

free.aero



WORLDWIDE PARAGLIDING AND PARAMOTORING MAGAZINE. FOR FREE.



CLIMBING



Photo: Martin Scheel

## CONTENTS

*Translation by Ruth Jessop*

300 KM on an EN B	4
168 KM on a tandem	5
Franky Zapata and his Flyboard Air	7
Climbing in a cauldron	10
To the sea	15
Finding the source	16
Cross section unleashed	18
The dust dance	21
To go up, release the handbrake.	24
Portfolio a heavenly slalom	28
XAlps 2017: Chrigel wins again	32
Chrigel's winning wing...	36
Paul Guschlbaur 3rd	38
Rising star Stanislav Mayer	39
Gaspard Pétiot	41
The Outtersider at the top...	42
World championships monte avena	46
Test Ozone Delta 3	51
Test Apco Swift R	57
Climbing with smartphones	62
Going up electrically	77
Review Exomo	87
Measuring the thrust	90



Dream. Touch. Believe.



### The instinctive choice

The Bolero 6 is intended as a first paraglider, suitable for school use but also for regular pilots who want to fly relaxed. The glider gives just the right amount of feedback to enable pilots to develop instinctive flying skills in a safe, comfortable and progressive manner.

Share your experience #gingliders



<https://www.xcontest.org/world/de/fluge/details/:mimu/28.05.2017/07:52>

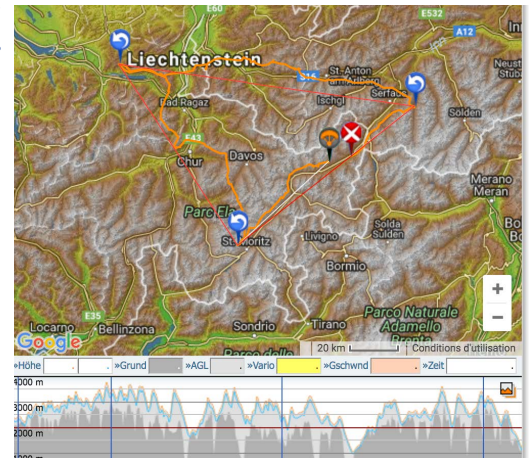
# NOVA MENTOR 5 300 KM ON AN EN B

*The 28th of May was a very good day, especially in the east of the Alps.*

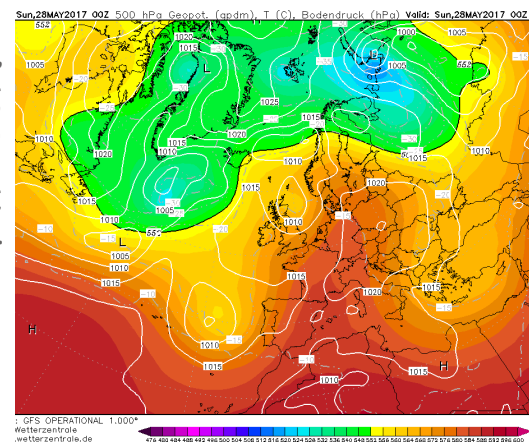
**O**n the 28th of May 2017, Michaël Müller flew almost 300km in Switzerland – 292.88 km on his EN B, Nova Mentor 5, size XS. He took eleven hours and one minute, and his average was 26.95 km/h. On the XContest server, it was a very fruitful day: 2000 flights, including twenty-one on EN Bs amongst the top one hundred. That day Michaël's distance was third, just after Christopher Manzl, 313 km in Austria on an Ozone Enzo 2, and Thomas Walder, 295.73 km, on a Skywalk Poison X-Alps.

The day's flights:

[https://www.xcontest.org/world/en/flights/daily-score-pg/#filter\[date\]=2017-05-28@filter\[date\]=2017-05-28](https://www.xcontest.org/world/en/flights/daily-score-pg/#filter[date]=2017-05-28@filter[date]=2017-05-28)



The map from 28/05/2017, with sea-level pressure (white lines) and 500 hPa geopotential (see key for colours).



A Mentor 5: the EN B high-performance wing from Nova.







Stefan and Ulli fly a Bion M, size 37 m<sup>2</sup>, all up weight 90-200 kg. The Bion is also available in L, 41.75 m<sup>2</sup>, all up weight, 120-225 kg.

NOVA BION 2

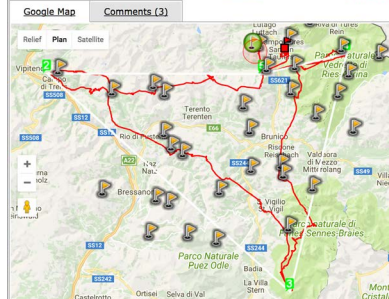
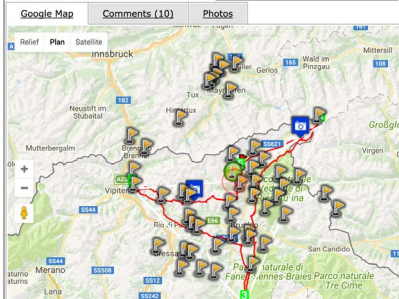
# 168 KM ON A TANDEM

The Bi Bion 2, which came out in 2016, is apparently making some of its owners very happy. Nova told us about two 137 km and 168 km triangles.



Pilot: Stefan Lauth Date: 22/06/2017		[ Paraglider ]	
Takeoff	Speikboden - IT 10:43:17	Nova BION2 - M [EN_B]	
Landing	Speikboden - IT [-3.6] 18:34:33		
Flight Info		7:51:16	
Duration	7:51:16	Max vario	7.7 m/sec
Min vario	-4.7 m/sec	Max alt (ASL)(GPS)	3986 m
Min alt (ASL)(GPS)	1024 m	XC Distance	167.9 km (21.4 km/h)
Takeoff alt (ASL)(GPS)	2382 m	XC score	335.80
Altitude gain(GPS)	1624 m	XC score type	FAI Triangle
Max speed	62.2 km/h	Show Optimization Details	
Mean speed	35.1 km/h		

Pilot: Stefan Lauth Date: 19/06/2017		[ Paraglider ]	
Takeoff	Speikboden - IT 12:25:02	Nova BION2 - M [EN_B]	
Landing	Ahornach (Acereto) - IT 20:21:54		
Flight Info		7:56:51	
Duration	7:56:51	Max vario	4.5 m/sec
Min vario	-4.9 m/sec	Max alt (ASL)(GPS)	3914 m
Min alt (ASL)(GPS)	923 m	XC Distance	137.3 km (17.3 km/h)
Takeoff alt (ASL)(GPS)	2387 m	XC score	274.84
Altitude gain(GPS)	1557 m	XC score type	FAI Triangle
Max speed	62.7 km/h	Show Optimization Details	
Mean speed	33.0 km/h		



The couple, Stefan and Ulli Lauth, regularly fly tandem, alternately sharing the navigation and steering.

On the 19th of June they did a 137 km triangle in the Dolomites, four days later they followed it up with one of 168 km.

They showed, once again, that a leisure tandem, simple and obviously EN B, is amply sufficient for going XC just like the solos.

137 km Triangle FAI: [www.dhv-xc.de/xc/modules/leonardo/index.php?name=leonardo&op=show\\_flight&flightID=884036](http://www.dhv-xc.de/xc/modules/leonardo/index.php?name=leonardo&op=show_flight&flightID=884036)  
 168 km Triangle FAI: [www.dhv-xc.de/xc/modules/leonardo/index.php?name=leonardo&op=show\\_flight&flightID=885478](http://www.dhv-xc.de/xc/modules/leonardo/index.php?name=leonardo&op=show_flight&flightID=885478)





# DELTA 3

Fall In Love... Again.

The new DELTA 3 is infused with ZENO and ENZO technology. In keeping with OZONE's True Performance philosophy, the DELTA 3 is solid and dependable in accelerated flight, agile and confidence-inspiring in active air, and just as accessible as its predecessors, the DELTA 1 and 2. It delivers class-topping performance with improved top speed and glide and handling that is simultaneously compact and, we must say, rather elegant.

[WWW.FLYOZONE.COM](http://WWW.FLYOZONE.COM)



OZONE's Instagram feed is full of great stories from team pilots and stunning images from their adventures. Follow along and get a daily dose of flying inspiration!  
[instagram.com/ozoneparagliders](https://www.instagram.com/ozoneparagliders)



photo: Jake Dodge pilot: Jason White



# FLYBOARD AIR







Photo: Franky Zapata

## FRANKY ZAPATA AND HIS FLYBOARD AIR HE'S GOING UP MORE AND MORE...

**W**e've already introduced Franky Zapata from Marseille: in 2011 he invented the Flyboard, this water-propelled board linked to a jet ski that you see everywhere now. In April 2016, he launched the Flyboard Air, a board weighing about 20 kg equipped with six little jet engines (four under the board, two on the sides). According to Frank, steering is done by a mix of computer control of the thrust and weight shift by the pilot. The Flyboard Air can reach a top speed of 160 km/h and a maximum height of 3000 m. Franky Zapata dreams of one day going up into the clouds.


Up until now, his flights have been done only over water, especially at Marseille and not very high. During the Breitling Air Show at Sion in Switzerland, from the 15th to the 17th of September 2017, Franky will fly above dry land for the first time.

<https://breitlingsionairshow.com/>







P-Series 

# BI SKIN 2 P

*Double delight*

The first single-surface lightweight tandem (EN-B 3.3 kg) designed so that the pilot and passenger can undertake hike & fly and vol-biv adventures together.





# CLIMBING IN A CAULDRON



© DikYaqua - stock.adobe.com





Sometimes, air goes up without any explanation...

*Whether by paraglider or paramotor: sometimes, we climb in unexpected thermals. This is sometimes because, contrary to widely held belief, the birth of thermals doesn't always obey the model of thermal sources on the ground found in our beginner's manuals.*

**O**ver twenty years ago, Hubert Aupetit started to promote the cauldron model: we all fly in a pot of boiling water! He doesn't use this image just to better understand unexpected thermals encountered in the plain as in the mountains, but also, overdevelopment of storms, which is often very random.

We all learnt that thermals are born on the ground, when the air is heated more in one place than in another. According to the laws of thermodynamics, the bubble starts to rise, especially above zones on the ground which have a strong thermic contrast.





Often, the source of the development on the ground is identifiable. But not always...  
Photo: Jérôme Maupoint

The same observation is true for storms...

That's very true, but it isn't the whole truth. Sometimes, you can't associate a thermal with a clearly identified source.

Of course, bubbles can wander about erratically on the ground, straying from their formation zone and meeting a small feature which triggers them later on. Here, it's very difficult for the pilot to identify the source of the thermal.

But the 'cauldron' model explained by Huber Aupetit goes further. He explained that often, the vertical movements aren't caused by a local source at all.

Sometimes, we encounter thermals above damp ground that shouldn't trigger them. Or where there is stronger wind and despite the wind not leaving time for a classic bubble to form, there are thermals.





Artistic representation of the Cunimbs at Manilla by Christophe Champetier: ten years ago during the World Championships, two storm cells joined together and trapped several pilots.

Hubert therefore suggested looking further afield, and widening the search: the atmosphere is compared to an immense cauldron, with vertical movements provoked by heating the bottom of the pan, and the horizontal movements which compensate.

According to Hubert, we fly in a boiling cauldron.

And yes, there are reasons that the bubbles which rise, do so mainly above certain points which have a larger contrast at the bottom of the pan.

But there are also places, where the bubbles rise because the circulation on a bigger scale forces them to. The trajectory of these bubbles can't be traced back to an identifiable source.

This doesn't just explain the 'phantom' thermals that we sometimes meet in the air, but even more the storms which sometimes form in unexpected places.

Cumulonimbuses form because they participate in the general circulation in the pan. The fluid which has heated low down needs to rise to compensate for the depression higher up, and that can happen anywhere.

Obviously one of the best recipes for climbing will always be finding the source on the ground...





DEALERS  
WANTED

# SWIFT RACE HARNESS

A true masterpiece of  
mechanics and aerodynamic design



- Fully certified EN up to 120kg
- 17 cm foam protector + Lexan plate
- Ball Bearing pulleys with adjustable position – unique APCO feature
- 2 reserve compartments
- Automatic Skirt closing after take-off



Protection



Speed System  
Adjustment



Aerodynamics

Cumulonimbuses are certainly the most visible proof of this cauldron theory: often a second cell forms in places where we don't expect them to.

Also, the movement of Cumulonimbuses often seems very incoherent, for example, against the wind direction...

Acceptance of this theory certainly doesn't help pilots find thermals any better, and they are best to continue to look for potential sources on the ground. But they could enjoy these phantom thermals more, which they sometimes encounter in the air, and they would have greater distrust for the storm cells which form behind their backs, whilst they carefully watch the cumimb' just in front, above the mountain... ✂



APCO AVIATION

WWW.APCOAVIATION.COM

At the leading edge of flying since 1974





# TO THE SEA!

In the Eastern Pyrenees, flying from the site at Mauroux to the sea is many pilots' dream, but rarely possible. It has been done once by Didier Exiga, then in June 2017 by our colleague Estéban Bourrouffiès and Simon Mettetal.

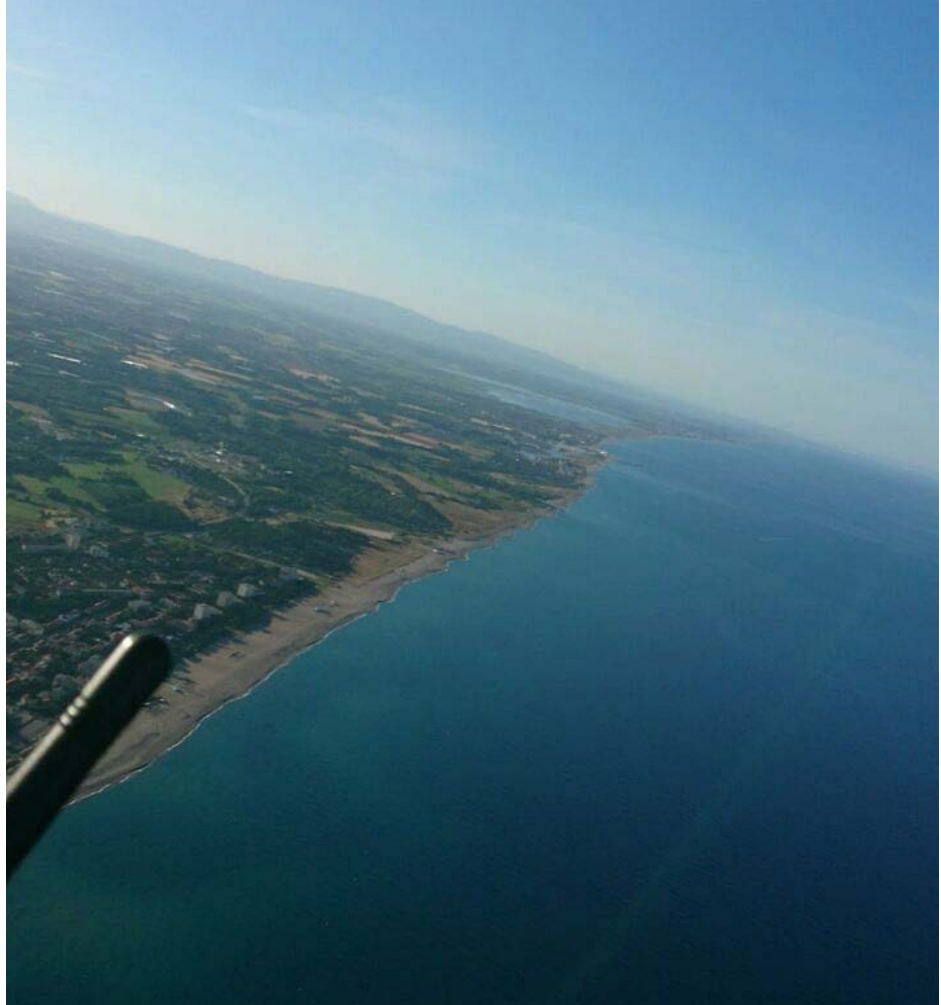
Yet lots of pilots have tried it and failed. The key to their success this time: Esteban and Simon didn't follow the normal route, sticking to the relief, but ventured temporarily into the plain, where they found thermals despite it being late. Or, in fact, because it was late: as a general rule, it's the sea breeze from the South East which blocks those seeking the sea.

At the end of that afternoon, it had already died down, leaving room for a light north-west wind, and the start of unexpected thermals in the plain.

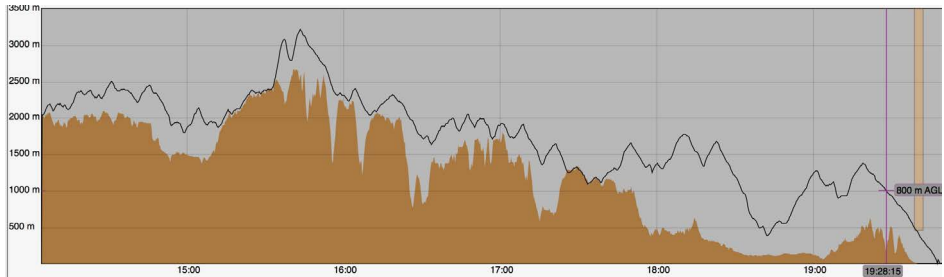
It was a reminder once again, that far from well known 'thermal motorways' you can find happiness...

In any case, the maps listing thermals suffer from a serious flaw, see the next page....

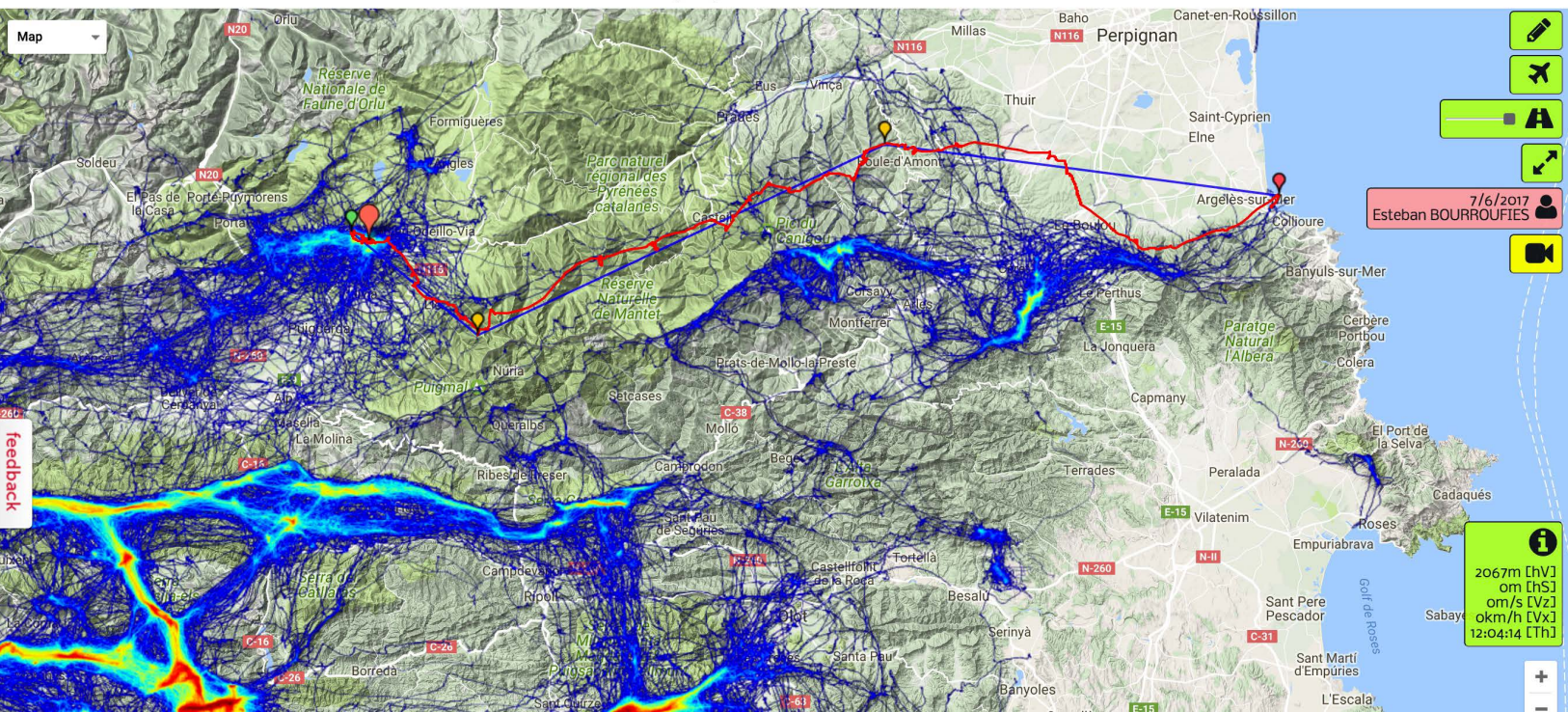
Clearly, you can find happiness far from the thermic motorways (coloured areas and blue lines). Unfortunately, having skimmed airspace, this flight wasn't validated.



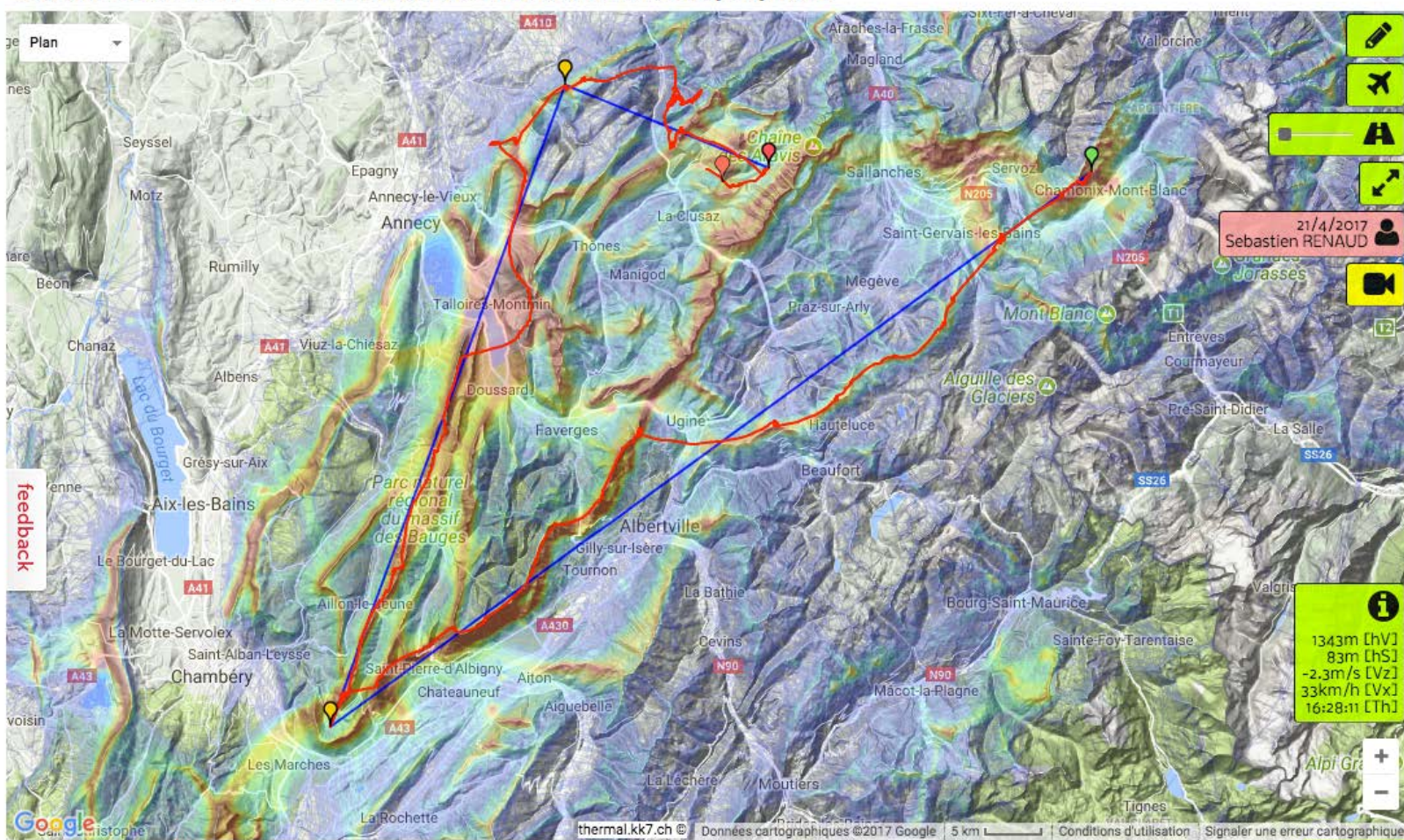
The Roussillon Plain: rarely reached by air.



## C.F.D. 2016-2017 : LE VOL DE ESTEBAN BOURROUFIES DU 07/06/2017







'Typical' thermal autoroutes can be thus identified. But others are missing...

## FINDING THE SOURCE

*More and more websites are including thermal maps with 'hotspots' and 'XC motorways'.*

When a pilot is planning an XC he can, of course, learn from other pilot's flights by studying their route on servers such as CFD (Coupe Fédéral de Distance, the French XC league), XContest, DHV-XC... And deduce the best places for 'house' thermals. Projects such as <https://thermal.kk7.ch/> analyse in a detailed manner all declared flights and devise a thermal map.

These maps can be superimposed onto French CFD maps for example. But this

system suffers a big problem. Firstly, it only takes into account declared flights. Most pilots take off and follow the same route as the others, but there's nothing to say that there aren't great thermals not far away, in other places which haven't been sufficiently explored.

Secondly, the models don't take into account enough the drift that thermals are subject to as a function of the meteo wind: when the wind blows in a different direction, the bubbles drift differently. On the other hand, if they are very strong, they can also pierce the wind and form a stationary column which doesn't drift.



On the site TherMiXC, you don't just find thermals noted by the KK7 algorithms, but also calculations carried out by the project Thermap. It's a model which calculates the probability of development of thermals, as a function of the topography and the season, for a given location.

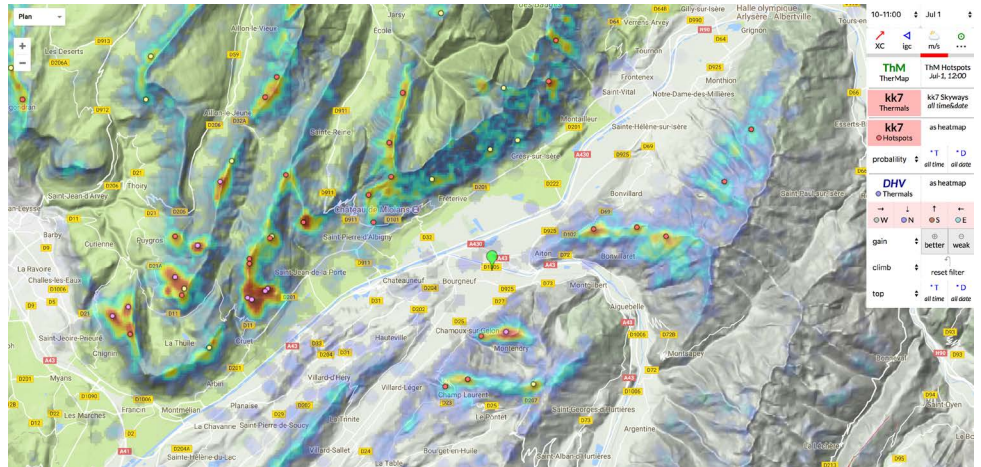
The two systems together already allow better identification of thermal sources and take into account the winds on the day while functioning.

**FINDING THE SOURCES**

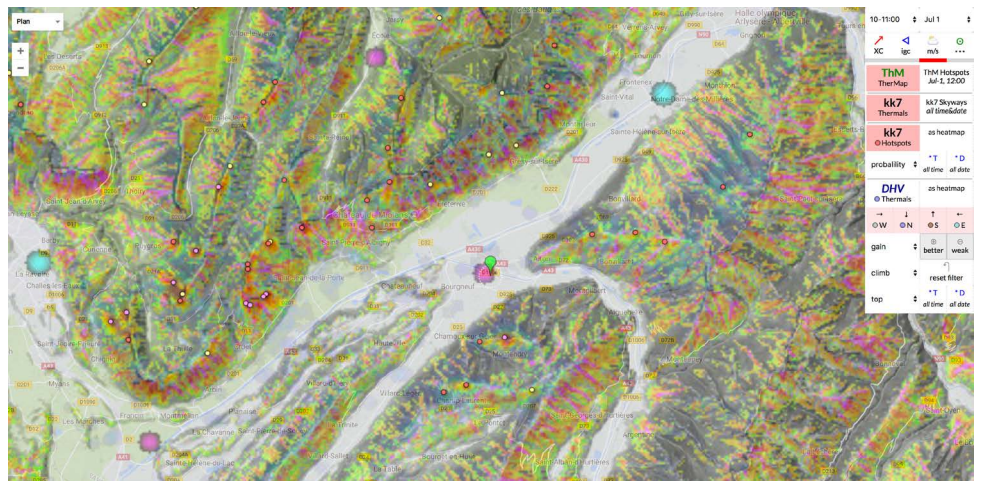
In the future, that could be taken even further: Stefan Ungemach, who developed the flying notebook "Parafightbook", works with flying instrument designer Skytraxx on algorithms which retrace the thermals encountered by thousands of pilots who have declared their flights, down to the ground as a function of the day's conditions. Sooner or later, we'll find on the Skytraxx screens, not just the thermal Hotspots, but also, and more importantly, their probable source on the ground.

It's a complicated task, because the algorithms must distinguish, for example two distinct thermal sources which join together in one big thermal.

The initiative is promising: very clear identification of the sources on the ground will let us plan very precisely the best route as a function of the conditions on the day: to know where most thermals come from in this area, and to look above, taking into account the probable drift with the wind on the day. To be continued...



On Thermix, the thermals noted by KK7...



...and those calculated by Thermap.



**SKYMAN**

Live your adventure!

Ultra-light equipment for adventurers,  
XC and tandem pilots.



*The freedom of lightness!*



String 350g



Cocone X-Alps 2,4 kg



Front container 230g



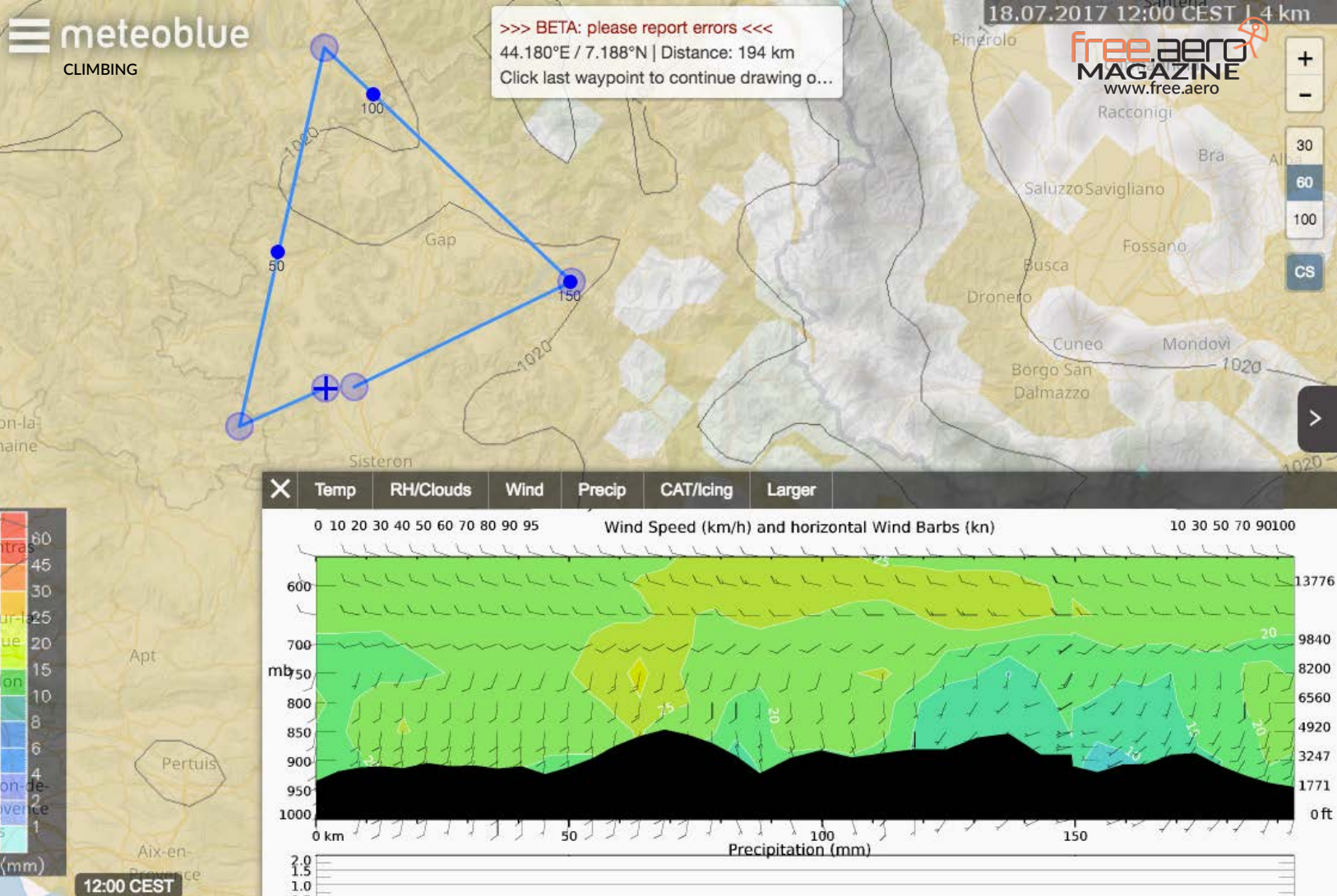
UltraCross 100  
975g



**www.skyman.aero**

CrossAlps EN/LTF C  
4,0 kg (Size M)





# A VERY USEFUL TOOL CROSS SECTION UNLEASHED

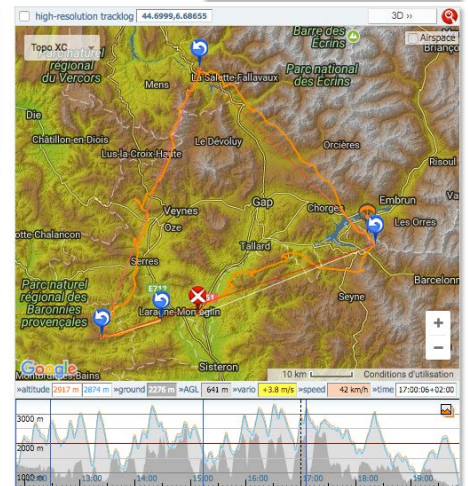
*Whether for a trip on a paramotor or an XC on a paraglider: the Cross Section tool by Météoblue has become totally versatile.*

In our last 'Weather' article in 2015, we introduced a new weather forecasting tool which is very practical and freely available from the Météoblue forecasters. Cross Section lets you know, for example, along a 72 km north south or east west axes, the winds expected in different locations. Now the tool has radically evolved: you can now freely draw distances, even

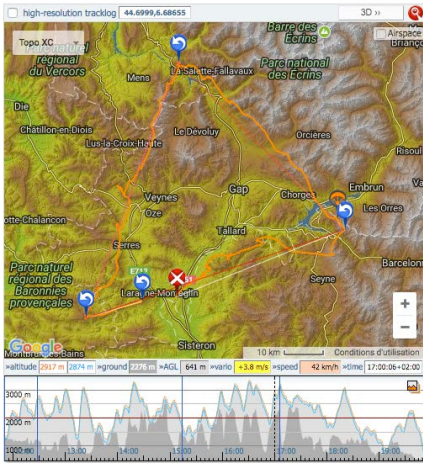
triangles, and obtain the conditions that you might encounter along this trajectory. The resolution of the forecast model and the topographical base is 4 km in Europe (and 10 elsewhere in the world); so there are even very localised phenomenon, near Lake Lemman for example. You can display two days in advance at this resolution, then a day further ahead based on a model with a 12 km grid.

An example, for those who want to relive Karlis's flight.

pilot :	Karlis Jaunpetrovics LV
date :	21.04.2017 11:50 UTC+02:00
launch :	Chabre FR
route :	193.22 km 270.51 p.
glider :	Diva
airtime :	8:03 h 24.01 km/h
<a href="#">IGC file</a> <a href="#">Google Earth</a>	
<a href="#">Flight</a> <a href="#">Route</a> <a href="#">Start</a> <a href="#">Land</a>	
airtime :	8:03:04 h
max. altitude :	3374 m
max. alt. gain :	2033 m
max. climb :	8.3 m/s
max. sink :	6.0 m/s
tracklog length :	322.689 km
free distance :	71.14 km / 193.51 km





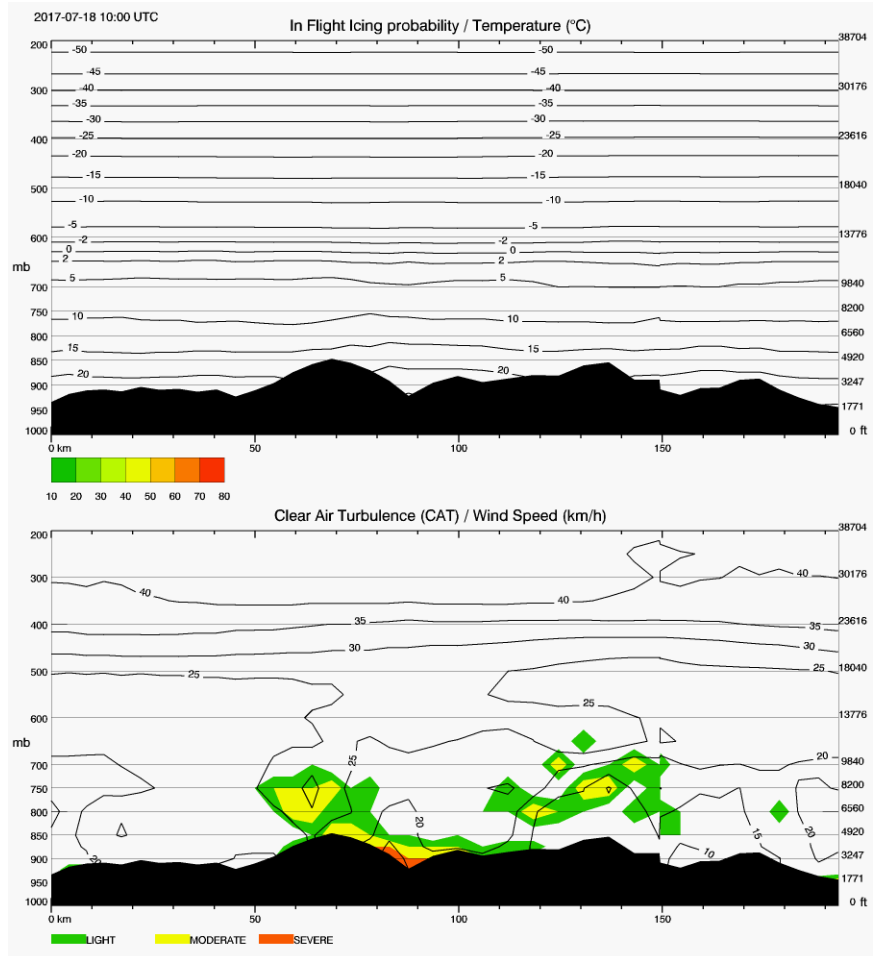
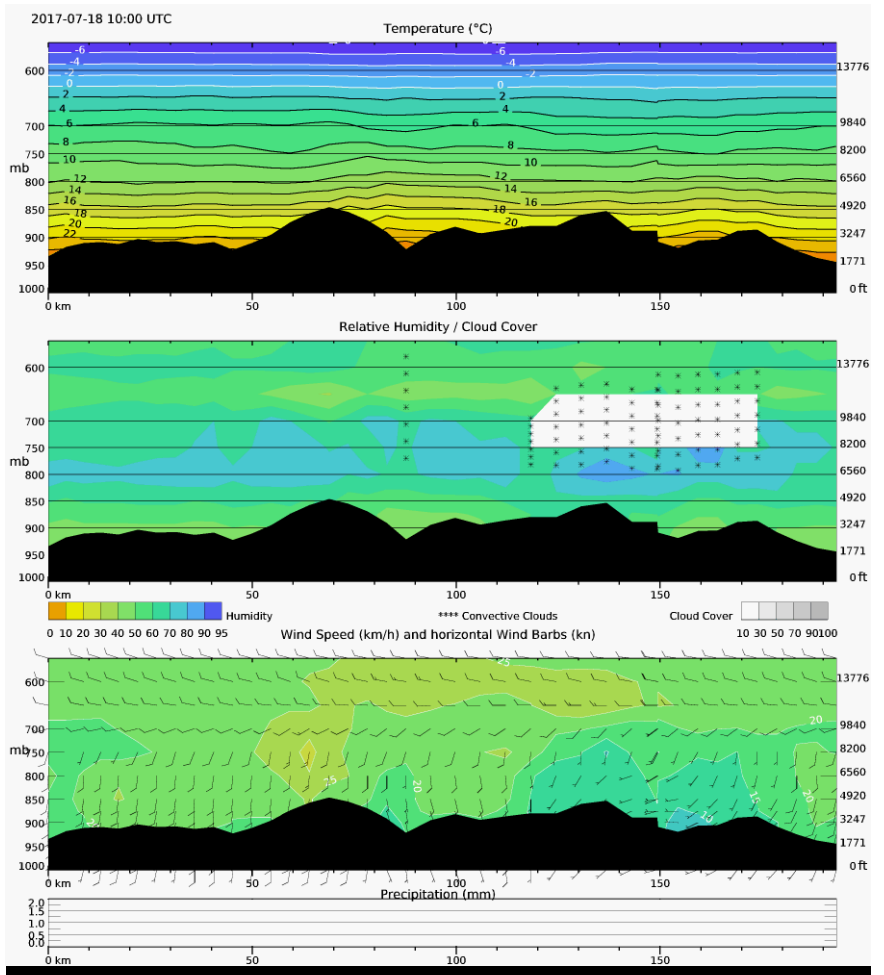


Still for the same triangle, the full report is for a single time. Obviously you need to play with the time adjustment to get the data for the approximate time you'll be there. The small stars in the clouds represent the convection clouds.

For us, high up, it's the layer up to 700 hPa which is very interesting (about 3000m), but the forecast concerns the whole atmosphere. The risk of icing concerns us less often, except under certain conditions on a paramotor. On the other hand, Clear Air Turbulence (the forecast of turbulence not associated with clouds) is really interesting.

The Cross Section function is very recent and was inaugurated in June. Don't hesitate to pass on your observations and experiences to our editorial team. We'll do a little summary at the end of the season. 🧑‍✈️

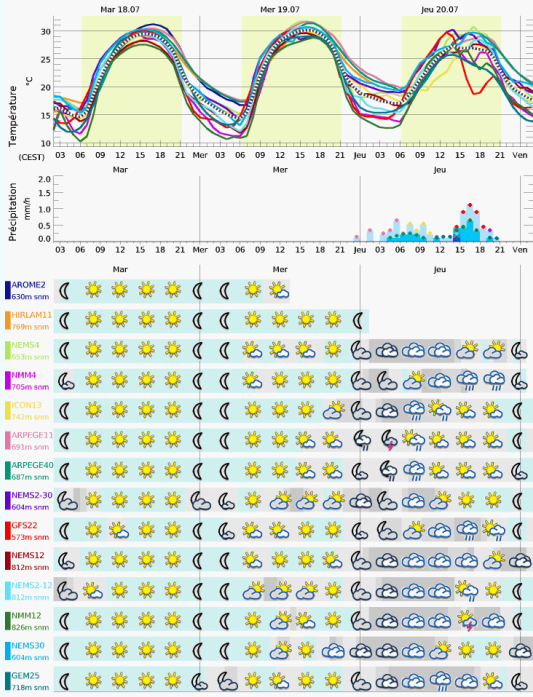
[contact@free.aero](mailto:contact@free.aero)





### METEOBLUE

Laragne-Montéglin 44.32°N / 5.82°E (577m snm) meteoblue



One of the big strengths (amongst others) of MétéoBlue: the 'Multimodel' views several models so that you can evaluate the quality of the forecasts.

### METEOBLUE POINT PLUS

Cross Section is one of the numerous services and forecasts partially reserved for those who are subscribed to Point Plus at Météoblue. You can display free of charge a cross section at the time of consultation, but for information about the future, you need to subscribe.

Paid monthly at a unit rate, the subscription is pretty expensive at 10 €. The annual price on the other hand is 50 €, so the monthly price falls to 4.16 € per month, which seems perfectly correct to us for the unique weather forecasting service offered by Météoblue for anywhere on the planet.

[www.meteoblue.com/fr/pointplus#pricing](http://www.meteoblue.com/fr/pointplus#pricing)

### Reminder

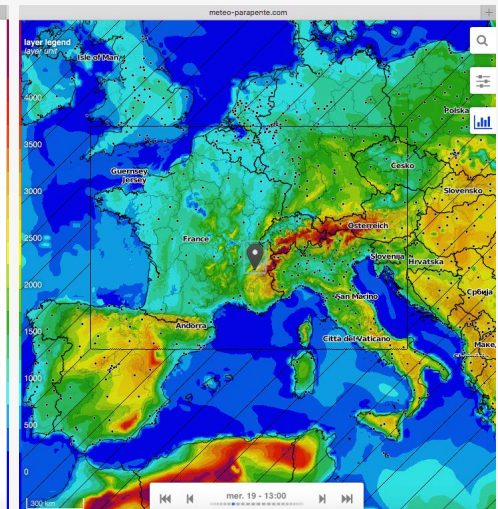
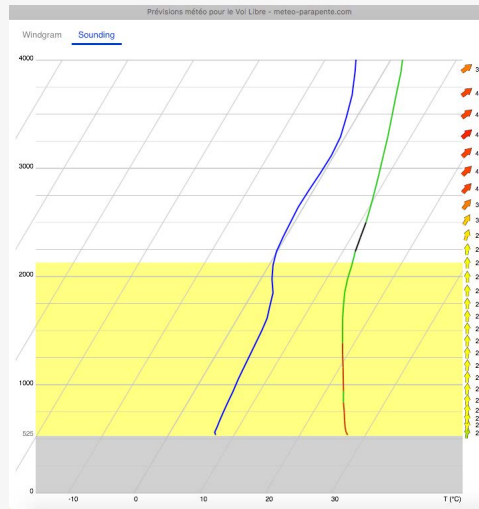
In Europe, especially in the Pyrenes and the Alps, a mix of two services of weather forecasting, plus observation in real time from weather stations and information from airports, lets us correctly forecast a flying day in the short term.

These are Météoblue ([www.meteoblue.com](http://www.meteoblue.com)) and Meteo Parapente ([www.meteo-parapente.fr](http://www.meteo-parapente.fr)). If Météoblue offers a wider variety of information, Meteo Parapente offers, with its unique Emagramme, an excellent tool for judging thermal quality. More details in our special Weather article, which is, like all our magazines, always available on line free.

[http://free.aero/en/contentsHTML/Weather\\_epure\\_150/?page=1](http://free.aero/en/contentsHTML/Weather_epure_150/?page=1)



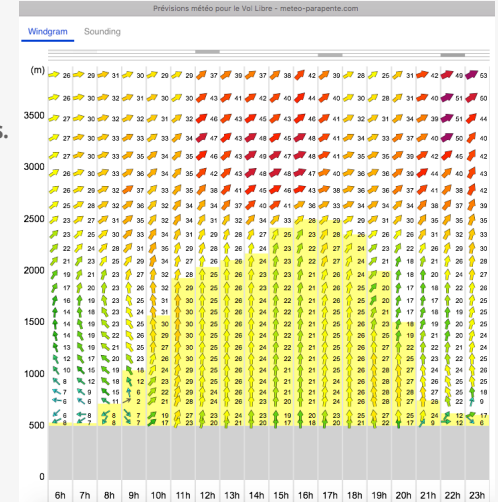
### METEO-PARAPENTE



Even other weather forecasting services recognise it.

Nicolas Baldeck of Meteo Parapente has developed a great format for emagrammes, specially adapted for paraglider pilots who aren't weather forecasting geeks.

Straightaway you can see the quality of thermals forecast. Price: from free to 24 €/yr.







A pretty bundle in a spiral. This dust devil is dangerous because it could pick the pilot up and throw him off the cliff.

# THE DUST DANCE

**M**arkus Gründhammer had a close shave: after thirty-five years of experience and thousands of flights, he had never experienced a similar situation to being hit by a dust devil just as he was about to take off from his site at the Kresselspitze, Tyrol, in south-west Austria. The dust devil spun the wing and turned it into a corkscrew. The combat lasted about ten seconds. Fortunately, Markus wasn't lifted up and was able to finish the dance

on the ground. The weather wasn't in any way typical for a dust devil: it was very hot and cloudy with a southerly wind and light Foehn effect with unstable air and gusts. The conditions which are normally conducive to a dust devil are: very little wind, often pure thermic conditions with no clouds, dry ground and air, and massive warming of the air when it touches the ground. The drier the ground, the more it can overheat, giving a higher frequency of dust devils in deserts.



*May the force  
be with you*



**syride**  
www.syride.com





### FORMATION OF A DUST DEVIL

When it meets an obstacle, a very strong little thermic bubble, kicks off and starts to rotate. Drawing in the air around it creates a pirouette effect: the rotation accelerates just like a dancer on ice bringing in her arms, drawing in air masses already circulating with a larger radius. The preservation of angular momentum increases the speed of the rotation. The diameter can be from less than a metre up to tens of metres and the height can be very variable. The average speed of the wind in a dust devil is around 50 km/h, but can reach more than 100 km/h.

If a dust devil approaches a pilot on take-off, the best thing to do is lie down on the wing to stop it inflating.

But a dust devil is only visible if there is enough dust, so it can also be transparent. The direction of rotation of a dust devil depends on the impulsion when the bubble kicks off. The air masses at play are too small to obey the Coriolis effect. There is no reason for it to turn more to the left than the right in the northern hemisphere. It's the same for thermals...



A dust devil clearly visible in the desert.

A tornado: you could call it a dust devil, but with, in addition, vertically accelerated movement due to condensation.



Illustration: Oliver Henze - stock.adobe.com





Even tornados, which often turn anticlockwise in the northern hemisphere, can sometimes turn the other way. Their rotation might not be a direct result of the Coriolis effect, but by the meteorological winds, which effectively are governed by this force, and which, because of it, are subjected to rotation to the right at altitude. One big difference between a tornado

and a dust devil: a tornado is much more powerful because it draws a large part of its strength from condensation in the cloud, absent in the case of a dust devil...

Global warming could, as a consequence, increase the frequency of dust devils, but there are no statistics, given the difficulty of counting them. ☹

## full range of freeflying & paramotor wings



[www.dudek.eu](http://www.dudek.eu)





THE 2 OR 3 CMS WHICH CHANGE A LOT...

TO GO UP, RELEASE THE HANDBRAKE...

...AND STEER WITH YOUR FEET!

*Many of us compare the performance figures for wings. But when steering by braking, we 'break' the performance of our wings too easily! An argument for slightly accelerated flight...*



# independence

● paragliding

Paragliding equipment since 1990



PARAGLIDERS



HARNESSES



RESCUE PARACHUTES



ACCESSORIES

*fly it your way*

[www.independence.aero](http://www.independence.aero)



Photo: Jérôme Maupoint

Each centimetre of brake travel on the accelerator corresponds to about 1 km/h of speed. But it isn't just the difference in speed which interests us, but also, and above all, piloting pitch directly.

**P**ilots all look for performance: when choosing a wing, each fraction of a point of glide ratio is important. Each kilometer/hour extra advertised by the manufacturer and measured by testers like *free.aero* magazine, raises the popularity of the wing, even for entry level ones.

Paradoxically, given this demand on the designers, we, as pilots, are much more lax in terms of steering. In fact, most of us, all fly with a bit too much brake. Hands at our ears or shoulders, that's a flap of nearly 10 cm of height which causes drag.

With that, up to 2 points of glide ratio are lost, it's a bit like driving with the handbrake permanently on.

Most pilots do that because they have learnt: 'that stabilises the wing', which isn't wrong. (Yet a wing which is slightly accelerated can also be very stable, thanks to the bigger differential between the wing tips and the centre when accelerated, amongst other things).

 @freeaeromag

[www.free.aero](http://www.free.aero)



There is also another reason for often keeping the brakes under tension: they also serve to manage the pitch of the wing. By being slightly braked, you can just as easily reduce the angle of attack by releasing the brake as increase it by braking more.

But another means exists for transitionally managing the angle of attack: the accelerator. This way is a lot more efficient. Because using the brakes is a roundabout way of controlling the pitch: the wing changes angle of attack as a reaction to the change of speed. With the accelerator, on the other hand, you control the pitch directly.

Firstly, it's best to properly adjust it so as to be able to use the two bars, as we saw in our last article on this subject. Then each time you've finished circling in your thermal, and when you have decided to move on, accelerate at least gently. Not just to go forward faster in the direction of the next thermal, but also, and especially, because a slight amount of acceleration with your feet of 2 to 3 cm, gives a margin in both senses: the angle of attack can be increased by releasing it and it can be reduced by pushing on it more.

Photo: Jérôme Maupoint



# ARCUS RS

FREE AGAIN...!

The ARCUS RS, with its particular features and stylish appearance, joins this successful low-end B-tradition. Innovative and redesigned, it departs from the well-worn paths of paraglider development and provides completely new impetus for our sport.

The unique new partition system known as RAST now has additional valves, and the ARCUS RS is an impressive example of how it operates!

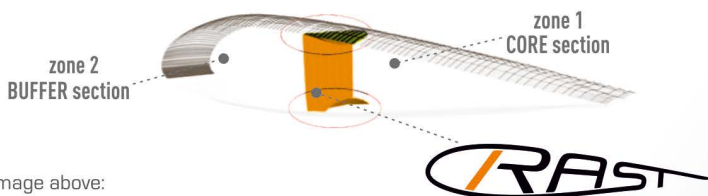


Image above:

The rear section acts like / forms the CORE section of RAST, that (almost) ever remains open.  
The front section acts like / forms the BUFFER section for controllable ventilation



SWING ARCUS RS | PERFORMANCE LTF/EN-B | [www.swing.de/arcus-rs-en.html](http://www.swing.de/arcus-rs-en.html)

MITO | DISCUS | ARCUS RS | SENSIS | NYOS | NEXUS | TWIN RS | TRINITY RS | APUS RS | MIRAGE RS





Piloting using the brakes:  
Not very efficient in terms  
of pure performance. On  
a tandem, you often can't  
control with your feet...

Another advantage: by modifying your trim, not only will your wing fly faster but it will become slightly more rigid in the sense of the wingspan. Some wings have their best glide ratio in this configuration. Crossing thermals that you don't use will be easier because your wing will cut through the air flow better. Once you have become used to using the accelerator for each transition, try to increase the amount you use and, in parallel, use the Cs to correct any eventual modifications to your direction.

We have already explained in detail how to manage the pitch with the accelerator when entering and exiting a thermal, here's a reminder:

Entering a thermal, accelerating more lets you penetrate the thermal better and compensate the nose-up movement as you enter. Once inside the thermal, you need to progressively stop all acceleration so that you can make best use of the thermal. Bonus: releasing the accelerator will release energy in the form of extra lift.

Coming out of the thermal, we often notice a surge of varying size, that most pilots stop with the brakes. But this isn't really necessary.

You can replace the damping with the brakes by releasing the accelerator if you have applied it for a few centimetres at the end of the last turn inside the thermal. To do this, increase the diameter of the last turn, coming out of the thermic airflow by finishing with an almost straight trajectory. Once in the zone of descending air (exiting the thermal) and when your wing surges, release the accelerator.


Once again, releasing the accelerator, will release energy and thus restore a bit of altitude. If the surge forwards is really strong, you can add a bit of brake or simply slow down the movement with a pull on the Cs. However, be careful, flying fast can obviously increase the risk of a collapse: at the beginning, use a small amount of travel of a few centimetres; that'll be enough for 'active piloting with your feet!' After learning the technique, increase the accelerator travel progressively. 



Photo: Sascha Burkhardt





Photo: Jason Whitehead

PORTFOLIO

BETWEEN THE CLOUDS

# A HEAVENLY SLALOM

*Sometimes, it isn't necessary to go very high to explore the ephemeral valleys between the cumulus...*

Jason Whitehead and Karen Skinner live and fly on the Costa Brava, in the North of Barcelona. Opposite the sea, they sometimes visit unusual countryside...





Photo: Jason Whitehead

It feels as if you are almost at the edge of the cumim' roaring with anger, or at the summit of a Congestus at 6000 m.

# PORTFOLIO

Karen and Jason live in Spain, on the south-eastern border of the Pyrenes. The photographer couple did a short aerial tour between Palamos and Parafrugell. At take-off, at about 8 o'clock in the morning, there was virtually no wind. Then above Palamos, from 300m, there was a southeast wind, maximum 15 km/h, and later, above Parafrugell, the wind turned to a weak northerly.

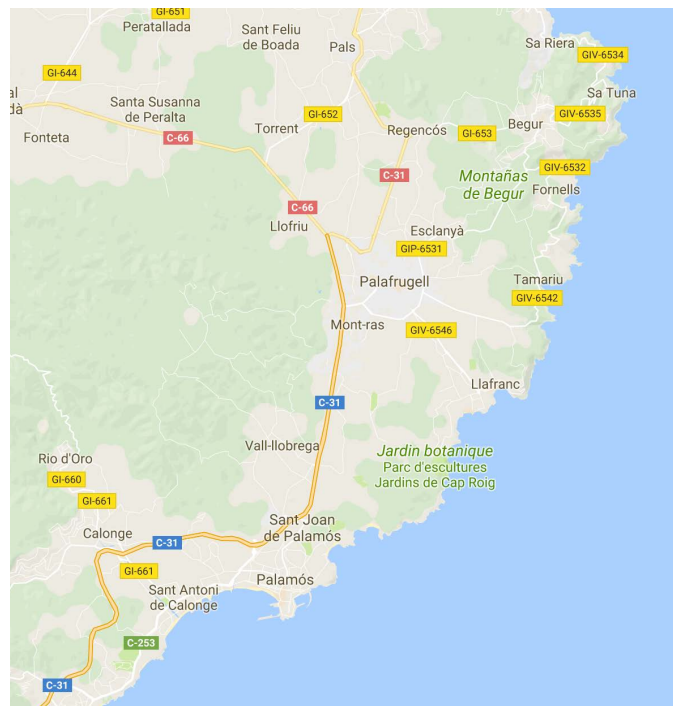


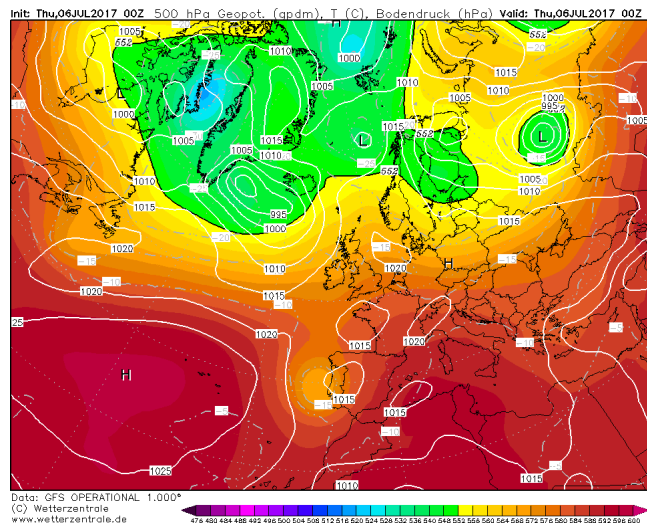




Photo: Jason Whitehead

Instead of a Congestus, there was just a layer of Cumulus from the ground up to 350 m. Above, a playground in relatively calm air... Despite looking chaotic, the air was almost turbulence free.

# PORTFOLIO



A lovely summers day, a local barometric col, from the humid air, with the sea breeze, before the north wind picked up.



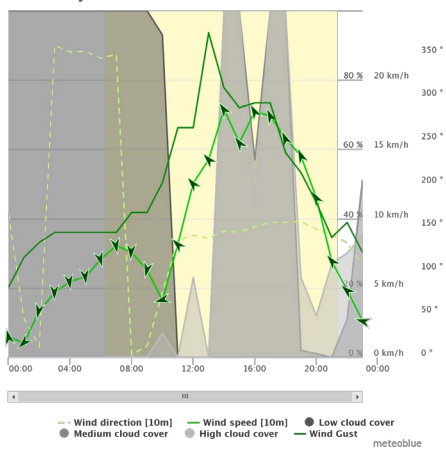


Photo: Karen Skinner

Here, you can see the ground some 300m beneath the pilot...

On the 6th of July 2017, Météoblue correctly forecast some not very nice low clouds, with a layer of high clouds above, and a northerly wind turning southerly.

## PORTFOLIO







WINNER FOR THE FIFTH TIME.

## XALPS 2017: CHRIGEL WINS AGAIN

*Once again Chrigel won the X-Alps. Amazing but true: his fifth victory in a row. But with less of a margin than the previous times...*

**H**owever, it didn't start well for Chrigel. An attack of the flu prevented him from taking part in the Prologue and so he couldn't win an extra Night Pass. In the end, Chrigel was able to be there for the start of the 'real' race, and quickly put the others behind him – even if it was with a little less margin. What is indisputable is that he always wins because he never makes a mistake.

He flies very, very well, also, and especially, in difficult or turbulent conditions.

In Switzerland when Chrigel flies with his friends in 'normal' conditions, he doesn't always end up first and if he does, the others are never far behind.







No matter what the conditions are, Chrigel flies well everywhere. Photo: Sebastian Marko



World of XC paragliding



*“In two years’ time, he’ll have to set off with a school wing or with shackles on his feet!”*

*The Live-Tracking options for the spectators...*

During the X-Alps, Chrigel adapted to every situation he came across in the air, and knew how to come out on top. And of course, what we had already noticed in previous races, remained valid, he always adopts the best strategy. Do you have to walk? Without hesitation he goes up to the right place, letting him fly as far as possible the following day.

Always going where he has to, waiting for the right moment, like an eagle ready to pounce on its prey. But we clearly saw this time, that his position was threatened much more than before, even while remaining the best.

Chrigel isn't a great fan of walking at night but, on the other hand, when it comes to going uphill, like here in the Cervin, it appears that he can perform very well. Photos: Harald Tauderer.



# Windsriders.fr

## Mountain&Flight

**Ethic and awesome**

Reversible Jackets,  
Lady, Hybrid, Thermik Light,  
Yéti, Nosleeve, Everest.

- Paragliding  
Down Jackets  
Fill Power 700 cuin  
- Flight Muffles

**BECOME  
A DEALER**





The work of the supporters, such as Tobias Dimmler, shown here bringing physical and moral support. And sometimes, even, having to accompany him for a few kilometres. Photos: Harald Tauderer

Nobody knows whether Gaspard Petiot could have snatched victory from him if he hadn't had his accident, but he had got off to a good start and was very close. And Benoit Outters arrived only two hours behind Chrigel. Certainly, if Benoît had got any closer Chrigel would have used his Night Pass more diligently on the last night instead of being invited to dinner by a paraglider pilot who owned a hotel and sleeping in a nice comfortable bed before starting the difficult ascent on foot from the beach to the take-off at Pelle, the last turn point and official end of the race.

But the others definitely improved their strategies, amongst other things, by analysing what Chrigel did in previous X-Alps races, as one competitor told us. Thus, they to get dangerously close... The next time, to see another athlete get there first, it perhaps won't even be necessary to oblige Chrigel to set off with a school wing or his feet tied together, as some spectators have suggested.

In two years' time, the race for first place could be even more breath-taking... 🧗







Chrigel Maurer (SUI1) during the 2017 Red Bull X-Alps at Lermoos in Austria, on the 5th of July. Photo : Harald Tauderer

SKYWALK X-ALPS 3 SIZE S

## CHRIGEL'S WINNING WING...

*According to Skywalk, the X-Alps 3 for 2017 was nothing other than a lightweight version of the Poison X-Alps from 2016, which itself was an EN D version of the X-Alps 2015, which was certified EN CCC...*

**R**ight up until the last few days before the race, Skywalk let very little out of the bag concerning the technical specifications of the X-Alps 3. Contrary to the 2015 version, according to the new X-Alps rule, it had to be EN D certified instead of EN CCC, which was still permitted in 2015. Finally, once victory was nearly in the bag, the company confirmed that the wing was, at least in size XS, almost identical to the Poison X-Alps that we tested in [free.aero](http://free.aero).

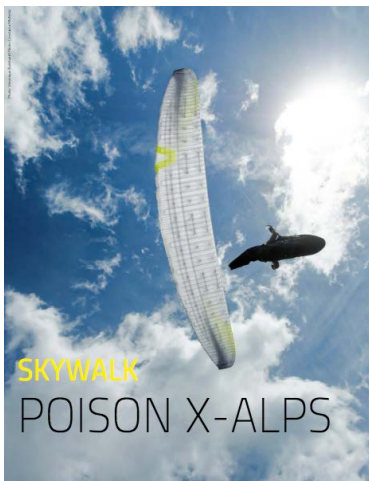


One undeniable difference: it is made totally from Skytex 27 and not from a mix of 27/32 like the serial Poison X-Alps (itself a 'general public' version of the Skywalk X-Alps 2015). In addition there are differences in the fabrication of the wing and its reinforcements to achieve the savings of 700 and 900 g depending on the size.

A direct comparison with Chrigel's size S winning wing is, in any case, not really possible. Even if the technical data for the XS is identical, the X-Alps 2017 S is 2m<sup>2</sup> smaller compared to the serial Poison X-Alps S. And as the test protocols from the EN D certification for Chrigel's X-Alps 2017 S in the German EAPR laboratory weren't published, we can't even compare it with our own observations. At worst, they should be identical, and at best, favourable to the X-Alps 2017, which is a lot lighter, therefore logically softer in the dive. We're really looking forward to testing an example of the X-Alps 2017!

If it turns out that the 2017 Skywalk X-Alps 3 is, in fact, just a lightweight version of the Skywalk Poison X-Alps, both models have got a great future: the 2016 Poison X-Alps will continue its career with a bit of a boost and the all new X-Alps 3 will make a great entry onto the market when it becomes available at the beginning of August. Because there will be a market for both wings: the Poison X-Alps for those who want a top level wing which is a bit more robust, even if it is a bit heavier, and an X-Alps 3 for fans of hike&fly who also want great XC performance. And the cherry on the cake: the lightweight wing could, theoretically, be a bit better behaved... 🍷

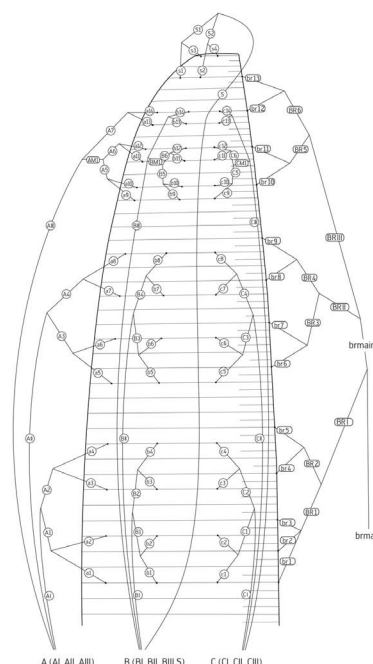
For a reminder, read for free our test of the Poison X-Alps in the last issue: <http://www.free.aero/en/contentsHTML/compet-e/?page=48>



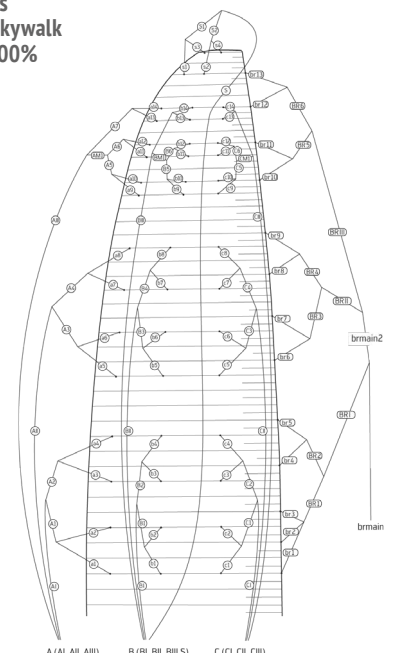
POISON X-ALPS TECHNICAL DATA			
Manufacturer: skywalk			
Web : <a href="https://skywalk.info/project/poison-x-alps/">https://skywalk.info/project/poison-x-alps/</a>			
DATE	2016		
SIZE	XS	S	M
CELLS	80	80	80
FLAT SURFACE AREA [m <sup>2</sup> ]	21.50	23	24.40
FLAT WINGSPAN [m]	12.27	12.69	13.07
FLAT ASPECT RATIO	6.99	6.99	6.99
ALL UP WEIGHT [kg]	65-90	85-105	95-115
WEIGHT OF THE WING [kg]	4	4.2	4.4
CERTIFICATION	D	D	D
Extrados : Porcher Skytex 32 Intrados : Porcher Skytex 27 Cloisons : Porcher Skytex 32/27 g hard			
PRICE [€]	4 700	4 700	4 700



SKYWALK X-ALPS 3 TECHNICAL DATA			
Manufacturer: SKYWALK			
Web : <a href="https://skywalk.info/project/x-alps/">https://skywalk.info/project/x-alps/</a>			
DATE	2017		
SIZE	XXS	XS	S
CELLS	80	80	80
FLAT SURFACE AREA [m <sup>2</sup> ]	20.50	21.50	22.40
FLAT WINGSPAN [m]	11.98	12.27	12.57
FLAT ASPECT RATIO	6.99	6.99	6.99
ALL UP WEIGHT [kg]	65-85	70-90	80-95
WEIGHT OF THE WING [kg]	3.3	3.4	3.5
CERTIFICATION	EN D	EN D	EN D
Extrados : Porcher Skytex 27 Intrados : Porcher Skytex 27 Cloisons : Porcher Skytex 27 g hard			
PRICE [€]	NC	NC	NC



The line plans supplied by Skywalk seem to be 100% identical.





# PAUL GUSCHLBAUR 3rd



One of the X-Alps veterans: 3rd in 2011, 9th in 2013, 3rd in 2015. He flew the Skywalk X-Alps 3 S. In 2017 he finished 3rd, having walked 635 km and flown 1803 km. Photos: Harald Tauderer



Paul Guschlbaur, Austria  
Test Pilot  
Date of birth: 25/12/1983  
[www.paulguschlbauer.at](http://www.paulguschlbauer.at)  
Photo: Honza Zak



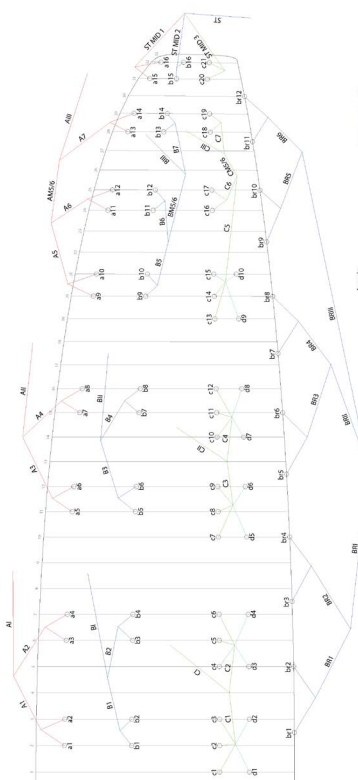
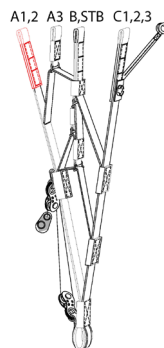
# ANOTHER RISING STAR



Another rising star in the 2017 X-Alps: the Czech, Stanislav Mayer, on his GIN Gto2. It's a three liner which, when it came out, was placed between the Carrera and the Boomerang 10. Stanislav took part in the 2013 X-Alps as a supporter, then as a competitor in the 2015 X-Alps, finishing in 12th place. In 2017, he finished 10th, having walked 572 km and flown 1683 km. Photos: Vitek Ludvik



Stanislav Mayer, Czech Republic  
IT engineer  
Date of birth: 21/8/1989  
[www.stanislavmayer.com](http://www.stanislavmayer.com)  
Photo: Vitek Ludvik





# A REVELATION: GASPARD PETIOT



Gaspard Petiot was a revelation in the 2017 X-Alps: after finishing in fifth place in 2015. He was just behind Chrigel in 2017 for four days, up until his accident, which left him with a fractured wrist. It was whilst flaring to land that a gust threw him against a wall. He was flying an Ozone Z-Alps, a real two liner. Gaspard was very happy with this choice and would, without hesitation, fly it again. When we asked him if there was a possible link between the two liner and his accident, his reply was a very clear 'no'. 'I find the Z-Alps generally as easy as a three liner!', he affirmed. Gaspard is a very experienced pilot: more than 1400 hours flying since 2006 and more than 15,000 km XC flying in mountains. Photo: Sebastian Marko.



**WORLD RECORD  
WITH EN B GLIDER**

**AIRCROSS**

**U**  
*Cruise*



LTF/EN B

The **NEW** Benchmark  
of its category!

1st of november 2016 Konrad Görg - CEO of AirCross - flew **446km XC** with the U Cruise in Brazil:

"... the stability of the glider, the extraordinary glide and especially its high speed, allowing me to enter thermals even with headwind, helped me to achieve this record flight. A feeling beyond words after flying for almost 11 hours!"

[www.aircross.eu](http://www.aircross.eu)

**4-Years  
insurance\***  
[WWW.AIRCROSS.EU](http://WWW.AIRCROSS.EU)  
Included when purchasing  
a glider from AirCross

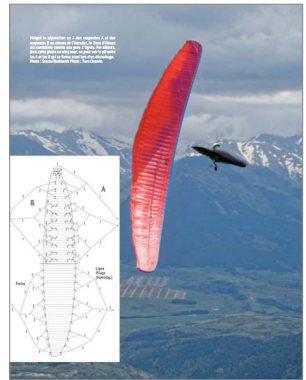




Photo: Honza Zak



Gaspard Petiot, France  
Mechanical engineering  
teacher and mountain guide.  
Date of birth: 27/5/1981  
[www.lesfrespetiot.fr](http://www.lesfrespetiot.fr)  
Photo: Honza Zak



For more information  
about the Zeno/Z-Alps  
and the 2 liners vs 3  
liners discussion see our  
[previous issue](#).



# The Original

## Legendary Fit – Exceptional Comfort

The COMFORTPACK has been copied many times – not least because of its distinctive zip. This runs around the top edge and makes top-loading possible. Now the third generation of the popular paraglider rucksack comes to light. Slender and compact as before, but with an even more ergonomic mesh back section and the current colour scheme:

COMFORTPACK 3 – your new template is here.

[www.advance.ch/comfortpack](http://www.advance.ch/comfortpack)

# ADVANCE COMFORTPACK<sup>3</sup>





The astonishing rise of Benoit Outters. In Austria getting ready for the X-Alps, the day before the Prologue. Photos : Vitek Ludvik

BENOIT OUTTERS, THE SURPRISE

# THE OUTTERSIDER AT THE TOP...

*The 27 year old, who only started paragliding four years ago, and with a little known wing, created a surprise by finishing second.*

**D**uring the 2015 X-Alps, Benoit was Antoine Girard's supporter. In 2017, he took part himself, with barely four years of paragliding experience. From the first year he flew, he was already doing distances of around 100 km. But this Supair employee and mountain guide is made of strong stuff: he has regularly been on the podiums at Ultratrail and Triathlon races. During the

2017 X-Alps, out of a total of 2172 km, he walked 772 km and flew 1400 km. Benoit joined Supair thanks to Pierre Alloix, who created the brand, and took him on when he was still a young pilot, 'but he already flew very, very well!' said Pierre. 'When Supair asked me to find a test pilot to help me in the south, I didn't hesitate for a second; it was Benoit that I wanted! He's a great guy, simple, accessible, helpful...'



Distance hiking  
772.4 km  
Distance flying  
1400.1 km  
Max altitude  
3864 m.

Benoit Outters, France  
Fireman and Supair test pilot  
Date of birth: 7/6/1990  
<https://www.facebook.com/benoit.outters>





Photo: Vitek Ludevik

Pierre encouraged Benoit to sign up for the X-Alps. 'Benoit didn't think that his candidature would be accepted, as he hadn't been flying long enough and wasn't well known. With a second place in the 2016 Air Tour and a few letters of recommendation, he was in!'

When his candidature was accepted, Supair decided to create a wing for the X-Alps, derived from the EN C Taska. We had to work very fast to develop Benoit's wing in time. We decided to base it on the Taska by increasing the aspect ratio from 6.3 to 7. The structure was also reviewed and made lighter to economise every gramme possible.'

Supporter Damien Lacaze (left) and Benoit Outters (right) on the 29th of June, after winning third place in the Prologue and thus gaining an extra Night Pass, which he used during the last night, still on Chigel's tail.

Photo: Harald Tauderer



**PURE PRECISION**

PG • PPG • HARNESSES • BAGS • CLOTHING • ACCESSORIES

**SHY**  
PARAGLIDERS

[www.sky-cz.com](http://www.sky-cz.com)





Benoit Outters on his Wild, which clearly reveals its internal structure in this beautiful photo by Niolas Assael. It's a three liner, derived from the Supair Taska, with a higher aspect ratio and an EN D instead of an EN C.






Pierre-Yves Alloix,  
Supair designer.



It's a three liner. Following research by free.aero on the development of two liners (Z-Alps) in hike&fly competitions, we asked Pierre-Yves Alloix if the team had thought of this type of wing.

Pierre-Yves Alloix:  
"Benoit didn't want a two liner. A two liner glides better and flies faster, but presents quite a lot of problems for this type of race; it's heavier (more leading edge rods), doesn't inflate as well, doesn't tolerate low speeds as well and is more sensitive to damage, because one line broken on a three liner is less problematic than on a two liner".

Which is just as well as the current Taska is a three liner. Therefore it was natural that Supair preferred to make a version for the X-Alps derived from this model rather than make a completely new wing... 

### WILD TECHNICAL DATA

Manufacturer: SUPAIR		
Web: <a href="http://www.supair.com/en/produit/wild/">http://www.supair.com/en/produit/wild/</a>		
DATE	2017	
SIZE	21	23
CELLS	67	67
FLAT SURFACE AREA [m²]	21	23.5
FLAT WINGSPAN [m]	12.12	12.83
FLAT ASPECT RATIO	7	7
ALL UP WEIGHT [kg]	72-86	80-95
WEIGHT OF THE WING [kg]	3.15	3.4
CERTIFICATION	EN 926 – 1 et 2 & LTF 91/09 – Classe D	

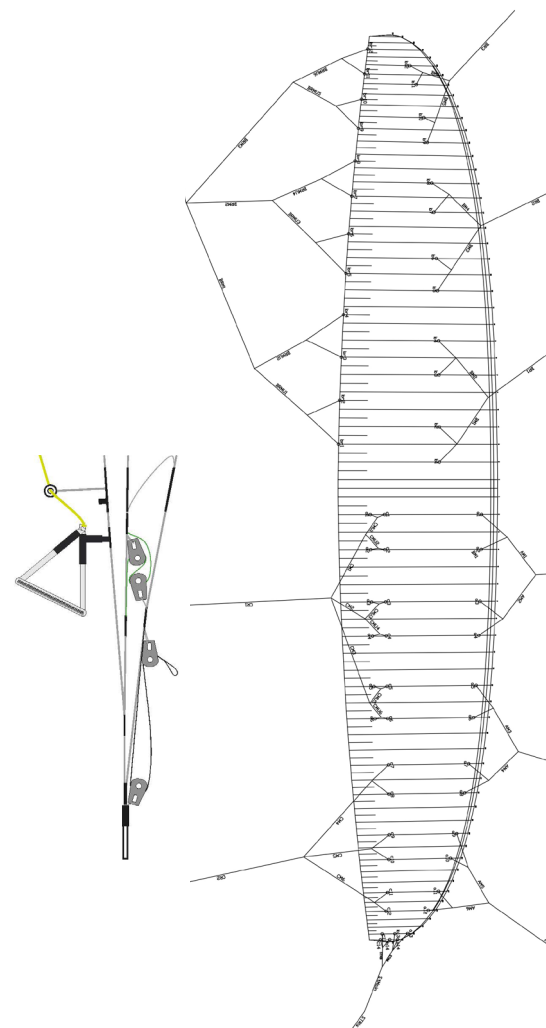






Photo: Martin Scheel

# WORLD CHAMPIONSHIPS MONTE AVENA





Photo: Martin Schaefer

## *Temperamental weather, France at the top, Pierre Remy and Seiko Fukuoka World Champions.*

**D**espite the weather not being easy 10 tasks out of 11 were validated. It was the first time that a World Championships had taken place in Feltre, at the foot of Monte Avena, in the Pre Dolomites. A lot of teams, such as the Germans who were particularly poorly placed compared to normal, must have cursed the weather conditions. Often the air was very stable, and everyone ended up on the ground. One hour later, everything

became unstable and ended in a storm. On the other hand, the organisation received a lot of praise. According to some of the most experienced competitors, it was the best organisation ever. Except perhaps for Mr Weatherman, who must have been pulling his hair out having announced excellent conditions several times, which never, in fact, came to pass. But it has to be said, in his defence, that the weather conditions weren't typical and were certainly difficult to predict.






Photo: Martin Schree

As for the anticipated duel between the GIN Boomerang 11 and the Ozone Enzo 3, the result seemed at first glance indisputable: the first fifteen places were taken by Ozone ahead of the first Boomerang 11.

However, those watching, including some Ozone pilots, agreed that the two machines did have roughly the same level of performance. It needs to be born in mind too that there were two dozen Boomerang 11s but seventy Enzo 3s.

In addition there were also two dozen Zenos, the best placed being 38th. 

The changeable conditions in this beautiful region: either very stable or overdeveloped.

# SKYTRAXX



WITHOUT COMPROMISE  
[www.skytraxx.eu](http://www.skytraxx.eu) [info@skytraxx.eu](mailto:info@skytraxx.eu)

[www.free.aero](http://www.free.aero)





The Women's World Champion not surprisingly: French pilot Seiko Fukuoka on her Ozone Enzo 3 who proved once again that she is, and remains, the best female pilot!



French pilot Pierre Remy on an Enzo 3 was the surprise winner. At the beginning it seemed as though Honorin Hamard would remain World Champion, but in the end it was Pierre who swept up the title. What makes this Pyrenean pilot different is that he flies an Ozone Enzo 3, whilst being a designer for the small French paraglider brand, Nervures!





The GIN Boomerang 11, flown here by Swiss pilot Patrick von Känel. All those watching agreed that the Boomerang 11 is far from having shown it's undeniable potential.

**Women:**

- 1. Seiko Fukuoka Naville (FRA)
- 2. Kari Elis (AUS), left
- 3. Silvia Buzzi Ferraris (ITA), to the right



**Nations:**

- 1. France (between)
- 2. Slowenie (left)
- 3. Suisse (to the right)

**Men:**

- 1. Pierre Remy (FRA)
- 2. Guy Anderson (GBR) (left)
- 3. Honorin Hamard (FRA) (to the right)
- 4. Jurij Vidic (SLO) (raised fist)







# OZONE DELTA 3





**T**he Ozone Delta 2 is still, to this day, a great success in the big family of sports wings. More than 2000 have been sold worldwide making it the model of which Ozone have produced the most since the brand began! An even more amazing achievement given that it's an EN C wing, less 'general public' than the mainstream market, which favours EN B or indeed B+. The challenge was therefore massive, and the Ozone R&D team spent more than two years and about fifty prototypes before validating the new baby, which came out this spring: the Delta 3!

The aspect ratio on the Delta 3 hasn't changed (6 flat and 4.4 projected). The surface of the wing has been reduced, losing a little bit more than half a metre squared.

The SharkNose is very present, not too aggressive, and the 3D shaping has further improved the general look of the surface of the wing. Thanks to Ozone's homemade CAD, which is constantly improving! The leading edge rods are long, so when

folding the wing, you need to use the sausage delivered as standard to protect them from excessive bending.

Also apparent at the trailing edge, nylon rods to improve the general cohesion in the chord, especially at high speed. The lines separate into three and a half ranks. As far as weight is concerned, this ML weighs 5.44 kg (so a little gain in weight of 100 grammes). The wing is beautifully finished!

On the ground, the Delta 3 is easy to untangle, due to the fluidity of the lines and having very few lines low down. The risers are thin.

Inflation is surprisingly simple: good scoop, in one block, linear elevation and without force, and no tendency to overfly. Easy and even more so since this wing is already aimed at experienced pilots. Two techniques which work well in stronger wind: the cobra (asymmetric inflation), or the ball, the centre nicely open and wing tips clear, with a gentle pull on the central As without the ears. Brilliant!



From the first few metres, the sensation is surprising. I remember the Delta 2 very well and its efficient turn, rather 'hands down'. Here, on the Delta 3, the slightest bit of brake provokes a gentle turn, from the start of the brake travel. It's also the same with the slightest weight shift in the harness, without any tendency to go into an unwanted roll. Hands up, well faired, I fly at 40 km/h, as if on a rail.

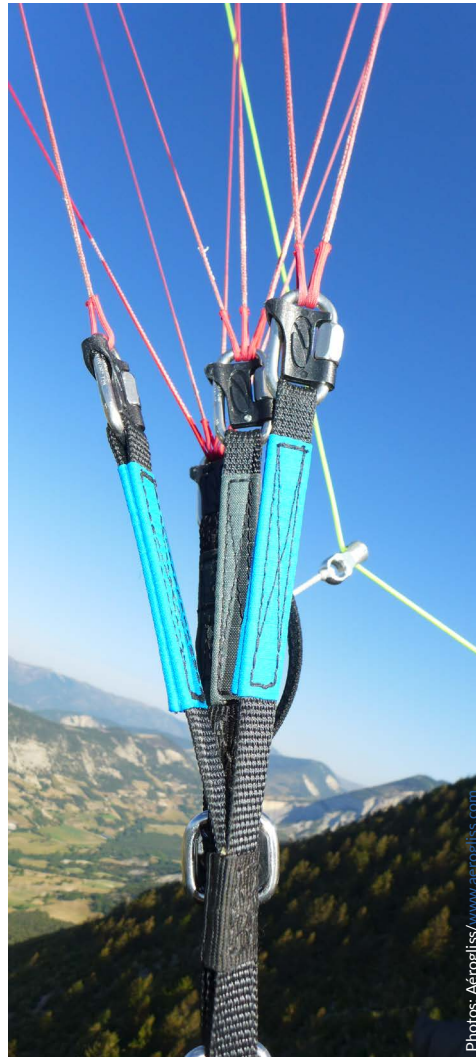
The glide ratio seems excellent, but at this speed, the improvement doesn't jump out at you. It's when you start to push on the bar that the improvements in the wing become apparent: better glide, and no more yawing.

The wing is taut, more homogenous and really wants to fly hands up, resting on the C handles, and modulating the pitch with the accelerator. On maximum accelerator, that's 15.5 cm on the front riser, the Delta 3 displays a good 56 km/h, pulleys overlapping, for fairly little effort through your feet. It's rare to use this option for long, unless flying in a competition but, at this speed, the wing still glides really well and proves to be very solid and easy to feel through the Cs.

The smoothness of the trailing edge, being thinner brings an improvement in the glide right from the first third of the accelerator and the best glide can be seen with about 5 cm of acceleration. Use it! It's the major progress in this version 3.

But for me, the main advantage of this new Delta is much more in the pleasure of flying it and the brilliant way it bites the thermals and appears to sniff them out. The wing tilts the way you want it to, puts itself in the thermal and you don't have to slow down a lot to optimise the climb. The precision is pure pleasure, with little brake travel and a bit of pressure through the harness. In addition, it's best to avoid braking it too much: the controls quickly become physical.

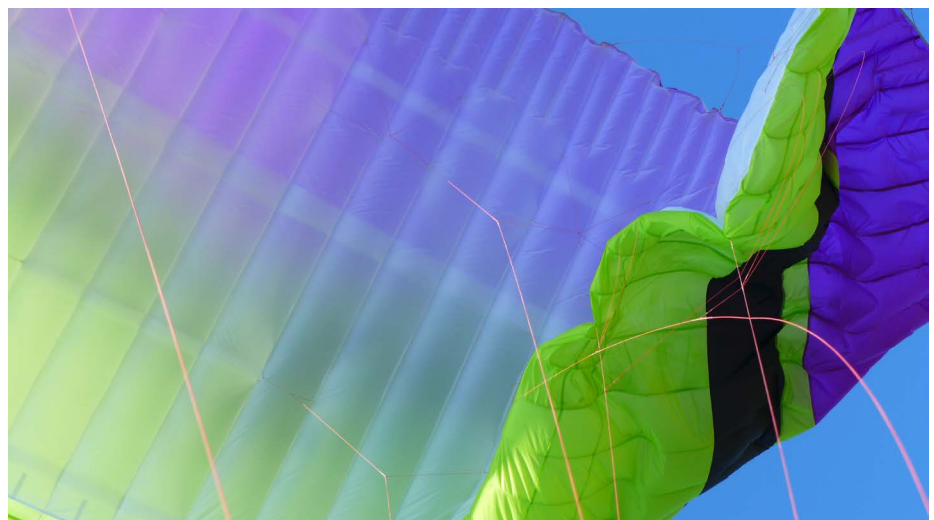
In turbulence, compared to the Delta 2, the wing doesn't seem massively different. I found it monoblock, solid over my head, very clear in its reactions and well damped in the pitch. The brake travel is long, and the low speeds, a result of the SharkNose, are very easy to use and tolerant without going negative unintentionally, or into a massive nasty stall. So, everything is easy.



Photos: Aérogloss/ www.aerogloss.com

The risers have three straps plus mini As for the ears.

A wing which gives clear feedback and is relatively easy for an EN C.







Photos: Aerogliss/www.aerogliss.com

The wing breaking between the Bs and Cs and emptying of air, that was sometimes seen briefly in the second version, has totally disappeared. Therefore it's a straightforward, well behaved wing!

So why is it an EN C? In size ML, 3 Cs appear on the test report, mainly due to the need for pilot intervention during asymmetric collapses. It's not rocket science for those who know how to counter a spiral. In fact, this Delta 3 remains, in my opinion, a very accessible EN C, with the same well known and acknowledged safety record as the Delta 2. It releases a bit more energy, it's true, but it isn't any more complicated to handle.

As far as descending rapidly, I really love deeply engaged spirals, which fall out of the sky very efficiently. It works really well and coming out of it is 'classic' for an experienced pilot to manage, with a very homogenous wing. The ears are easy thanks to a dedicated riser, but they can stick when re-opening.



**OUR TEST PILOT:  
PHILIPPE LAMI**

Philippe has worked with Aerogliss paragliding school for thirty years. He is also one of the most experienced test pilots and specialist paragliding journalists. Another string to his bow is his company Windsriders, who make down jackets optimised for our sport.



Landing is accomplished with a nice flare, dissipated by a good dose of brake. What a pleasure to land without taking a step or sliding for several metres.

I love this Delta 3. It's ability to play at being a butterfly, biting the thermal, spontaneously leaning to the correct side, talking sweetly to the pilot, without much need to brake, its capacity to follow the air mass by weight shift and accelerate without flinching, that's exactly my personal definition of the pleasure of flying.

The Delta 3 had a long and difficult birth, but in my eyes, the baby has exceeded all expectations! Fifty prototypes, certainly, but what a success, what a pleasure! Effectively, the owners of the Delta 2 will be on known territory, excellent whilst, as a bonus, finding flying it a real pleasure.

The only thing which casts a shadow is the price: 4,400 € for the size ML and the delivery time, the price of success for the Ozone brand and their policy of indisputable innovation.



Photo: Jake Dodge

A very accessible EN C.

#### POSITIVE POINTS

- **All round increase in performance, especially accelerated.**
- **Exceptional turn and bite.**

#### NEGATIVE POINTS

- **Length of delivery time...**



# FLYMASTER VARIO LS New



*Vario. Light. Simple*

Powered by Flymaster



The positive side of the story? You'll find excellent Delta 2s on the second hand market, at great prices! Have a great flight with these gems! 🪂

DELTA 3 - TECHNICAL DATA						
Manufacturer: OZONE						
Web: <a href="http://flyozone.com/paragliders/en/products/gliders/delta-3/">http://flyozone.com/paragliders/en/products/gliders/delta-3/</a>						
DATE	2017					
SIZE	XS	S	MS	ML	L	XL
CELLS	66	66	66	66	66	66
FLAT SURFACE AREA [m²]	20	21.9	23.1	24.4	25.9	28.5
FLAT WINGSPAN [m]	10.97	11.46	11.78	12.11	12.47	13.08
FLAT ASPECT RATIO	6	6	6	6	6	6
ALL UP WEIGHT [kg]	58-70	65-85	75-95	85-105	95-115	110-130
WEIGHT OF THE WING [kg]	4.7	5	5.28	5.44	5.75	6.2
CERTIFICATION	C	C	C	C	C	C







## HIGH PERFORMANCE HARNESS

# APCO SWIFT R

*A very comfortable 'faired, racing, armchair, cocoon,' for an attractive price.*

*Test : Philippe Lami*

In this niche market, there is also the Ozone Exocean, the Woody Valley XR7 and the Gin Genie Race 3. Under wings with a high aspect ratio these faired supine harnesses have become the rule for several reasons. First of all they have an optimised aerodynamic fairing, mindful of the frontal drag and management of the turbulence behind, which improves the performance.



Secondly the total length of the harness, perfectly balanced, also assures great directional stability. Unexpected yaw movements in a smaller harness reduce the capacity of our racing wings to fly fast. A racing harness puts the wing on a rail!

Overall comfort, thanks to the internal shape which is very enveloping, very close to the body and sufficiently rigid, also improves performance, especially during very long flights. Pockets for two reserves, required by the FAI rules, have been integrated.

These competition harnesses come at a high price: 1775 € to more than 2000 € for these little gems, which, in addition, are heavy and bulky.

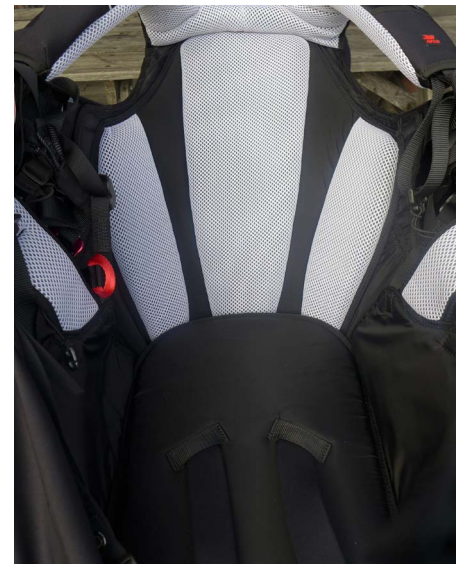
Apco, the Israeli manufacturer have recently launched the Swift R, a magnificent cruise ship of the sky, with lots of options.



[https://youtu.be/iy\\_4Mh60\\_2g](https://youtu.be/iy_4Mh60_2g)

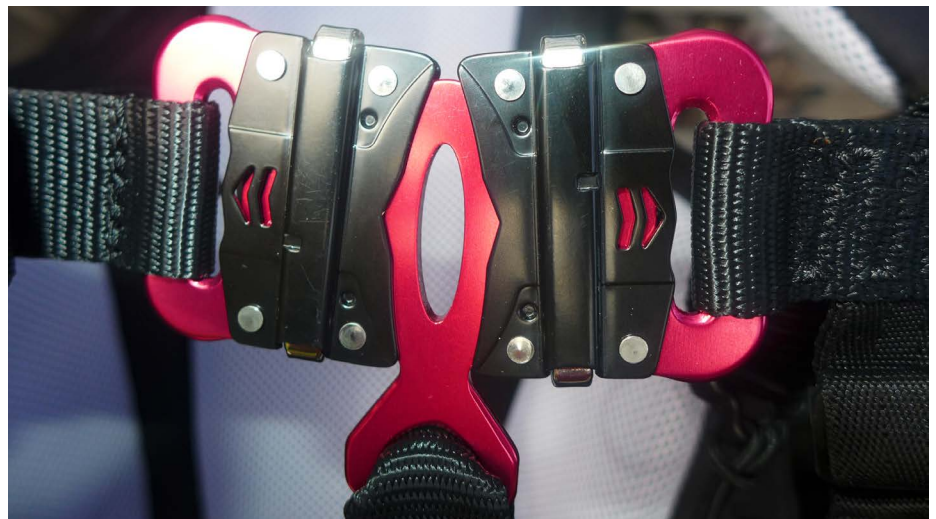


A harness with every detail nicely finished.



The comfortable seat.

The chest strap with classic automatic buckles.





## CLIMBING

The first thing you notice: The Swift R is beautifully finished and integrates all the latest sophistications for this type of harness. The harness is made from a mix of thick neoprene (1cm) and lighter fabric (underneath and behind). The total weight is 6.4 kg compared with 9.5 kg for an Exocoat.

The foam in the chassis seat is very comfortable and enveloping from knee to neck. The cockpit is easy to see, at an optimal angle and closed by a big black zip. The cocoon closes like a wallet, requiring you to use your foot, a gesture you quickly learn after a few take offs.

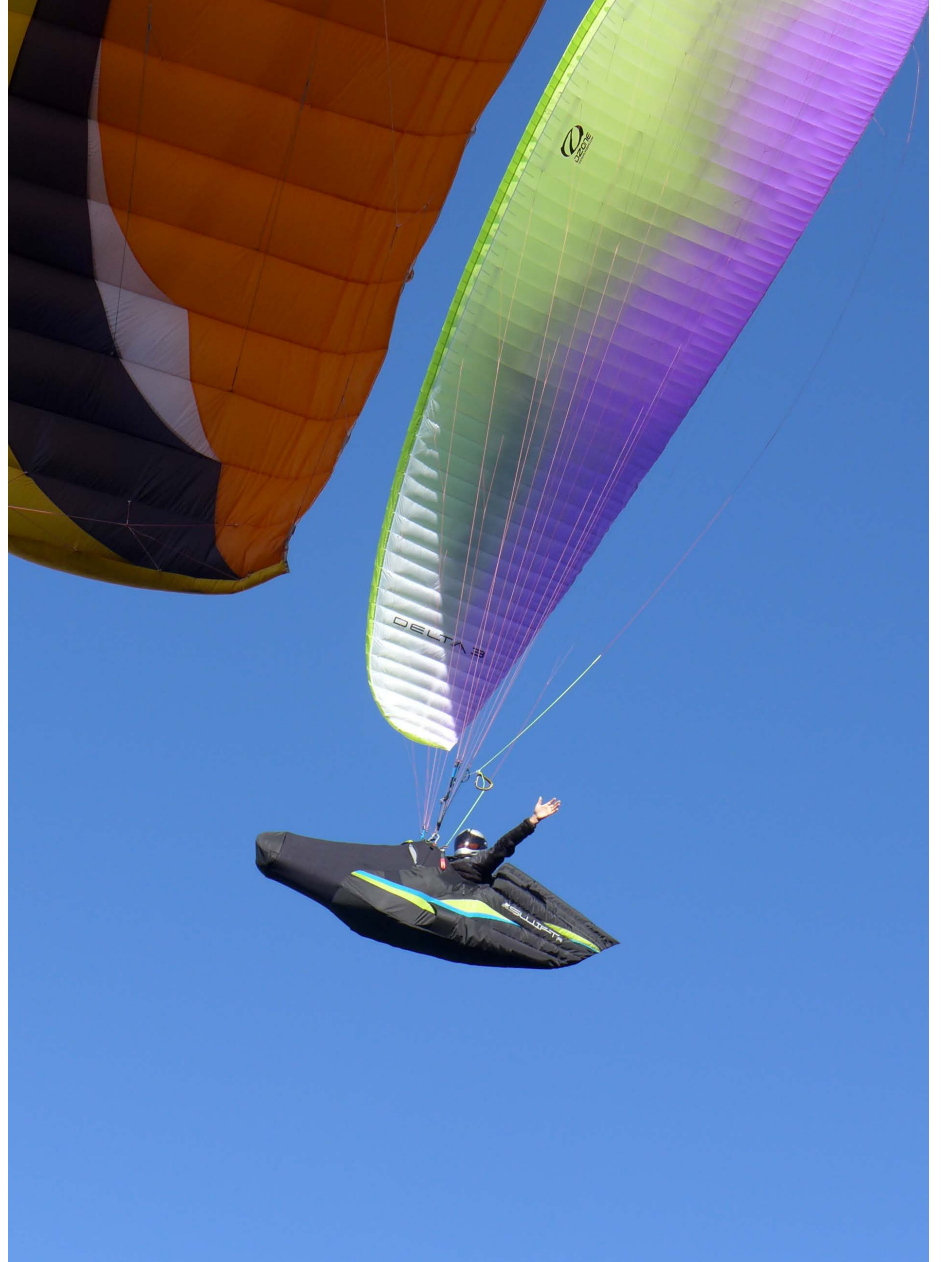
Once in the Swift R, welcome to your new sofa! It's really comfortable, and the cockpit is very compact and nicely in the field of view. Handy, on the right, a nice zipped pocket. Ditto on the other side with, in addition, a pocket designed for an Anti-G drogue. Amongst the details, a radio pocket on the shoulder, ballast compartment, slots designed for the drinking water tube, a pee tube and the ballast tube.

### POSITIVE POINTS

- **The lowest price in its category.**
- **All-purpose harness, very well finished, relatively light.**

### NEGATIVE POINTS

- **Bulky, although fairly well managed given the volume in flight.**



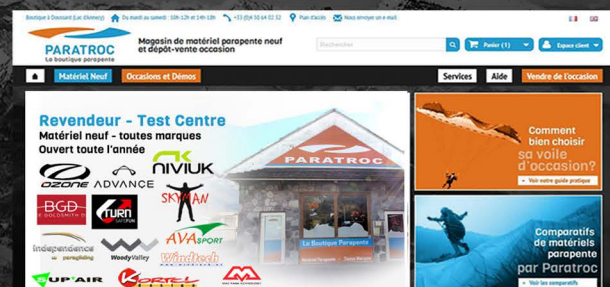
Online store - Paragliding equipment

First shop for used paragliders



Express shipping in Europe  
Duty free ex-EU  
We buy used equipment

paratroc.com  
Doussard - Lac d'Annecy (France)







The upper part of the cockpit is removable so that you can take it to a briefing with the instruments attached. It has an integrated pocket for a USB battery.

A very interesting feature: The accelerator passes over ball bearing pulleys whose axis of exit can be adjusted. A great idea which lets you set the balance when accelerated, as well as the force through your feet.

For safety, there is a series of dense foam panels with a total thickness of 17cm. On my normal wing, I immediately feel a difference in behaviour: better direction, better glide in accelerated flight, excellent roll damping, less yaw movement and all in the greatest of comfort. With my GPS

under my nose, I have an excellent field of vision. The access to the three accelerator bars, as well as adjustments for comfort and of the ABS, is very easy.

Back on the ground, it's time to pack the harness. The flexible rods from the fairing at the back fold around the wing in its internal bag. The harness goes, without being forced, into the paraglider bag. Nice.

A multi option harness, which isn't cheap (1690 € - the price has changed recently), but whose price remains a lot lower than that of other comparable harnesses. Yet, this Swift RS is ranked comparable with the competition!

The back fairing, remarkably inflated by two lateral scoops, gives the surface an amazing aspect.





CLIMBING

A faired, racing, armchair, cocoon for flying in the Paragliding World Cup very comfortably or installed for long leisurely hours, under your racing wing! I loved it! 🧑🏻‍🦺



**AD**  
AIRDESIGN

**HERO**  
Ultralight High Performance EN-D

THE HERO REDEFINES THE CLASS OF ULTRALIGHT HIGH-PERFORMANCE GLIDERS. HIGH TOP SPEED COMBINED WITH PRECISE HANDLING CHARACTERISTICS. SIZE SMALL WEIGHING LESS THAN 3 KG  
+ LIGHTEST CONCERTINA AIRPACK 50/50 WEIGHT 160 GRAMM



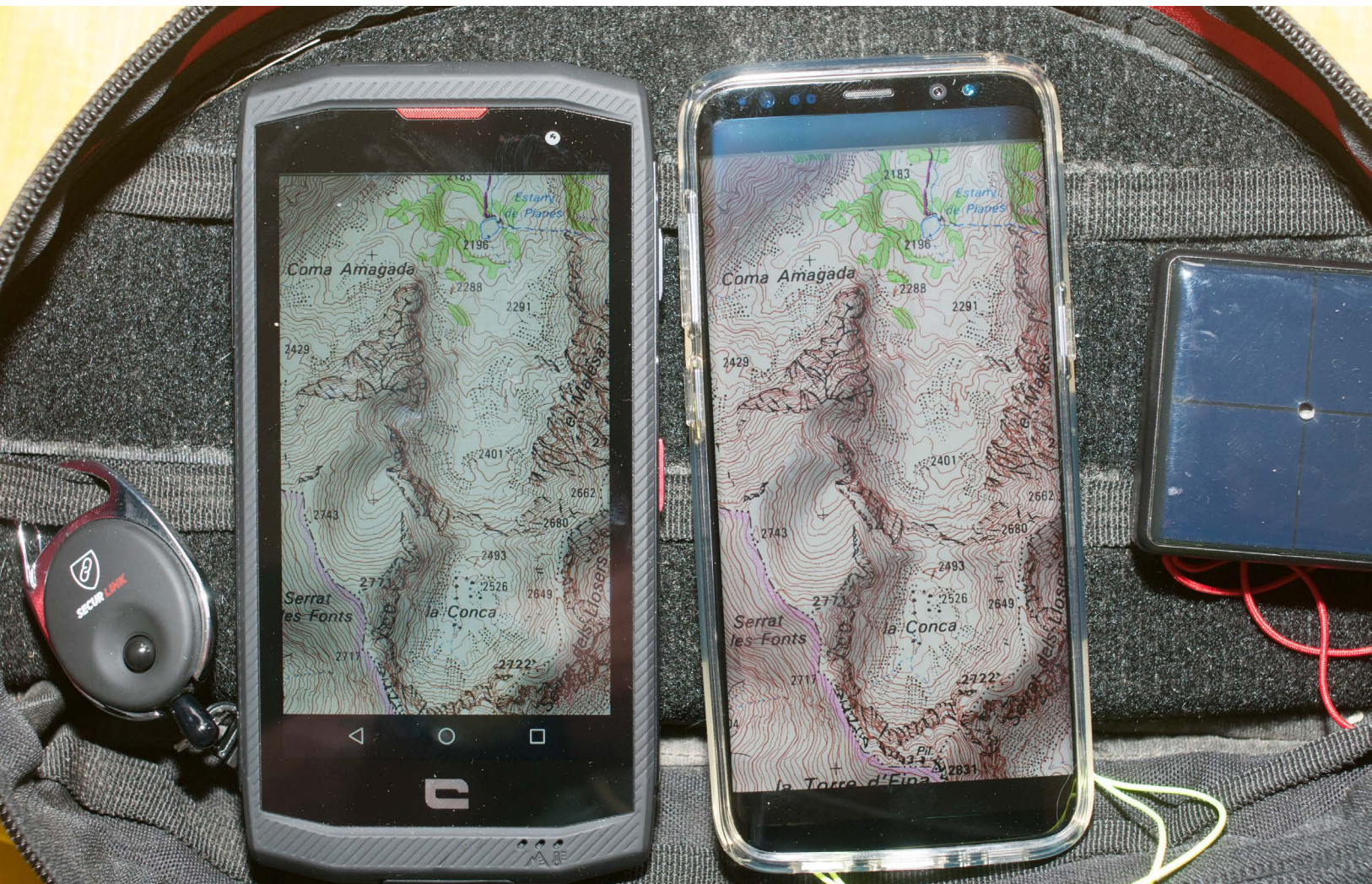


TOP OF THE RANGE SMARTPHONES IN FLIGHT

# CROSSCALL TREKKER X3 VS SAMSUNG GALAXY S8

*Modern smartphones are true computers, equipped with a range of sensors which can be used in flight. Two top of the range Android models in the air...*

Used for reading a topographical map, the Trekker and the Samsung side by side.  
 Photo: S. Burkhardt





## CLIMBING

Using a smartphone as a flying instrument is becoming increasingly simple. There are no longer smartphones without GPSs: using your phone as a map reader, to warn you of airspace, and know your speed over the ground: no problem. You can even know your height above the ground, because applications like XCSoar let you load a topographical database for anywhere in the world.

On the other hand, they often don't have a barometer for very precisely measuring differences in altitude, giving the possibility of using a smartphone as a precise vario.

A Trekker X3 linked via Bluetooth to an AHRS vario, to a C-Probe sensor (air speed) and a FLARM, all displayed by XCSoar. This works very well; there is only the FLARM link that we still need to test in real conditions. Photo: S. Burkhardt



Gaspard Petiot using his mobile phone during the X-Alps. But the smartphone isn't just a means of communication and safety, it is also becoming a very flexible instrument. Photo: Harald Tauderer



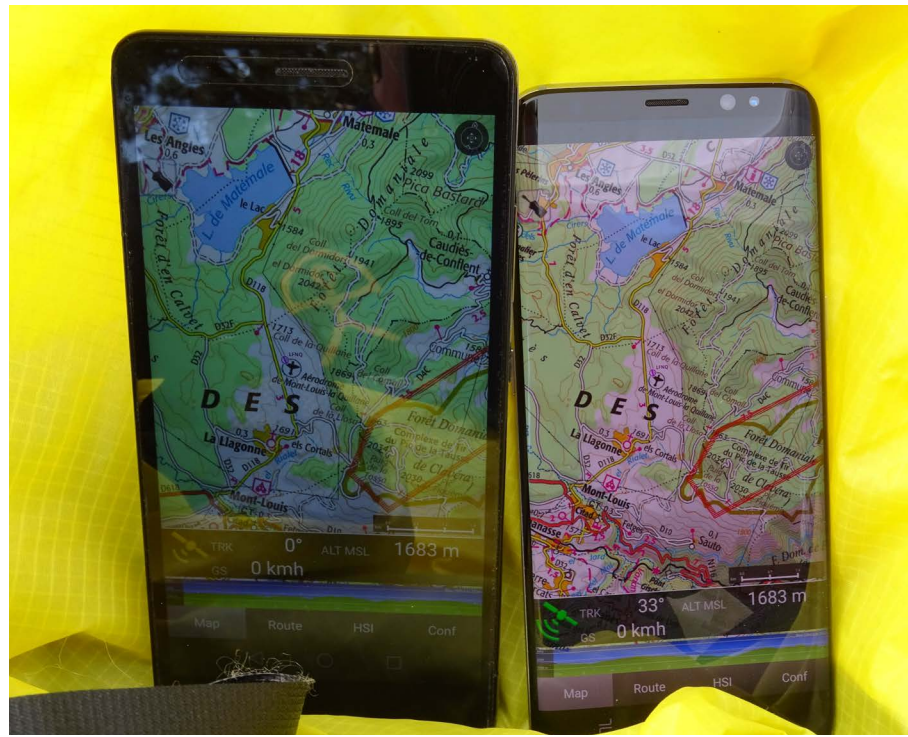




**TOP: DOUBLE SIM**

Lots of low or mid-range telephones have two slots for SIM cards. Example: the Yezz Andy for 50 € (for example from ALDI) or the Acer Liquid Z630 in the photo (less than 200 € in 2015).

It adds reassurance and improves safety in the mountains: with two tariffs, one which is basic for a few euros. With two different operators, the network coverage available increases significantly. Unfortunately, a lot of top of the range instruments, and in particular all the iPhones, don't offer this possibility.



**FLOP: THE HONOR 5X IN PRACTICE**

The Honor 5X (on the left of an S8 in this photo) is often described as a top of the range smartphone at a low price: with a light metal case, fingerprint sensor and big screen, all for about 200 €.

In addition, it has a double SIM! But, in reality, and in the editor's opinion, this model, in the end, doesn't pass the test.

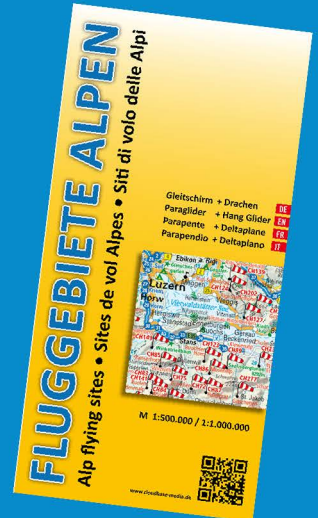
For this price, the fact that it is neither waterproof, nor does it have a large memory, nor does it have a barometric sensor, is to be expected.

But what was disappointing was the considerable slowness of the software and its mechanical fragility despite its metal case. In addition, it never charges at more than 490 mA and therefore takes too much time to get to 100% battery.

neu! - new! - nouveau!  
nuovo! - nuevo!

# Wohin zum Fliegen?

Where to fly? - Où voler ?  
Dove volare? - Donde a volar?



auch als eBook erhältlich!

[www.cloudbase-media.de](http://www.cloudbase-media.de)



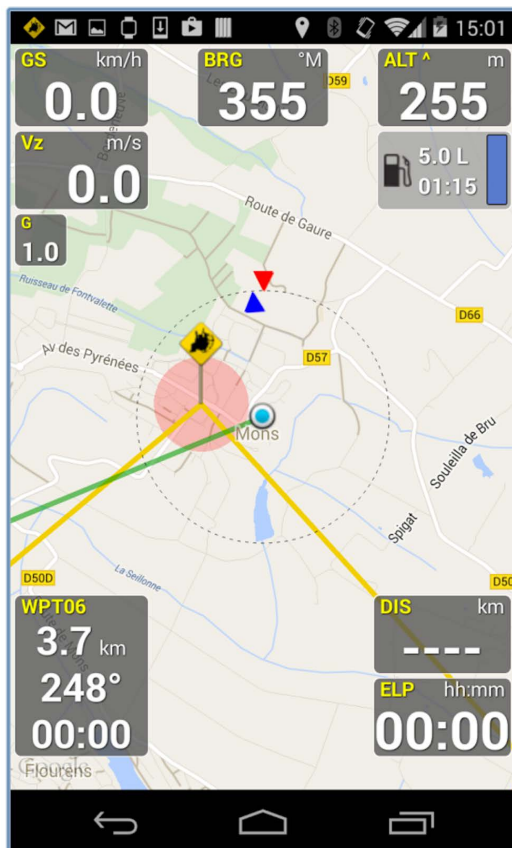


This failure is perhaps compensated for by a Bluetooth or wired connection to a vario/GPS such as the XTracer, GPSBip or Skydrop: the external mini-vario takes charge of these measurements and transmits them to the navigational software, which displays them on its big colour screen. Better still: as the mini also transmits the GPS position, you can deactivate the GPS on the telephone and thus increase its battery life, as this remains one of the biggest problems of smartphone usage in the air.

But if the pilot wants to use a smartphone as it is, without any extra instruments, he can rely on the new models like the iPhone 6 or the two Android instruments in our test: they include a barometric sensor. The list of ingredients necessary to make a 'real' vario is therefore complete.

The smartphone even offers functions which are absent on most dedicated varios, such as the transmission, from one smartphone to another, of all the turn points in a competition.

We'll review this type of application in detail in a future edition. In the meantime, on the following pages, there's a comparison between two smartphones which have just come out...



A very complete application for paramotoring. It exists in a free version too, but at this price, we had no hesitation in buying the full version.

PPGpS Android: 3.59€  
<https://play.google.com/store/apps/details?id=com.ppgps.full>

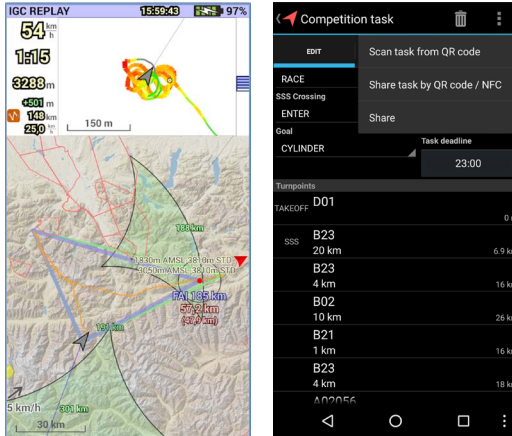




A function which is being increasingly used: the exchange of the turn points in a competition via QR-Code or via NFC, thanks to the XTrack application: in less than a second, the other pilot has the full task in his navigational software.

XTrack obviously also works as a map reader. We'll review all the possibilities of this application in a future issue.

XTrack  
Android, free  
<https://play.google.com/store/apps/details?id=org.xcontest.XTrack>





" With the safety  
I need to explore new things."

I first flew the **MESCAL 5** during my training and on my first flights in the thermals. This wing is made for me! I look forward to building up hours on it and gaining experience without stress. I hear that the guys at skywalk improved a lot of existing details and even invented some new things.

For even more safety and longevity, we rely on PPSLS lines from Liros

2017 New MESCAL.



SKYWALK 5

MASALA  
ARRIBA  
TONIC  
TONKA  
SPICE

**MESCAL**  
TEQUILA  
CHILI  
CAYENNE  
POISON

JOIN'T

PURE PASSION  
FOR FLYING

www.skywalk.info



@freeaeromag



Hans-Martin Hurler – freshly minted paraglider pilot

skywalk.paragliders

skywalkparagliders

Photo: Tristan Shu



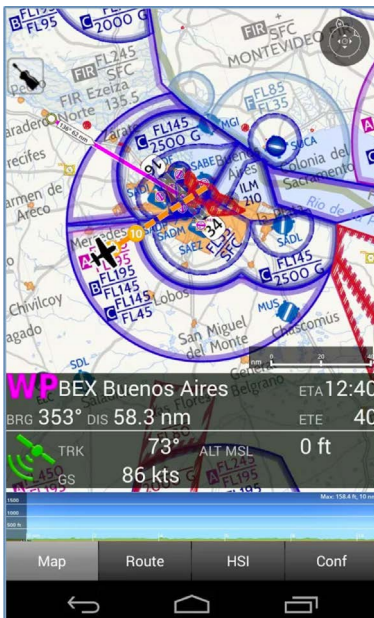
The most complete free Android application: this open source application includes unexpected functions and an interface with all the sensors imaginable. More details in a future issue.

XCSoar  
Android, free  
<https://play.google.com/store/apps/details?id=org.xcsoar>





One of the most complete commercial Android applications: Air Nav Pro is a lightweight version of the iOS application by Xample. The manufacturer offers, above all, a reliable upgrade service, but only if you pay the subscription.

Air Nav Pro  
Android: 24.99 €  
<https://play.google.com/store/apps/details?id=com.xample.airnavigation>



## SAMSUNG GALAXY S8 VS. CROSSCALL TREKKER X3

		
	<b>SAMSUNG GALAXY S8</b>	<b>CROSSCALL TREKKER-X3</b>
<b>SYSTEM</b>	Android 7.0 Nougat	Android 6.0.1 Marshmallow
<b>DISPLAY</b>	SuperAmoled 5,8"	IPS LCD 5" Gorilla Glass 4, Wet touch
<b>RESOLUTION</b>	2960 x 1440	1920 x 1080 pixels
<b>PPP</b>	571 ppp	441 ppp
<b>MEMORY (RAM)</b>	4 Go	3 Go
<b>MEMORY (FLASH)</b>	64 Go	32 Go
<b>MICROSD</b>	yes	yes
<b>BACK CAMERA</b>	12 MPx	16 MPx
<b>FRONT CAMERA</b>	8 Mpx	8 Mpx
<b>ENREGISTREMENT VIDÉO</b>	UHD 4K (3840 x 2160) @30fps	Full HD, 1080p@30fps
<b>GPS</b>	GPS, Glonass, Beidou, Galileo	GPS (A-GPS) + GLONASS + Beidou
<b>BAROMETER</b>	STM LPS22H	Bosch BMP280
<b>ACCELEROMETER</b>	STM LSM6DSL	Bosch BMI160
<b>GYROMETER</b>	STM LSM6DSL	Bosch BMI160
<b>MAGNETOMETER</b>	AKM 09916C	AKM AK09916
<b>THERMOMETER</b>	-	STM HTS221
<b>HYGROMETER</b>	-	STM HTS221
<b>FREQUENCIES</b>	850 MHz, 900 MHz, 1900 MHz, 2100 MHz, 800 MHz, 1800 MHz, 2600 MHz, 700 MHz, AWS	900 MHz, 1900 MHz, 2100 MHz, 800 MHz, 1800 MHz, 2600 MHz
<b>SIM 1 / SIM 2</b>	nano SIM / no	nano SIM / no
<b>NFC</b>	yes	yes
<b>PORTS (IN/OUT)</b>	USB Type-C	USB Type-C
<b>BATTERY</b>	3000 mAh	3500 mAh
<b>AUTONOMY</b>	Communication 20h	Communication: 31 h GPS: 9h
<b>SIZE</b>	148,9 x 68,1 x 8 mm	81,8 mm x 155,7 x 14,3
<b>WATERPROOF</b>	IP 68	IP 67 (also saltwater, oil)
<b>WORKING TEMP.</b>	0° / 35°	-10°C / +50°C
<b>WEIGHT</b>	152 gramme	230 g
<b>PRICE</b>	740 €	529 €





The two 'Flagships' from their respective brands: the Samsung Galaxy S8 on the left and the Crosscall Trekker X3 on the right. The Crosscall, a dedicated instrument for outdoor use, has a more precise sensor and a better sample rate of 26 Hz instead of 10 Hz. With a barometric utilisation, the difference, as far as response time is concerned, is perceptible in flight where the Crosscall reacts a bit quicker when climbing. Also visible in this photo: the points correspond to vertical movements of about 60 cm.

Paraglider database.

The history of our sport.

All the gliders since paragliding time began.

Technical information.

Test archives.

[www.para2000.org](http://www.para2000.org)

P@r@2000



Sponsors :





**SAMSUNG GALAXY S8 VS. CROSSCALL TREKKER X3**

The comparison may appear random: the Samsung is a classic top of the range smartphone and the Crosscall, an outdoor specialist. But given a closer look, it's a logical choice: the top of the range 'town' phones have become waterproof (Samsung: since the 'S6 active', Apple since the iPhone 7), and therefore take on a certain 'outdoorsy' aspect, whilst being a bit more classy than a specialist outdoor phone like the Crosscall. From an impact point of view, the Crosscall definitely seems stronger: it has a dedicated chassis comparable to those of an industrial telephone such as the Caterpillar brand, but prettier all the same: the design represents a good compromise between an 'ironclad' telephone and a town smartphone. An integrated metal plate makes it heavier, but protects it against bending for example.



At 152g, the Samsung is obviously lighter than the...



... Crosscall whose very robust design has increased the weight to 244 g.



- *Innovative technology*
- *Fast airspeed*
- *Passive safety*



Made in Occitanie - France



www.trekking-gliders.com





Surprising: the Crosscall on the left with its covers over the sockets that you must close after using them, is only IP67 (immersion 30 minutes to < 1m), whilst the Samsung on the right, with its open sockets, is IP68 (immersion 30 minutes at > 1m). In any case, you don't want to go diving with it. But it's good to know that it'll survive, for example, being dropped into a puddle of water when walking to take-off; that would be no problem for either of them. The main difference: the Samsung only permits immersion in fresh water, whilst the Crosscall copes with salt water as well as oil.





# CROSSCALL TREKKER X3

The user interface on the Trekker X3, with Android 6 Marshmallow, seems slightly behind compared to Android 7 (the most recent version); an upgrade isn't anticipated.

The screen is very readable, even in full sunlight. For an outdoor telephone, you could perhaps wish for even more, but that would require a disproportionate effort.

The 16 Mpix camera lets you record great souvenirs of flights at high resolution. Only the exposure balance in case of pictures with a strong contrast could sometimes be improved. Thanks to the wide bezels, handling this instrument is a lot better than town phones. The keys are very (perhaps even too) prominent.

A programmable button can act as an SOS button.



**Programmable button:** if its SOS function is activated, this button lets you call a preprogrammed number. You can also program it to take photos on the camera, or start another application.

**Well thought out:** an integrated metal ring which lets you fix the security string delivered with the instrument. The automatic spool is very practical; you can attach it to the harness, and telephone whilst flying without worrying about losing your telephone. After the pilot has pushed the button, the string disappears in the spool.







16 MPix, more than on the Samsung S8. On the other hand, processing images with a high contrast is better with the S8.



It isn't necessary to open the USB socket cover to charge the telephone: its box can be used as a cordless induction charger. It's just a bit longer.

The 3500 mAh battery isn't oversized; in the case of average or heavy use, it lets you keep the phone working for a day, but no longer. The fast charger, via the USB cable, on the other hand, lets you recharge 80% in an hour; that's really practical. The cordless induction charger, delivered with the instrument, is more adapted for charging at night time.

All the applications, including mapping and navigation, work very smoothly. The range of working temperatures is a lot greater for this out doors telephone than for the town instruments: -10 °C - +50 °C.

The GPS positioning is fast and obviously flawless. The internal sensors are clearly good quality, especially the barometric sensors, which take 26 measurements per second; that's more than double that of the Samsung. This difference is clearly felt: used as a vario with an application like XCTrack, the Trekker indicates the thermal a lot earlier. Compared to 'town' phones, the Trekker has two extra sensors:

a thermometer and a hygrometer. It's commendable, but as they are integrated into a tiny box, the measurements are affected by the heat of the instrument working.

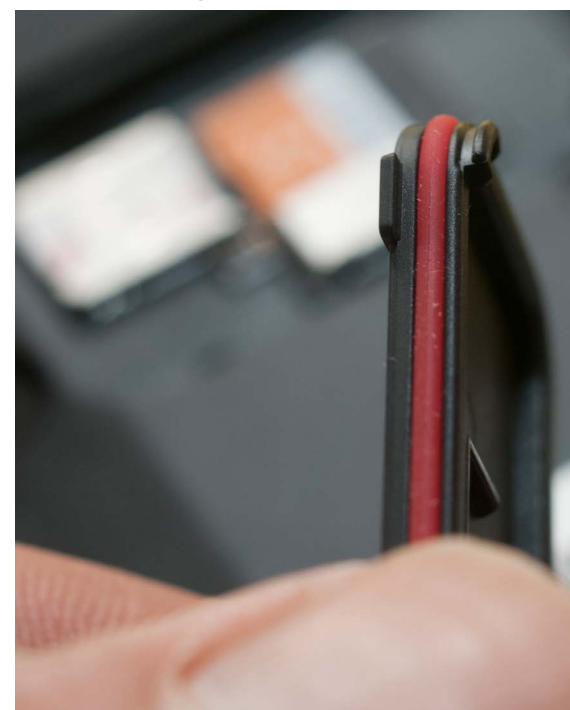
It's perhaps for this reason too that the application 'Sensors' from Crosscall doesn't offer an automatic calculation of the dew point, for example, which would be theoretically possible (temperature + humidity)

#### CONCLUSION

A real 'outdoor' telephone, robust and watertight, unaffected by high and low temperatures. The safety string is very practical in flight. It works smoothly, and carries out its role of navigational and flying instrument perfectly if you use it with applications such as XCTrack.

It's price of 529 € is well below that of the S8, which has a more up to date user interface and a better screen.

The join to waterproof the SD and SIM card compartment. The latter isn't a double SIM, which would be an advantage in the mountains.





# SAMSUNG GALAXY S8

The S8 Galaxy is the current Samsung flagship, with a corresponding catalogue price of around 800 €.

One of its strengths is its screen: it goes right to the edges of the instrument, which looks great. The screen is very high resolution and can be adjusted to 2960 x 1440 pixels. The visibility of the screen in full daylight is very good, which makes this 'towny' easy to use in the air. On the other hand, the unusual format of the screen (tall and narrow) isn't necessarily ideal for reading maps.

The fact that the screen goes right to the edges of the instrument makes it a little bit more difficult to hold and your hands can hide information. This smartphone has the best level of software possible: the Android 7 'Nougat' user interface, customised with the Samsung touch, is very modern, practical, nice and works smoothly. As far as a map reader is concerned, this smartphone fulfils its role perfectly: the GPS is of course precise, and is moreover already compatible with Galileo. The colour topographical maps have very good clarity.

Its barometric sensor clearly doesn't work as well as that of the Crosscall Trekker: with only 10 Hz and less precision, it turns out to be a little less precise at detecting thermals. Having said that, it is perfectly possible to use it as a vario, the difference only plays a role in very weak conditions and the consequences of the slight delay are minimal.

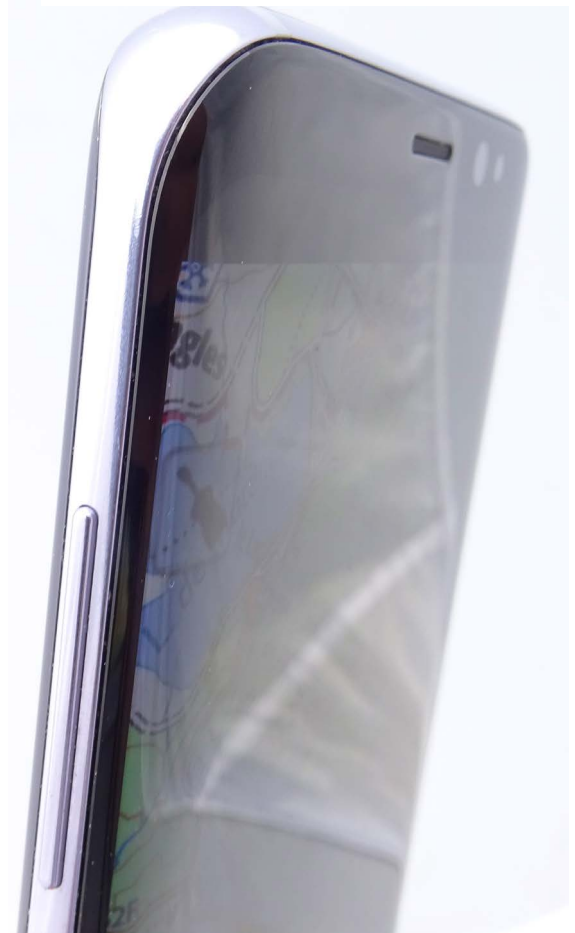
## CONCLUSION

The watertightness of the Samsung S8 makes it a bit more 'outdoorsy', but as far as the chassis is concerned, it remains more 'elegant towny'. It will, no doubt, be more susceptible to bending. The screen of this top of the range smartphone is very good, its camera, despite having less resolution compared to the Crosscall, performs well. The video stabilisation is even far superior to that of the Trekker.

The Samsung S8 can work very well as a flying instrument, especially if it is linked to an external vario. Its internal barometer can nonetheless play this role well, if you aren't expecting the performance of an ultra-precise vario, such as an XCTracer.



The screen is perfect as far as resolution and colour are concerned. The 'borderless' concept is very pretty, but not particularly useful.





# leGPSBip

SOLAR-POWERED AND ONLY 35g

## VOCAL GPS ALTI-VARIO

Free shipping on stodeus.com

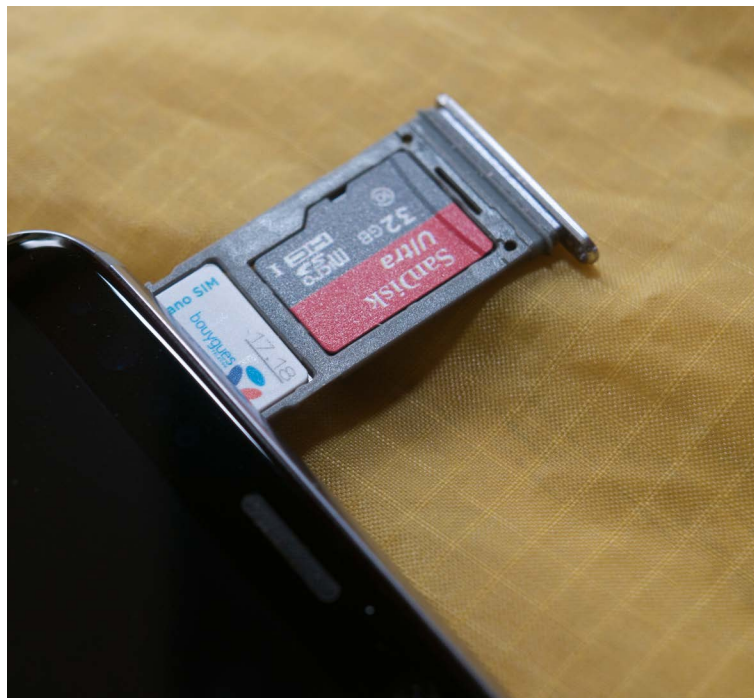


A very tall, but fairly narrow, display.

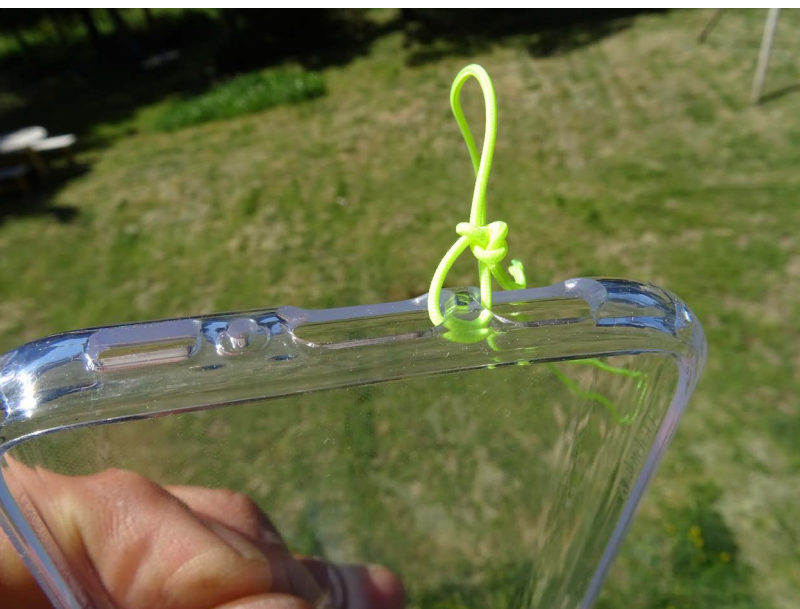


Next to the camera lens there is a digital fingerprint sensor. Practical for every day use, but not for in the air.

It's a pity: the European version of the S8 only has a mono SIM. There is an international version where you can insert two SIM cards.







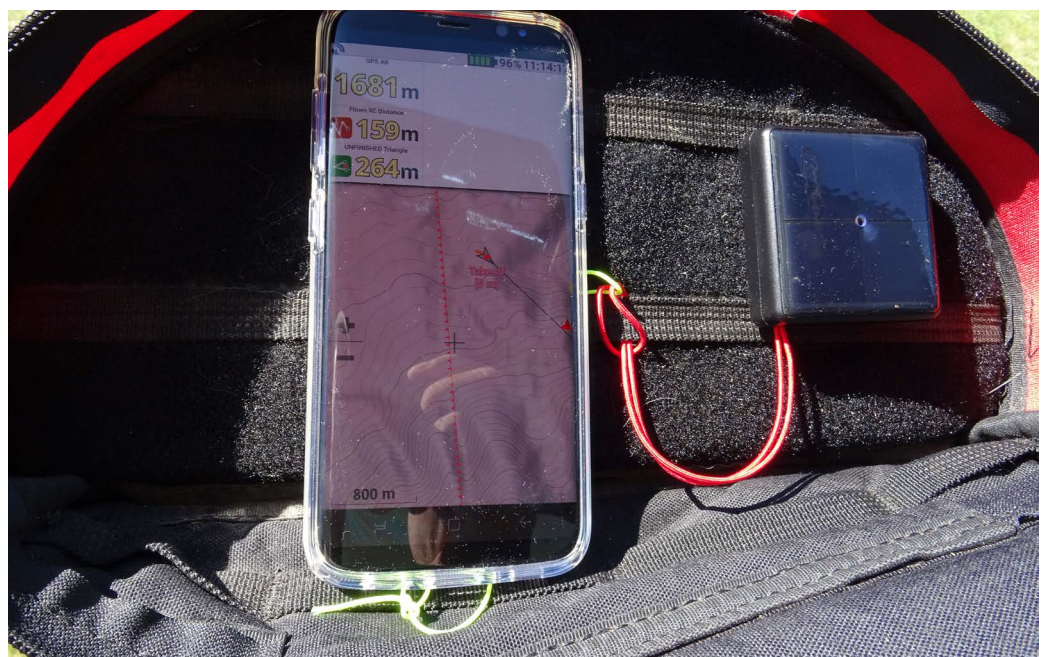
Contrary to the Crosscall, the vast majority of telephones like the S8 don't have an attachment point to fix a security string.

The problem: covers enveloping the whole smartphone reduce the visibility of the screen too much.

A solution: buy a silicone cover, such as this Galaxy S8 Spigen "Liquid Crystal Ultra-Fine Premium" cover from Amazon (6.99 €), which only covers the reverse.

It lets you put together a safety attachment and fix the smartphone with Velcro. Check that the telephone is properly held in the shell, even when swinging it by the cord.

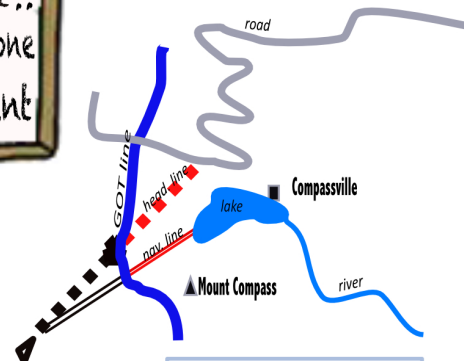
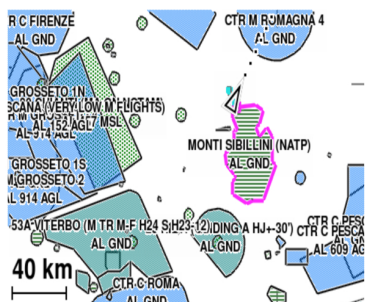
The shell can remain in the cockpit, and for everyday use, the pilot can use another cover without the Velcro or the string.





IMPROVED SOFTWARE

IMPROVED MAPS



free download from the web; customization and management

**AIRSPACES**

**NEW TOPOGRAPHIC VECTORIAL MAPS**

Cities, rivers, lakes, names and altitude of mountains

LONG LIFE BATTERY

XC

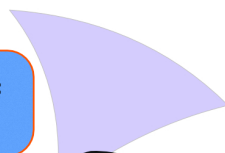
ALL-IN-ONE

NEW HARD GLASS

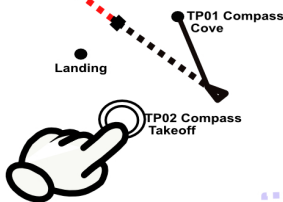
**NAVIGATION BY TOUCH**



**XC ASSISTANT & TRIANGLES**

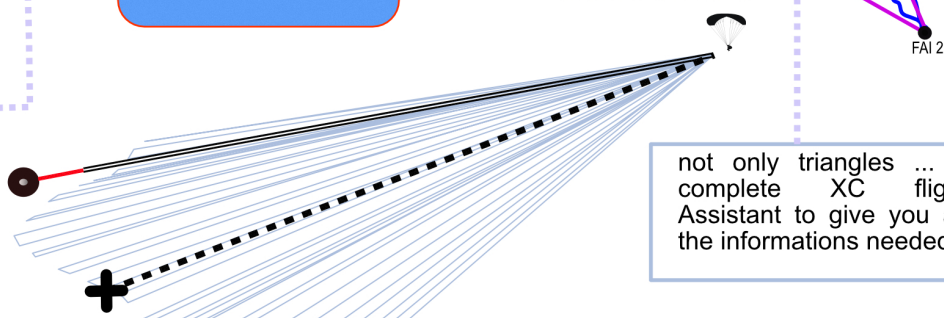


**GLIDE OVER TERRAIN**



choose a "goto" by a simple touch in the map. Move and zoom the maps

watch in real time where and at what altitude your transition will end considering the terrain: crossing is much more easy!



not only triangles ... a complete XC flight Assistant to give you all the informations needed

The **XC** - INSTRUMENTS

Designed for the Cross Country Pilot  
We give you all the data to let you take the best decisions





# FROM DREAM TO REALITY? GOING UP ELECTRICALLY

*The electric motor is a regular fantasy. Still not the right time? A quick look at the situation.*

Paraglider pilots dream about it: going up almost silently with just an electric motor that you stop simply by releasing the throttle as soon as you're in a thermal. In addition, it would be totally ecological. At the same time, paramotor pilots would also find it great no longer having to mess around with the mix of oil and petrol in order to fly in the flats.

Razzeebuss: more than twenty units sold at the catalogue price of 15 000 €; that counts as a success.

The battery: shown here, 16kg in front...



Photo: Sascha Burkhardt

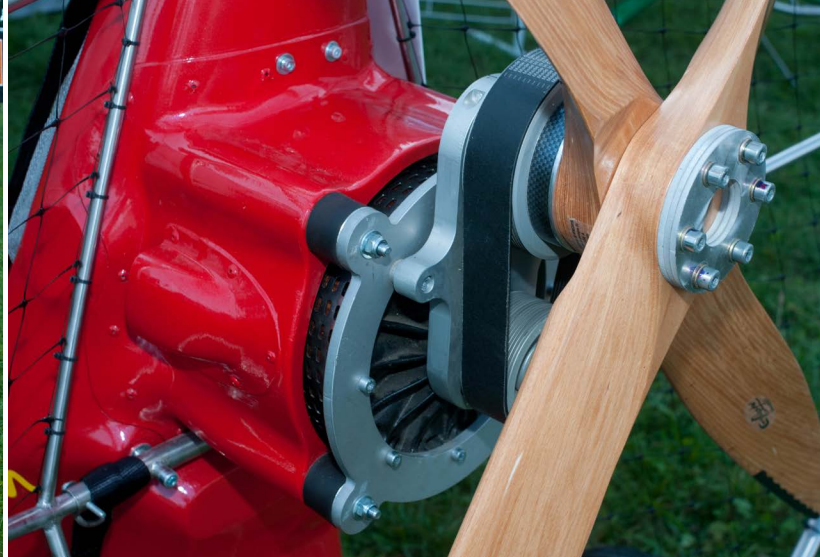




A great machine at the Coupe Icare 2011, giving one hour of battery life. Unfortunately, it didn't reach commercialisation.

The Flytec-Geiger-Eck HPD 10, at 10 kW, was the first motor specially made for paramotors: Brushless, it could turn very slowly and could therefore connect directly to the propeller. It is still used and can be ordered with 10kW or 13 kW, or even pepped up to 16kW.

A small motor always means that it uses a reduction belt which is often heavier.







The Yuneec at Basse Ham in 2010: attractive, but this machine has never been marketed. The battery was the problem...



At least from a design point of view, the E-Pac by Yuneec was a success.

Some specialised magazines have got excited about it, announcing a real revolution as soon as the first motors with a 'finished' look about them came out. It's true that the E-Pac from the Chinese company Yuneec, for example, looks really nice: chassis with a carbon aspect with amazing lines, were launched in 2010. In addition, Yuneec were a promising company in the field: their electric tandem plane, the E430 with its 48 kW motor, launched in 2009, was considered a small revolution with its two hours battery life.





Scott-E: without a cage, with sensors which stop the motor if there is a problem. The motor with a direct drive Flytech-Geiger-Eck HDP 10. Minimal battery life at full thrust: 10 minutes. Discontinued in 2012.

For the E-Pac paramotor, Yuneec promised a retail price of less than 8,000 - 9,000 €. Which was attractive in comparison to other machines of the time which sold for around 12000 € - 15000 €. We remain fairly sceptical all the same, and we've never been able to obtain a machine to test. Yet, one of the first E-Pacs participated in the French paramotor championships. But the marketing date was delayed due to battery problems.

The Yuneec E-Pac ended up stillborn, and their aeroplane, the E430, got no further than two specimens. Today, the company specialises in drones...

The battery was, and remains, the main problem, despite progress made during the last six years: they are heavy and expensive, around 100 € per Ah, making 4000 € for a 40 Ah, weighing 16 kg and giving a maximum of 45 minutes of battery life. Roughly speaking, the initial price is a minimum of 100 € per minute of battery life...



The E-Walk from Skywalk. Minimal protection from the propeller: motor Plettenberg Predator 10 kW. Minimal battery life with maximum power: 11 minutes. Also discontinued in 2012...



CLIMBING

September 2009: Adventure also launched an electric machine. Put on standby whilst waiting for better battery life.

And this price still hasn't changed much: George Blottin, from Exomo, suggests it would take more than a weeks work to assemble a battery made up of 21 elements in series, themselves made with fifteen 3.5 V batteries in parallel. And you definitely mustn't botch the work: this type of 60 V battery yields currents which can reach up to 400 amps! It's not surprising that pioneers of the electric paramotor, like Christophe Tumson from Razeebuss, have gone through numerous machines which have caught fire in flight.

Project Revolt 2016: financed by Kickstart, cancelled after having raised 57 437 € out of the 95 000 € necessary. But they promise they'll be back to relaunch this original idea. More information in our [Special Coupe Icare 2016](#)



Photo: Sascha Burkhardt

Christophe Tumson with his Razeebuss which cost 15 000 €, shown here in 2010. It's the dream engine for lots of paraglider pilots: climb to a thermal, cut the motor and hook into the thermal with the extra drag reduced thanks to a folding propeller. The battery in front balances out the weight of the system.

Photo: Sascha Burkhardt





## CLIMBING

The motors, on the other hand are, especially since the HPD 10 by Flytec-Geiger-Eck came out, perfectly adapted to the electric paramotor: the HPD 10 and 13 are based on the brushless principle. The rotation is regulated by a sophisticated controller, which sends the current to the numerous coils in the stator, which thus advance the rotor around it. Contrary to brush motors, which turn very fast and need a reduction belt, this type of motor is very efficient at low revolutions too. They can be run at 2000 RPM for example and have the propeller attached directly onto the rotor. Therefore there are fewer parts to wear out and it's lighter.

In Switzerland, paramotoring has finally become legal, as long as they are electric. Shown here, the Skyjam Electro Lizard 2017, Titanium chassis, with a Geiger-Ecker HPD 10 thrust at 12 kW. About 10 000 € with a 25 Ah battery, total weight 27 kg, battery life 20 minutes.  
[www.skyjam-aircraft.com](http://www.skyjam-aircraft.com)

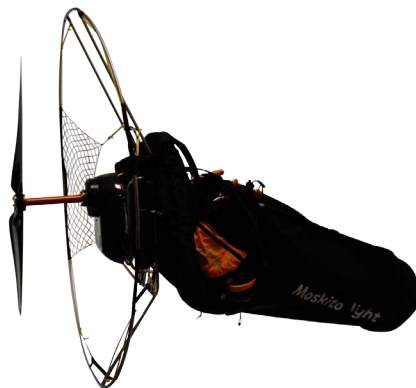




# Paragliding Map

Paragliding sites mashed  
up with live weather &  
forecasts.

See where it's flyable  
right now. Worldwide!



Designed more as an aid for finding thermals: The Mosquito E-Light from the German FTR. Motor HQ150 9 kW, full weight about 25 kg (of which 13 kg is the 37 Ah battery, battery life 20 minutes), full price with the charger and travel bag: 11000 €. <https://www.moskito-light.com/moskito-e-light/>



GET IT ON  
**Google Play**



Download on the  
**App Store**

[www.paraglidingmap.com](http://www.paraglidingmap.com)  
**http://**





Flying, that's all.



Paramotors



Trikes

**KANGOOK**  
PARAMOTORS

WWW.KANGOOK.CA 



Accessories

The thrust developed by the HPD 10, is about 500 N (50 kg), which is comparable to combustion motors. The maximum continuous power of 10 kW corresponds to 13 HP. This may seem low, but it's sufficient because it can be released in a more linear manner, and thus more efficiently, than by a petrol engine. The Exomo (see hands-on on the following pages) even gives 15 kW, or 20 HP.

In summary, the problem is more with the battery rather than the motor, and this is despite the rapid expansion of electric cars (lots of European countries intend to ban the sale of petrol/diesel cars in eight years time!)

Electric bicycles are having more success: with their 250 W (0,25 kW!) motors and 8-10 Ah batteries, they can do 50 km and 1000 m of ascent.

But they are not comparable: the user needs to pedal as well and, in any case, moving a vehicle forward on the ground uses a lot less energy than getting an aeroplane, with an all up weight of 100 kg, into the air. Even just maintaining height with a wing with a glide ratio of 8, you need about 4500 W!

A Czech machine  
from 2010,  
still sold on demand.  
<http://e-glider.com>

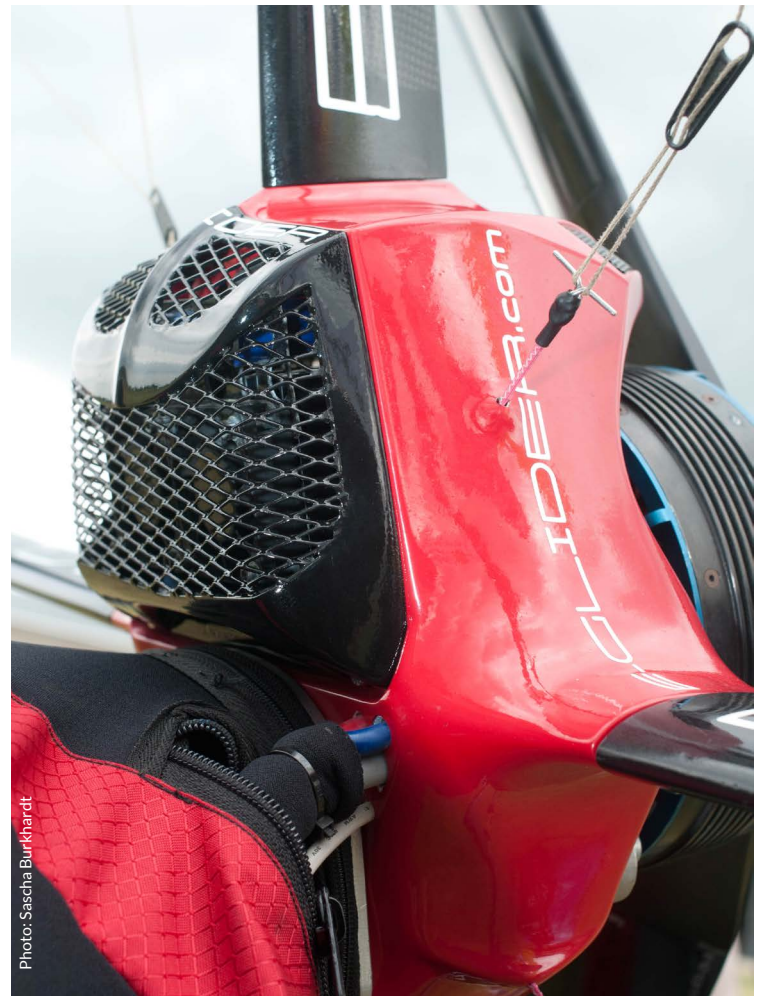
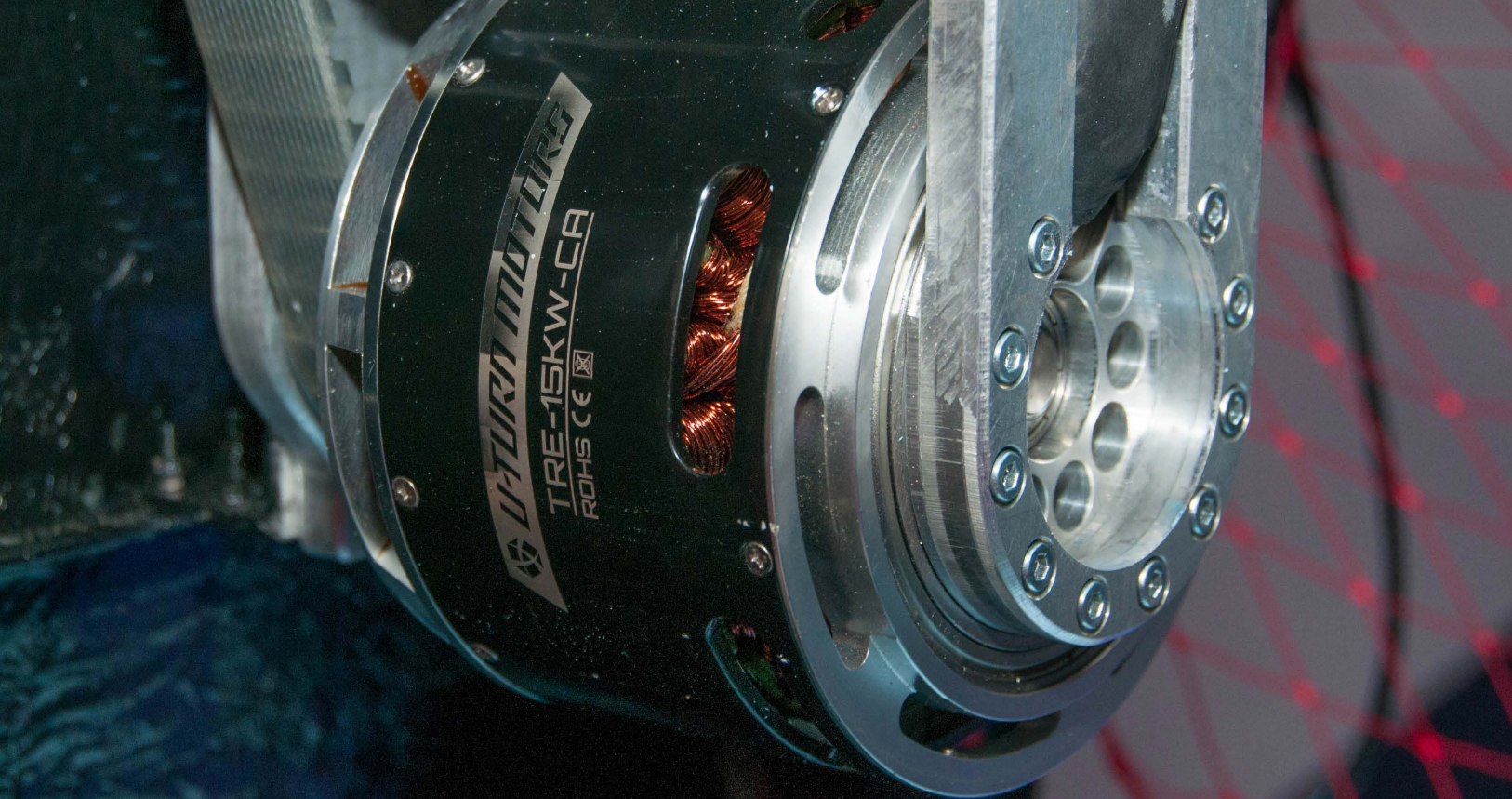


Photo: Sascha Burkhardt





At the Coupe Icare in 2016, U-Turn launched this paramotor based on a small motor with a reduction belt, whilst announcing a price that seemed total fantasy: only 5000 € with the battery... The problem: the machine still isn't available. Photo: S.Burkhardt

A lovely engine. Provided that it really will be on sale one day and, in addition, at the published price. The propellers, from the make E-Props, have a very good reputation amongst the manufacturers.

Some manufacturers and professionals have tried to use electric motors with low battery life (20 minutes), and therefore lighter, with a paraglider, just to reach the thermal. For that, you need to, if possible, get rid of the propeller cage, which causes a lot of drag. For that, they even thought of, and tested, sensors in the wing and on the chassis which cut the motor out automatically if the pilot falls or the wing collapses. It was a waste of time: expensive and complicated, all of these solutions were abandoned.

The Razeebuss was one of the most successful models. They sold about twenty at 15000 €/each. At the moment, among the machines specially designed for paragliders, the main one is the Moskito E-light by FTR.

Apart from that, there is a little bit of interest in the slightly heavier machines, with chassis which are typical of paramotors, like the Skyjam or the Exomo described on the following pages. With the current trend of improving batteries, electric propulsion will no doubt develop in a significant manner. But not for now, as they have been trying to make us believe for years... 🙄







Kangook have done tests with this set up by Paracell, the Spanish assembly company. The anticipated battery life with a 72 Ah battery: more than an hour. The price still hasn't been decided.

**EOLE**  
by **BIDALOT**

DISPONIBLE SUR  
[www.bidalot.fr](http://www.bidalot.fr)

COUPE C-C



Follow us on Twitter  
[www.twitter.com/BIDALOT\\_Techno](http://www.twitter.com/BIDALOT_Techno)



Join us on Facebook  
[www.facebook.com/ Vidalot.paramoteurs](http://www.facebook.com/ Vidalot.paramoteurs)



Infoline

**+33 559 859 500**



TEST

# EXOMO

## ELECTRIC MOTOR

*Despite development being a bit slower than expected, some manufacturers still see it as the motor of the future, like Georges Blottin from Exomo in the Hérault, in France. Marc Coffinet, a paramotor instructor near Perpignan, reports on his hands-on of an Exomo...*

I had three flights with the Exomo electric motor mounted on a titanium chassis by the manufacturer MacFly, at the Aeronature base near the town of Sommières. One of the principles of the Exomo is its easy adaptation to numerous chassis on the market.

The base, created and managed by George Blottin, is unique: it is exclusively dedicated to electric paramotors!

The model tried was the EXOMO "Classic" with detachable battery configured for schools (35 minutes of flight) sold complete from 13,800 € mounted on a titanium MacFly chassis and its harness. The battery is a Li-ion of 45 Ah which charges to 80% in two hours and requires two extra hours to balance and charge it fully. The charger is very simple and not very bulky because the charging management is internal to the battery. You can expect between 500 to 1000 cycles of charge/discharge and still get 80% of the initial capacity (nobody has managed that yet!)

The initial impression is of a simple machine. Putting the cage together is routine and fast. All that's left is to connect two cables to the battery which is in place of the fuel tank... and you're ready!





Pre-flight checks are reduced to a minimum given that the 'heart' of the electric motor is protected by a carbon case. Master switch to ON, a push of the thumb on the control button, a three second wait, a beep ... and then you're off!

On your back, the machine is really well balanced. Used to flying a MacFly Thor 130, I don't feel any difference in weight. On the other hand, moving about on the ground is nicer with this electric motor, the weight distribution seems better for the pilot on foot.

#### TAKE OFF

The noise, both quiet and 'modern' is an immediate surprise. The acceleration has to be really progressive with a risk of being caught out by the large torque effect.

#### THE FLIGHT

The absence of an anti-noise headset is wonderful. Firstly, because the noise is no longer a problem but, above all, because you can feel the sensation of the airflow. It's really nice to discover this feeling of freedom, of wind in your ears. For me, this was a surprise and being able to feel the wind like this really improves the quality of flying.

The power curve requires time to adapt to. At low revs, the inertia is comparable to a petrol engine. On the other hand, from mid revs, there is almost no inertia. I was surprised by the thrust which was available so quickly. This aspect, in my opinion, requires time to get used to, in particular for flights near the ground and/or slaloms. I was surprised by the creation of pitch movements in straight flight when I used too much power and took a bit of time to adjust my turns when working near the ground.

The small screen placed on the throttle gives information about power and consumption. It reinitialises with each flight, in such a way that you don't really know what's left in the battery. Remember not to wear polarised glasses, as you won't be able to read the screen wearing them.

George Blottin, paraglider and paramotor pilot since the very beginning and defender of electric motors.



The chassis from the machine tested is identical to this one by MacFly, equipped with a petrol engine.



With three approximately ten minute long flights, I didn't manage to flatten the battery, or even get into the 'red zone', which limits the power available for a time before the engine stops. Therefore, the thirty minutes specified for a 45 Ah battery seems to be about right. Note that a battery of 63 or 73 Ah allows more than one hour of flying.

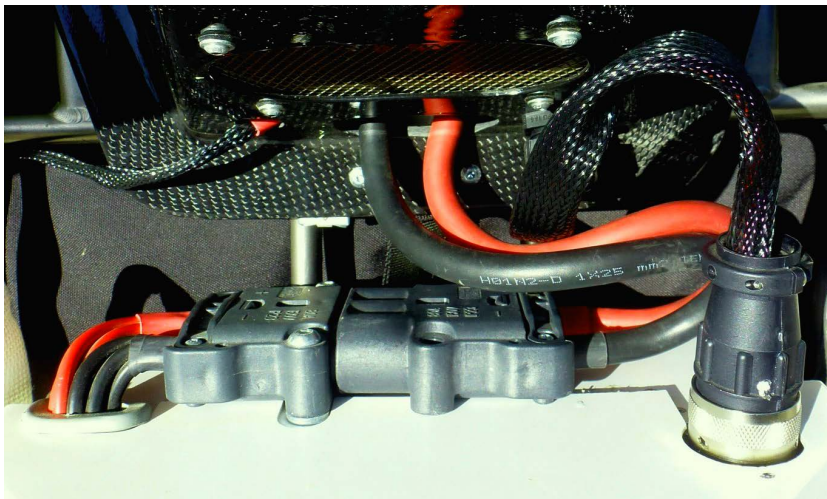
**A CONCLUSIVE TEST**

The Exomo seemed comfortable, reliable and easy to access. For a 'classic' paramotor pilot, the adaptation only takes a few minutes. The systems and procedures are the same, getting it started is incredibly simple and you can, at last, get rid of the jerry cans of fuel and the tool kit. And above all, you'll never be told again that you make a lot of noise!

It's undeniably an important step in the story of paramotoring, even if the price obviously remains well above that of a chassis and petrol motor set up. 🙏



The classic throttle... if it wasn't for the presence of a digital screen.



The two connections which link the battery to the motor: one for 'data' (black woven cable) the other for power (thick red and black electric cables).

The motor is protected by a very smooth carbon cover.

Below, the battery fits in a white box with very practical handles.

This box is attached by a solid Velcro system.





# MEASURING THE THRUST

*In March, during a meeting, the American school CloudBase PPG measured and compared the thrust from different combinations of motor/propeller.*



Photo: Véronique Burkhardt

**P**recise measurements of thrust aren't easy to obtain and above all to compare. Firstly, most testing benches used in paramotoring only measure static thrust: on the ground, the motor is opened to maximum and the force measured is that which it exerts in the propeller axes. Some measure this just by putting the motor on their back, full throttle and push against bathroom scales positioned vertically on a wall. On other testing benches, the motor is fixed to a trike, and they measure the pulling force. But all these static measurements, no matter how precise, can't take into account the modification caused by the flow in the air, where the pilot travels at different speeds, often around 40 km/h. Obviously the output from the propeller isn't the same.

The real thrust in the air, with the air flow, isn't identical to the static thrust on the ground. The latter, all the same, gives a good idea.

  
**Adventure**  
Soufflez, Inspirez





The static measurements don't necessarily reflect the reality in the air, but they give an idea.

During a meeting, London Ivey, from the school CloudBase PPG, and reseller for the Simplify and the Cisco brands, compared more than two dozen motors and established a list of thrust prize winners.

We know neither the precision of the instrument used, nor can we judge the objectivity of these measurements, which should therefore be used judiciously, but this comparison did seem, nonetheless, very interesting and fairly comprehensive.

Future updates will be put on line on the school's website:

[www.cloudbaseppg.com](http://www.cloudbaseppg.com)



We know neither the precision of the instrument used, nor can we judge the objectivity of these measurements.

Pilot	Cage	Constructeur engine	Model	size in cm <sup>3</sup>	Prop	prop size	No of Blades	max RPM's	thrust (lbs.)	Thrust (kg)
London Ivey	Simplify	Cisco Motors	Bull Max	230	Helix	130	2	7400	188,3	85,4
Lee Smith	Macfly	Polini	250	250	E-Prop	130	2	7950	188,2	85,4
Lee Smith	Macfly	Polini	250	250	E-Prop	130	4	8200	185,0	83,9
London Ivey	Simplyly	Cisco Motors	Bull Max	230	Peszke	130	3	7880	185,0	83,9
Karl Monstor	PAP	Vittorazi	Plus	185	Helix	140	2	8500	176,0	79,8
Loren Mikel's	airfer	Vittorazi	Plus	185	Glider Sport	130	2	8340	171,7	77,9
Danny Bell		Monstor	Vittorazi	185	Helix	130	2	8550	163,4	74,1
London Ivey	ManTech	Polini		200	E-Prop	125cc	2		160,0	72,6
Mark Webber	Nirrina	Simonini	Instinct	230	Nirvana	128		6400	155,9	70,7
Ernie Ely	Power2fly	Vittorazi	Plus	185	Helix	125cc	2	8410	155,4	70,5
Kirk Souder	instict		Instinct	230	Nirvana	128	3	7300	148,0	67,1
David Buttler	PAP	Vittorazi	Plus	185	E-Prop	125	2	8800	140,0	63,5
Tim Helms	skycruiser	Corsair	Black Bull	235	helix	125	2	7880	138,2	62,7
Gale Tyler	AC	Nitro	AC	200	E-Prop	125	2	7560	138,0	62,6
Karl "Dude"	AC	Air Conception	Nitro	200	nirvana	125C	3	7400	135,6	61,5
David Buttler	PAP	Vittorazi	Plus	185	Helix	125	2	8400	134,5	61,0
Eric Cotte	Propulse	Vittorazi	Fly Product	185	Helix	120	2		132,0	59,9
Michelle Helmes	AC	Air Conception	Nitro	130	E-Prop	125	2	9940	129,9	58,9
Scott Lazarus	Kestrel	HE	Blackhawk	125	YUENY	125	2	9570	129,0	58,5
Macie Angelo	Instict	Nirvana	Instinct	200	Nirvana	128	3	6300	125,7	57,0
Phil Goffey		Nirvana	Rodeo	200	Nirvana	125	2	6650	123,0	55,8
Jack Dooly	AC	Air Conception	AC 130	130	E-Prop	125	2	9400	118,6	53,8
Macie Bussy	AC	Air Conception	AC 130	130	E-Prop	130	2	9400	114,0	51,7
Alberto Montero	Adventure	Solo	Solo	210	Mike Haye	115	2		107,6	48,8
Dave Holton	AC	Air Conception	AC 130	130	E-Prop	125	2	9600	104,0	47,2
Ernie Ely	Fly Produits	Cisco Motors	SNAP	100	Wood	124.5 R	2	9010	102,0	46,3
Carson Theman	mini plane	Top 80		80cc	E-Prop	125	2	10010	98,2	44,5



Concept, editor in chief, webmaster: Sascha Burkhardt  
test pilots: Sylvain Dupuis, Pascal Kreyder, Estéban Bourroufiès, Philippe Lami  
Layout: Véronique Burkhardt  
Translations: Ruth Jessop  
iOS development: Hartwig Wiesmann, [Skywind](#)  
Android development: Stéphane Nicole [www.ppgps.info](#)  
Logo designed by Indalo: All rights reserved by Michael Sucker [indalo@web.de](#)  
Magazine free.aero  
SIRET 807821319 00017

Editor and director of the publication:  
Sascha Burkhardt, [contact@free.aero](#)  
F-66210 Saint Pierre dels Forcats  
Tel. +33 6 70 15 11 16

The contents of [free.aero](#) (photographs, articles, videos etc) are protected by copyright.

Anyone has the right to duplicate, redistribute or publish our online magazines, as long as they don't modify them. It is strictly forbidden to copy articles or photographs, to publish them, to use them in any other format or context, or to use them in another piece of work.

