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WORLDWIDE PARAGLIDING AND PARAMOTORING MAGAZINE. FOR FREE.


Foto: Swing

LIGHT&BIVOUAC 2017

COUPE ICARE 2017

At the 2017 Coupe Icare, we discovered numerous new products and trends, especially in 'Lightweight'. The special edition recounting these first trends for 2018 will be out in the next few days.


Foto: Alain Douce

Foto: Bruno Lavit

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Cover photo: A Swing Arcus RS in its completely new lightweight version. Profly/SWING

For 'hike&fly' paragliding as well as for travelling by paramotor, the often stable, autumn air still offers numerous flying days. Including for vol bivouac, an adventure which tempts more and more pilots. The equipment is getting lighter and lighter, not just from a carrying on the ground point of view, but it's also, and especially, for comfort and safety in the air when flying that we benefit from less weight with its reduced inertia. In this edition, we have brought together news and tests about this trend and have also consecrated a large part to the walk in and bivouacing. In the special 'Coupe Icare' edition which will appear a few days after this edition, we will continue our review of the trends for 2018.

CONTENTS

Translation by Ruth Jessop

Red Bull X-Alps 2017
SALZBURG TO MONACO
PROUD PARTNER

"X-ALPS3
THE wing for winners!"

Photos: Red Bull Content Pool

Congrats to our athletes on their amazing Red Bull X-Alps 2017 results
You guys rock!

Chrigel Maurer - **Rank 1**

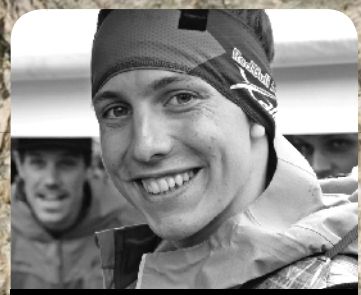
"The ease and safety of the 3-Line-Concept allowed me to defend my title without stress..."

Paul Guschlbauer - **Rank 3**

"Under the X-ALPS3 I felt comfortable, even in risky situations. That opened the doors to take extraordinary routes."

Ferdy van Schelven - **Rank 4**

"With the necessary performance of the X-ALPS3 I could finally achieve a result in the top five!"



Simon Oberrauner - **Rank 5**

"I just had serious fun flying skywalks X-ALPS3 wing during the competition. To get a spot in the top 5 makes a dream come true for me."

PURE PASSION FOR FLYING

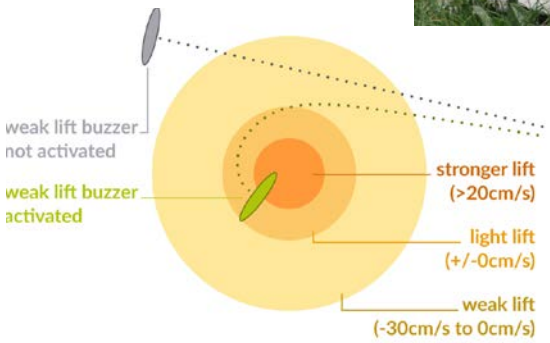
skywalk.paragliders skywalkparagliders www.skywalk.info

SKYWALK
PARAGLIDERS

BIPBIP+ EDITION 2017

The BipBip+ vario has been available since this summer. This acoustic vario is solar powered like its predecessor, but also has some new functions: A more powerful buzzer and a completely new resonance chamber to give louder sound. A 'Silence' mode is possible: visual indication of the climb by flashing LEDs. It has a 'buzzer' which can be activated (sound to optimise the search for thermals in zeros). Sensitivity to climbs, adjustable without a screwdriver, from 10 cm/s to 50 cm/s, as well as slow or fast reaction. Price: €90 Like its big brother the GPSBip, BipBip+ was designed and assembled in France at Grenoble in collaboration with a workshop employing handicapped people.

www.lebipbip.com



An increasingly efficient vario which is still just as small and light:
Dimensions: 5.7 x 3.6 x 1.7 cm
Weight: 25 g

Remember that, weighing 10 g extra, the company also offer a GPS vario with voice output and a flight recorder. We'll talk about it again in the next issue. Now it integrates AHRS algorithms!

Foto: Tristan Shu

Our explanations and tests of the older versions which came out in 2015 of the Skywalk Range Air/Range X-Alps. http://www.free.aero/en/contentsHTML/Free_aero_Light_E_150/index.html?page=62


Paul Guschlbauer was third in the 2015 X-Alps with a Skywalk Range X-Alps harness which is now available in mass production for everyone.

SKYWALK
RANGE X-ALPS 2

Skywalk have brought out the second version of their light weight X-Alps harness. Despite a weight of 1.7 kg, almost similar to the Range X Alps1, the version 2 has an inflatable back protector.

This harness, identical to the version used during the 2017 X-Alps, will be available in a limited version until the launch of a production version, which will no doubt be a bit heavier.

www.skywalk.info


SKIN 2 P
NIVIUK
AMAZING ADVENTURES
niviuk.com
facebook.com/niviuk
@niviukparagliders

Foto: Advance

ADVANCE

OMEGA XALPS 2 READY TO RACE !

Conceived as a Light Racer for the 2017 X-Alps; developed as a High-End cross country wing with the feelgood factor which includes a top speed you can use: the new OMEGA XALPS 2 from ADVANCE is intended for ambitious cross country pilots, and benefits equally from extensive development lavished on the SIGMA 10, and the knowledge gained from the earlier OMEGA XALPS. The result is a light racer which is very direction and pitch stable through bumpy air, and also has a particularly effective and easy-to-push speed system. We should add the exceptionally light weights starting from 3.4 kg. The OMEGA XALPS 2 comes in three sizes - 22, 23 and 24 - and these cover a weight range of 70 to 120 kg. This EN/LTF-D wing can be tested from the beginning of September at ADVANCE dealers.
There's more information on:
www.advance.ch

Photo: Advance

ADVANCE

NEW ADVANCE PI BI LIGHT TANDEM

ADVANCE will launch the new PI BI in the autumn. This Lightbuild tandem, size 37, carries an all-up weight range from 100 to 180 kg and weighs a mere 4.9 kg! This makes it particularly suitable for Hiking and Flying with friends and family. The PI BI is a three-liner with trims like the BIBETA 6. Special features: not just the weight and pack volume, the handling and agility reminds you of an M solo wing. PI BI – Dynamic Flying Fun for Two ...

There's more information on:
www.advance.ch

DELTA 3

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.

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

WWW.FLYOZONE.COM
photo: **Jorge Atramiz** pilot: **John Mallard**

NEWS GIN

GIN are now selling a new reversible, very light harness: the Yeti Convertible 2. 1.48 kg plus 0.43 kg for the optional airbag. Less than 2 kg for a reversible harness certified EN/LTF. Another new and useful accessory for hike&fly: the Concertina Compress folding bag which only weighs 200g and is available in lengths 2.7 and 3 m.

www.gingliders.com/sellettes/yeti-convertible/

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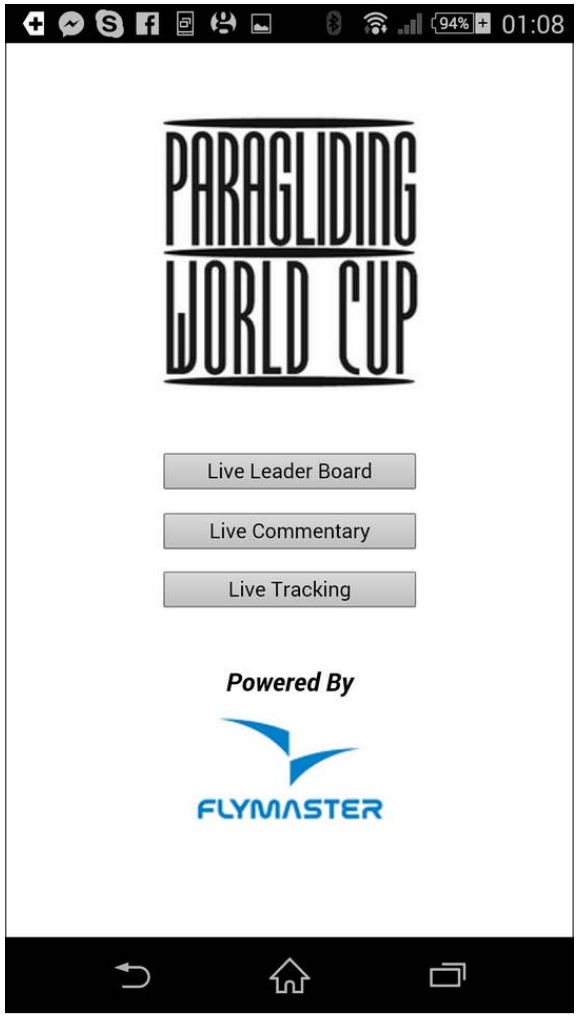
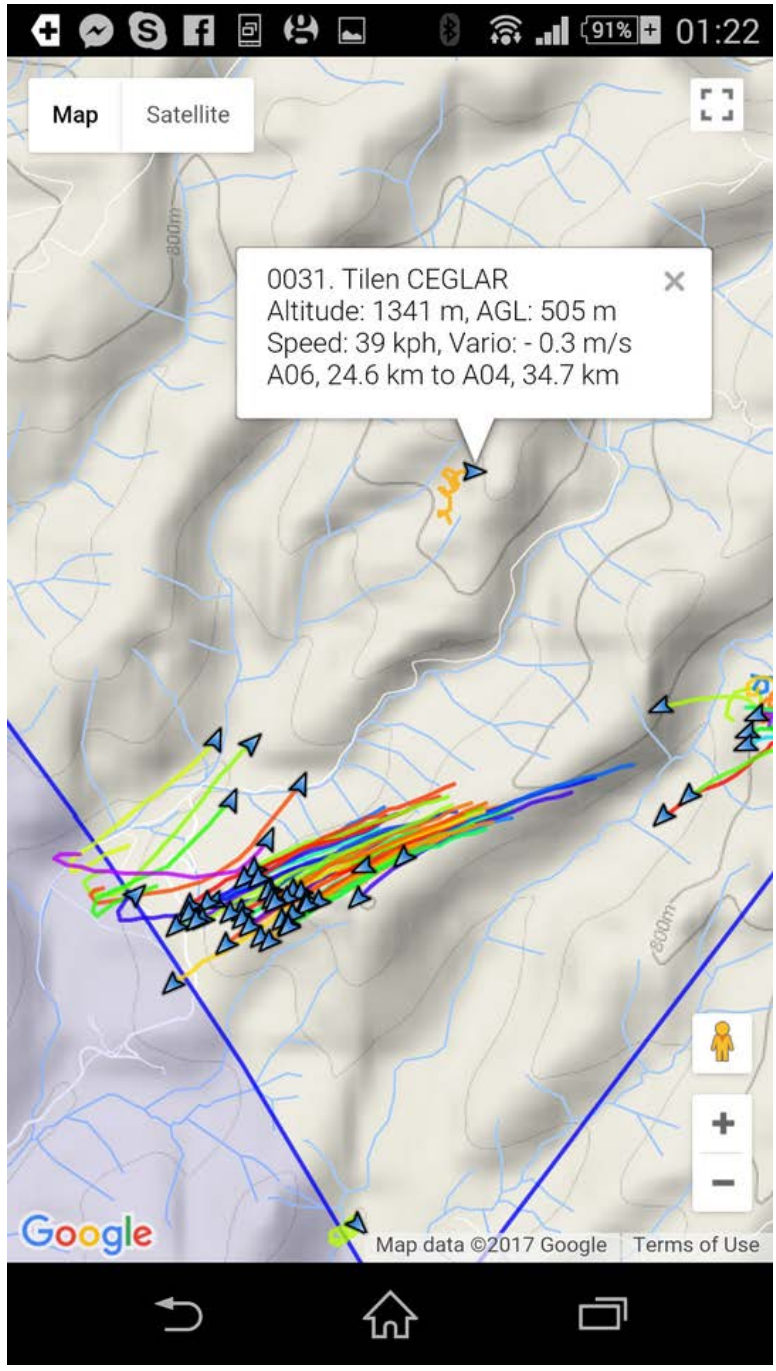
PWCA : THE APP...

To make it easier to keep up with the Paragliding World Cup live commentary and tracking on a mobile phone or tablet, Ulric Jessop (World Cup Technical Delegate) has designed an app. The app also includes the leaderboard and results. Information on how to install it for the next World Cup being held in Ecuador 28/10/2017 - 04/11/2017 or the Super Final in Roladanillo in Columbia 09/01/2018 to 21/01/2018 is posted on the Paragliding World Cup website (pwca.org) or you can go directly to the Google Play Store:

https://play.google.com/store/apps/details?id=org.pwca.liveapp

It will also be available soon for iOS





Rank	ID	Name	AMSL	AGL	Vario	Tracker	Result
1	0031	T. Ceglar	2061	1257	- 0.8	3 min	13.0 km to #1, 19.8 km
2	0771	D. Goksal	957	134	- 2.5	3 min	12.6 km to #1, 19.6 km
3	0044	R. Gallon	933	32	- 1.2	3 min	12.7 km to #1, 19.5 km
4	0047	M. Novak	1052	74	+ 0.2	3 min	12.8 km to #1, 19.4 km
5	0048	T. Lavolé	1119	318	- 3.5	3 min	13.0 km to #1, 19.3 km
6	0060	M. Hrgetic	1221	149	- 2.2	3 min	12.8 km to #1, 19.2 km
7	0226	Y. Mishanin	1083	75	- 0.8	3 min	12.9 km to #1, 19.2 km
8	0075	M. Quintanilla	2083	1286	+ 0.8	3 min	13.6 km to #1, 19.2 km
9	0320	A. Rainsford	971	157	+ 1.0	3 min	13.2 km to #1, 19.1 km
10	0818	R. Geijsen	976	29	+ 0.3	3 min	13.2 km to #1, 19 km
11	0064	Y. Savov	2046	1253	+ 0.3	3 min	13.8 km to #1, 19 km
12	1111	M. Petz	2061	1244	- 1.2	3 min	13.8 km to #1, 19 km
13	0381	S. Gichuki	1037	65	+ 0.3	3 min	13.3 km to #1, 18.9 km
14	0353	A. Michiels	980	11	- 2.7	3 min	13.4 km to #1, 18.9 km
15	0022	M. Sigel	2085	1269	+ 0.3	3 min	13.9 km to #1, 18.9 km
16	0059	M. Rebord	2004	1188	- 0.7	3 min	13.9 km to #1, 18.9 km
17	0396	P. Titov	1016	47	- 2.7	3 min	13.4 km to #1, 18.9 km
18	1205	K. Nesengmo	2061	1228	0.0	3 min	14.0 km to #1, 18.8 km
19	0014	J. Oberhauser	2030	1177	- 0.3	3 min	14.0 km to #1, 18.8 km
20	0105	L. Gerin-jean	2081	1251	- 1.3	3 min	14.0 km to #1, 18.8 km
21	0453	A. Schalber	2069	1239	+ 0.5	3 min	14.0 km to #1, 18.8 km
22	0500	J. Napret	1446	859	- 0.8	3 min	13.7 km to #1, 18.8 km


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Photo : Profly/SWING

The Arcus RS Light: the RAST wall is clearly visible in the middle of the wing.

SWING
ARCUS RS LITE

The Arcus RS Lite is under development: the characteristics of the RS system, which allow it to dampen the behaviour of the wing, will be increased by the 'Light' construction…

We've already introduced Michael Nesler's RS system in our columns: a wall divides the wing into two parts. The back part keeps the wing flying 'reasonably' even if the front part is collapsed.

Read more on the subject in our test of the Swing Mito. The system is now integrated into most Swing wings, including the lightweight ones. Logically, the security aspect and the damping from the RAST system should add to the inherently better behaviour due to being lighter, and therefore more damped.

Our test of the Swing Mito with explanations of the RAST system: http://www.free.aero/en/contentsHTML/Season2016/?page=71

A frontal on an Arcus RS Lite: the RAST system on its own gives rapid reopening and limits the pitch movement. Logically the lighter wing dives even less.

As we've explained many times, a lighter wing moves more. It's twitchier, but the movements remain more limited and it dives less compared to a classic wing because the inertia is less. This is what makes lots of 'light' wings safer than their classic counterparts. If you combine 'light' with technology which allows damping such as RAST, this should improve the behaviour.

According to Michael Nesler, this is effectively the case for the all new Arcus RS Lite: a frontal opens very quickly, there is very little dive and very little loss of altitude. We're looking forward to testing one! The wing weighs about 800g less than the classic version, therefore between 3.4 and 4.3 kg according to the size.

Photo : Profly/SWING

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CONFIDENCE MAKES THE DIFFERENCE

* Tissus et composites pour les acteurs de l'outdoor / Création : avec1e - Photo shutterstock

NOVA MENTOR 5 LIGHT

As you would expect, after the XXS, Nova have brought out a lightweight version of the Mentor 5 in sizes XS-M as well.

Photo: Nova

Clearly visible: the mini ribs on the trailing edge as well as on the very airy diagonal cell walls.

The eagerly awaited lightweight version of the Mentor Light has passed certification and has been available since September. Nova have saved 25% in weight, by using mainly Porcher Skytex 27 (and Skytex 32 on the leading edge) instead of Dominico 20D (and 30D on the leading edge) on the standard Mentor 5. The Mentor 5 XXS was made as a light version from the beginning, Nova have added, de facto, three new models (XS Light, S Light and M Light). As usual, the size L isn't available in a lightweight version. The geometry of the Mentor 5 hasn't changed, and it is obviously also made with a Nova Air Scoop SharkNose, variable sized cells called Smart Cells and Double 3D-Shaping. Nova have designed this wing for very flexible use: travelling, hike&fly, bivouac and also for use at normal flying sites, as the reduction in weight hasn't been done to the detriment of longevity.

Nova give a three year guarantee, which can be extended to four years.

TECHNICAL DATA	MENTOR 5 STANDARD					MENTOR 5 LIGHT			
Manufacturer: NOVA Web : https://www.nova.eu/fr/parapente/mentor-5/ -						www.nova.eu/fr/parapente/mentor-5-light/			
DATE	2017					2017			
SIZE	XXS	XS	S	M	L	XXS	XS	S	M
CELLS	59					59			
FLAT SURFACE AREA [m²]	21,84	24,16	26,49	28,88	31,24	21,84	24,16	26,49	28,88
FLAT WINGSPAN [m]	10,86	11,42	11,96	12,48	12,99	10,86	11,42	11,96	12,48
FLAT ASPECT RATIO	5,4					5,4			
ALL UP WEIGHT [kg]	55-80	70-90	80-100	90-110	100-130	55-80	70-90	80-100	90-110
WEIGHT OF THE WING [kg]	3,35	**4,8**	**5,05**	**5,3**	5,55	3.35	**3.55**	**3.8**	**4.05**
CERTIFICATION	B					B			

The 'normal' XXS was already 'light' when it came out.

CARBON
EVERYWHERE,
LIGHTWEIGHT AND
ROBUST.....

ADVENTURE PLUMA

On this machine, the arms and the full cage (optional) are in carbon.

Adventure are getting lighter: the PLUMA is a chassis which reflects a remarkable evolution from the manufacture to the finish.

Fotos : Arnaud Dréan pour free.aero

Carbon is a fibre which is soaring in popularity. We know it's a material which is very robust but nonetheless light. To make a lightweight paramotor, it's prudent to replace a maximum number of components with this material. It has almost only advantages, aside from the high price…

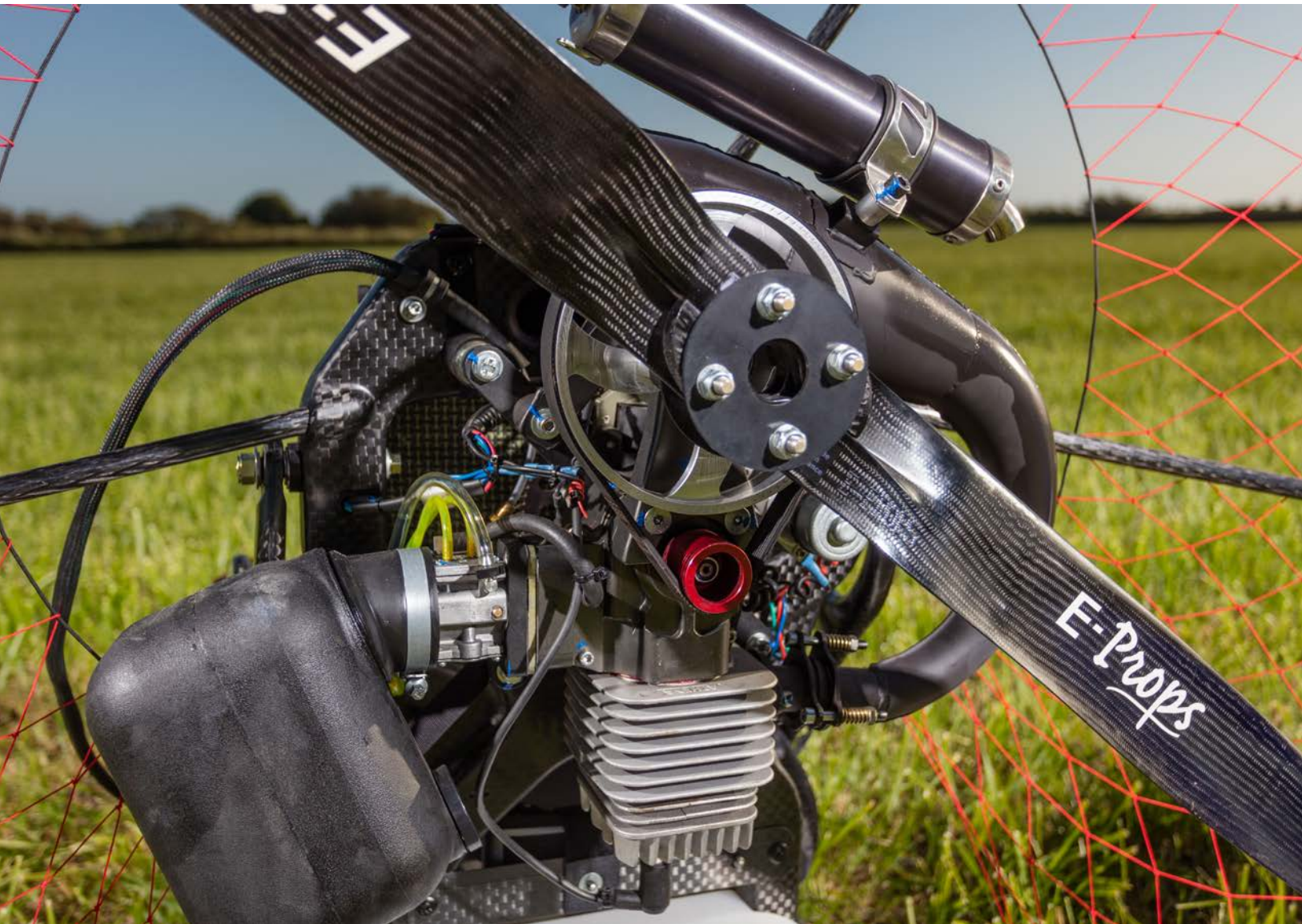
Adventure are one of the pioneers of this material. The chassis on the X-Race LT is already a remarkable evolution. With the PLUMA, Adventure spearheaded a whole new way of producing carbon fibre paramotor chassis, inspired by a technique already in vogue for racing cars and top level aviation: the use of pre impregnated fabric cooked in an autoclave oven. In the past, the shells were laminated by putting in place layers of carbon fibre fabric, on which a resin was applied.

The part played by the resin was a lot more random than with the new technology. Now for the PLUMA chassis, the manufacturer uses fabric pre-impregnated with resin.

The polymerisation of these specific fabrics is activated and controlled by the passage of the parts in a vacuum oven.

The PLUMA is delivered with the 3D rod system. There are more explanations in our test of the X-Race LT in 2015 (http://www.free.aero/en/contentsHTML/Free_aero_Light_E_150/index.html?page=118).

The 8.1 engine with an e-props blade on a PLUMA chassis.

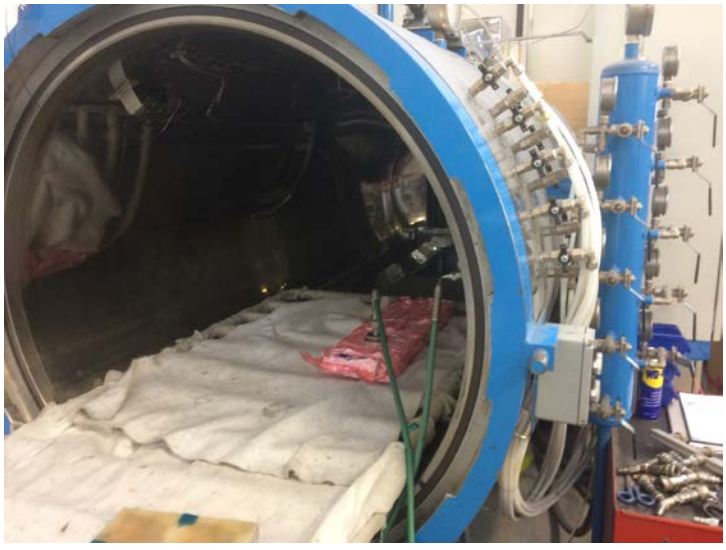


ADVANTAGE
One works with an appropriate quantity of resin, because it is already in the fabric.

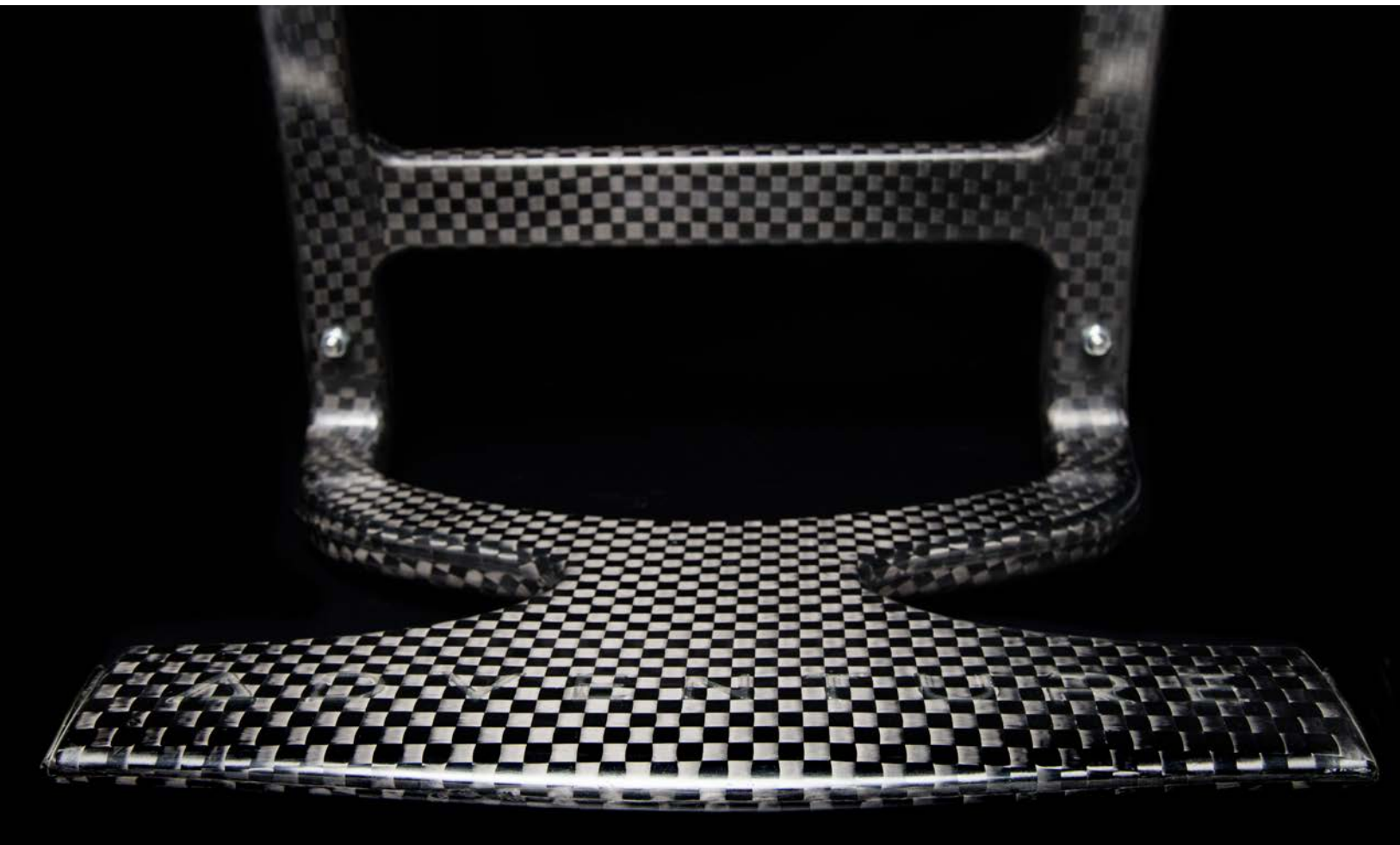
Therefore the manufacturer perfectly controls the supply of material to each place, which guarantees solidity and at the same time, light weight. This technique also makes it easier to manufacture components in complex forms.

Even the mobile swing arms on the PLUMA are made this way: the chassis with rods and full cage only weighs 2.65 to 2.95 kg depending on the options (standard: aluminium cage, optional: cage also in carbon fibre)! With the 8.1 engine, Adventure can offer a very robust machine weighing less than 19 kg.

The autoclave oven in which are 'cooked' under a vacuum, the new chassis and feet. Beforehand, the fabric is cut by laser and placed in a mould. Photo : Adventure



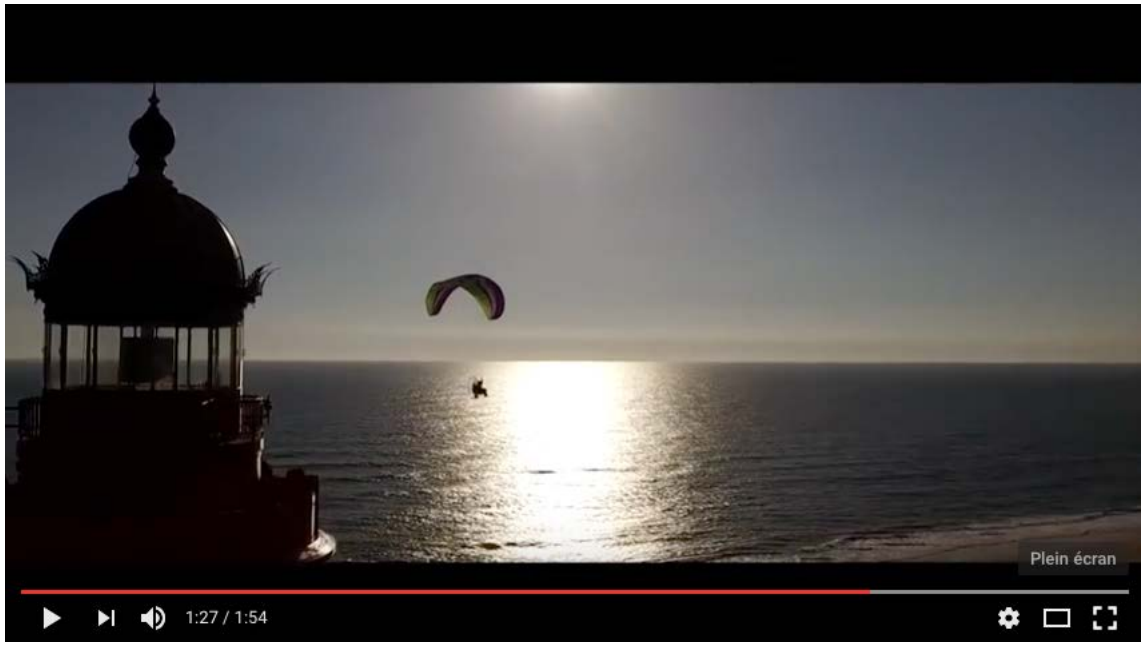
Thanks to this new technology, the foot of the chassis with its complex forms, is also in Carbon.



The most amazing part: the very robust arms in carbon fibre...

The functionality and undeniable aesthetic of the reduction to the essentials.

Adventure still offer a full range of their own wings.



Adventure video on Youtube : https://www.youtube.com/watch?v=IY1cdiB7udA&feature=youtu.be

With an 8.1 engine, the weight of the total machine can go down to 18.75 – 19.85 kg depending on the options.

With the excellent Bidalot Eole, the maximum pilot weight can go up to 110 kg, for a machine weighing 22.65 - 23.75 kg. Now, a version with the Moster (no photo) also exists.

The sturdiness of the system was checked in the EAPR laboratory in Germany: with a pilot weighing 125 kg, this chassis sustained 15 G... This sturdiness is also documented in a video put online by the manufacturer. Some professionals have asked whether the carbon fibre couldn't, in the unlikely case of a breakage, turn into sharp points, which would be dangerous for the pilot.

According to Adventure, the unidirectional fabric used doesn't carry this risk. The pilot therefore shouldn't be worried about safety, but instead perhaps about his bank account. Obviously, the hi-tech used in Formula 1 and top level aviation comes at a price, which starts at 6600 euros for the starting models without any options or harness.

At the same time, it could be worse, given the technology being used.

Equipped with a 'bumper', the chassis in this video shows remarkable sturdiness. https://www.youtube.com/watch?v=MXOtnEm3X1g

PLUMA - TECHNICAL DATA

Manufacturer: ADVENTURE **Web :** http://www.paramoteur.com/en/

	8.1	Bidalot EOLE 135	Moster 185
Helix propeller (1.1 kg)	115/130	115/130	130
E-Props propeller (0.6 kg)	130	130	130
Total weight in kg (depending on harness and propeller)	18.75 - 19.85	22.65 - 23.75	23,85 - 24,95
Pilot weight (kg)	< 80	70 -110	75-biplace
Capacity	80	135	185
Power HP	17	25	25
Thrust kg (according to propeller)	50-55	66-74	80-85
Consumption l/h	2.5	3,0	nc
Starter	electric	electric	Electric + manual
Clutch	non	non	oui
Reduction	4.2	3.12	nc
Price without harness from	6600 €	7400	7900

Photos : Sascha Burkhardt

Softlinks: often above, but below, the use of karabiners is more common.

A simpler fastening thanks to a loop and a ball shaped knot.

SOFTLINKS SIMPLER ?

Softlinks are used increasingly frequently between the risers and the lines, but still aren't very widespread between the harness and the risers. Yet, these links are very lightweight, safe and strong. But their installation is not as easy as a karabiner.

Pioneers of softlinks such as Kortel Design, are working on quicker fastenings, but still haven't found anything that they can market.

One avenue tried, was a simple loop, where the braid passed through itself and finished with a stopper knot in the form of a ball, the Diamond knot. (https://en.wikipedia.org/wiki/Diamond_knot).

It's a fabric shackle, widely used in nautical sports. It holds perfectly: 2500 kg for an 8mm shackle for example, and it's a lot easier to open and close. Too simple no doubt: psychologically, it doesn't seem 'closed' enough perhaps, not helped by the fact that it has to be pulled tight before being under tension, otherwise the loop can further give this impression.

For this reason, Kortel are working on other types of fastening and hope to be able to market them soon. Whilst waiting, you can buy this type of buckle from Cousin Trestec for example, the French rope manufacturer known for their line manufacture (in Dyneema, Vectran and Technora amongst others).

They also offer manufacturing kits to make dozens of shackles yourself: it's very informative and allows you to better understand the potential of textile buckles (0.5 mm, breaking strain 2 900 daN, €42). Available for example from Accastillage distribution: http://www.accastillage-diffusion.co.uk/

Manufacturing kits (above) and the pre-manufactured buckles in front.

Different sizes of manufacturing kits. It isn't complicated, but the instructions could be clearer.

As a reminder, the possibilities for Softlinks replacing karabiners: http://www.free.aero/en/contentsHTML/security/?page=53


BUCKLE UP!

Softlinks are replacing traditional metal karabiners or maillons more and more, but they don't just save a lot of weight. Here's what you need to know to use them correctly...

Cousin video: Making a buckle. https://www.youtube.com/watch?v=FOD-czpli_-o&feature=youtu.be

Foto: Jacques-Paul Stéfani

'Normal' on a dune, 'mad' elsewhere?

HIKE AND FLY BAREFOOT (OR ALMOST)

Lighter 'hike&fly': also concerns shoes. All-encompassing ankle boots have given way to lighter, even minimalist, shoes...

As far as shoes are concerned, school instructors or tandem pilots taking a passenger on a first flight, are often uncompromising with their pupils/passengers: you can't work on the training slope/take-off in light shoes. That seems obvious because heavy walking boots, which go higher up, can protect ankles whereas, in trainers, it seems easier to twist an ankle.

Taking off in a tandem after a two hour walk in with Fivefingers... Wow !

Photo: Véronique Burkhardt Pilote: Sascha Burkhardt

Like the X-Alps competitors in this photo, most pilots fly in some form of trainer or trail shoe: about 1 kg of saving compared to walking boots.
Photo: Harald Tauderer

Yet, when they fly for fun, those same instructors often wear light trainers. This is even more so the case in the growing sport of 'hike&fly': every gramme counts. Where's the point of reducing the weight of the wing by 500g, when the pilot is carrying 1.5 kg on their feet, or even 2 kg in the case of walking boots? Almost all the X-Alps pilots wore trail shoes, resembling good quality trainers, weighing less than 600 g per pair. So, is the argument for ankle support strong enough to justify the increase in weight of at least one kilo extra?

Perhaps not.
More and more voices are being raised to promote minimalist shoes, and also with the aim of reducing injuries. Explanation: the more feet are enclosed in a solid case, the less the foot can work naturally when walking or taking off. The human foot is a very sophisticated structure, made up of lots of small bones, tendons and muscles which, amongst other things, act as shock absorbers if they are given enough freedom to move.

When you put your foot on the ground when walking in or taking off, a natural movement would be to spread your toes out.

Photo: Sascha Buckhardt

Going up to take-off, from time to time it's great to take your shoes off and feel the mountain, with nothing in between.

Vivobarefoot is another make of shoes which, since 2003, has advocated using thin soles which are flexible and don't have a cushioned heel. Their full brochure (in English) explains, amongst other things, why classic jogging is bad for your feet: https://goo.gl/nGJyR2. Here, it explains that the more humans walk or run fast, the more they use the front of their feet to shock absorb. It's natural.
Using the heel on the other hand prevents your legs from having this shock absorption: jogging is really bad for your health. https://www.vivobarefoot.com/uk/science#thin

And especially, with thick heavy shoes, the feedback from the ground is virtually zero.

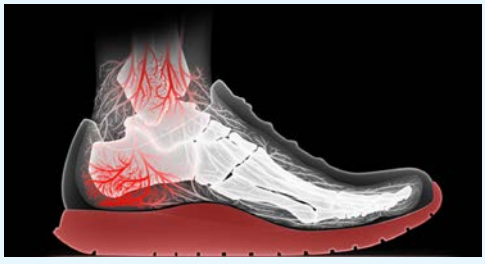
The pilot can't feel where he is putting his feet. But, the proprioception, in other words the information transmitted by the 'sensors' in our ankles and inside our feet, is an important element in our natural gait.

As a bit of an exaggeration, imagine being at take-off in ski boots on uneven ground full of big stones: it would be very difficult, and correct positioning of your ankle wouldn't guarantee against injuring your knee.

The problem just moves higher up than your ankle. Shoe manufactures like Vivobarefoot protect barefoot fan's feet, when running as well as walking. The very thin soles of about 3mm, give lots of feedback about the nature of the ground and lots of freedom of movement, thanks to the flexible materials used.

Broadly speaking, it feels like walking barefoot, whilst giving a minimum amount of protection against stones and brambles. And above all: there is no shock absorption in the heels, because this encourages a very bad gait, by putting the heel down first. This prevents the body having any shock absorption system which is normally provided by all your toes, the front of your foot, the pads, tendons and muscles in your foot. Minimalist shoes, such as the barefoot ones, force the walker/runner to modify their gait, back to the basics of travelling by foot. Vibram, the company who specialise in making mountain soles, have done a lot of work to educate, and thus promote, their "Fivefingers" since 2006.

On the other hand, in the absences of a scientific study to prove it, the company don't have the right to officially promote the health benefits of such a move. It does, however, seem logical not to deprive your feet of all their faculties. On the other hand, a pilot who swaps, with no training, from supportive shoes to a 'barefoot' minimalist shoe needs to pay a bit more attention initially:you need to gradually relearn to walk using the front part of your foot.
The footsteps need to be shorter and quicker, for example.



'Bad', according to Vivobarefoot: a foot tightly enclosed in a rigid shoe with a shock absorbing heel.

'Good' according to Vivobarefoot: a foot placed on a thin sole, leaving lots of room for the toes to move.

Vibram Fivefingers: a frog-like look for a better gait. The toes are completely independent.

Photo: Véronique Burkhardt Pilote: Sascha Burkhardt

When taking off on a paramotor, the pilot has hardly any choice: with the body behind to keep the horizontal thrust, their heels are forced to touch down first. Good shock absorption is the goal! On the other hand, when free flying a paraglider, we work a lot more naturally with the front of our feet...

Lots of muscles in our feet and legs are not used in walking boots, but are put to work when we go barefoot. We can confirm that during our tests of the Fivefingers, after the first 1100m height gain, we were exhausted and felt as if we were walking for the first time in our lives, with pains in our calves and ankles.

But apart from the climbs, what a pleasure to feel closer to the ground and to walk in a more conscious fashion. Without a doubt, they take time to get used to.
Vibram advise that it takes about a year to relearn to walk! After that, your feet will be more alert and more reactive when you risk a sprain, for example. Conclusion Everything is becoming lighter, and shoes are no exception. In free flying, the advent of minimalist shoes seems interesting, especially for hike&fly. Lighter, more natural... But be careful; you need to get used to them and train progressively.

On the other hand, an ankle which is free and muscular, having woken up its proprioception during initial training, could perhaps really be better armed against injury than another which is enclosed and sluggish as if in a manacle.

MINIMALIST SHOES BAREFOOT

POSITIVE POINTS

- **Light**
- **More muscular ankles and feet**
- **Natural shock absorption**
- **Better perception of the ground**
- **More natural gait**
- **More appropriate reactions**
- **They often have better ventilation**

NEGATIVE POINTS

- **Sometimes they are colder**
- **No ankle support**
- **A bit less protection from the sole**
- **Sometimes the protection is less higher up the foot**
- **Initial training necessary**

VIVOBAREFOOT

For these shoes (not tested), their barefoot character isn't visible at first glance, but they have plenty of room for the toes to move, and their sole is very thin and flexible.

These really are 'barefoot'.

Vivobarefoot Hiker Soft Ground Men 400 g in size 42.
Soles of only 3 mm, plus a 5 mm profile.
Vegan. 180 €
https://goo.gl/PkpDzR

free aero MAGAZINE
www.free.aero

VIBRAM FIVEFINGERS

We fully tested these unusual shoes, the Trek Ascent model, to be precise.

With these, you don't (unfortunately) go unnoticed! The Fivefingers exist in numerous variations and colours, with very different soles. The Trek Ascent is the shoe for middle of the range mountain walks, with a thin sole, but with thick tread and lots of grip on a variety of surfaces. Initially, getting into them isn't easy: each toe goes into its own compartment...The sensation is unusual, but not unpleasant. The weight: what a pleasure, less than 450g per pair in size 45.

That's a third of the weight of classic walking boots.

You feel as light as a mountain goat!

On a névé in summer. But still pretty warm!

Despite the thinness of the fabric, these shoes (or rather slippers) are relatively warm, almost too warm in full summer. Because as the foot muscles work more, they heat up more! There are other models with more ventilation.

In the air, on the other hand, where your feet don't do much, these shoes are at their thermal limit at the end of autumn (except in a cocoon harness, of course). The same model exists in wool fur, not tested. The foot protection on the ground is good. You get good feedback, but even pointed stones don't really hurt.

Of course, these shoes force you to walk in a 'bare foot' style, paying more attention to where you put your feet.

As already mentioned, using these muscles is unusual and requires training. Protection against injury from above (stones falling on your feet) is obviously less, almost zero in fact. This is going barefoot without a doubt.

When you've got used to the minimalist approach and have trained for it, very few users want to go back to normal shoes, even in everyday life.

You can also wear them in the town, but be careful: everyone will look at your feet…

This shoe is relatively supple, almost like a climbing rock shoe. The flexible sole adapts well to different surfaces. It works well too for light climbing, as the sole grips well. On damp ground, they slide a bit more. The shoe can be totally submerged and it dries well.
They can also be put in the washing machine.

CONCLUSION: a new life for your feet, especially for 'hike&fly', from May to October, and perhaps more. A fascinating new way to walk that you'll get hooked on, but it requires training…

The Trek Ascent is, amongst other things, designed for country paths, forests and low mountains. Inner sole: 4 mm anti-bacterial sole. Outer sole: Vibram sole in 4mm EVA and 4 mm Vibram Megagrip. Uppers: in Polyester Mesh and Spandex fabric to give maximum feeling. Machine washable at 30°. Weight: 180 g in size 43 and 140 g in size 38. Price: 109 €.
http://www.fivefingersfrance.com/produit/trek-ascent/#

Once in the cocoon, it isn't as necessary to protect your feet from the cold, thus extending the season for minimalist shoes. Here the pilot is flying a Génie Lite 2, semi light harness, 4.4 kg (Size M).
http://gingliders.com/sellettes/genie-lite-2/
Photo : Jérôme Maupoint/GIN

SANDALS CHALAS

The Chalas de Voycontigo: they hold really well in the mountains thanks to a well thought out strap.

We discovered these by accident in the sales (as they had a small manufacturing fault): Chalas are made by a small German manufacturer. At first sight, they look like flip-flops with an exorbitant price tag (nearly 100 €!) The shoes were inspired by sandals made in the bush in Africa (sometimes using bits of car tyre!) and by tribes of Indians in Latin America. Is it a completely mad idea to use them for paragliding hike&fly? Not after trying them: these are technical sandals, which fit your feet at least as well as other walking sandals.

The fastening system is fairly precise by using a buckle and adjusting the straps. The part of the strap which holds the foot by the big toe is elastic and isn't annoying. During our trials, the system even with stood, to a certain extent, use on a climbing wall.

Protection against nettles, stones and branches which can harm the side of your foot is obviously zero, but the sole, despite its relative thinness of 7.5 mm, protects against stones whilst also giving good feedback about the ground and letting your feet work. This sole is in three layers: Vibram to give good anti slip performance (efficient!), then 2 mm "Poron XRD" anti-shock (seems efficient on hard surfaces), then an interior sole in artificial leather, which is very nice and prevents the foot from slipping. In short, nothing to do with flip-flops.

Really useful in summer in the mountains for pilots who like minimalist shoes and whose feet are used to them. How lovely to feel the air around your feet which don't sweat and don't smell... On the other hand, despite the raw materials, which are no doubt expensive and being made in Europe, 100 € does seem a bit excessive.

The buckle itself moves on the other part of the strap allowing a multitude of adjustment combinations, which lock efficiently under tension. Voycontigo, Chala EVO 4.0 XRD Vegan, 210 grammes, 95 €, www.voycontigo.de

TRAIL SHOES

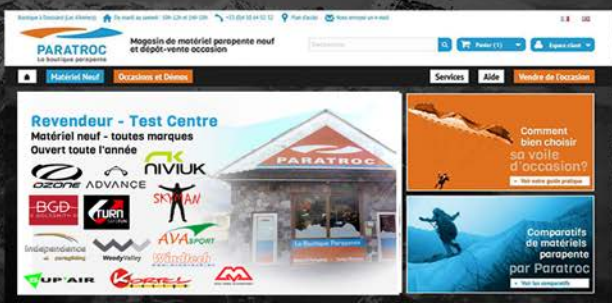
During the X-Alps, almost all the competitors were equipped with trail shoes such as the Salewa Multi-Track. It's a low cut mountain training shoe, very light and breathable with an exterior Michelin sole!

It is adapted to rough, uneven terrain such as rocky, muddy, grassy paths.

But be careful, it isn't a real minimalist shoe like the barefoot ones.

Salewa Multi-Track, Michelin sole, vegan, from 270g/shoe (size not specified). Price about 150 € - 180 €. Below, on Gavin McClurg's feet during the 2017 X-Alps. https://goo.gl/zE5RNq

Photo: Harald Tauderer



THE CLASSICS

As a reminder and comparison, some classic tried and tested boots in our sport: The Hanwags are a real reference! They are boots which protect perfectly against injury by things such as stones and sharp branches and, of course, also against cold and damp. They have good ankle support. Compared to classical walking boots, they have at least one specific feature for free flying: no exposed hooks (for catching lines!) On the other hand, the pilot has 1.5 to 2 kg more on his feet, and their natural movement is very limited...

Hanwag Super Fly GTX Materials: leather, rubber, Gore Tex membrane and an aeroplan Vibram sole. Weight: 950 g. Sizes: 37 - 48 280 €
http://www.hanwag.de/super-fly-gtxr

Hanwag Sky GTX Materials: air mesh, leather, Gore Tex membrane and Vibran soles Weight: 635 g Sizes: 37 - 48 240 €
http://www.hanwag.de/sky-gtxr

Crispi Airborne Gore Tex membrane Upper: waterproof Nubuck. Vibram sole. Removable ankle reinforcement. Nubuck flap over the lacing. Weight: 710 g. Sizes: 38 - 47 240 €
https://www.airetaventure.com/liste.php?idCat=577

NIVIUK

AMAZING ADVENTURES

NIVIUK.COM > TANDEM

TAKOO 4

The ultimate tandem experience

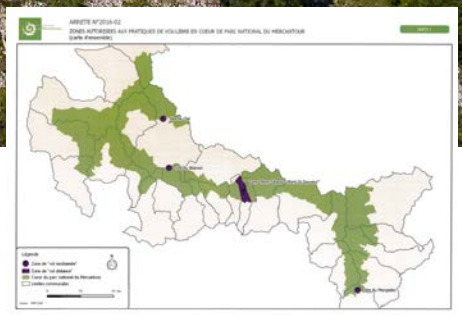
The Takoo 4 meets the most stringent demands of tandem pilots and is one step above the rest thanks to greater performance in all aspects of the flight.

Discover the most Amazing Adventures on our Facebook and Instagram:

facebook.com/Niviuk

instagram.com/Niviukparagliders

Flying in front of the summit of Berchia 2194m, above the ski station of Auron, not far from the forbidden zones.
Photo: Michel Farrugia

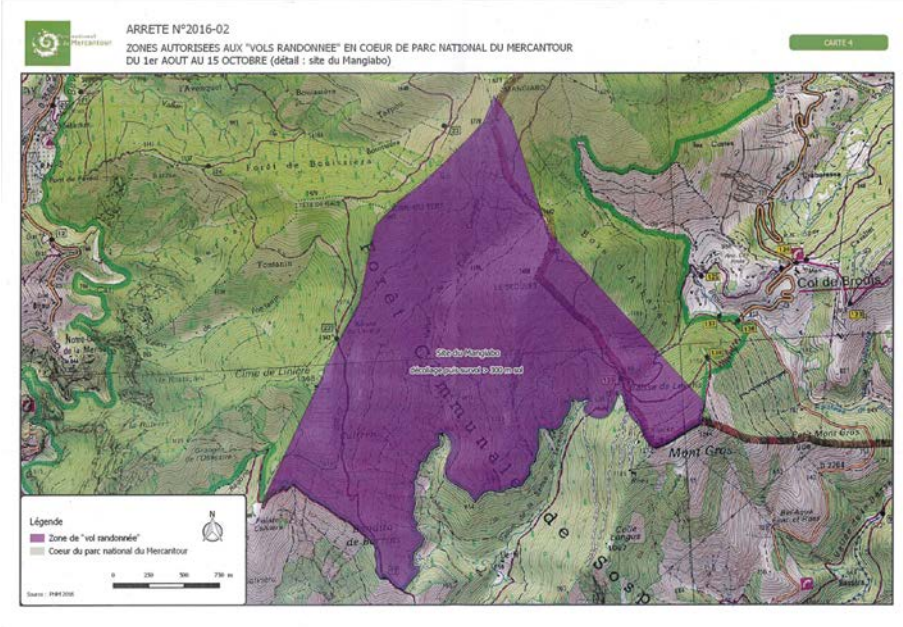


Only the little 'marks' in purple on the map show the zones 'flyable' less than 1000 m above the ground. See example below.

MERCANTOUR NATIONAL PARK (FRANCE)

The national parks have, quite rightly, strict rules excluding, for example flying at less than 1000m above the ground, as in the Mercantour National Park. For a year, with the assistance of the FFVL, some exceptions have been put in place: sites specially dedicated to 'hike&fly', authorised from the 1st of August to the 15th of October, as well as a 'corridor' for crossing it during an XC. A request must be made to the Park Director every time.

An association, led by photographer Michel Farrugia has, as its goal, to further improve the flying potential: longer windows and more sites. Amongst others, extra zones around certain refuges which would allow hike&fly over several days and could even serve as an economic argument for the refuges. For more information: https://www.facebook.com/unrevedemercantour/



Flying near the park limits, above the Tinée Valley on the Nervures Whizz (Test in the issue: http://www.free.aero/en/media/Light-freeAero.pdf).In the background, Cimet 3 020 m and Mont Pelat 3 051 m.
Photo : Michel Farrugia

The Refuge des Merveilles in the heart of the Mercantour National Park could make a great stop for the night whilst doing a hike&fly circuit.
Photo : Michel Farrugia

ICARO2000

extreme sport helmets

Nerv Scratch Grey

Nerv Black & Green

Nerv Deep Forest

Nerv Blu

Nerv Carbon Optic

Nerv Black & Orange

Nerv Carbon White

www.icaro2000.com
staff@icaro2000.com

Foto: Markus Gründhammer

On the summit: a wing and a sleeping bag are enough to protect you from the wind...

VOL BIVOUAC

Whether in a refuge, tent or under the stars, combining peaceful morning flights with nights outdoors adds a new dimension to our sport. Hence the success of "bivouac and fly", often involving 'hiking'...

... spending the night under the stars...

Foto: Markus Gründhammer

...then setting off with the first rays of sunshine...

Foto: Thomas Ulrich

Hike&fly is also a great way to share a long journey in the mountains with a friend and the preflight starts during the walk in with a common or contradictory analysis of the weather conditions.

Foto: Jerome Maupoint

During an autumnal anticyclone, pilots are almost sure of finding relatively calm air after a long climb.

Foto: Jerome Maupoint

Foto: Jerome Maupoint

Foto: Jerome Maupoint

**Hike, fly and bivouac in October: Savour the silence in the wilderness of the high mountains.
And at night, the refuges are often all yours...**

Photos : Jerome Maupoint

Photo: Jérôme Maupoint /GIN

Whilst the air is calm, the pilot can approach nearer to the relief and 'caress' its form...

Foto: Honza Zak

For those who love their home comforts, here's a little way to 'cheat': get a friend to follow each flight with a camper van... After all, in the Red Bull X-Alps that's what they do too, like Michal Gierlach (POL) shown here during the 2017 race.

Foto: Jerome Maupoint/GIN

For vol bivouac on a paramotor, there are arguments for both foot and trike launching: on foot you can carry less, but remain more mobile. With a trike, you normally need to relaunch from where you landed. Except if the pilot has a flying bike which lets him travel by road as well...

Photo: Till Middelhauve

Foto: Rolf Engel

A Photon 2 (822 g). Photo : Bami Engel

BIVOUAC

CLASSIC TENTS

In addition to the models reviewed in our most recent issue about "Light&Bivouac", here are some other tents used by numerous pilots...

For a modern tent used for hike&fly, there are three important criteria: the ease with which it can be put up, its weight and its price. The price can be surprisingly low, for example €200 for the Aero 2 tested last year (only 1.3 kg), but as a general rule, for a lightweight tent, the price starts at €350. Below a kilo, the price rises...

Our test of two lightweight tents in the Light&Bivouac 2016 issue:
http://www.free.aero/en/contentsHTML/light_2016_e/?page=12

LIGHTWEIGHT TENTS

TENTS FOR THE GENERAL PUBLIC ARE BECOMING COMPATIBLE WITH AIR SPORTS...

Swiss pilot Beat Bischof, is very happy with his Terra Nova Solar Photon 2, price about €600. 'Although it's a double skin designed for two people, it weighs less than 900 g, I've used it for lots of paragliding trips, attached to my Radical 3 harness. This tent copes with heavy rain, no problem.' On the other hand, lots of users find this tent is too small for two people, it's more of a big tent for one person.
Weight 822 g (without transportation bag), folded dimensions 40 x 15 cm, height when assembled 1m.
Photos : Beat Bischof

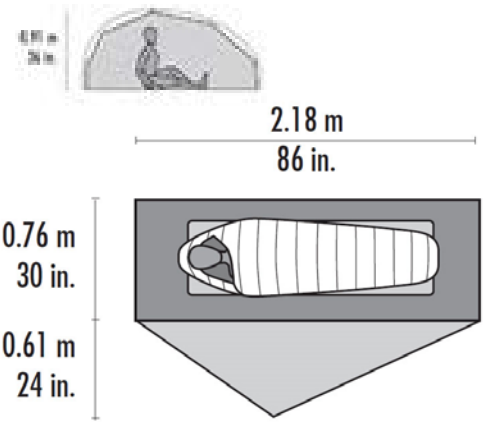
MSR HUBBA HUBBA NX 2

A 3 season American tent, up until now used a lot for hike&fly: at 1.72 kg, it has enough space for two people and, in addition, each has their own entrance! This tent is very easy to put up.
Official price: $400.
https://www.msrgear.com/tents/backpacking-tents-1/hubba-hubba-nx

A more recent, lighter version, the Freelite 2 Ultralight, only weighs 1.36 kg and has an official price of $440..
https://www.msrgear.com/tents/backpacking-tents-1/freelite-2-ultralight-backpacking-tent

MSR HUBBA FREELITE

The American brand MSR, also sell their single person Ultralight. Thus it only weighs 1.09 kg and costs officially $370.
https://www.msrgear.com/tents/backpacking-tents-1/freelite-1-ultralight-backpacking-tent



X-COUNTRY-TENT

Unfortunately, still not available, despite being advertised: the follow up to the X-Country Tent, a 600g lightweight tent which uses the structure of the paramotor. It is supposed to let you keep the paramotor inside.

We're waiting!

Version 1, simple to put up thanks to Velcro. Photo: Sascha Burkhardt

The X-Country Tent attached to the chassis.

There is enough space for a pilot and his wing. Only the motor stays outside without protection.

Flying tents on the edge of Lake Fusine (Italian Alps) Martin Steinthaler/Flying Tent

HIKE&FLY

FLYING TENT

Suitable for hike&fly: a tent which can also be used as a simple hammock, hammock-tent and poncho! And in addition, it's called the 'Flying Tent'!

The Flying Tent can be put up like a classic tent.

A hammock is a lot more comfortable than a tent, as long as there are two trees or two rocks to support it. It's a lot softer and without any stones pushing into your back.

You can even do without a mattress. Some campers already use a hammock with a sheet to protect themselves from the rain, thus similar to a 'hanging tent'. A new Austrian start-up company has launched a well researched product: a hammock tent called the Seven Seconds Flying Tent.

On Kickstarter, they got €475 000 in pre-orders!

'SevenSeconds', is a tribute to the famous Decathlon tents which 'put themselves up' in two seconds. The team at Flying-Tent have effectively integrated an element from the latter: hoops in fibreglass are placed under tension and open the cupola of the tent as soon as you let go of them.

The Flying-Tent in its carrying bag. It's flat but a bit high and wide. The attachment to the harness is a bit more complicated. The weight of the tent tested was 2200 g. It's a bit heavy, but still usable for hike&fly thanks to its flexibility.

Therefore, a real self-erecting tent, even in 'hammock tent' mode. For one person, it's pleasantly roomy and you don't feel smothered by the roof. The attachment between two trees (distance: from 4 to 7.5 m) is fast thanks to the adjustable buckles on the straps. Two karabiners stop the flow of water towards the tent when it's raining.

The flying tent, closed with the help of a zip, protects you from mosquitos.

The only holes are where the two straps go out, but in mosquito-infected regions, these can be easily plugged with a sock, for example. The tent's rain-proof protection is reinforced by a layer of silicon fabric. (Pressure 5000 mm, which is good).

The protection against the wind is good. Against the cold too but, when you take into consideration that the base of the tent is suspended in the air, it isn't insulated from the cold!

Adjusting the tension of the hammock is easy.

Above right: Robust: the hammock attachment

Right: an efficient ventilation system

It's worth remembering: the floor of the tent is also usable as a waterproof poncho.

To separate the tent from the hammock, there is a Velcro system.

The Flying Tent is put up like a tent on the ground.
There is room for one person and his flying equipment.

Photos : Sascha Burkhardt

The tent in almost all its forms: very comfortable (for one person) and versatile!

The quality of manufacture seems good, but the tent isn't indestructible. The fine stitching on the mosquito net is naturally more fragile than that on a paraglider for example. When getting into the hammock, you mustn't fall heavily against the mosquito net, for example. Putting it up and taking it down are fast once you've worked out the system.

Getting into the poncho on the other hand takes a bit more than 7 seconds; you need to take the base of the tent out completely. If the pilot anticipates showers during the day, it would be best to prepare it before the rain starts.

An unlikely installation, but possible! Photo: Martin Steinthaler/tinefoto.com

CONCLUSION
It's a shame that it isn't a bit lighter. Apart from that, it's a great system which lets you adapt your 'habitat': on the ground in fields, between the trees in a forest, or indeed between two rocks in a lunar landscape.

One of the biggest disadvantages was its initial price of €388. Fortunately, until the end of 2017, the price has been reduced to €233, which is a very good price for such a versatile tent. A 9 minute long film showing how to handle it:
https://youtu.be/kuFpZ9cAbu4

POSITIVE POINTS
- **Very versatile**
- **Comfortable**
- **Well thought out**
- **Low price**

(SMALL) NEGATIVE POINTS
- **The attachment to the harness/chassis is less practical.**
- **A bit too heavy.**
- **Less insulation against the cold in hammock mode.**

FLYING TENT- TECHNICAL DATA

Web : https://www.flyingtent.com	
SIZE WHEN PACKED (CM)	48 X 35 X 9
WEIGHT WITH ACCESSORIES	2 450 g
ROOF FABRIC	30 D waterproof 5000 mm, double stitching on the zip and glued. Fabric certified Öko-Tex®-100, without phthalates (endocrine disruptor).
PRICE	233 €
WEIGHT [kg]	1.25

Foto: Sascha Burkhardt

Photo: Andreas Lattner

THE SINGLE SKINS MOVE ON...

One of the pioneers, the UFO by Air Design

It was already clear four years ago: the single skins are far from being an exotic niche. More and more pilots and manufacturers are going for them...

One of the most recent models: the Sir Edmund by Skyman. The developer Markus Gründhammer is one of the pioneers of acro and puts his single skins regularly through their paces.

Therefore it's a class which is progressing fast, even if in the most recent generation of single skins, one of the disadvantages remains: the speed in turbulent air. Single skins are more easily stopped by a gust. You sometimes have the impression, for a second or two, of dropping vertically in front of a thermal, before the wing 'bites' and continues to fly. It's a bit better with the more recent generations, but they still don't have the same penetration as the double surfaces. On the other hand, most of the single skins only dive a little and have very gentle behaviour.

This is, amongst other things, thanks to the wing's lack of inertia.

These wings have a lot of low amplitude movements, but don't try and overfly the pilot.

These are very safe characteristics!

On the other hand, despite a slight increase in the speed range for the latest models, the hollow profiles can always stall sharply if the pilot brakes too much: beginners, whom you can give this type of wing to, may well be surprised.

We've already described this in detail and the article is still available (link opposite).

Here we'll summarise the current models having briefly tried the recent Skin 2 and the Sir Edmund in single and double skins..

http://www.voler.info/cms/contentsHTML/light2015/?page=30

From the beginning, we also tested single skins on a paramotor (here, a Batlite in 2014). As the wings are made from relatively fragile materials, they are difficult to adapt. But their exceptional inflation makes them potentially very interesting for with motors as well. Don't forget that with model aircrafts, the single skins are the easiest and the most accessible models for beginners.
Photos : V.Burkhardt

Another group which perhaps weren't given much thought in the beginning were tandems; in the mountains a single skin is particularly attractive, here the famous Bi Skin 2 from Niviuk.

Foto: Niviuk

AIR DESIGN UFO

It's a single skin that we tested extensively comparing it with the Skin 1 from Niviuk. It doesn't glide as well as the Skin 1. Like the new Sir Edmund by Skyman, it's more of a 'descent' type wing, although it can also be used in thermals. Lots of pilots who 'Climb and Fly' have chosen it.

2015: our test Skin vs UFO

Remember, the Air Design UFO has been on the market for two years...

Long before their competitors, Air Design were applying a very elaborate finish to their single skins, such as trim on all the fabric edges.

UFO - TECHNICAL DATA

Manufacturer: AIRDESIGN **Web :** ad-gliders.com

DATE	2015			
SIZE	14	16	18	21
CELLS	6	6	6	6
FLAT SURFACE AREA [m²]	14,50	16	18,08	20,61
FLAT WINGSPAN [m]	7,87	8,26	8,78	9,38
FLAT ASPECT RATIO	4,26	4,26	4,26	4,26
ALL UP WEIGHT [kg]	50-70	55-70	60-80	75-90
WEIGHT OF THE WING [kg]	1,60	1,70	1,80	2,00
CERTIFICATION	EN-926-1	EN-926-1	C	B

Photo Nicolas Cochin Pilote Olivier Cochin

Photo: Dudek/ Zbig Wlodarczak

DUDEK

V-KING

Dare working on, amongst other things, a single skin wing, but this is nothing new: back in 2014, the Polish company brought out a little wing for a remote controlled model paramotor.

The full scale version will be out soon, this wing is called the V-King referring to the diagonal walls (V-Ribs) particularly visible on this 2.1 kg single skin.

They allow the number of lines to be reduced.

www.dudek.eu

APCO

SINGLE-SKIN

Are we getting closer to birds?

Since the Single Skins have been getting closer, as far as performance is concerned, to classical paragliders, we've noticed that the leading edge has also become increasingly classic, with a piece of fabric placed on the inner surface, partially forming a real cell. Apco have gone even further with these tests and have added a real cell onto the leading edge.

If this only concerned the leading edge, you could actually partially keep the advantages of a single skin (low weight, less volume to fold), whilst at the same time increasing the performance. Apco compare this technique to the characteristics of a bird's wing.

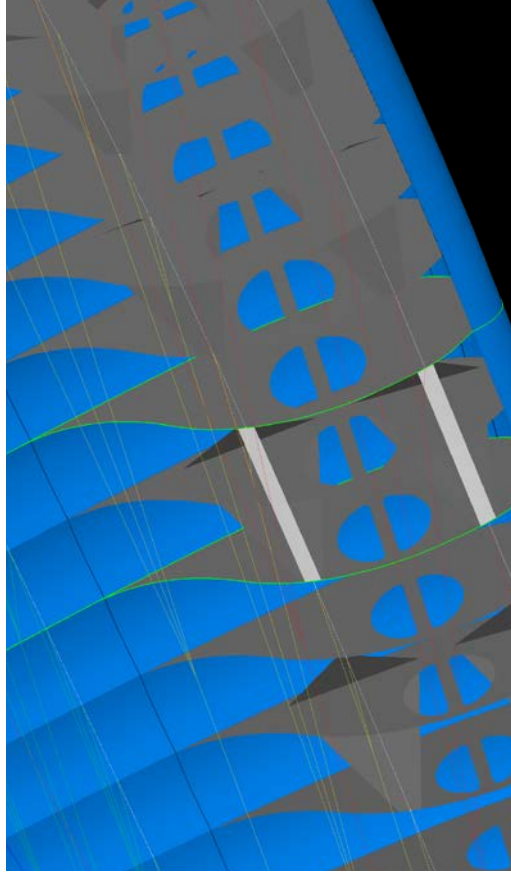
In fact, birds have a relatively bulky double skin leading edge whilst, towards the trailing edge, the profile is very thin and sculpted only by the thickness of the feathers.

Shemat : Apco

An interesting approach, and we are awaiting the results, bearing in mind that bird's profiles can't be exploited in the same way. The Reynolds number for bird's profiles isn't as high. The relationship shape/size/viscosity of the air doesn't correspond at all to our wings, due to their smaller size bird's profiles are highly curved.

If we did the same thing with a paraglider, we would have very violent stalls. But why not take partial inspiration?

We're looking forward to trying the first model as soon as it's ready!



Fot... aymond dennessy/Fotolia

Photo: Luc Hentsch

Niviuk Skin 2

NEW SINGLE SKINS.
NIVIUK SKIN 2 VS SKYMAN SIR EDMUND

Skyman Sir Edmund

Foto: Markus Gründhammer

Foto: Sascha Burkhardt

Two Skyman Sir Edmunds and a Niviuk Skin 2. The Sir Edmund is logically a bit more compact on the ground.

Two recent single skins compared in flight: there were clear differences.

Test pilot: Estéban Bourouffiès

Since the beginning of the year, two new single skins have been available: the Sir Edmund from Skyman and the Skin 2 by Niviuk. The Sir Edmund is the first single skin model from this manufacturer who specialises in mountain and lightweight wings, directed by Markus Gründhammer.

The Skin 2 by Niviuk is a new version of the Catalan single skin which was, in fact, the first single skin paraglider with the behaviour of a 'real' paraglidier.

Foto: Sascha Burkhardt Test pilot: Estéban Bourouffiès

A Niviuk Skin 2 Plume 18. Clearly visible: the positioning on the biais of certain ribs.

Photos: Sascha Burkhardt

Six cells, four rows of lines, metal (Nitinol) leading edge rods and some Skytex 27 on this "Plume" version of the Skin 2. The 18 weighs 2.13 kg on our scales. It's a featherweight, but 500 g more than the Skyman. An even heavier version exists: 2.5 kg made with Skytex 32 fabric.

One cell plus two mini cells, pyramidal lines, everything is light on this Skyman 20: only 1.59 kg But the materials have been chosen accordingly: the Dominico 10 D fabric seems particularly thin (but very silky).

SKIN 1 18

The first version of the Skin Plume as a comparison: advanced air intakes but the finish has a little less detail.

Photos : Sascha Burkhardt

SKIN 2 P 18

The Skin 2 Plume: air entries set back with a SharkNose, trim around the cells, attachment tabs: the longevity should be better.

SIR EDMUND 20

Here the weight was the priority: in keeping with the spirit of 'ultra-light' the finish is a little less sophisticated. The leading edge is more open on the ground.

SKIN 2 P 18

SIR EDMUND 20

Photos : Sascha Burkhardt

The lines and the risers are light on both. On the Skin 2, there are trimmers, on the Skyman Sir Edmund there is a foot accelerator.

Then in the autumn of 2016, Niviuk brought out a tandem Skin 2 P as the first representative of the recent generation. We were amazed by this wing (see link to our test on the right). In the Spring, Niviuk added the solo Skin 2 in sizes: 16, 18 and 20. This model is endowed with more compact architecture and improved life expectancy compared to the Skin 1. Trimmers made their appearance: they are designed to improve the flare when landing, thanks to added speed. The wing will also be even more stable and gentle. One thing is certain: the manufacture of the Skin 2 is a lot more refined and trim has been added to the cells.

And the leading edge rods, still in Nitinol, now form a SharkNose at the leading edge of the six 'real' cells.
The scoop is therefore done from much further back, whilst on the Skin 1 and the Sir Edmund, the cell openings are in the nose of the profile.

On the Skin 2, Niviuk increased the weight by 200 g compared to the Skin 1: the classic version of the Skin 2 in size 18 weighs 2.5 kg, the light version (Plume) 2.1 kg. That's 200g more than the first version of the Plume 18.

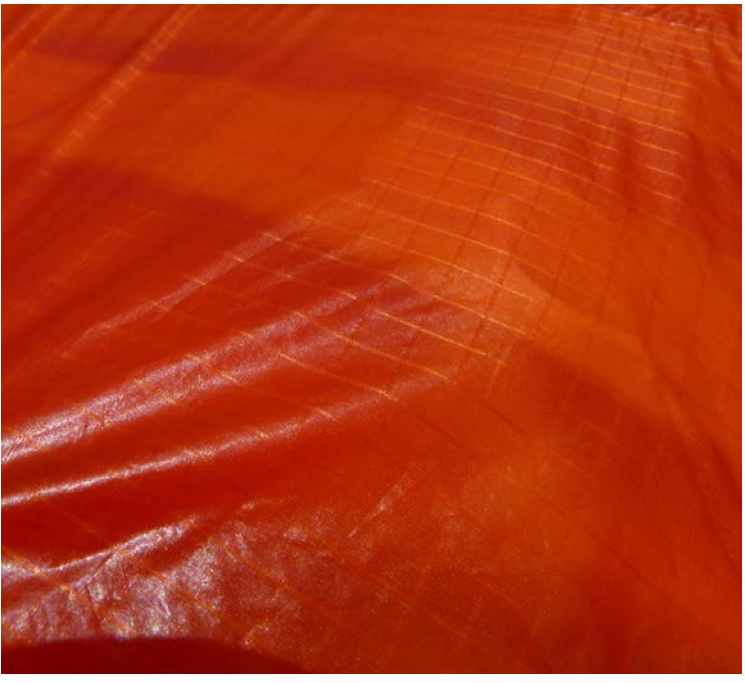
The Skyman Sir Edmund in size 20 weighs 1.58 kg. It is therefore the lightest, but it is also less sophisticated in the detail (no trim, no straps as attachments). The line cone is shorter on the Sir Edmond, and its aspect ratio less: this indicates a programme inclined more towards mountain flydowns than thermic flights... Inflation Obviously, as far as single skins are concerned, the two wings are great to inflate: their light weight and their simplicity to bring up and hold are still just as amazing. The Sir Edmund is a bit more compact, therefore easier to handle, whilst the Skin, with a higher aspect ratio, can sometimes close an ear.

The lines are also simpler on the Sir Edmund, making ground handling easier.

The Sir Edmund is in Dominico D10, a very silky fabric, about 25 g/m². o fold it, start with the leading edge, after having attached the risers in the fabric loops provided for this.

Photos : Sascha Burkhardt

Another nice detail on the Sir Edmund: the mini pegs to attach the wing during steep or slippery take-offs.



Photos : Sascha Burkhardt

Complex work on the sail for this Niviuk Skin 18 Plume.

MANOEUVRABILITY

The Sir Edmund is a real toy: excellent responsiveness to the controls and good precision, which I would even say are its main assets.

Easy inflation and handling similar to a mini wing. It's a bit the toy/go-everywhere-in-the-mountains wing.

Be careful however, the 'short' line cone seems to play an important role there, but it changes the trajectories.

When you start a wingover close to the ground, often the trajectory takes you further from the relief than expected, and the pitch phase comes more rapidly than if there was a longer cone. Speed The speed isn't always the strong point of single skins.
We couldn't measure it exactly, but in any case, it isn't in calm conditions that you find out, but in slightly windy and lightly turbulent conditions: it felt more difficult to go forward than on a 'normal' wing.

In gusts, it digs its heels in more than classic wings.

There is less impression of this on the Sir Edmund, which manages more successfully to 'flee' lower down whilst, at least with the trimmers closed, the Skin remains a bit more 'stuck' with a low sink rate.

We'll do precise comparative flights in a future edition. Gliding The glide in calm air is pretty good, especially for the Skin.

But as we've already said, as soon as you add irregularities in the airmass (thermals, turbulence, wind) the glide degrades a lot. In this game the Skin comes out best. With its bite it plummets less than the Sir Edmund.


Foto: Niviuk


Foto: Markus Gründhammer

SKIN 2 P 18

SIR EDMUND 20

EXPLOITING A THERMAL
Exploiting a thermal. This is where the difference is most striking between the two. The Skin is fairly impressive in this domain and conversely the Sir Edmund is less efficient. The Skin has better performance when it comes to exploiting thermals and as far as its sink rate is concerned. The Sir Edmund is intended to be manoeuvrable and to have effective controls, especially in the roll.

It is very easy to put into a turn (perhaps even too easy), but its sink rate degrades enormously, even with a minimum amount of tilt. Conversely, the Skin is a bit slower to go into a turn, except if you weight shift heavily in the harness. Just using the controls, it has a tendency to want to stay completely flat and do bigger circles, but in return, it climbs as well as a normal wing!

Surprising enough, however, when you think that it was an 18 m² that we compared with a 20 m² Sir Edmund. (

(INVOLUNTARY) COLLAPSE
The Skin is a lot more sensitive to collapses at the wing tip. Nothing nasty, but often part of the wing collapses before calmly reopening.

Photo: Sascha Burkhardt

Foto: Markus Gründhammer

SKIN 2 P 18

SIR EDMUND 20

	SIR EDMUND			SIR EDMUND BI	SKIN 2 P			SKIN 2			BI SKIN 2P
MANUFACTURER:	SKYMAN Web : www.skyman.aero/en/paragliders/Sir-Edmund_LTF-EN-B.html			SKYMAN Web : www.skyman.aero/en/paragliders/Sir-Edmund_LTF-EN-B.html	NIVIUK Web : www.niviuk.com/product.asp?prod=JNNMFRN8			NIVIUK Web : www.niviuk.com/product.asp?prod=JNNMJNG8			NIVIUK Web : www.niviuk.com/product.asp?prod=JNMRMQP8
DATE	2017			2017	2017			2017			2016
SIZE	17	20	23	31 BI	16	18	20	16	18	20	31
CELLS	39	39	39	39	39	39	39	39	39	39	39
FLAT SURFACE AREA [m²]	17	20	23	31,5	16	18	20	16	18	20	31
FLAT WINGSPAN [m]	9.44	10,06	10,98	12,85	9,38	9,95	10,5	9,38	9,95	10,5	13.06
FLAT ASPECT RATIO	5.24	5,24	5,24	5,24	5,5	5,5	5,5	5,5	5,5	5,5	5.5
ALL UP WEIGHT [kg]	65-90	70-100	90-120	140-200	60-85	70-90	85-110	60-85	70-90	85-110	130-190
WEIGHT OF THE WING [kg]	1.45	1,58	1,78	2,62	1,9	2,1	2,3	2.3	2.5	2.7	3.3
CERTIFICATION	B	B	B	B	-	B	-	926-1	926-1B	926-1	B
MAIN FABRIC	DOMINICO D10			DOMINICO D10	SKYTEX 27 II			SKYTEX 32/38			SKYTEX 32/38

The wing tips on the Sir Edmund also close from time to time but less frequently than on the Skin. Perhaps thanks to the cells on the wing tips? As we suspected given the line system on the Sir Edmund, it is impossible to provoke a collapse: by pulling on the As, the top of the lines at the front in a Y lower all the front part of the single skin and the wing takes on an S shape.

We pulled much harder, the deformation increased, but it was impossible to provoke a collapse without folding lines (see box on the following page).

TISSUS : LA MATURITÉ DU LIGHT ?

D10 weighs about 25 g/m².
Skytex 27 classic 27g/m², and the classic II version, with double coating, 29 g/m². It's a version which is becoming increasingly popular. More on the lightweight fabrics in our previous issue on 'Light': http://www.free.aero/en/contentsHTML/light_2016_e/?page=28

On the Skin, the provoked collapses were ample, but reopened pretty quickly, with very limited effect on the trajectory of the flight.

It's clearly a single skin with these safety characteristics!

THE RESULTS

In summary, you could say that the two wings aren't aimed at the same group of people or type of flying.

The Sir Edmund is more of a 'go everywhere' type of wing, it's certainly possible to use it in thermals as well, but it has more the behaviour of a mini wing.

The Skin also fits into the domain of 'little mountain wing', but it resembles more a 'normal' paraglider which can be used to easily exploit thermals.

In a breeze, the two don't always fly as fast as a classic paraglider but that's inherent with the principle of single skins.

CERTIFICATION

The single skins are even more appealing since they passed certification thus giving pilots confidence in them. The first single skin to be certified was the UFO by Air Design (UFO 18: C, UFO 21: B). The Skin 1 isn't certified.

The problem isn't really the behaviour after a collapse: with the exception of the first XXLite, these wings are often very damped and behave for numerous manoeuvres like EN As, especially the Skins as we noticed.

It's more the speed range through the controls which can be a problem. In the Air Turquoise laboratory, the Skin 2 was certified EN B in size 18 and tandem.

In the German EAPR laboratory, the Sir Edmund received an EN B in all sizes.

This has become a controversial topic between the manufacturers as well as the laboratories: the lines on the Sir Edmund are such that the As and the Bs join up in a Y on the lower A lines.

It is therefore impossible to provoke a collapse by pulling on the risers.

Our test pilot, Estéban Bourouffiès, tried everything, as did Alain Zoller from Air Turquoise. At the EAPR, they used extra lines to do it during the tests.

But, according to a debatable rule, a wing which requires a folding line to carry out a certification test should be automatically certified EN D or worse and in no way should it be an EN B. But according to the manufacturer, the lines used don't fit within the definition of folding lines, being more 'Cross-Lines', whose definition seems a bit more vague.

Their anchor point should have been behind the As.

Initially, Skyman even tried prototypes with separate A and Bs, which would, according to the manufacturer, have been perfectly suitable for an EN B limit EN A certification.

A bit of an opaque procedure, which we would love to see clarified! But in any case, we think that, given its behaviour in the air and all our experiences with single skin wings, that the behaviour, after a collapse, of the Sir Edmund was good enough.

On the other hand, we understand that Niviuk, for example, could feel aggrieved because their Skins were certified without any auxiliary lines. Read all you need to know about the problem of Folding Lines in our article published in 2015 that we've reproduced at the end of this issue.

Foto: Skyman

Foto: Sandra Budde

INDEPENDENCE TENSING

The Independence Tensing is comparable with the Skyman Sir Edmund but with slightly heavier and more resistant fabric: Domincio D20 and 15 mm wide risers.
Its trim speed will be 38 km/h


Foto: Sandra Budde

TENSING TECHNICAL DATA			
Manufacturer: INDEPENDENCE **Web:** https://www.independence.aero/en/products/paragliders/single-skin-tensing.html			
DATE	2017		
SIZE	17	20	23
CELLS	39	39	39
FLAT SURFACE AREA [m²]	17	20	23
FLAT WINGSPAN [m]	9,44	10,06	10,98
FLAT ASPECT RATIO	5,24	5,24	5,24
ALL UP WEIGHT [kg]	65-90	70-100	90-120
WEIGHT OF THE WING [kg]	1,9	2,1	2,3
CERTIFICATION	EN/LTF B	EN/LTF B	EN/LTF B

Foto: V. Burkhardt Pilote: Sascha

Niviuk Bi Skin 2 P (2016): six inflatable cells.

Foto: S. Burkhardt Pilote: Estéban Bourroufiès

Sir Edmund Bi (2017): A single central cell and a little cell in each stabilo.

EXCLUSIVE

SKYMAN SIR EDMUND BI VS. NIVIUK BI SKIN 2 P

Less than a year after Niviuk, Skyman have brought out a tandem version of their single skin wing. We briefly compared these two amazing machines...

The specifications were clearly based on applying the record light weight of the Sir Edmund to a tandem version. A tandem weighing less than 3 kg (2.83 kg on ours scales), that's a record. And moreover, it's the 'Pro' version which has just come out with sheathed lines that we briefly tested. There will be an even lighter version, with unsheathed lines and an integrated small Dyneema spreader: 2.69 kg, incredible for a tandem. However, compared with the solo Sir Edmund, Skyman have added some protective trim around the 'cells'. The fabric is the same as for the solo versions: Dominico D10. It was a clear choice to produce a mountain tandem, as light as possible. On the other hand Niviuk use, for longevity reasons, Skytex 32 g/m2 and 38 g/m2 for their 'Plume' tandem, whilst the 'Plume' solo wings are made from Skytex 27. But Skyman are totally confident. 'The D10 has shown its very good strength and longevity,' said Markus Gründhammer. On the ground, the Skyman tandem looks a bit like the solo version, relatively compact. The lines are also a lot shorter than those of the Skin tandem. As a consequence, it's a bit easier to bring this wing up. At the same time, the way the Niviuk Skin comes up is already incredible, there is hardly any need to do better.

On the other hand, the clean line layout on the Sir Edmund (solo or tandem) can be an advantage on wild mountain take-offs. For both tandems, those who are not used to them need to pay attention: this type of wing really comes up all by itself given the slightest pull on the risers. You need to be very careful not to find the wing above your head, whilst still getting your passenger ready! That may seem caricatural, but it's the truth! On a windy take-off, during the last moments of preparation, it's best to keep the rear risers constantly in your hands, or indeed the brake lines between your teeth! On the other hand, a rapid controlled pull up finishes fairly gently. Given the speed it comes up, especially the Sir Edmund with short lines, you would expect to be violently pulled off the ground, but that isn't the case, the wings position themselves nicely and reliably above the pilot and passenger.

The load take up on both tandems is correct. If you need to do one or two more steps compared to a 'normal' tandem, firstly, that's pretty normal given the size (31 m2/31.5 m2) and secondly, it's compensated for by the ultra fast inflation just beforehand. In the air, we carried out a comparison flight between the Sir Edmund and the Niviuk Skin, which has already, on several occasions and in a variety of conditions, amazed us with its capacity to efficiently hook in.

Especially in weak thermals, this 31 m2 Niviuk Bi Skin holds its own against tandems with much higher performance. Flying side by side, hands up and trimmers closed, the Skyman Sir Edmund achieves about the same speed and has a sink rate which is just slightly less than the Niviuk Skin.

As far as turning is concerned, the Sir Edmund logically 'gives' more: here it is also comparable to its smaller solo brothers, with a rapid attack in the turn, coupled with, as a consequence, an increased sink rate.

Compared to the solo version, it is slightly more damped from a certain amount of bank.

Trimmers open, we noticed a little surprise during this first quick comparison: The Niviuk Skin flew slightly faster on a horizontal trajectory, whilst keeping a 'normal' sink rate, whilst the Sir Edmund 'plummeted' more as far as the sink rate was concerned, and was therefore quickly behind and lower. This goes with its image of a wing designed, above all, for mountain flying.

Pulling in wingovers, the wing is a real toy with precise steering. The sensation is good for the passenger too, whilst at the same time behaving safely.

Moreover, even if the roll movements initiate very quickly, at some point they find a gentle limit which is difficult to cross. It's a characteristic common to all the current single skin wings: quick movements with limited amplitude. When landing, you need to fully detrim both wings to allow a good flare.

But even in the opposite scenario, by braking at the right moment, a pilot with average experience won't 'pile in' with his passenger…

IN SUMMARY
Both tandems are very clearly good companions, especially in the mountains.

Both tandems synchronised before the comparative flight. The speed is comparative Trim speed. The sink rate of the Skin tandem in this configuration is slightly higher.
Photo: Sascha Burkhardt

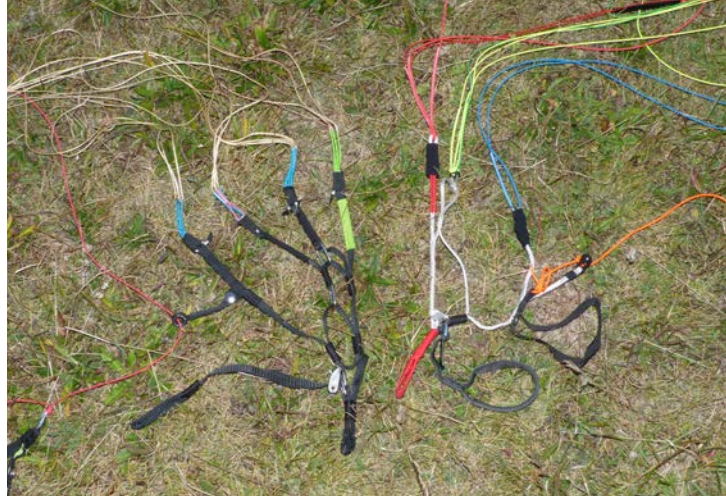
Foto: Sascha Burkhardt

Niviuk Bi Skin 2 P (2016): six inflatable cells and nitinol leading edge rods.

The Sir Edmund Bi (2017): a single central cell and a little cell in each stabilo. The leading edge rods are plastic.

Half a wing of each glider side by side: the Bi Niviuk (left) has got a higher aspect ratio, while the Skyman is more compact. The surface is almost equal.

The unsheathed lines on the Niviuk Bi Skin; this material has been tried and tested.



On the left the risers on the Bi Skin, on the right those of the Skyman.

Taking off, the Sir Edmund had a slight advantage, and for playing with rolls and turn reversals, it is also a bit better suited. For exploiting thermals or weak dynamic lift, the Niviuk Skin is better placed, it is closer still to a 'real' paraglider.

The sheathed lines on the Bi Skyman Pro version.

BI SKIN 2P AND SKYMAN SIR EDMUND
TECHNICAL DATA

	Bi Skin 2P	Sir Edmund Tandem
Manufacturer	Niviuk Web : www.niviuk.com/	Skyman Web : www.skyman.aero/
CELLS	39	39
FLAT AREA [m²]	31	31.5
FLAT PROJECTED [m²]	26.17	26,39
FLAT WINGSPAN [M]	13.06	12.85
PROJECTED SPAN [m²]	10.39	10,60
FLAT ASPECT RATIO [m]	5.5	5.24
PROJECTED ASPECT RATIO [m]	4.12	3.83
ALL UP WEIGHT [kg]	130 - 190	140-200
WEIGHT OF THE WING [kg]	3.3	2.62
CERTIFICATION	EN/LTF B	EN/LTF B

The performance of the Niviuk Bi Skin was amazing; reread our 2016 test. http://www.free.aero/en/contentsHTML/light_2016_e/?page=66

Contrary to their solo wings, for the Sir Edmund tandem, Skyman added trim on the edges of the cells.

Here, for sure, the weight is negligible, as is also the protection, unfortunately. A choice asserted by photographer and designer, Markus Gründhammer, the famous "Skyman".

LIGHTWEIGHT HELMETS

A helmet is an essential form of protection for most pilots, but also a source of weight.

We try to economise every gramme in the fabric and lines, but the weight of the helmet seems almost impossible to reduce. However, the X-Alps saw three models at the lower limit of what's possible. Quite rightly, for the famous race, it's been obligatory since 2013 to wear an EN 966 certified helmet.

Remember, we are free to fly bare headed, unless a local or special law requires one (Dune de Pyla, school or competition) or to wear any old helmet. However, be aware that an insurance company may possibly refuse to pay for physical injury following the use of an inappropriate helmet.

Chrigel Maurer won wearing an Iguana by Icaro 2000: a model which hasn't been available for a long time, but which he apparently really likes...

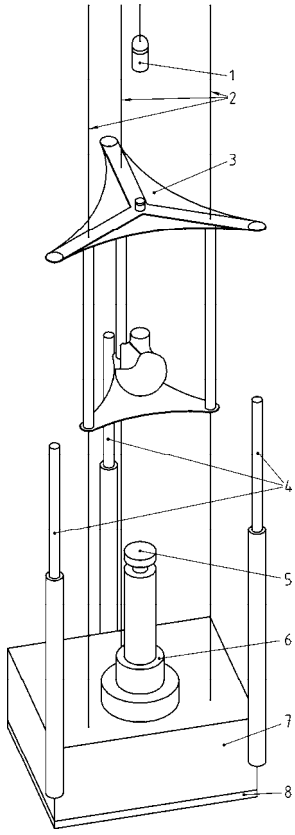
On the other hand, in any shop, it's obligatory that a helmet sold for paragliding be EN 966 certified (free flying helmet). The seller can also offer a helmet designed for other activities, but it must be clearly marked that it isn't designed for free flying… But wearing a helmet respecting the EN 966 norms is certainly advised. The tests are different to those for skiing helmets for example.

Amongst other things, the protection against penetration needs to be greater. Moreover, it's the penetration test in particular which is slowing down the lightweight race. '*We can't make any more economies as far as weight is concerned, the entire unit consisting of external shell and polystyrene layer must keep a certain thickness to give sufficient protection and conform*,' explained Gianni Hotz, owner of the company Icaro 2000.

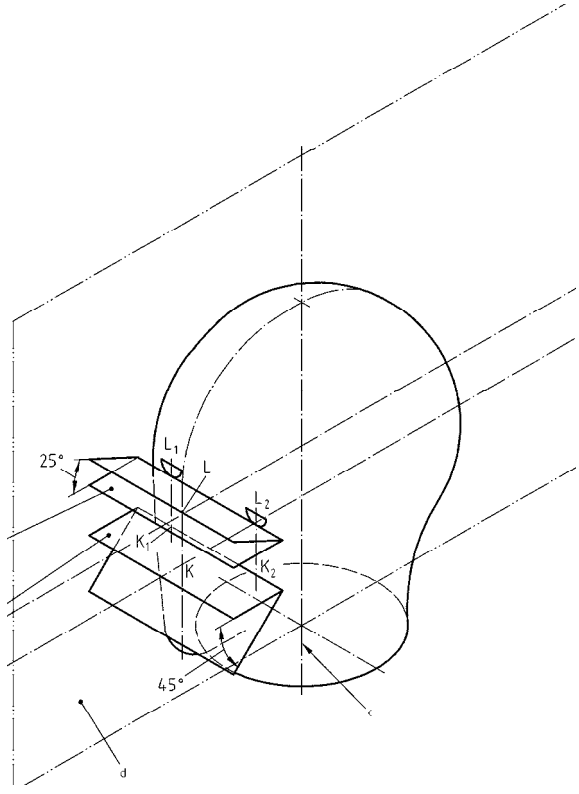
Therefore it's difficult to make it much less than 388-400 g, the weight of the Icaro Transalp helmet. '*We also had it in a version weighing 340g, but adding the adjuster and the densification of the polystyrene made it slightly heavier*,' said Gianni Hotz.

Paul Guschlbaur: 3rd in the 2017 X-Alps with his Icaro 2000 Transalp. Lots of other competitors wore the same, amongst others, Ferdinand Van Schelven, Simon Oberrauner, Stanislav Mayer, Toma Coconea…

Video: The EN 966 test of an Icaro 2000 helmet. https://youtu.be/Oq0BrxVgjEM



Extracts from the EN 966 norm: it doesn't just regulate the strength tests, but also the minimum field of vision.



Supair have the 'School' helmet which weighs only 320g, but during the X-Alps, pilots like Benoît Outters used the slightly heavier version, the 'Pilot'. The only differences: The Pilot has ear covers and it has more comfortable foam...

Benoît Outters with the Pilot by Supair. Weight: 380 g. Price: €115.

The School by Supair: 320g thanks to a sparser interior. Price: €85. In red and blue, the more comfortable interior of the 'Pilot'.

The Transalp by the Italian company Icaro 2000 was specially made for the X-Alps.

It was widely used. The design gives away its Italian origins: it's pretty nice, although even its designer much preferred the other models in their range (see following page).

In any case, with a weight of between 388-400g, it is very light despite its comfort and nice finish, including for example a fabric hem protecting the edge of the helmet.

Neither ear covers nor a visor can be added. This minimalist but well made helmet costs €130.

An exemplary finish. But warning: it isn't real carbon fibre, but a graphic 'look'.

The Transalp on the head of our Hippie-Hippster. An elegant helmet!

The adjuster is easy to grip.

As always, it's the thickness of the foam which defines the size of the helmet. The outer shell in polycarbonate and the shell in polystyrene 90 g/cm3, are still identical. If requested, Icaro 2000 will change the internal foam if the shape of your head changes...

On the left the Transalp, on the right the Nerf by Icaro 2000. The latter, here in colour 'Deep Forest', weighs 530 g.

If you don't mind an extra 130g or so, the Nerf by Icaro is even more comfortable (more foam, earphones for winter) and it can be equipped with a visor. Its design is a bit more sophisticated and it costs between €135 and €155 depending on the design. We'll review it in more detail in a future issue.

www.icaro2000.com

All the Icaro 2000 helmets are made in Italy. Below: the Nerf with the optional visor (+93g).

ON A PARAMOTOR

On a paramotor, even if the weight isn't as important as for hike&fly, it counts all the same, especially during a foot launch take off: the less you are carrying whilst gathering momentum, the better... The Solar X by Icaro 2000 is a relatively lightweight helmet for paramotoring.

It's a specially adapted and certified version of the Nerf. It's called the Solar X because it was worn by the team on the solar powered plane, the Solar Impulse 2. Weight: 550g plus 230g (ear defenders) or plus 390g (shell with radio headphones and cable). Price: €175 + €35 ear defenders.

An ultra light harness integrated in a backpack. Warning, the pilot in this photo made a slight error: the fastening is the wrong way round; the straps on the front should be the same colour.

HARNESS: HIKE&FLY AND CLIMB&FLY

THE CRUX AT THE SUMMIT

With the Crux, Sky Paragliders have combined, in a very light and original fashion, a mountain harness and its back pack.

The Crux was designed for hike&fly and para-alpinism. It can also be used as a climbing harness. Contrary to a reversible harness, Sky Paraglider's Crux doesn't turn inside out to transform into a back pack. The straps for the backpack double up as straps for the harness. The seat for the latter is packed in a pocket under the bag. All you have to do is open it, for the seat to fall out and be put underneath you.

A nicely finished harness and comfortable to carry as a backpack. The straps from the harness are also used for carrying the backpack.

Transforming the bag into a harness: open the lower compartment, the leg straps fall out, the pilot puts the harness on...

This transformation can theoretically even be done whilst keeping the bag on your back. According to Sky Paragliders, this lets you get ready to fly in places which are very steep and exposed whilst remaining in your harness.

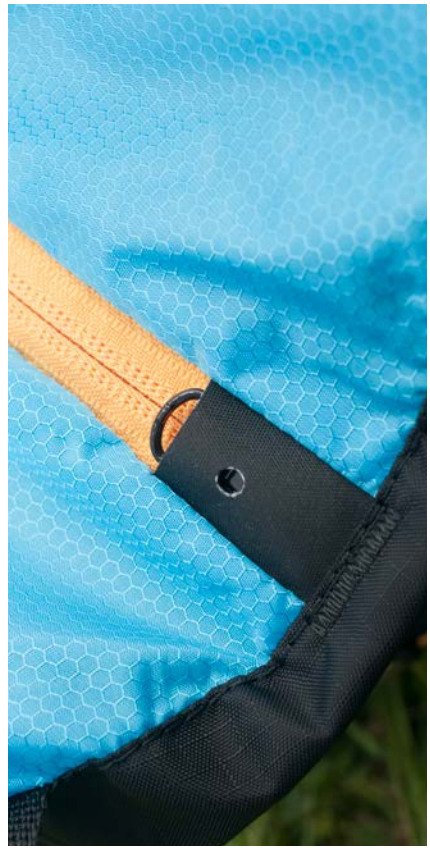
Even if this last scenario seems fairly improbable, the concept has lots of advantages: it obviously saves weight and volume and you don't need to empty the whole backpack at take-off to transform it as you do with a reversible. The total weight is 1250 g; the harness on its own (they can be separated) weighs 360g.

The 56 l backpack is big enough for a small mountain wing. The Dyneema straps are wide, their attachment buckles protected by fabric.

This only very slightly increases the weight compared to more radical harnesses (Kortel Kruyer, Neo String), but can psychologically give more confidence.

The Crux has been particularly carefully made, and the design is very nice.

Numerous details have been carefully positioned, such as the extra pockets. A successful harness which is comfortable, light, small and remarkably well made and finished, for use with a small mountain wing. Optional extras like the foot accelerator and airbag will be out soon. With the latter, an eagerly awaited safety accessory, the harness will be LTF certified.



The meticulous detail on a very light harness.

CRUX - TECHNICAL DATA

Manufacturer: SKY PARAGLIDERS
Web: www.sky-cz.com/web-skyparagliders/news-top-fr/crux.html

SIZE	M	L	XL
SIZE PILOT HEIGHT (cm)	160-180	175-190	185-200
HEIGHT OF THE ANCHOR POINTS (cm)	45	48	51
CHEST STRAP SEPARATION (cm)	43	45	48
HARNESS WEIGHT (kg)]	1.25	1.27	1.33
CERTIFICATION LTF/EN	EN COURS	EN COURS	EN COURS
PRICE	650	650	650

The padding in the back of the bag is the same as the back of the harness.

Foto: Sascha Burkhardt

A modular system: the airbag and the compartment for the helmet can be removed.

SCORPIO ALPAGE

The French manufacturer Scorpio also has a harness/backpack on offer which uses the same straps when in backpack mode as in harness mode…

This harness is intended for hike&fly and also for activities such as speed riding right up to long XC flights. The transform system from backpack to a harness was designed in a similar fashion to Sky Paraglider's Crux, but other than that, it is very different. It is heavier, bulkier, the straps are thicker and the materials used are more classical. The big advantage: it has removable airbag protection.

The backpacks (principal + helmet compartments) have more volume (67 l + 15 l), but are also detachable.

Photos : Sascha Burkhardt

Photos : Sascha Burkhardt

Open the compartment and the harness is ready...

The harness comes thus equipped weighing a little over 2.6 kg in size S.

For a seatless harness, it's fairly heavy. In fact, Scorpio didn't particularly want to make a harness which was limited to hike&fly.

It is also perfectly usable for Speedflying and as a tandem harness.

The modular system allows it to be adapted to the day's requirements.

You can even add an extra foam back protector (not tested). Nevertheless, we would have preferred the same, but a bit lighter and less cluttered.

Apparently, Scorpio are working on that... Price: 660 € with all the options except the back protector.

https://goo.gl/qE1BXs

The fastening, more classic than light.

Photos : Sascha Burkhardt

Nice to carry.

A typical strap harness, but with relatively wide straps.

The fastening system for the harness compartment is more (too?) complicated. There are two parallel zips.

The padded back of the harness doubles up as the back of the rucksack when being carried. Comfort is a given...

ALPAGE - TECHNICAL DATA

Manufacturer: SCORPIO
Web : http://www.scorpio.fr/fr/sellettes/183-sellette-alpage.html

SIZE	S	ML
SIZE PILOT HEIGHT (cm)	155-170	170-190
HEIGHT OF THE ANCHOR POINTS (cm)	46	48
CHEST STRAP SEPARATION (cm)	36	50
HARNESS WEIGHT (kg)]	1.210	1.380

TEST

GIN EXPLORER

3.7 kg for an 'easy racing machine' certified EN B! 'Light' is visibly a force and omnipresent factor for GIN.

Test pilot: Estéban Bourouffiès

The GIN Explorer is supposed to be aimed at XC pilots looking for a comfortable wing with nonetheless high performance and good responsiveness, certified EN B. It could be a follow up to the Carrera Plus, with the intention of adding another nice layer of comfort. And also reducing the weight: a high performance wing of this type, with an aspect ratio of 6.1, weighing only 3.7 kg in size S, is amazing.

Therefore, this wing must have everything to allow such great flexibility, and be as good for both XC and 'hike&fly' pilots.

MATERIALS

To reach this feather weight, it is made mainly from Porcher Skytex 27 g/m^2, including the ribs, with the exception of the leading edge, which is in Skytex 32 g/m^2.

The lines are in unsheathed Edelrid Aramid 8 000. The risers are thin, but classic.

INFLATION

Thanks to its light weight the wing comes up nicely and is easy to keep above your head.

But sometimes, you need to control the pitch. It's a wing which is easy to get going, bearing in mind its 6.1 aspect ratio.

The load take up during take off is pretty good, but not immediate. When flying, it straightaway displays a good glide and a feeling of performance which makes you think of a top of the range racing machine.

Photo: Jérôme Maupoint/GIN

Skytex 32 on the leading edge...

... then Skytex 27 everywhere else.

Photo Véronique Burkhardt Pilote Estéban Bourouffiès

THERMALLING
This wing is really comfortable in thermals! Its responsiveness and the precision of the controls are its major advantages.

Its good glide is affected very little by turbulence.

In fact it is so comfortable that you can simply crank it in efficiently with just the inner control.

On the other hand, in a thermal which is a bit nasty or narrow, steering with both hands is recommended.

It continues to remain comfortable, but seems a bit sensitive at the exterior wing tip during dynamic surges. As it's a high performance wing, which could be compared to an EN C, or even an EN D, and in this case you would notice the only hitch when thermaling: a slight lack of feeling through the harness and controls.

But this is only bothersome for a pilot dropping down from a higher classification (C or D).

The Explorer is a wing which will, no doubt, attract lots of this type of pilot.

ACCELERATED FLIGHT
Its comfort during accelerated flight is also very good, to such an extent that almost all my transitions were 100% on the accelerator. The wing filters the turbulence very well and flying on the rear risers is advised, but the pilot has almost nothing to do, as it really flies on its own.

Great for taking photos! On the other hand, when we say damping, we mean filtering: when accelerated it seems to filter even more. The comfort during accelerated flight even at maximum can also perhaps be explained by the limited accelerator.

In fact, the speed at 100% accelerator, remains less than 50 km/h.

Photo: Jérôme Maupoint/GIN

The ears reopen on their own, but slowly if there is no pilot input.

Foto: Véronique Burkhardt - Pilote: Estéban Bourouffiès

Behaviour reminiscent of racing machines: good stable glide when flying straight, but if the pilot wants to, he can provoke nice dynamics with big pendular movements.

Photo Véronique Burkhardt Pilote Sascha Burkhardt

The very low weight is also achieved thanks to airy internal architecture.

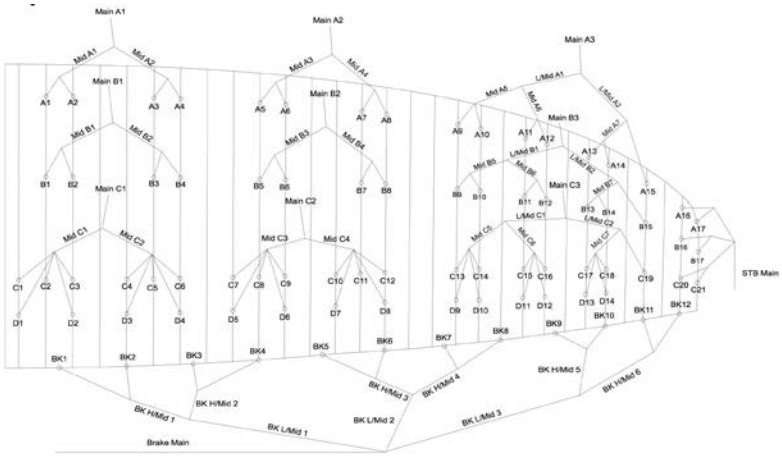
A very pronounced SharkNose. It's, no doubt, thanks to this too that the low speeds are very usable.

POSITIVE POINTS

- Precision
- Responsiveness
- Comfort and damping
- Usable low speeds
- Comfortable accelerated flight

NEGATIVE POINTS

- Filters a bit too much
- A slight lack of speed
- The wing tip needs to be held in during active thermic flying

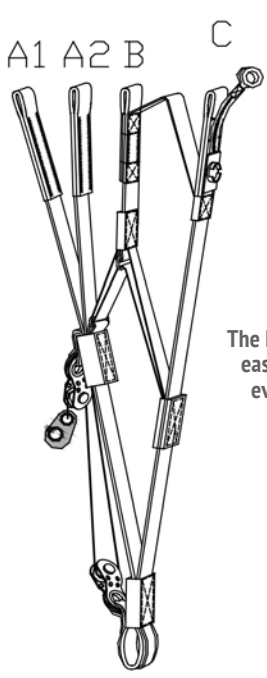


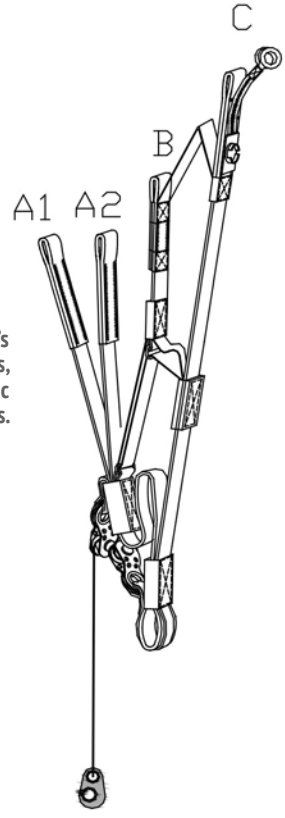
Our test pilot Estéban Bourouffiès on take-off.

EXPLORER - TECHNICAL DATA

Manufacturer: GIN
Web : http://gingliders.com/parapente/explorer/

SIZE	XXS	XS	S	M	L
CELLS	59	59	59	59	59
FLAT SURFACE AREA [m²]	20.1	21.6	23.6	25.5	27.6
FLAT WINGSPAN [m]	11.07	11.48	12.00	12.47	12.95
FLAT ASPECT RATIO	6.1	6.1	6.1	6.1	6.1
ALL UP WEIGHT [kg]	55-75	65-85	75-95	85-105	95-115
WEIGHT OF THE WING [kg]	-	-	100	110	120
CERTIFICATION	3.2	3.4	3.7	3.9	4.1
HOMOLOGATION LTF/EN	B	B	B	B	B





The Explorer's risers It's easy to fly with the Cs, even without specific handles.

Unsheathed lines in Edelrid Aramide 8000.

A Harken pulley held in place by a sheath. Impressive detail!

Risers marked left/right, this is handy even for experienced pilots.

Foto: Sascha Burkhardt

COLLAPSES
The wing very quickly takes on a slight roll during a big collapse, but it is easy to counter.

It reopens on its own but pilot input to accelerate reopening is advisable. Auto rotation

AUTO ROTATION
Auto rotation was tried with an arms up configuration during a 50% collapse.

During the collapse, the wing very gently inclines on the roll axis, before finishing in an auto rotation.

But this phase is very long (about five seconds) and is therefore very easy to anticipate.

It is very easy to restore level flight using the controls and the harness.

SPIRAL
The wing comes out very quickly with hands up and with a neutral position in the harness.

LOW SPEED
Low speeds are very good with a stall point below the seat (almost the full length of your arms).

In addition, the sensation of loss of pressure in the controls warns of an imminent stall.

STALL
Reverse is easy to find and an exit with minor pitch: nothing more to say.

SUMMARY
The GIN Explorer perfectly fulfils its specifications: add good precision to performance and handling in the EN B category, whilst being damped in roll and pitch.

It's very comfortable and, in addition, very light.

It' s a great success, Gin has clearly capitalised on their know-how in this wing which has been designed to 'go everywhere'.

The Explorer is innovative in a very current paragliding niche: it has very accessible performance and, in addition, it's compatible with hike&fly.

Foto: Véronique Burkhardt - Pilote : Estéban Bouroufiés

AIR DESIGN
VITA 2 SUPERLIGHT

Foto: Véronique Burkhardt Pilot: Sascha Burkhardt

In 2016, Air Design brought out a lighter version of their EN B 'for all', the Vita 2: the SuperLight version is, indeed, a lot lighter and not at all bulky in its bag…

By Estéban Bourroufiès

Photo: Véronique Burkhardt Pilote: Sascha Burkhardt

The Vita 2 SuperLight is a particularly light version of the Vita 2 classic: it's weight has been reduced from 5.2 kg to 3.6 kg in its SuperLight version, 'Super' being visibly a justifiable superlative. This reduction in weight has been obtained by using Porcher Skytex 27 classic 2 fabric, including for the cell walls, the exception being the leading edge, where there is equally lightweight fabric, Dokdo-20DMF (WR). For the Skytex 27, Air Design use the version coated on both sides (classic 2), it's an interesting argument concerning longevity. The lines are fairly clear and easy to untangle, despite being totally unsheathed, except for the brakes.

Long rods hold the leading edge fully open, even before take off: this is, no doubt, a reason for its exemplary behaviour during take off.

Clearly visible: the leading edge goes back near the stabilo, forming a break. Below: the "Vortex-Hole" in the stabilo.

The riser: simple, with straps, easier and nicer to untangle. And yet, the entire wing only weighs 3.6 kg.

Lightweight fabric everywhere: Dokdo 20 and Skytex 27, the latter in classic 2 (double coating). This makes it weigh about 29 g/m^2, but increases the life expectancy.

The unsheathed Edelrid lines are easy to untangle.

Foto: S. Burkhardt

TAKE OFF AND FLYING

In fact, the Vita 2 SuperLight comes up with disconcerting ease. It isn't just thanks to its low weight, because you can see it even just in comparison to other lightweight wings. This wing is one of the easiest and nicest to inflate out of all those I've tried.

A bit of pressure on the front risers, even in very little wind and the wing comes up with exceptional ease.

As a consequence, the control of the wing as it rises, by creating a pressure difference between the two front risers, is fantastic. It also comes up without using the As, whether with your back to the wing or facing it. Once it's above your head, the wing doesn't deform much and it's very simple to maintain it there.

Photo: S.Burkhardt

During folding, take care of the leading edge rods...

IN FLIGHT

This wing glides well. Air Design have given this "Low EN B" numerous elements normally found on higher classed wings, such as miniribs at the trailing edge and 3D-shaping at the leading edge. It also has "Vortex Holes", openings in the stabilo. The airflow through these holes is supposed to reduce the vortices that generate induced drag.

BEHAVIOUR

This wing is impressive due to its interesting mix of lightweight and solid behaviour. As a general rule, the lightweight wings move around a lot as they deform in turbulence.

For the Vita 2, this isn't the case: it is pretty compact and there is very little differential between one half of the wing and the other.

... which keep the inlets fully open and contribute to the exceptional inflation of this wing.

FLYING/THERMALING/TURNING

In thermals, it is pretty easy with a good rapport between the feeling in a thermal and its capacity not to deform, as well as its pitch stability.

Its reactivity to the brakes is very nice and, above all, can be modulated because Air Design have integrated a technique that is particularly well known in acro and paramotor wings: the brake pulleys are fairly far from the risers.

Combined with the attachments being placed in an unusual position on the trailing edge, this allows them to work in a differential manner on the wing: By pulling the brake the length of his body, the pilot brakes right across one half of the wing. By pulling towards the inside, the wing tip is braked more and the wing tilts more in the roll, letting it 'wind in' with a greater bank.

Contrary to lots of other wings, when the pilot applies the brake, the shortening of the trailing edge affects the centre and not the stabilo area. Another positive little detail: the marking in the centre of the wing at the level of the trailing edge. It's practical at take off and when folding.

A video explaining the differences in braking depending on the direction in which the brake is pulled. https://youtu.be/pK9NpBmTR3k

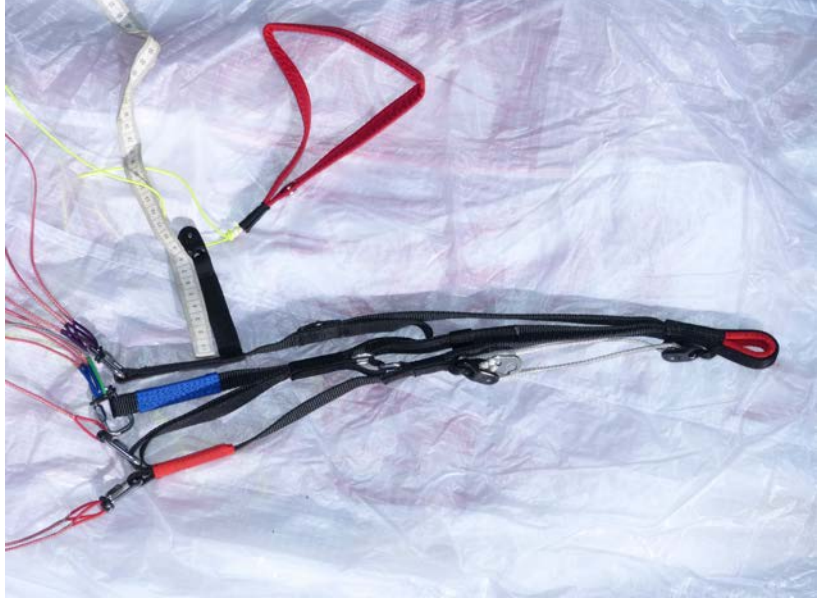


Photo: Véronique Burkhardt Pilote: Sascha Burkhardt

This system works fairly well and you could ask why this isn't done more often in intermediate wings.

EARS
The ears on this wing are stable. Little ones reopen on their own but, on the other hand, big ears can require a bit of input from the pilot to accelerate the reopening.

50% COLLAPSE
The wing closes gently and reopens on its own, but slowly (cell by cell).

As for a held in collapse, that's a nice surprise!

The wing rolls very slightly but nothing else.

Another characteristic: the trailing edge is very thin at the end, Air Design call this technique the "Razor Edge".

Photo: Véronique Burkhardt Pilote: Sascha Burkhardt

The wing swings slightly on the roll axis before finishing by stabilising itself, but it doesn't dive. Even by maximum weight shifting to the closed side, the wing continues in a straight line. The requirements in the specifications, as far as safety are concerned, seem to have been fully achieved.

LOW SPEEDS
The stall point is fairly high, at the height of the harness seat, but the pressure through the brakes is such that the pilot is generally forewarned. It is therefore possible to fly at low speeds, as you can easily feel the limit, but on the other hand, the brake travel through the controls is fairly short. Therefore be careful at maximum amplitudes.

STALL
Using maximum travel without taking wraps will rapidly stall the wing. Reverse is easy to find, but can have a slight tendency to want to come out if you don't hold it in. The dive coming out is perfectly normal.

NEGATIVE
Whether in straight flight or in a turn, the low brake travel can induce it to go negative fairly rapidly, but always after a clear warning embodied by strong pressure in the controls.

CONCLUSION
A wing which fulfils its specifications: very light (1.6 kg less than the classic version), compact, nice to fly and efficient in thermals. The surprising mix between compact and light weight also gives it an aspect which is reassuring and safe. The particularly easy take off is entirely appropriate for its easy EN B classification, and also for its use for hike&fly and/or use in high mountains.

MANUFACTURER'S SPECIFICATIONS

Requirements Low EN B wing, intermediate for all, highly balanced. Combining agility, performance and pleasure with a high level of safety.

Manufacturer: Stefan Stieglair

VITA 2 SUPERLIGHT
TECHNICAL DATA

Manufacturer: Air Design
Web : https://ad-gliders.com/fr/

DATE	2016	2016	2016	2016
SIZE	XXS	XS	S	M
CELLS	43	43	43	43
FLAT SURFACE AREA [m²]	19,29	21,34	24,11	26,57
AREA PROJECTED (m²)	16,21	17,93	20,26	22,33
SPAN FLAT (m)	10,15	10,68	11,35	11,91
SPAN PROJECTED [m²]	7,89	8,30	8,82	9,26
ASPECT RATIO FLAT	5,34	5,34	5,34	5,34
ASPECT RATIO PROJ.	3,9	3,9	3,9	3,9
TAKE OFF WEIGHT [kg]	50-65-75*	60 - 75	70 - 90	85 - 105
WEIGHT [kg]	3,1	3,3	3,6	3,9
CERTIFICATION	LTF/EN B	LTF/EN B	LTF/EN B	LTF/EN B
PRICE	3540	3540	3540	3540
MATERIALS	Extrados: DOMINICO - DOKDO-20DMF(WR) Extrados: Porcher Skytex 27 classic II Intrados: Porcher Skytex 27 classic II Cellule: Porcher Skytex 27 hard Elévateurs: Liros 13mm Aramid/Polyester Suspentes: Edelrid 8000/U-090, U-130,-U-230			

AIR DESIGN

VITA 2 CLASSIC

The Air Design Vita 2 also exists in a classic version, made entirely from Dominico Dokdo 30D fabric. The difference in weight isn't negligible (5.2 kg in size S compared to 3.6 kg for the SuperLight), but it is, for example, an attractive wing for those doing both free flying and paramotoring. The wing has just been DGAC certified for paramotoring in five sizes from 50 kg to 140 kg..

Photo: Air Design

The classic version, 1.6 kg heavier, as good for use with a paramotor (right) as for free flying (below).

Foto: josef.nindl

Foto: Sascha Burkhardt

WATER WHEN WALKING

During vol bivouac, water is one of the heavy objects that you have to transport. Unless you use what you find in the countryside.

When walking during hike&fly, water is very heavy. You can drink from springs, but you don't always find sufficiently clean water. In the mountains, the risk of drinking unclean water isn't negligible: even above the tree line, where the risk is theoretically less, water can be the vector for diseases transmissible by animals in the summer. A sufficiently fine ceramic filter connected to a pump can capture almost all bacteria and protozoa (single cell pathogens and amoebas for example).

On the other hand, unlike chemical purifiers, they don't eliminate viruses.

It's part of the sport: no matter how much water is flowing in the river, the bottle only ever fills up slowly.

Cow pats by the water's edge.

This type of filter lets you use water pretty much anywhere you can find it.

Photos : Sascha Burkhardt

On the other hand, the water has a great flavour, the suspended sediment is obviously filtered out too, and you can pump just the quantity required. In addition, you don't have to wait for it to be treated as you do with tablets which take thirty minutes to get rid of bacteria and viruses, and in fact two hours for certain protozoa like giardia. When bivouacking we used a Katadyn Combi a lot, but it's pretty heavy. The Katadyn Mini on the other hand, is well adapted to our sport, it weighs less than quarter of a litre of water.

But for sure, pumping is tiring, it takes about 1 minute to do 0.3 l of water (Data from Katadyn: 0.5 l/minute). If there are several of you, it's best if everyone has one so that you don't have to queue to drink! In summary: a good insurance against diarrhoea or more serious illnesses such as parasitic diseases. Reassuring, an acceptable price (134 €) and fairly light for 'hike&fly'.

It saves weight, even for a one day outing, because you don't need to carry as much water.

Be careful, if the pump is dropped, the filter can crack and become ineffective. www.katadyn.com

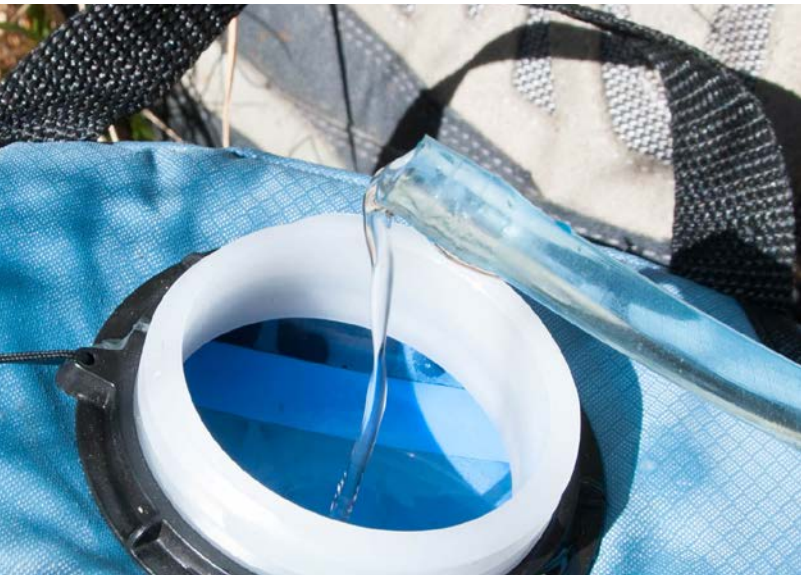
The mini's pump is ergonomic

The outlet fitting: could be a bit longer to better attach the tube to the outlet (which was missing from the pump we tested).

The ceramic filter with 0.2 micron pores (=0.0002 mm). It can be cleaned with an abrasive sponge. Thus it is good for up to 7000 l, then you can throw everything away. But 7000 l is a lot: you would need to pump for ten days, night and day, without stopping.

The little inlet tube with the pre-filter.

The whole thing as delivered. The manual and sponge can stay at home if the pilot is only away for two days...



It doesn't run like a spring, patience is required. Half a litre per minute is already a bit unrealistic.

Without the bag, everything necessary weighs only 220 g. Less than the weight of quarter of a litre of water brought in a bottle....

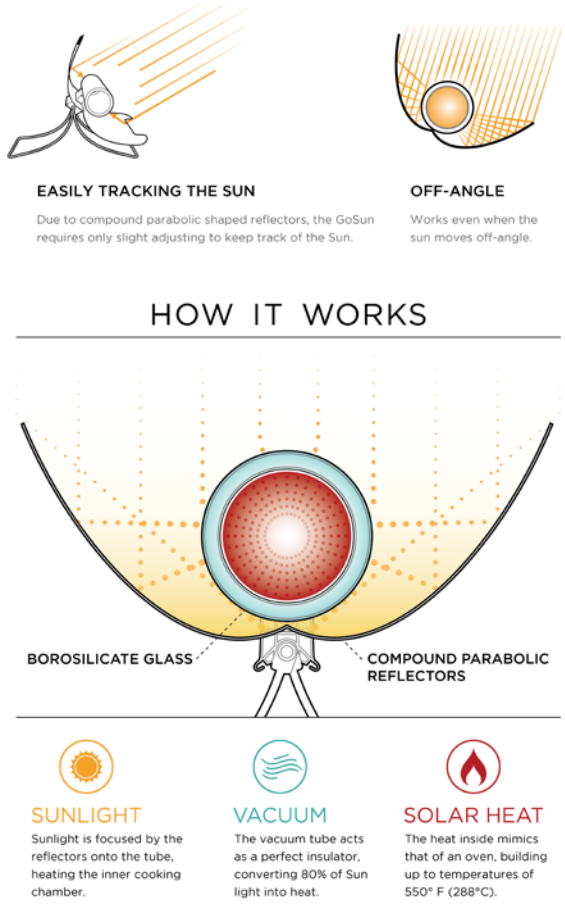
PORTABLE SOLAR OVEN

After a thermic flight, eat thanks to a solar powered oven! An attractive idea...

Photos : Y. Burkhardt

An American start-up has been selling, for a little over a year, a solar powered portable oven: the GoSun Sport weighs 3.2 kg and can be attached to a back pack. OK for hike&fly it's too much, but the manufacturer promises a much lighter 'pocket' version. Last summer we were able to test the GoSun Sport and were waiting for the mini version for our article. However, the mini version is clearly behind schedule so, whilst we're waiting, we'll publish the results of our test of the big version. Thanks to its parabolic flaps, it isn't really necessary to orientate the system to face the sun perfectly as it's fairly tolerant. The flaps concentrate the sun's rays onto a tube whose walls are insulated by a vacuum. Inside there are layers of aluminium, steel and copper.

The system is fairly tolerant of an imprecise orientation.



Even a pizza works!

Photos : Sascha Burkhardt

We got to almost 250°C.


Photos : Sascha Burkhardt

The oven is thus heated, thanks to the sun's rays, up to 288° according to the manufacturer. This efficient system differentiates the GoSun from more basic solar ovens.

On the other hand, you can touch the tube whilst, inside, it's above 200°. Amazing: it doesn't necessarily need to be very hot; it works just as well in the autumn as in the winter, as long as the sun is high enough. On the other hand, it isn't fast and crispy cooking, but slow and more by steaming.

You can do almost anything in it, including pizza or cakes, but you need to allow between forty minutes and an hour before eating. It's a great gadget: cook thanks to the sun if you can't find any dry wood to make a fire.

But you have to start well before the sun begins to set and for 'hike&fly', you'll need to wait for a lighter version. GoSun Sport €289, weight 3.2 kg Volume 1.2 l or 1.4 kg of food maximum.

www.gosuneurope.com/

Foto: Go Sun

It is possible to take it hiking, but we're waiting for the 'mini' version see illustration below...

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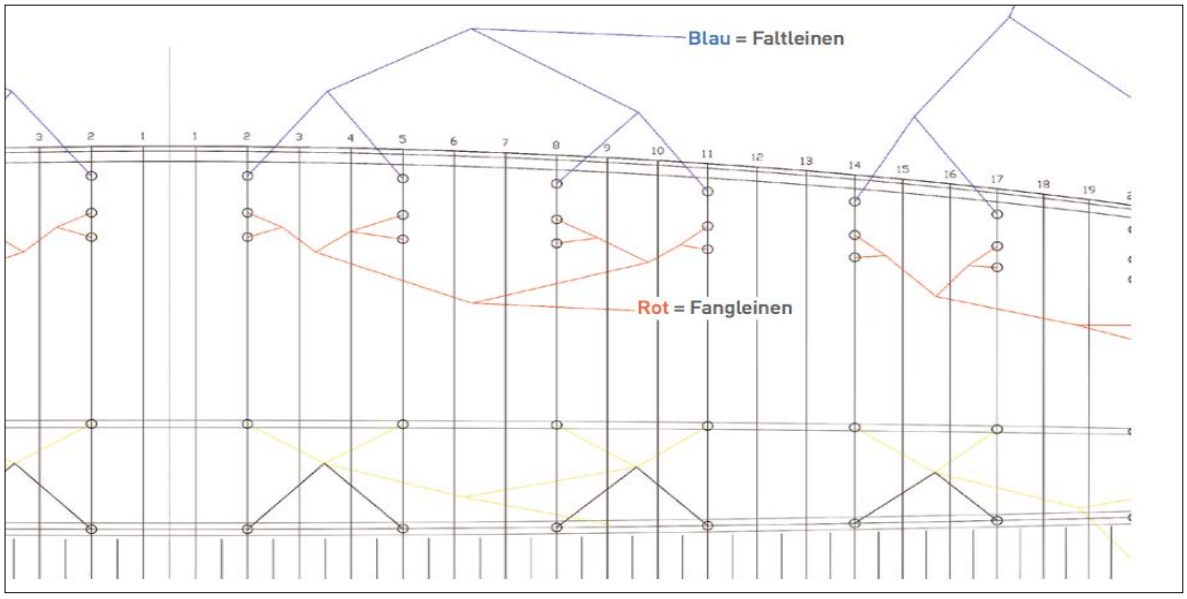
FOLDING LINES



The folding lines on a two line EN D wing in a document from the DHV: drawn in blue, they are the exact replica of the As (in red) but further forward.

Below, a nice collapse: it is becoming more and more difficult to produce the angles required. Using folding lines is sometimes essential. Photo : www.profly.org

To certify the wings, you have to deliberately collapse them. For that, the test pilots sometimes have to use folding lines. What are they, and why are these lines the cause of so much discord?

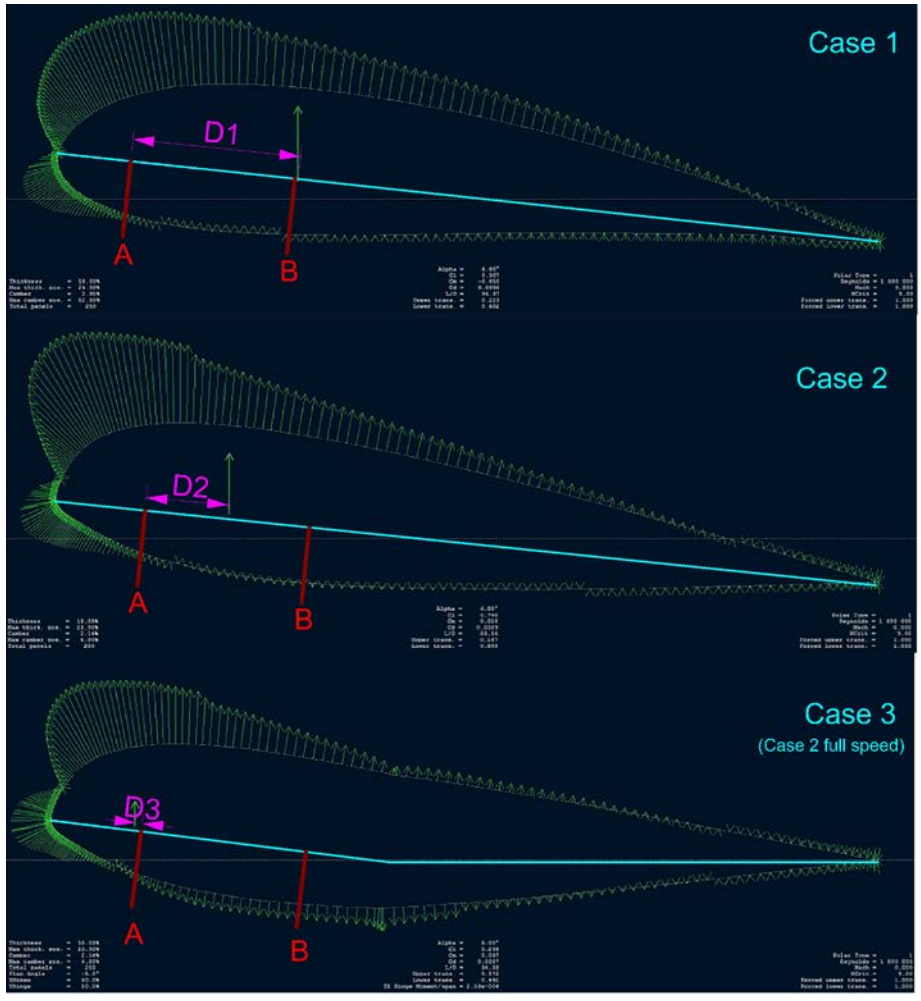
By Sascha Burkhardt

In the past, for older paragliders, it was enough to quite simply pull more or less hard on the A riser to collapse a wing so as to simulate a collapse with a view to analyzing and noting the behaviour of the wing. But with modern profiles, this is becoming more and more difficult to do. The leading edges don't fold up as they did in the past and they resist more and more.

One of the reasons for this is that the profiles are more stable, indeed self stabilising (the reflex profiles are almost impossible to collapse), and the attachment points of the A's being further back makes this simulation even more difficult.

free.aero MAGAZINE
www.free.aero

A document provided by Ozone to illustrate the manufacturer's arguments.
The first profile corresponds to a more classic profile. The centre of the upward pressure (green arrow) is far enough back, offering a big enough leverage (D1) so that the test pilot can collapse the profile.
The second drawing corresponds to a more modern profile. Amongst other things, its upper surface is more convex at the front and its lower surface is flatter. Its centre of upward pressure (green arrow) is further forward, it is more stable and the leverage smaller if the pilot pulls on the As.
The third diagram corresponds to the same profile accelerated. The As and the centre of upward pressure (green arrow) overlap. The pilot can hang on as much as he wants but he won't be able to collapse it by doing this. It's a shame because this profile is, in principle, better...



As Fred Pieri from Ozone explained very well with the aide of the diagram opposite, the point where the maximum lift is concentrated (the centre of upward pressure), has moved forward in modern profiles to the point of being confused with the As. The result: if the pilot hangs under the As, that changes nothing on the profile, it won't collapse.

This increase in stability is good news in itself, because it makes the wing safer, but it prevents the correct simulation of a collapse using the As. But a collapse can never be ruled out on a flexible profile no matter how self stabilizing it is. It therefore has to be simulated at all costs.

A solution quickly appeared: Extra lines attached in front of the As allowed the test pilot to apply more 'devastating' force to collapse the profile, because the leverage is in front of the centre of upward pressure. For a while, more and more manufacturers and testing labs used these lines, until the new norm EN 926-2 came out on the 13th of December 2013.

It forbids the use of folding lines except for EN D wings. An A, B or C doesn't collapse with the risers? Refused or revised to EN D. This new rule has found a lobby in the German Federation the DHV, the British Federation as well as some German manufacturers.

Their argument: folding lines allow cheating at certification. The test pilot would be able to favour behaviour which conforms by cleverly using these lines, whilst the same wing collapsed in a real situation would be refused because it behaves violently.

Fred Pieri, one of the designers at Ozone. A joint battle, with competitors like, for example, Olivier Nef from Niviuk, for folding lines in the name of progress. 'Folding lines should not only be authorized in all certification classes but they should almost be obligatory given their efficiency in producing collapses which are even closer to reality in turbulent conditions', he confided provocatively.

Photo: Sascha Burkhardt

'Not true', retorted Ozone. According to the manufacturer which invented the SharkNose, it is becoming quite simply impossible to certify modern very safe wings with very stable profiles because it is in their nature not to collapse after pulling on the As.

"*It's true that a test pilot with the wrong intentions could try to cheat by provoking gentler collapses', indicated Fred Pieri. 'But in that case, the collapse wouldn't show the angles and closed surfaces required by the norm, and it's easy to check, for example on the video…*"

Indeed, for the certification tests, the wings need to be collapsed according to the angles and with predefined sizes and in line with the marks on the underside of the wing. Between 2005 and 2013, there were slight changes in the requirements, but the principle stayed the same.

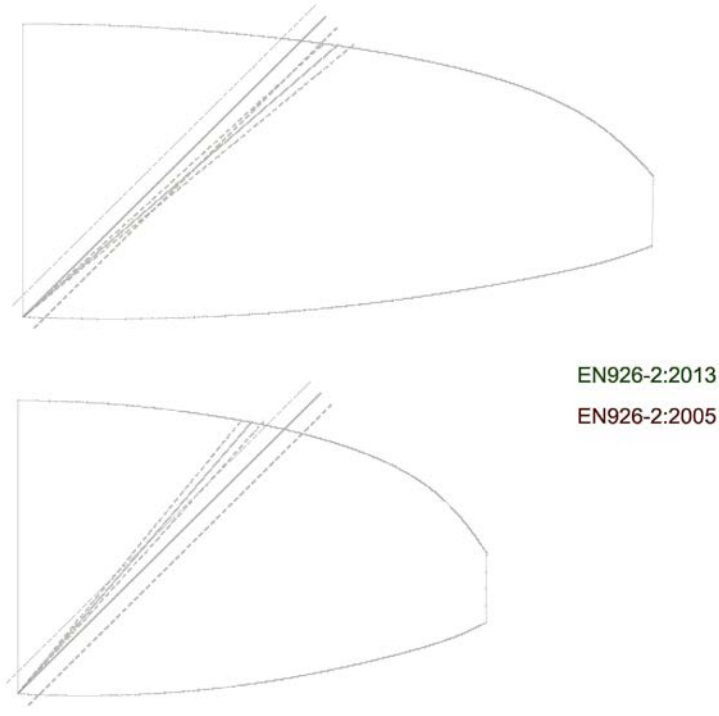
According to Ozone, no matter how you get there, folding lines or not, if the collapse is where it should be, then it is representative.

So why are certain federations and manufacturers still against it? One explanation is that under some wings which are difficult to collapse, using all their strength, the test pilots have managed to induce fairly violent collapses which don't conform.

By dint of having their As overloaded, these wings accelerate on that side and start to go into a spiral. Indeed, if the pilot can then collapse it, this accelerated half-wing won't behave at all like a wing which has been hit by a gust from above 'for real'. It's a fact, which even the critics of folding lines, such as the DHV, admit.

For the designers at Ozone and other manufacturers, the new rule is counter productive and prevents progress in developing high performance safe wings.

The definition of asymmetric collapses required has slightly changed. Above, everything in red must disappear in the 'big' EN 2005 collapse, with a tolerance (in green). Below, comparing the old and the new collapses. The principle remains the same in the 'new' EN. On the other hand, it forbids folding lines as a way of achieving this, except for EN Ds. Photo: Gudrun Öchsl/Profly



Photos: Simon Winkler / DHV

A little collapse provoked by the DHV test pilot, perfectly following the mark defining the correct angle. It's a real art...

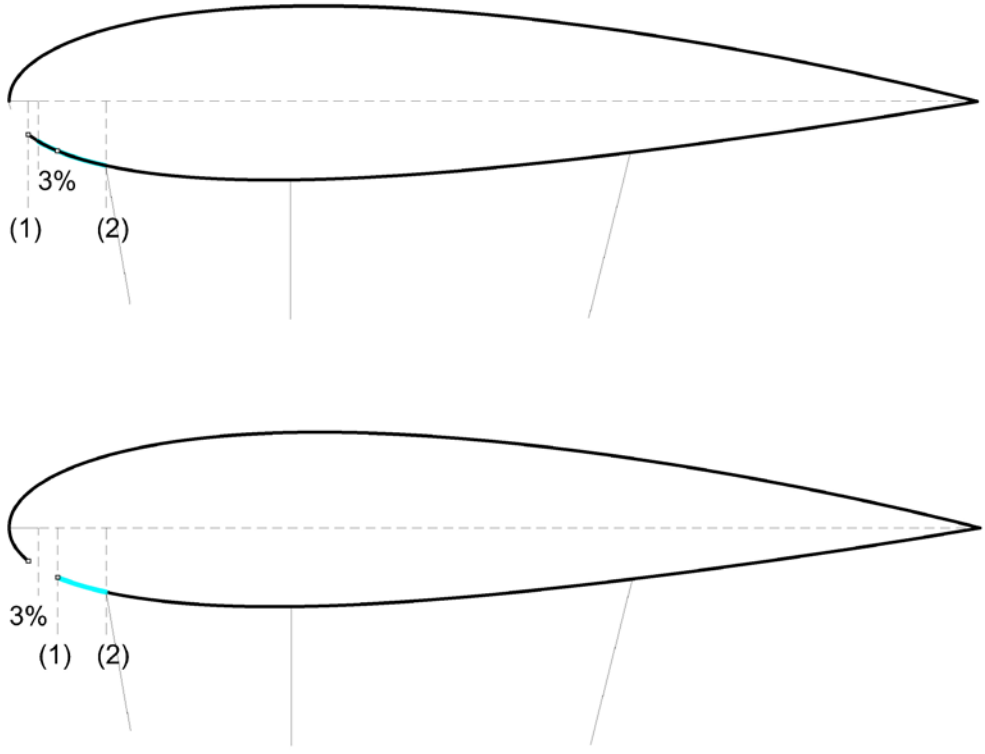
The same wing in a 'big' collapse. Here the DHV pilot managed very well without folding lines – but is it feasible for all modern wings?

The trend is clearly going towards moving the As and the air intakes further back, the SharkNose being one of the best examples, and that's the case in all the classes. Obviously, a two line competition wing is even more impossible to collapse by using the As.

But some wings of this type wouldn't even pass as a D because according to the new norm, the position of the folding lines mustn't pass certain limits, which cannot be achieved for wings with air intakes set right back.

In the meantime, the DHV and other members of the working group drafting the norms are standing firm on the new rules and demanding time '*to see if the folding lines won't actually let wings which are less safe to pass the tests to the detriment of pilot safely*'.

Understandably, it's a very frustrating situation for the designers....



Even for an EN D, it is more and more complicated to pass with folding lines, because according to the new norm, the lines mustn't be fixed further forward than 3% of the chord and, in any case, in or before the air intakes. The limits are situated between points (1) and (2) on these diagrams. Understandably with the air intakes being put further and further back in modern designs, the margin (in blue) where the lines are allowed to be attached, is shrinking fast.

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