boucherville, Quebec Canada J4B 5E4, at a special introductory price. See <http://www.icare-rc.com/osiris-mk2.htm> for more information.*


# 3D PRINTING

## *a new way of building RC planes*

Tomas Gallovic, admin@kragamodels.com

There is something magical and satisfying about building planes capable of flight just from sheets of balsa. When I see an airplane quietly gliding in the air I'm always amazed that all these elegant and aerodynamic curves were a couple months ago edgy sheets of plywood and balsa.

I have to make a confession, I rarely finalized some balsa build projects. I still have a pile of balsa ribs prepared for sanding on my bench which are supposed to be one day within a Supra designed by Mark Drela. They are sitting there and reminding me, every time I look at them, that there are too many cool projects out there which I would love to build.

How wonderful it would be if I could build planes exactly as I designed them with just a click of the button. No cutting of dozens of wing ribs and spars from balsa. No hours of sanding, aligning, gluing.

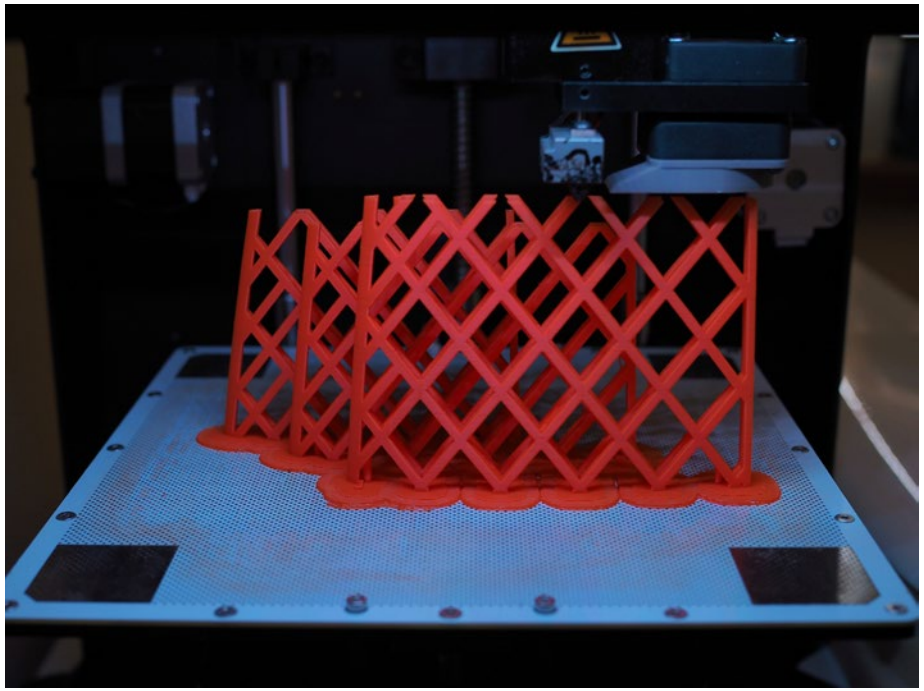
That was sitting in my head for long long time.

At first when 3D printers came on the market I didn't realize the potential. But one day while I was wandering in my mind in a world of new plane ideas, it suddenly hit me. I could design the whole airplane in the computer and then just print it. I could reprint whatever I destroyed when crashing (yes that happens to me from time to time) or having a harsh landing.

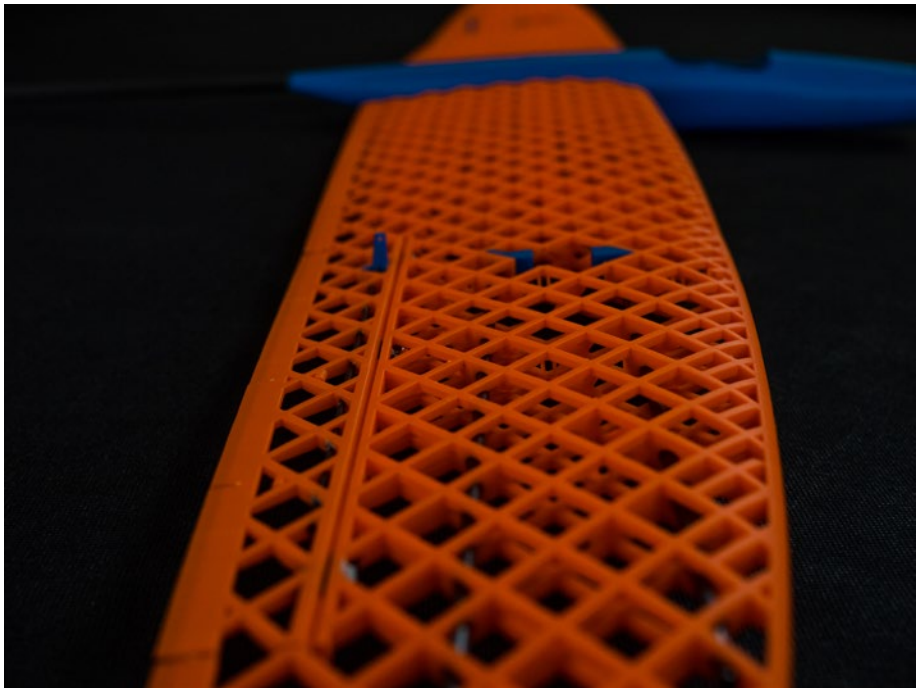
This idea has possessed me for the last two years of my life.

3D printing is a process for making a physical object from a three-dimensional digital model, typically by laying down many successive thin layers of a material.

3D printable models are created using computer-aided design (CAD). The result of this process is an STL file containing a triangulated representation of the object.



*Printing a wing*



*Wing structure detail*

Next, the STL file needs to be processed by a piece of software called a “slicer” which converts the model into a series of thin layers and produces the G-code file containing instructions tailored to a specific type of 3D printer. The G-code is then transferred to the printer typically on an SD card or a USB stick and printed out.

There are multiple types of 3D printers. Fused deposition modeling (FDM) printers are the cheapest and most used type. These printers use a thermoplastic filament in the form of strings wound on a coil. The filament is heated to its melting point in a nozzle and then extruded in thin layers to form a 3D object.

3D printing brings many advantages but of course it has its limitations. When I bought a 3D printer there were already some airplanes designed for 3D printing available on the internet. Naturally, the first thing I ever printed was part of an RC airplane wing. It was basically the shell of a wing with a tube where one would insert a carbon spar.

I was disappointed though. No matter what I tried the printing always failed. The wing surface cracked or the whole part deformed in some way. On top of that, the surface of the part was not that smooth.

It was at this point I realized that this is a new technology and it needs a new approach and a new way of thinking.

It took weeks until I found a solution. I tried almost 30 design ideas. Eventually I found a structure that can be printed on a basic printer and on top of that can wonderfully absorb impact energy. It is combined with a carbon spar which gives it required the stiffness and covered with plastic covering foil so that the surface is smooth.

Using this technology, I've now designed three airplanes. The last of them called Kraga Kodo is now commercially available. It is a 1.6 m span electric glider with the option to be built as a pure glider.

The weight of the plane without electronics and covering foil is 482 g and the wing area is 0.25 $m^2$.

It consists of many smaller parts which are joined together by the carbon spars and glued with CA. The whole structure is then covered with covering film.

I'm not saying that this is the future of the RC world or that all airplanes will be built this way ten years from now. It is just a new technology which has still a bit of balsa building magic in it.

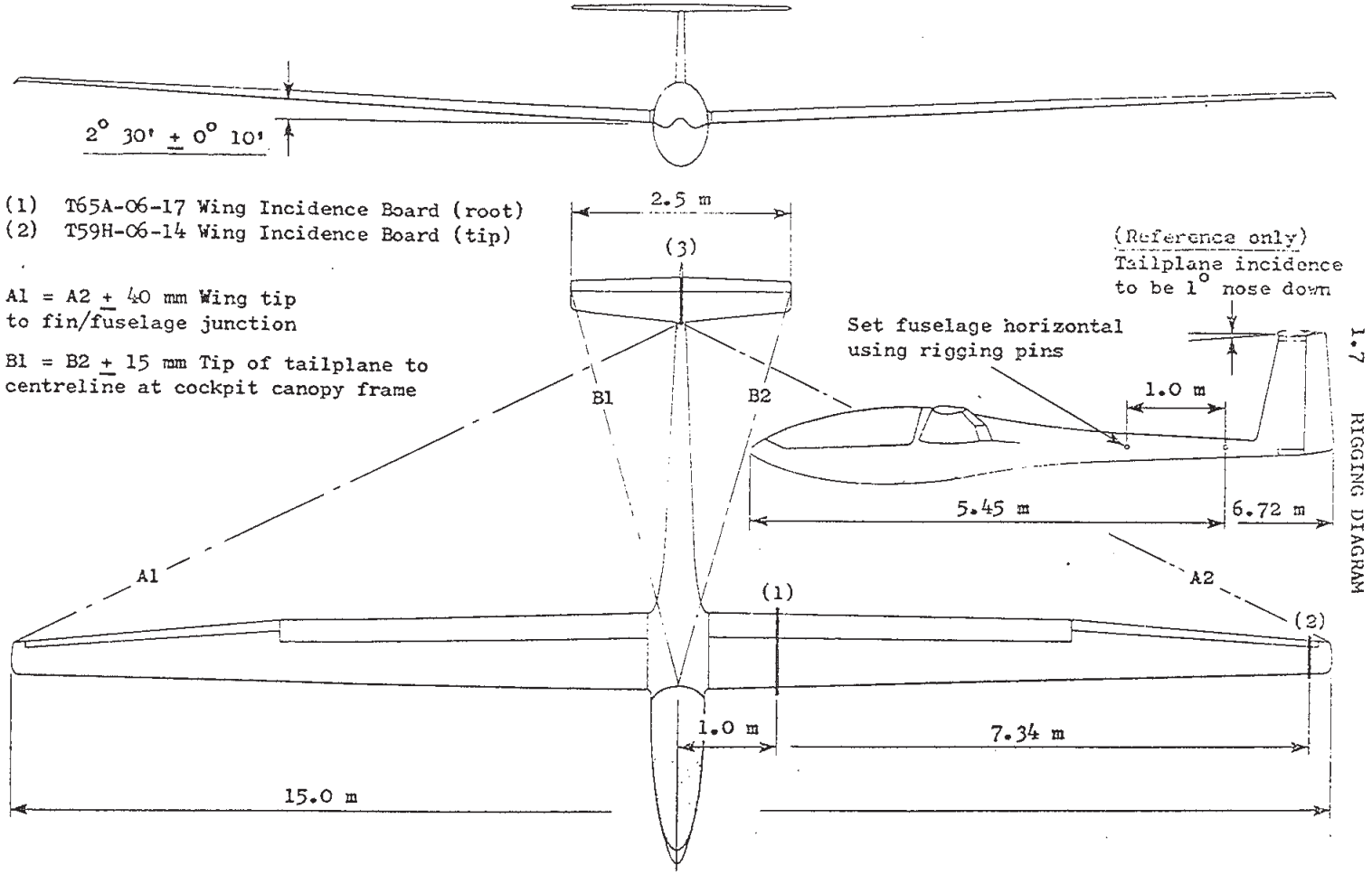
You start with plastic string and carbon spars. You do spend quite some time printing all the parts, and you have to assemble it and cover it with covering foil.

But you end up with a pretty cool looking plane in considerably less time than using traditional techniques.

Tomas Gallovic
Kraga Models
http://www.3DprintedRCplanes.com

*There is a 2-minute video of the Kraga Kodo on the main page, also available at: <https://www.youtube.com/watch?v=qT2nc_uKL-M> / <http://tinyurl.com/gw8bb94>.*

# Vickers-Slingsby Type 65A "Vega" (from the Vega Flight, Repair and Service Manual(s)

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# 7th Vintage Glider Model Meet 3T

## Cremona, Italy

Vincenzo Pedrielli, vincenzopedrielli@gmail.com


The Vintage Glider Model Meet, organized every year by the "Gruppo Aeromodellistico Cremonese (GAC)" led by the active President Marco Pattoni, took place on September 18th 2016 in the airfield of Annicco (Cremona), reaching its seventh edition.

Despite the meteo predicting bad weather, not even a drop of rain fell throughout the day; not only, the sun has shined steady, producing beautiful cumulus that generated good thermals. Unfortunately, the pessimistic weather forecast discouraged some vintage enthusiasts to participate at the meeting. In spite of that 25 pilots coming from different parts of North and Central Italy with 32 vintage glider models did show up to fly their beautiful scale models. Five power planes were made available to tow the sailplanes, so that waiting time was negligible.

The models on the field were scale reproductions of sailplanes from various parts of the world from Germany to Poland, from Japan to the USA, from Switzerland to Austria, and last but not least from Italy.

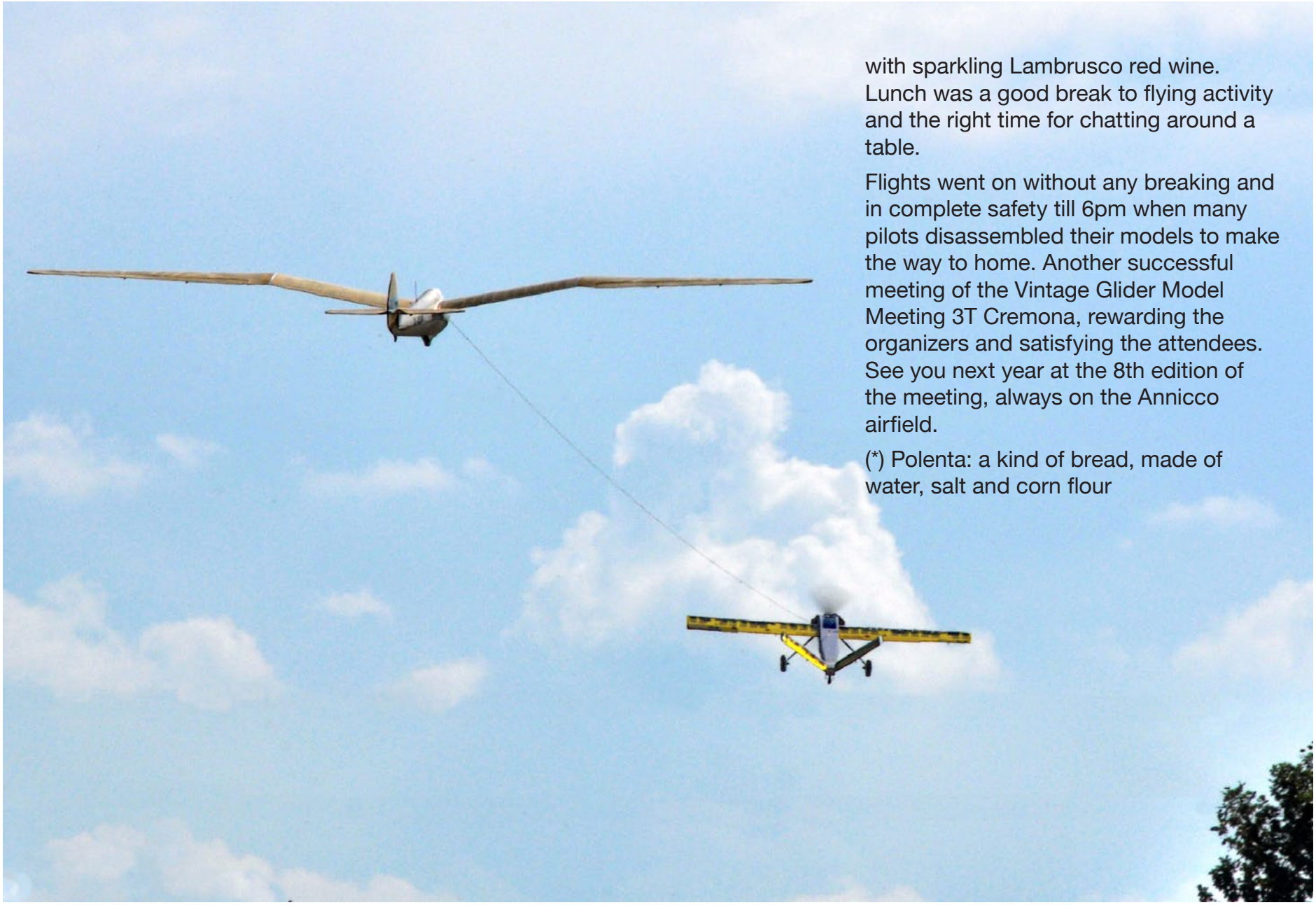
More and more model builders pay attention to the scale details, such as the cockpit of the glider with its original instruments.

The pilot must be also in the same scale of the model and possibly wearing vintage suits, hat and glasses of the time. Of course the seat belt and the control stick must be included. For the most demanding modelers the pilot may have the owner's face, obtained by 3D technology.

And what about color scheme? It has to have the same color and markings of the full size sailplane. The faithfulness of the models is improving every year and also the scale size is increasing, with many sailplanes in scale 1:3 and 1:2,5.

It's difficult to state which were the best models in the field, so I'll let you decide which one, or which ones, were the most deserving, by viewing the photos in this article, which I took during the event.

As in the previous meeting, a generous BBQ meal was prepared by the club members, consisting of sausages, pork steaks and grilled polenta(*), all watered



with sparkling Lambrusco red wine. Lunch was a good break to flying activity and the right time for chatting around a table.

Flights went on without any breaking and in complete safety till 6pm when many pilots disassembled their models to make the way to home. Another successful meeting of the Vintage Glider Model Meeting 3T Cremona, rewarding the organizers and satisfying the attendees. See you next year at the 8th edition of the meeting, always on the Annicco airfield.

(*) Polenta: a kind of bread, made of water, salt and corn flour

*Tiramisù (“tow me up”) tow plane pulling a Minimoa to altitude*


*Waiting in line for a tow*


*Quarter scale EC38/56 Urendo*



*Ciani EC38/56 Urendo*

*Kaiser Ka 1*


*DFS Habicht*

*Hirth Göppingen Gö3 Minimoa*



*Maede 703*


*Hirth Göppingen Gö3 Minimoa*

*CVV3 Arcore on tow*


*A beautiful vintage trio, a Ka6E, the Teichfuss Sparviero and the EC36/58 Urendo*


*Ka-4 Rhönlerche II*


*PWS 101 and Teichfuss Sparviero*

*Teichfuss Sparviero landing*


*Kaiser Ka6 landing*


*Yelloa SZD Mucha on its preparation stand, blue PWS 101 on the right.*


*Moswey III*


*Grunau Baby IIb*


*Teichfuss Sparviero*


*Hirth Göppingen Gö3 Minimoa in flight*

*Bowlus Baby Albatross in flight*


*Bowlus Baby Albatross*


*The detailed cockpit of the Teichfuss Sparviero*

# sUAS Aircraft Design Software

*<https://techxplore.com/news/2016-10-aerospace-free-d-aircraft-software.html>*

As interest in small autonomous aerial vehicles and their applications continues to expand, a Utah State University aerospace engineer is offering the public a free software tool that could revolutionize the drone industry.

Doug Hunsaker, an assistant professor of mechanical and aerospace engineering at USU, is offering a free, easy to use 3-D online software program that generates aerodynamic information about a user's aircraft design.

The program, called MachUp, is available at <aero.go.usu.edu>. The web-based software operates on any browser and on any platform including smartphones and tablets. The site also features training tutorials and how-to videos.

"MachUp lets a user design an aircraft, and the software will calculate aerodynamic information about that design," said Hunsaker. "The program will generate lift, drag, stability and trim data for any design you put into it."

MachUp uses modern 3-D web graphics to render images in a browser, and does the heavy-duty aerodynamic computations on a dedicated server. The software could prove to be a valuable resource for companies developing small autonomous aircraft. Most software tools capable of calculating aerodynamic data are tied up in the major aerospace firms and are not commonly available without steep licensing fees.

"The average Joe does not have access to this kind of software," said Hunsaker. "And if they did, it would be prohibitively expensive for the average user or small startup company."

In the near future, small autonomous aircraft will play a big role in everyday life. Drones are already creating new opportunities in agriculture, research, cinematography and data delivery. Companies including Google and Facebook are exploring the use of drones to provide wireless internet coverage and, Amazon is developing drones to deliver packages. As applications expand, a variety of drones will be needed to perform a variety of tasks.

That's the heart of the problem for Hunsaker: There is no one-size-fits-all design for drones, meaning different drone models used in different applications will need to be designed from the ground up.

"For years, we've been imagining drones doing everything from delivering packages to monitoring freeway traffic and performing security functions," said Hunsaker. "But because each mission is different, each of those applications will require a unique drone that will have to be designed for safe

and efficient operation. Designing any aircraft, including drones, requires sophisticated software tools and expert-level knowledge in aerodynamics and aerospace engineering.

The software is available to anyone including aerospace engineering students and  drone start-up companies. Credit: Utah State University

That's where MachUp comes in. Hunsaker said he developed MachUp with the goal of putting useful design tools into the hands of engineers at drone startup companies. Now, he wants anyone interested in fixed-wing drone design to try the software to see what it's capable of.

"It's a tool I would have used in my aircraft design courses if it had been around," he added. "This level of resource just hasn't previously been available to most designers."

Dozens of companies and aerospace engineering schools around the country have used MachUp including Embry Riddle, Virginia Tech and MIT. The software is also used by Utah State University's Aggie Air agriculture research program.

Hunsaker is a leading expert in aerodynamics and aircraft design. Before coming to USU, he worked for Scaled Composites, the California company behind the iconic SpaceShipTwo suborbital spaceplane.

web site:
<http://aero.go.usu.edu/machup/>
web-based version: <http://aero.go.usu.edu/mu3/>
download: <https://github.com/usuaero>

CloudFoil, a full RANS (Reynolds-averaged Navier–Stokes equations) airfoil simulations in the cloud, is coming Nov. 1, 2016.
<http://aero.go.usu.edu/cloudfoil/>

*Phil Cooke's PSS Hawker Fury seen flying fast and low into the bomb release zone at the recent PSSA Fly-In at the Bwlch, South Wales, UK. Model spans 60" and has an AUW of 8lb – all black EPP construction with brown paper and PVA covering. Finished in a Dutch Navy scheme. Bomb release system by HobbyKing worked well!  Photo by Andy Meade – PSSA – more info at <http://www.pssaonline.co.uk*

# From the *Horten Flying Wing Believers* FaceBook page

Marko Stamenovic

Figure 1: Here is one not so intuitive graph but it shows some interesting things about the nature of flying wings. All data points are for Horten's aircraft as before. It really doesn't mater which one is which. On horizontal axis we have Wing Loading and on vertical we have not so usual parameter. It shows how much force you need to move 1kg at 1m/s for particular design at sea level. If you would multiply that with mass and speed at best GR, you would get drag (it doesn't work for other speeds). This was done in order to be able to compare different designs and to show how efficiency of transporting payload depends on wing loading. This data are mainly important for powered aircraft, for sailplanes it is a little bit different. Clear conclusion is that in order to improve performance of flying wings in general we have to solve old problem they have - low wing loading. This problem has 2 sides: one is how to achieve high Cl for take off and landing, since swept wings are not very effective at that; and the second is how to trim the aircraft at high Cl. For the first problem we have some solutions using high lift devices. The second problem is much more complex and we still don't have a good solution for it. Solve that and flying wings will beat anything designed so far. Another important thing to notice that although flying wings have low parasitic drag coefficient, drag it self is not so small due to low wing loading - big surface area. This diminishes the advantages of clean, all-wing design.Hope I didn't bored you to death with my blabbering

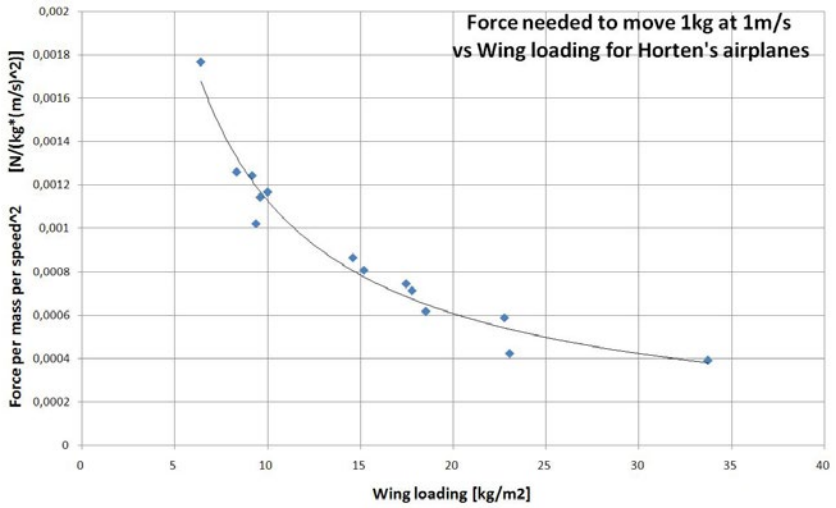



*Figure 1*

Figure 2: I have this in front of me so thought to share. Graph shows trend line for glide ratio vs aspect ratio for the most of Horten's design (blue dots). You can read expected GR for any AR. For models actual values would be usually lower due to more drag at low Re numbers.

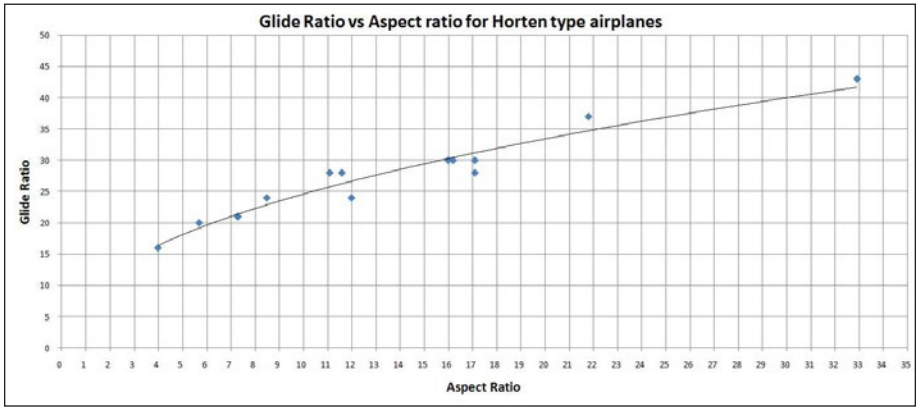



*Figure 2*


*A PSS Supermarine Spitfire Mk24 built and flown by Bob Jennings. Model is built up from the Alan Hulme PSS plan, has a span of 44" and an AUW of ~3lb. Finished in an attractive all over silver scheme, the model is seen in flight at the Bwlch PSSA Fly-In, South Wales, UK, May 2016. Photo by Phil Cooke – PSSA – more info at <http://www.pssaonline.co.uk>.*

# The Annual Christmas and Gift-giving List

After a several year hiatus, the RCSD Annual Christmas and Gift-giving List makes its reappearance. Some of the items listed may be familiar to long-time readers, but because of product updates to individual items and additions to inventories, all deserve attention.

Ready? OK, here we go...

## Small Tools

There are two reputable sources for RC soaring enthusiasts. Both put out printed catalogs and have a very substantial web presence with on-line ordering.

Garrett Wade
<http://www.garrettwade.com/>

A very large selection of tools for home and office, workshop and woodworking. While some products are made in Asia, Garrett Wade looks for exceptional items made in the UK, and there is a special section on their web site devoted to items made in the U.S.

Micro-Mark
<http://www.micromark.com>

Micro-Mark is an excellent source for hard-to-find mini-tools and model building supplies at low prices. Micro-Mark takes great pride in providing the best customer service in the industry.

Micro-Mark carries both hand tools - clamps, knives and saws, drills, measuring devices, etc. - and power tools, including drill presses, table saws, planers, a small vacuum forming machine and a laser cutter.

## Servos

*"You can never have too many"*

ServoCity
<http://www.servocity.com>

ServoCity has perhaps the largest selection of servos from Hitec and Futaba at low prices. Shipping is $6.99, USPS or UPS, depending on order size.

MKS Servo-tech
<http://mks-servo.com.tw/mks/n22.html>
<http://www.mksservosusa.com/home.php>

For those involved in slope racing or in some other high performance environment, we suggest you take a look at the MKS brand. MKS has a very good record with the F3F crowd.


Hitec HS-5125MG


MKS HBL-6625MINI

## Small field sailplanes

Dream-Flight
<http://www.dream-flight.com>

Michael Richter has been producing small glider designs for 20 years and has developed an amazing international presence over that time.

Michael/Dream-Flight currently has three aircraft in their inventory: the Alula-Trek, Libelle, and Weasel-TREK.

All three of these aircraft are incredible slope machines as that is their natural design environment. The Libelle is a good flatland flyer, and we've had some success with thermal flying the Alula-TREK as well.

Prices, not including shipping:

- Weasel-TREK - $100
- Alula-TREK - $90
- Libelle - $120

## Computer software

While there are a number of software packages which can be acquired at no charge - XFoil and XLFR5 stand out - there are few professional or semi-professional packages which carry what we consider reasonable price tags. The exception is X-Plane, a product of Laminar Research <www.X-Plane.com>.

Although it is a tremendously accurate flight simulator on its own, the package includes the ability to design your


own aircraft and then fly it within the simulator. As a virtual experience which precisely mimics the real world, your design is affected by all of the relevant aerodynamic loads during flight and the effectiveness of control surface deflections, weight and balance, etc. are all taken into account.

X-Plane runs on Mac, Windows, and Linux operating systems, includes worldwide scenery, and more than 40 aircraft. The realism of the simulator is truly exceptional.

The latest release, X-Plane 11, is scheduled for November, just in time for gift-giving during the holidays. Purchase the X-Plane 10 digital download now ($59.99), and get X-Plane 11 free on release day.

It should also be noted that older versions of X-Plane on DVD are still available for purchase: the X-Plane 10 DVD (no update to X-Plane 11) is $49.99, and the X-Plane 9 DVD is $39.00.


## Books

R.E.S.: Kleine Thermiksegler mit grosser Leistung
Modelle, Bau- and Flugtechnik
Frank Schwartz
Verlag fur Technik und Handwerk neue Medien GmbH, 2014
Best.-Nr.: 310 2248
ISBN 978-3-88180-463-9
87 pp.

This book focuses on a relatively new Class of RC sailplanes which utilizes a simple launching method, inexpensive models and equipment, and a contest environment which is more low key than the usual F3-glider events most of us are familiar with. It is also a Class which fosters technological advancement in the areas of wood wing construction and aerodynamics, and various mechanical systems.

Chapter 1 outlines twelve models with a 2m span limit (including a swept wing tailless design!) with text descriptions and accompanying photographs. A table of dimensions and specifications for the twelve listed models is at the end of the chapter and provides a direct and convenient basis for comparison. Prices as of September 2014 are noted.

One of the primary aims of the F3-RES Class is to promote the building of models rather than outrightly purchasing an RTF airplane in a box. In addressing this, the volume explores some of the basic techniques most of the described models utilize. In this regard, Chapter 2, written by Fritz Koch, advances the benefits of self-building, including the ability to modify the initial design to suit personal needs and/or desires.

Chapter 3 is a treatise on building and covers tools, adhesives, methods for aligning parts, and an extensive explanation of covering techniques.

The chapter ends with a single page photo layout showing a mechanism for deploying two separate spoilers with a single servo. Although requiring a large number of custom parts, the mechanism looks to be relatively failsafe.

The F3-RES Class was formulated to promote relatively simple models which can be easily and quickly built, it is also an event which requires only simple radio equipment. The transmitter needs only three channels (Rudder, Elevator, Spoiler), but having end point adjustment, dual rates, and mixing functions (Spoiler to Elevator Trim) are helpful. For some models - tailless models utilizing elevons or models with V-tailsas examples - V-tail mixing is of course a requirement.

The receiver must be capable of driving as many servos are as used, naturally. For models of the F3-RES type, the servos themselves can be of small size. This not only means light weight, but the cost of purchase is quite reasonable. A small table listing the most popular servos, along with their specifications, is included. This chapter concludes with a description of airborne battery packs and small Voltage limiters.

Chapter 5 describes launching and flying F3-RES Class models. This Class is formulated for hi-start launching only, and the hi-start specifications are well defined. These specifications

are covered in this volume, along with several photos showing representative hi-start systems and launching scenes. As these models are not necessarily relegated to flat-land flying only, there's a page describing slope flying as well.

As aerodynamics is always a consideration for those designing their own models, Chapter 6 is devoted to this topic. This chapter is another written by Fritz Koch. In a few short pages, the reader is given an overview of wing profiles, Reynolds numbers, lift and drag, glide ratios, and stability and control. Also described are incidence angles and the location of the CG.

F3-RES is a competitive Class, and the contest format is therefore defined within the established regulations. This is explained in Chapter 7.

The volume concludes with a very short chapter describing the potential of the Class so far as gaining interest in RC sailplanes and technological advancements driven by competition.

The "appendix" includes the defined regulations and a list of resources.

Because of the list of resources, table of model specifications, photos of the various planforms currently available in kit form, and some "technical" photos, this volume may be of benefit to anyone interested in F3-RES, despite being written entirely in German.

VTH is a reputable firm with a long history of publishing model aircraft materials (the original Eppler airfoils were covered in several books produced by VTH).

Available from a number of sources for low cost, this book is highly recommended.

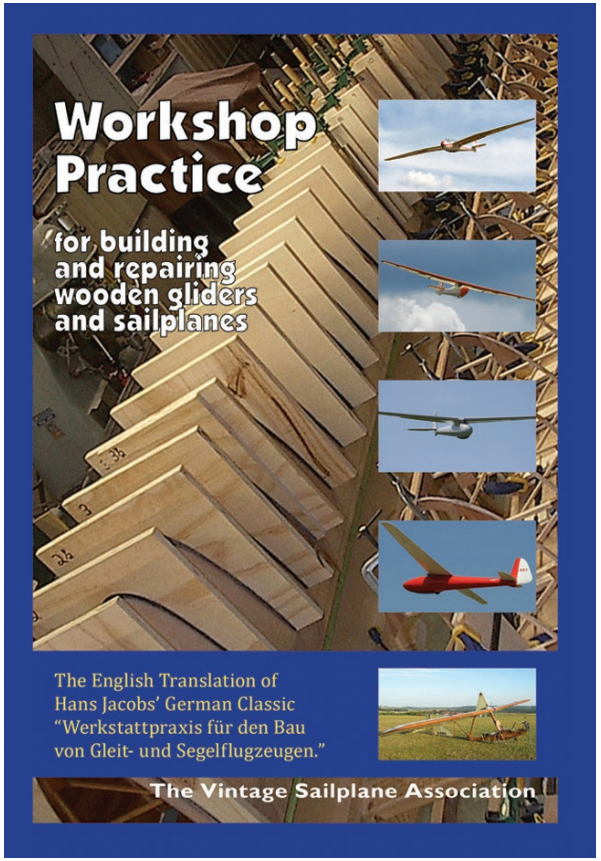
"R.E.S.: Kleine Thermiksegler mit grosser Leistung" is available for less than $20 from several sources via <www.amazon.com/>. Simply search for ISBN 9783881804639 in the Books section.

Workshop Practice
*for building and repairing wooden gliders and sailplanes*
The English translation of Hans Jacobs' German classic "Werstattpraxis für den Bau von Gleit- und Segelflugzeugen"
The Vintage Sailplane Association, 2016

Know someone interested in vintage gliders? Give them VSA's just published, English language, hard cover book Workshop Practice.

Purchase via the VSA web site <http://www.vintagesailplane.org/classifieds/books/>/<http://tinyurl.com/zvzrozj>. $47 plus $6 P&H (US address) or $30 P&H (non-US). Or from Cumulus Soaring <http://cumulus-soaring.com> or EQIP <http://www.eqip.de> in Europe.

Make someone very happy this holiday season!



CN-Model Optimus F3J
<http://flightcomp.com/collections/f3j-thermal-duration>

The Optimus is brand new for 2015 and offers outstanding aerodynamic design combined with the very latest in carbon composite spread tow construction. At 3.83m wingspan it is ideally sized mid way between the popular 3.5m and 4m formats giving an ideal balance of performance and handling throughout its very wide speed range.

Made exclusively from new unidirectional bi-axial carbon spread tow material, the Optimus structure is extremely stiff and light with electric versions and lightweight glider versions ready to fly from as little as 1700g. This very low starting weight combined with a highly efficient wing planform and airfoil profiles gives the Optimus an outstanding float and minimum sink performance.

Great care has also been taken to ensure optimum performance towards the high speed end of the flight envelope as well. Accurate computer modelling and simulation means the Optimus series of airfoil profiles give the best velocity distribution and boundary layer control throughout its entire span and speed range. This translates directly to faster higher launches for F3j glider versions and excellent search and return capabilities for both glider and electric versions. Performance in wind is also

good where the Optimus demonstrates good forward penetration and the ability to return from downwind thermals with more height to spare.

- Light, with a flying weight of 1650-1750 grams (58-62 oz) Wind speed limit for direct tow - 5 m/s

- Standard, with a flying weight of 1850-2000 grams (65-70 oz) Wind speed limit for direct tow - 8 m/s

- Heavy, with a flying weight of 2100-2200 grams (74-78 oz) Wind speed limit for direct tow - 12 m/s

Prices: US$1,849.99 to US$1,939.99

Closing out this year's list are a number of small items which can be best described as "stocking stuffers."

Fiskars 8 Inch Premier Easy Action Bent Scissors (12-99118697WJ)

Great for cutting fiberglass and other fabrics without rubbing the finger grips against the material.

Available through Amazon.com for around $11.

Remote Control Switch Replacer
Suitable for Flysky, Walkera and Futaba transmitters, this is one of those gadgets that takes up very little space in the field box and can always be at hand when needed. "Don't leave home without it." Available from <http://www.banggood.com/Remote-Control-Switch-Replacer-For-Flysky-Walkera-Futaba-RC-Transmitter-p-1072285.html> / <http://tinyurl.com/gtlusbk>

CA glues and Epoxies

For those involved in wood construction, CA glues and epoxies have become indispensable.

In response to the needs of users, manufacturers of these adhesives have expanded their usefulness for various tasks by adjusting the formulations.

In the realm of CA glues, for example, in addition to the "regular" variety there are now high viscosity variants as well as those which are very thin. While the higher viscosity types are promoted as being "gap filling," good fitting is still of paramount importance. This is even more true with the thinner types. In addition, there are also CA glues which are foam safe and work well when repairing foamies while on those slope expeditions. A wide variety of CA glues should be available from your local hobby shop or on-line retailer.

In the realm of epoxies, we've always had good experiences with West System products put out by Gougeon Brothers, Inc. <http://www.westsystem.com>.



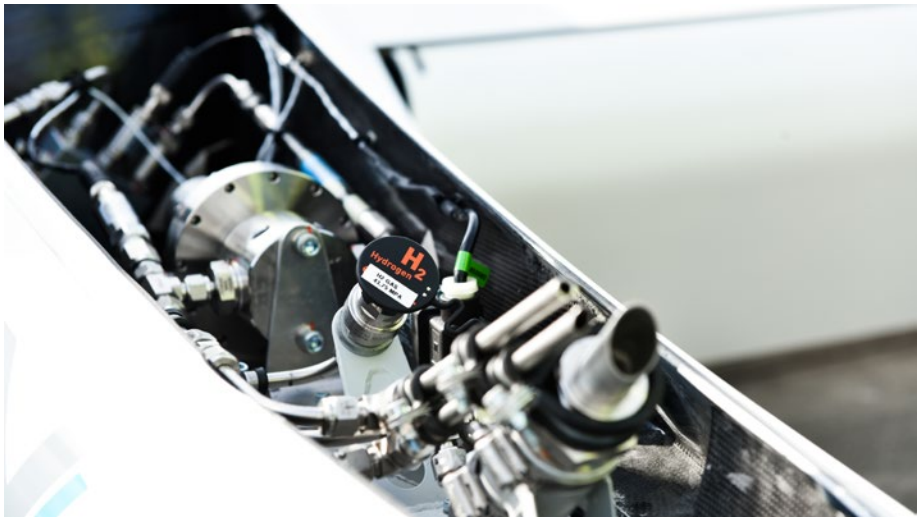
We've used West System 105 resin and West System 206 slow hardener or West System 209 extra slow hardener for vacuum bagging processes. One of the newer West System products is G/Flex. This is a two part system which uses a clear resin and a brown colored hardener. Its main advantage is that it remains flexible after hardening, making a good option for mounting servo frames in wings and mounting plates in fuselages. And it does have significantly greater adhesion than regular epoxy, too.

# Zero-emission air transport

*first flight of four-seat passenger aircraft HY4*

On 29 September 2016, the HY4 aircraft took off on its first official flight from Stuttgart Airport. The HY4 is the world's first four-seat passenger aircraft powered solely by a hydrogen fuel cell system. Researchers from the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) developed the aircraft's power train and worked on the project with industry and research partners.


The HY4 fuel cell aircraft was developed by the DLR Institute of Engineering Thermodynamics together with partners Hydrogenics, Pipistrel, H2FLY, the University of Ulm and Stuttgart Airport. DLR researchers were responsible for developing the hydrogen fuel cell power train and installing it in the aircraft. The power train consists of a hydrogen storage system, a low-temperature hydrogen fuel cell and a battery. The fuel cell converts hydrogen directly into electrical energy. The only waste product from this process is water. An electric motor uses the power thus generated to propel the aircraft. A high-performance lithium battery covers peak power loads during take-off and when climbing. If the hydrogen required for the fuel cell is generated via electrolysis using power from renewable energy sources, the HY4 can fly without generating any emissions at all. The aircraft is operated by the DLR spin-off H2FLY.



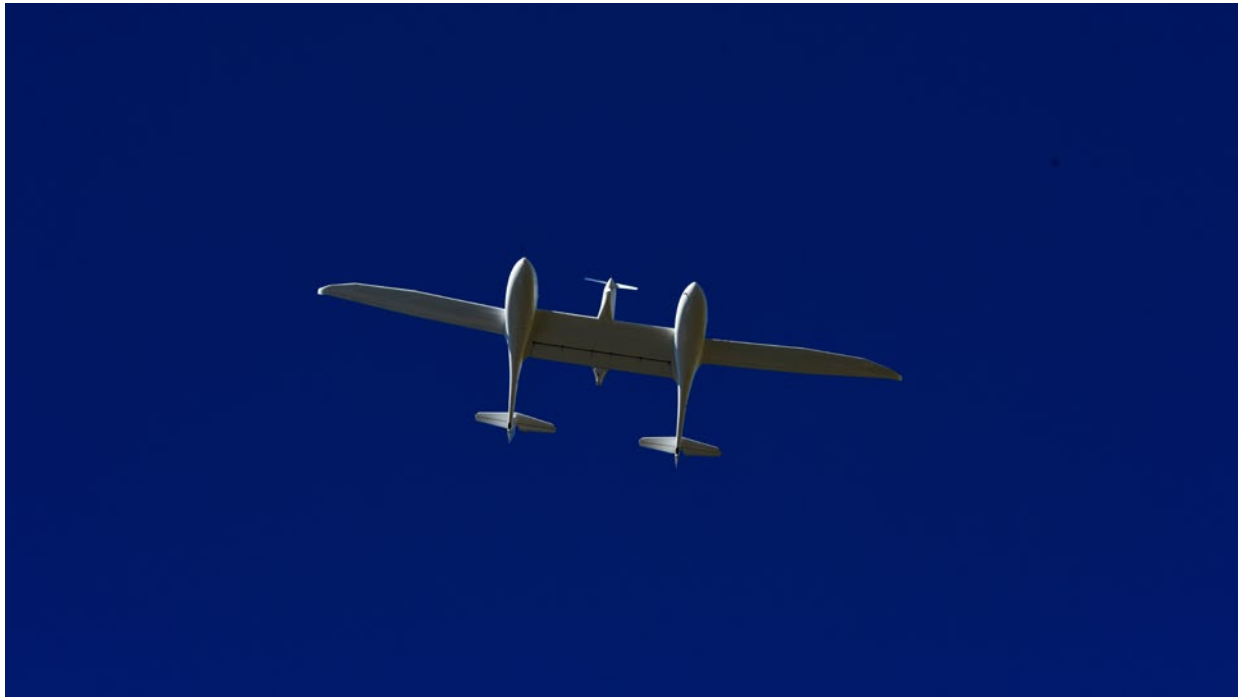

## Important step for sustainable air transport

Violeta Bulc, EU Transport Commissioner on Zero Emission Flying: “I am proud that European researchers and manufacturers are launching this hydrogen fuel cell powered aircraft. Such forward looking activities embody the future of zero-emission flying. The Commission firmly supports such initiatives, which are fully in line with our new strategy for low-emission mobility. Aviation plays an important role in bringing people together, connecting large cities as well as remote locations. It also ensures businesses can grow and develop. The EU will continue to support such

initiatives, to drive innovation forward. Georg Fundel, Managing Director of Flughafen Stuttgart GmbH, is delighted by the fact that the first flight took place at Stuttgart Airport: “Further growth is expected for Stuttgart Airport and aviation in general. For us, this is an important reason to focus on environment-friendly and, someday, even zero-emission aviation, as well as innovative technologies.”

## Electric air taxis for regional transport

“For the foreseeable future, large passenger aircraft will continue to fly using conventional propulsion. One of the major challenges for the coming decades, however, is bringing electromobility to the aviation industry and making the air transport system of the future carbon dioxide neutral,” explains André Thess, Head of the DLR Institute of Engineering Thermodynamics. “Our goal is to further improve the fuel cell power train and, in the long term, use it on regional aircraft with up to 19 passengers.” DLR is currently actively involved in electric aviation together with industry partners Airbus Group and Siemens, as well as 20 university institutes and Helmholtz centres as part of the Helmholtz Association’s DLR@Uni Electric Flight initiative.



The HY4 has a motor output of 80 kilowatts, a maximum speed of approximately 200 kilometres per hour and a cruising speed of 145 kilometres per hour. Depending on speed, altitude and load, it can achieve a range of between 750 and 1500 kilometres. The most striking feature of the HY4 is its twin fuselages, each with space for two passengers. The maximum weight of the aircraft is 1500 kilograms. “With the HY4, we now have an optimal platform to continue developing the use of fuel cells on aircraft,” says Josef Kallo, responsible for the HY4 project at DLR and a Professor at the University of Ulm. “Small passenger aircraft, such as the HY4, could soon be used in regional transport as electric air taxis and offer a flexible and rapid alternative to existing means of transport.”