free.aero

WORLDWIDE PARAGLIDING AND PARAMOTORING MAGAZINE. FOR FREE.

light

Cover photo:
Taking off light on a Trekking Senso Trek in the Pyrenees.
Photo: Véronique Burkhardt

CONTENTS

Translation by Ruth Jessop

Always going up: a magic moment during a hike and fly trip in the Massif de l'Obiou in the Isère region of France. Photo: Jérôme Maupoint

Long live lightweight

As expected, lightweight is taking over everywhere in our sport.
Obviously we think first and foremost of hike and fly with a paraglider. More and more pilots are discovering the enjoyment of going off on foot with a pocket aircraft on their back weighing less than 4 kg, sometimes only 3 kg. Even after just a few metres along a mountain path, your approach to the forthcoming flight changes completely: Inspired by the feeling of freedom and the immense open space, you feel light as a gazelle, exploring high mountain pastures, inaccessible with the equipment of yesteryear. Going up a shoulder the conditions can change unexpectedly.

But there isn't just this side to it. Paramotorists have also discovered that lightweight is possible on a paramotor. No you don't have to be completely shattered after two failed launches on the flats. With new paramotors with a range of 18-24 kg, you can start all over again with a smile on your face.

It isn't just a question of comfort: taking off and flying light, without a doubt, also improves safety. Less weight moving about, means less energy when there is an incident and less speed. Cool!

It's also the case, and especially for the wings above our heads, whether a paraglider or a paramotor. Less weight in the wing, gives less surge and less parasitic roll. Certainly lightweight wings move a bit more, but they are little movements of much smaller amplitude. Everything is gentler, more damped. All this means that manufacturers are going more and more lightweight even for those pilots who will never put a foot on a mountain path.

As promised, we are continuing our review and tests of lightweight material. And as always, the list of products presented is far from exhaustive. In the summer of 2016, there will be another article full of lightweight equipment.

Sascha Burkhardt

SLALOM PARAMOTOR: ALEX MATEOS IS BACK, MARIE LIEPMANN IS ON THE UP

The podium at the Air Games, including Marie Liepmann (holding the trophy) and Alexandre Mateos (just above) Photo: Sharon Skinner

The champion Alex Mateos is back after fracturing his pelvis in April. And what a comeback! After winning the first event of the Slalomania 2016 circuit in November 2015 in Bornos, Spain, he won the Air Games in Dubai in December. It's also good news for the manufacturers of his equipment: Alexandre flies an Ozone wing propelled by a Thor from Polini.

Alex Mateos in action in Dubai

Floating pylons at Bornos: from now on this will be mandatory for this type of competition.
Photo: Karen Skinner

Marie Liepmann (Polini/Dudek) took first women's place in both competitions.

The Slalomania circuit at Bornos was moreover the first official pylon course which took place over water, an important step for safety in slalom competitions. The pylons at the Air Games were also mainly placed on water.

This new measure seemed to work well: several pilots went in the water, particularly in Dubai. They were uninjured. The consequences on hard ground could have been a lot worse.

Obviously, it remains to be seen whether this new security measure will encourage pilots to take more risks.

Karen Skinner (third woman) in action around one of the floating pylons at Bornos. Obviously a boat is ready to rescue the pilots.
Photo: Jason Whitehead

RESULTS FROM BORNOS:

MEN
1 - ALEXANDRE MATEOS (FRA)
2 - JÉRÉMY PENONE (FRA)
3 - GUILLAUME VALLANCE (FRA)
4 - VICENTE PALMERO (SPA)
5 - NICOLAS AUBERT (FRA)

WOMEN
1 - MARIE LIEPMANN (FRA)
2 - AURÉLIA HALLIE (FRA)
3 - KAREN SKINNER (SPA)
4 - EMIKO MOROTA (SPA)

RESULTS FROM THE AIR GAMES:

MEN
1. ALEXANDRE MATEOS (FRA)
2. PIOTR FICEK (POL)
3. JÉRÉMY PENONE (FRA)
4. MARCIN BERNAT (POL)
5. MOHAMMED ALYAFEI (QAT)

WOMEN
1. MARIE LIEPMANN (FRA)
2. JANEJIRA CHUYNOEY (THA)
3. KAREN SKINNER (SPA)
4. EMIKO MOROTA (SPA

Some scenes from Dubai including an interview with Alex Mateos.
https://www.youtube.com/watch?v=SEiTVU_z2dE

This video shows the winner, Marie Liepmann, in action in Dubai.
https://www.youtube.com/watch?v=5yFP_VVIa4g

NIVIUK : RÉMY DUMAS TELLS US ABOUT THE ARTIK 4

Like any instrument which has been meticulously worked on, the Artik 4 fulfils its maximum potential.

That's how Rémy Dumas, string instrument maker by profession, felt when he flew XC with the Artik 4. Fly with him in this video where beautiful images of violin manufacture come face to face with flying.

Video:
https://vimeo.com/147696579

SUP'AIR: FIRST WING FOR THE GENERAL PUBLIC

Sup'Air have launched their first 'general public' wing. The Leaf is a wing accessible for all levels, from beginner to experienced pilot. It is excellent for first big XC flights. Certification: EN B

For more information:
http://www.supair.com/

SOL: WASABY 3

SOL announced the launch of their new acro harness the WASABY 3.

Working in partnership with the best pilots has allowed the development of this acro harness destined for acro and free-style pilots.

Available in four sizes
Retail price: 795€ including VAT

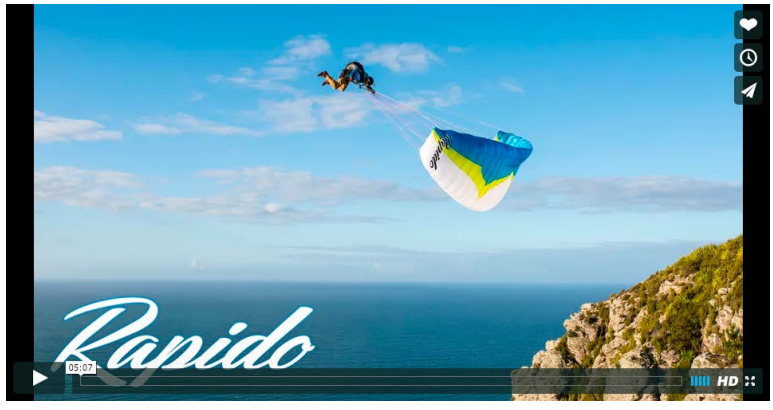
For more info:
http://www.altimo.fr/?page=pages/pagessol/page0233.htm

OZONE: MINI WING AND SPEEDFLYER

Ozone have put two videos on line showing their new mini wing and speedflyer. The LiteSpeed is a continuation of the Zero, the first mini wing with a SharkNose.
It's a mini wing which can be used in thermals as well and accessible to a greater number of pilots than the Rapido which is a fairly radical speedflying/speedriding wing.
Two well made films!

LiteSpeed Video
https://vimeo.com/148043595

Rapido Video
https://vimeo.com/147968118



SKY APOLLO NOW AVAILABLE

The EN B top of the range Apollo wing from Sky has been launched with 55 cells and an aspect ratio of 5.45. The 3 line configuration and a very elliptical form in plan view, are supposed to contribute to its good performance.

Alexandre Paux has worked particularly on the nose. Nylon leading edge rods combined with mylar and the elastomer Hypalon as well as a triple 3D-shaping cup guarantee an efficient profile and good maintenance of internal pressure.

Available in five sizes: XS to XL for a surface of 21.35 to 28.11 m^2.
All up weight 55 to 125 kg.
Speed 38 to 56 km/h.

www.sky-cz.com

Individually made, they even come with strawberries.
Photos: Benedikt Bös

WINGMOUNT

The German pilot photographer Benedikt Bös, well known to readers of voler.info/free.aero, produces mountings for cameras like the GoPro Hero3, Hero3+ and the Hero4. They can be placed under the lower surface of the wing and are held there thanks to a magnetic plate. More and more top level pilots like Alex Mateos, Emilia Plak, Ramon Morillas, Michel Carnet, Manu Malaguitas, Victor Rodriguez, Pascal Campbell-Jones and Franck Simmonet use these devices.

In addition to the Wingmount XLight model, Benedikt has launched a "Wingmount Acro Edition", developed with the support of Manu Malaguitas. The magnets which are even stronger make it better for manoeuvres like Infinity Tumbling.

To attach a GoPro under the lower surface, where it will be well protected.

The attachments are individually made by Benedikt and it is possible to have a very customised product.

Weight without the camera: 70g approx.
Diameter: 11 cm approx.
Price: 55€.

With the promotional code "free.aero", postage and packing is free and the optional lense protection only costs 5 €.

http://paramotorgermany-products.com/products/wingmount-xlight-english

A self-portrait of Alexandre Mateos thanks to his Wingmount

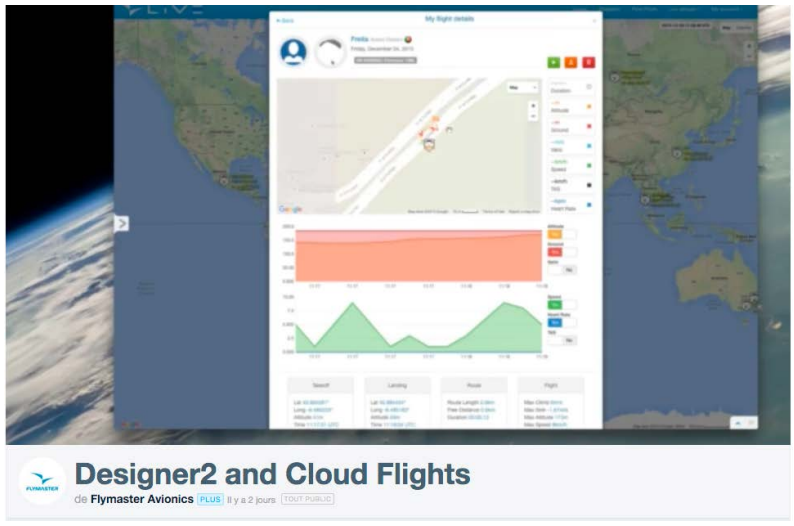
Video: Manu "Acro" Malaguitas doing an Infinity with a Wingmount
https://youtu.be/gtk99Prq3aY

FLYMASTER DESIGNER IN THE CLOUDS

The manufacturer of Flymaster instruments is now offering a completely new version, the 2.0, of its "Designer" software for MacOS, Linux and Windows. As with the previous version, it allows the screens of its instruments to be configured in a really nice way when plugged in via USB.

It is also possible to transfer new versions of the firmware as well as airspace. In addition it allows you to transfer flights registered on the Flymaster server into a completely new space called "Cloud Flights".

A recent video explains the new functionality:
https://vimeo.com/150265221
www.flymaster-avionics.com



GET DRESSED WITH ADVANCE: NEW HOODY

Advance are now selling a new sweatshirt with a hood (or 'hoody', to be more fashionable). The new designer clothing from Advance will be soft, comfortable and great to wear.

According to the Swiss manufacturer the hoody is made in the EU.
Sizes: S-XXL, unisex,
Colour: black

http://advance.ch/fr/produits/vetements/hoody/

GIN GLIDERS : ACCESSORIES, SPEED AND PARAMOTOR

For the start of this year GIN have lots new on offer, especially in accessories:

LIGHTWEIGHT 80 L RUCKSACK
On the lightweight side, this backpack is designed to carry all your flying equipment, with a big front zip and a raised pocket. It's narrow and compact shape increases the volume available. Capacity 80 litres.

30 CM TANDEM SPREADER BARS
The new rigid GIN spreader bars are light and will be an ideal tool for professionals. An aluminium bar maintains the distance between the pilot and the passenger giving optimal comfort as soon as you take off, and throughout the flight.

VARIO CASE FOR THE NAVITER OUDIE 3
Specially designed for the Naviter Oudie 3, this neoprene vario case is light and discrete and has an integrated Velcro band.

THE YETI CROSS
GIN have also got into the niche market of square reserves, known for their pendular stability, after a rapid opening.

The Yeti Cross is available in sizes: 26, 32 and 38 m^2
For an all up maximum weight of: 86/104/126 kg.
The weight of the reserve is very light: 1.3, 1.5 or 1.7 kg depending on the size.

Video
https://www.youtube.com/watch?v=0jMHOwKB5CU

Photo: Jerome Maupoint/Gin

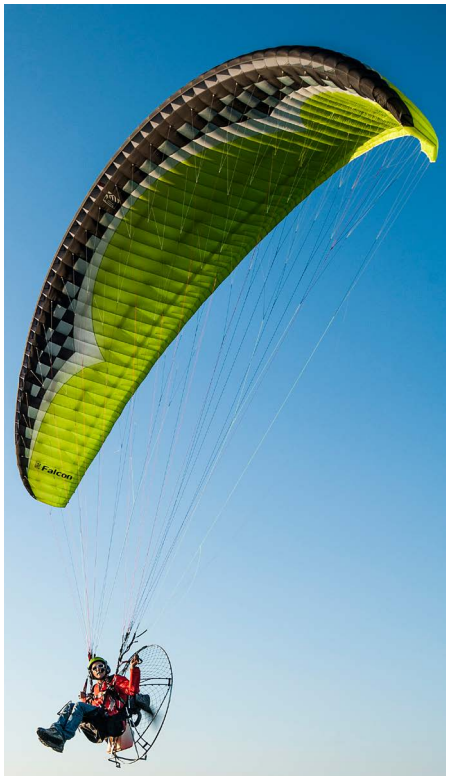
FLUID 2
Just in time for the winter season, the speedriding/speedflying wing, the Fluid, is available in its version 2.

Compared to the first version dating back to 2009, the Fluid 2 is more versatile, thanks to its improved sink rate it can also be used for speedriding with skis.
Foot-launched speedflying is also possible.
Sizes: 8.5, 9.5 and 11.

http://www.gingliders.com/speedflying/speedriding-gliders/fluid-2

THE FALCON PARAMOTOR
The Falcon is a semi-reflex wing that GIN have designed for leisure flying, cross country, bivouac and in competitions. Aimed at intermediate and experienced pilots, it is the multi-use wing for motorised flying, whether for travelling at a leisurely speed or for kilometre crunching.

www.gingliders.com



The semi-reflex Falcon for paramotoring.

Top photo: a swooping sequence on the Fluid 2.
Above the Fluid 2 at take-off ready for speedriding or speedflying.
Photos: Jerome Maupoint/Gin

NEO: GO SUPER LIGHT SPEEDRIDING TOO

The French manufacturer of ultra-light harness and speedriding equipment introduces the X-Lite, an ultra-light speedriding wing, specially designed for hiking and freeride. It's capable of going to the limit, easy to slow down, and very precise when skiing and flying.

It has been tested to a load of 6 G, available in sizes 8, 9, and 10 and weighs 1050 to 1350 kg.

Principal materials: Skytex 27 g, seat ultimate Dyneema, lyros tubes Dyneema 6 mm. Made in France.

It is obviously well suited to be used with the Neo Body, no doubt the only harness exclusively designed for speedriding which, in particular, makes it easier to go from standing up to sitting down. It is available in several sizes (S-M- L). A new video shows this harness in action.

You can order it as a version with the harness over a ski suit or integrated into a ski suit, which is specially designed to integrate the harness worn inside the suit (see photo, you have the choice of buying it in two parts jacket/trousers or one integrated piece).

www.flyneo.com

The Body harness
https://www.youtube.com/watch?v=uODedZnbGBI

Another new video: The X-Ride, the wing for experts.
https://www.youtube.com/watch?v=wQx1T1cTo9k

A reminder: the S-Ride film for beginners and experts, discover freeriding:
https://www.youtube.com/watch?v=AJrV7QcYJfk

PIERRE BOUILLOUX LEAVES US

Pierre Bouilloux founder of the make Sup'air and paragliding pioneer, has left us at the age of 60. Pierre was a pioneer and a champion in our sport. He founded Sup'air in Annecy in 1982 and was a world leader in paraglider harnesses at the end of the 80s. He leaves behind him his partner Lynn and his two daughters Élodie et Stéphanie.

The team at free.aero will always remember him as an exceptional person, really friendly, clever and ahead of his time. He was one of the first pilots to set off with an ultra-light tent in his harness, thus starting the vol bivouac trend more than a decade ago, well before the advent of the fashion for hike and fly. He always had his harmonica with him and played it well, as if the music were real hymns to nature and the elements. We are particularly shocked to learn that he took his own life.

May the wind be with you Pierre.

APCO: LIGHT

Apco have launched a new very light karabiner, the AirXTreme Mini Carabiner 25. It's a 25 mm version of the range's Twist-Lock karabiner. As with the latter, the lock has several safety measures before it opens: lift, turn, and open.
It only weighs 55 g and holds up to 2000 kg.

APCO BECOMES UNIQUE

The Israel based manufacturer has equipped themselves with a new 2 x 10 metre laser cutting table. It will allow them to make wings more quickly.

It also allows them to personalise wings produced in this workshop: in predetermined places on their new wing, pilots can add a logo or writing. This service, which normally costs 400 $, is free for a limited time.

http://www.apcoaviation.com/DL/PersonallySignedWings/index.html

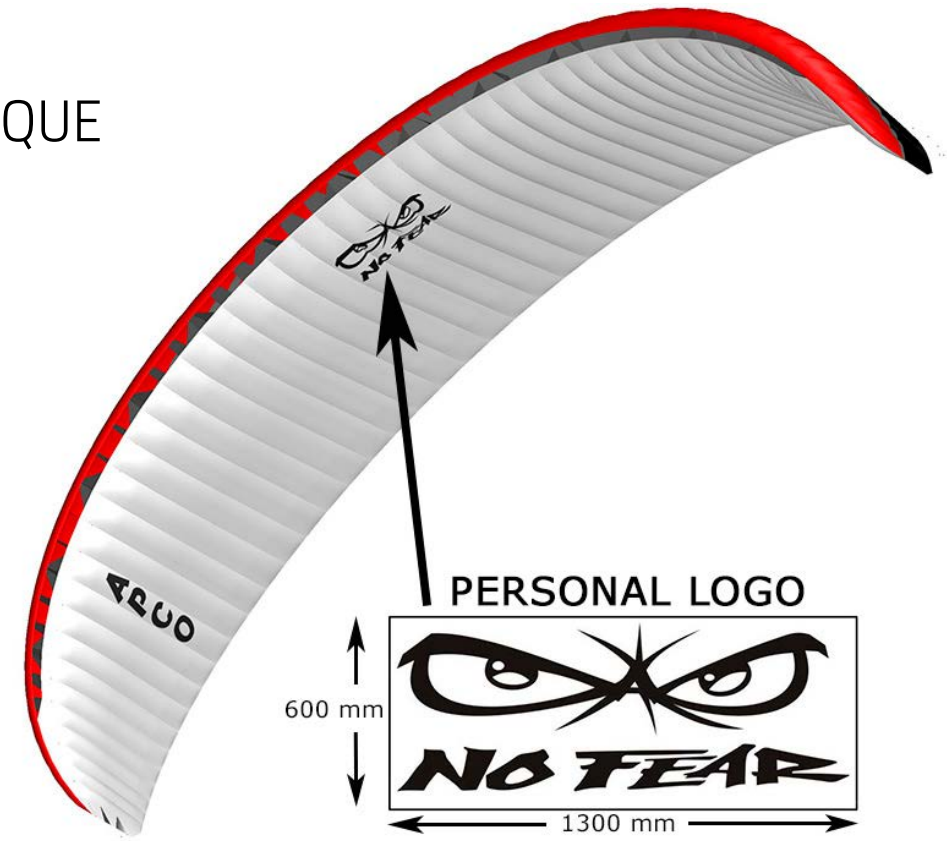


Photo: Apco

The new video of ARTIK 4: Rémy Dumas

Rémy Dumas has two passions he wants to share; his drive toward perfection and level of excitement. He is a luthier pilot, or a pilot luthier always aiming for a job well done, polished in all details to deliver the most outstanding result. This was the reason why he did not hesitate for a moment when choosing the Artik 4.

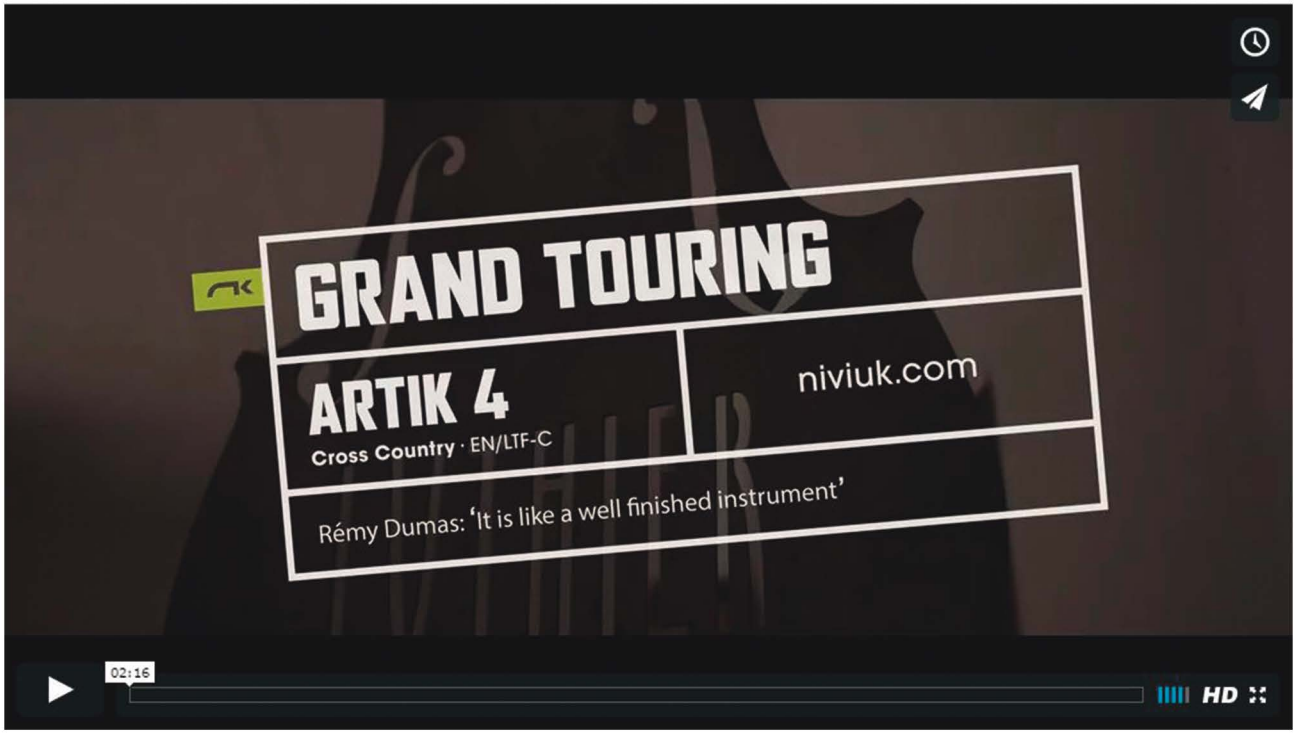


Photo: Jerôme Maupoint/Gin

The impression of being light

THE PRELUDE...

The walk before you fly isn't just about adding more views and magic moments to the day. It also lets you observe the weather and the variations in the aerology for a few hours before you fly. Fans of hike and fly are often very switched on about the air.

ON THE WAY...

Two Advance team pilots on the Hardergrat ridge above Interlaken in Switzerland looking for the ideal place to take off on their lightweight wings. They've got plenty of choice.
Photo: Thomas Ulrich

Photo: Stéphane Boulenger

NEEDLE EYE RIBS

THREE LINER

AIR SCOOP

DOUBLE 3D SHAPING

EASY PACKING

LIGHT WEIGHT

TRITON 2 light – The champion of the flyweights

Maximum performance with minimal weight – at just 3.4kg (XS) the TRITON 2 light is the ultimate flying machine for our X-Alps athletes. The wing is uncompromisingly light and distinguishes itself with its performance and an instinctive feeling for thermals.

The ultimate mountain machine (EN/LTF-C, EN-CCC)

www.nova.eu

NOVA

TRAVELLING LIGHT IS ALSO POSSIBLE WITH A MOTOR...

The reduction in weight of both motors and wings has encouraged more and more pilots to do vol bivouacs – these flights open up completely new horizons for paramotors.
Photo: Jérôme Maupoint/GIN

AVEYRON BY FALCON

Two GIN Falcons discover the hills and valleys in Aveyron, France.
Views that are the prerogative of paramotorists. Photo: Jérôme Maupoint/GIN

A WHOLE AIRCRAFT IN A HANDBAG.

The arrival of a new generation of mono skin wings has made this dream possible. A whole aircraft can fit into a handbag. Here the Niviuk Skin Plume (1.65 kg) is in the bag and an Ozone F*Lite (102 grammes) harness in the pocket: Not just everything you need for flying down a mountain, but also for climbing in thermals and spending hours in the air.

AND WE'RE OFF...

Taking off on a Pi2 in front of the Eggstöcke in Swirzerland. The second version of the Pi only weighs 2.12 kg in the smallest size. This saving in weight and the small volume when folded, have been achieved thanks to modern technology, taken from the Omega X-Alps. It comes in four sizes 16, 19, 23 and 27, and is very versatile as a function of its wing loading: thermic flying, hike and fly or mini wing. From beginner to expert...
Photo: Andreas Busslinger

Buzz Z5 by OZONE

SharkNose Performance, Legendary Comfort

The Buzz Z5 is the highest performance Buzz that we have made, and the most solid and comfortable Intermediate class wing that we have ever flown. The Buzz legacy of comfort and ease of use has received a huge performance upgrade with the patented Ozone SharkNose profile, double 3D shaping, optimized line layout, overall line length reduction, and more cells, all of which mean reduced drag and increased glide and speed. Best of all, these performance upgrades come at no cost in passive safety, because the aspect ratio remains the same. This balance of performance and safety is the most important consideration for any pilot, and the Z5 offers what we think is the ideal amount of both for long XC flights in real conditions.

The Buzz Z5, like its predecessor, is suitable for a wide range of pilots. It is an ideal choice for those who fly 30-50 hours per year, or for experienced pilots seeking a wing with high levels of passive safety and comfort in the Intermediate Class.

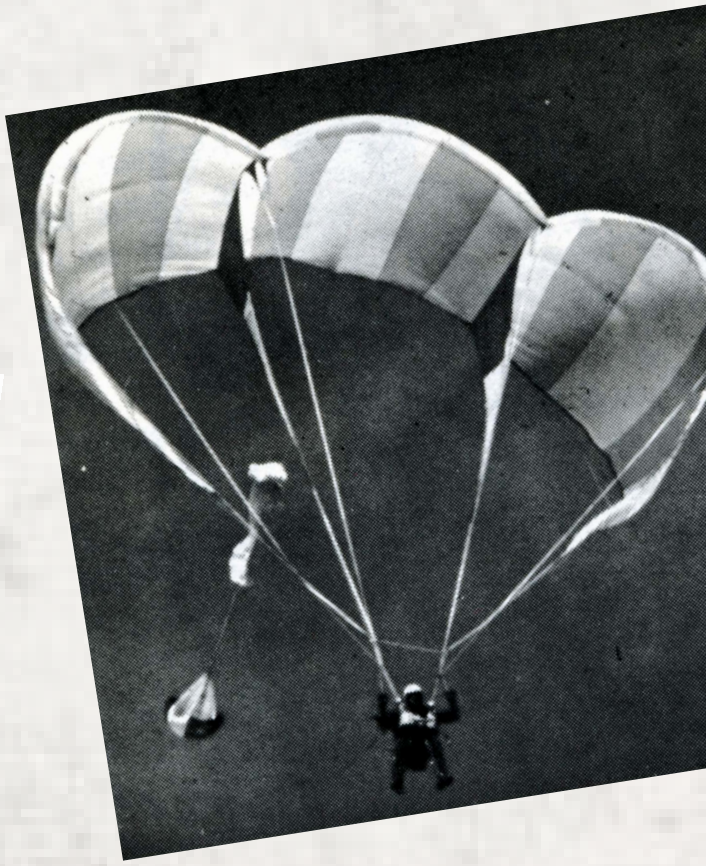
WWW.FLYOZONE.COM

Justin Brim surfing the low clouds in Florida, USA. photo: **Loren Cox**

50 YEARS OF PARAGLIDING

SINGLE SKINS, BACK TO OUR ROOTS...

The new trend for Super Light is possible thanks to single skin wings. This is nothing less than a return to our roots: the first paragliders were single skins.



The very first ‘slope parachutes’ flew fifty years ago, from 1965 onwards, well before the real birth of the sport in Mieussy. Dave Barish had to come up with a concept for NASA who were looking for parachutes to bring back their spaceships.

He invented a parachute in the form of a wing, obviously single surface, which could be piloted so that the capsule could be steered to the desired point of impact. In the end NASA stayed with traditional round parachutes, but Dave Barish continued looking into the recreational side of his ‘Sailwing’.

On the 15th of October 1965, he took off for the first time on a grassy slope and glided about sixty metres. In 1966, fifty years ago, he did a tour to promote this new sport, visiting tourist villages in the American mountains.
But apparently he was too far ahead of his time. We had to wait until the 1970s for parachutes with cells, and the first ploofs at Mieussy, for the birth of an activity based on the ‘slope parachute’.

In 2005, Francis Heilmann, well known in the paragliding world for his outrageous costumes at the Coupe Icare, decided to pay homage to the forefather of paragliding, the Sailwing, by making an exact replica. There were no plans left so he had to design it all from photographs taken at the time. What’s more, for safety reasons, the inventor Dave Barish who was contacted in the USA, wouldn’t give his support to the project.

Back in the beginning: Dave Barish showing what his Sailwing could do in 1965/66. Photo: Barish Collection

The replica made by Francis Heilmann in 2005. He uses it regularly. Photo taken in 2015: Françoise Hurlin

Francis made it all by himself and the adventure was an amazing success. He took off on his Sailwing from different sites from July 2005 onwards. The crowning glory was the demonstration flight at the Coupe Icare at St Hilaire in the presence of Dave Barish who had come over especially from the States to watch.

Since then, Francis Heilmann has flown his Sailwing regularly just for fun. In 2015, he did demonstration flights again at Villeneuve and the Coupe Icare. We asked Francis a few questions:

voler.info:
Why are there very long panels at the back? Is it to stabilise the turn?

FRANCIS HEILMANN: David Barish thought that these big flaps would serve to stabilise the wing in a turn, but he realised that they were no use, except to add drag and so he removed them from the next

Francis Heilmann with Dave Barish in 2005, before the demonstration flight at the Coupe Icare. Photo: Françoise Hurlin

prototypes so that they would fly better. I kept these big flaps in my Sailwing because they are part of the design of the first paraglider in history.

voler.info:
How long did you take to sew the wings?

FRANCIS HEILMANN: I started in 2000 with a Kite version of the Sailwing, then I made two half scale prototypes and then, in 2005, I made two Sailwings of 40 m2, so it was lots of work in the end. I worked from just two photos, the old fashioned way without a computer as it would have been in 1965, with graph paper, tracing paper and a slide rule.

voler.info:
How did you feel when you did the first flight? Did you hit any turbulence?

I did lots on the school slope before the first flight at Sainte Victoire in Provence so it was always in turbulent air. The first flight went very well. The wing was very stable in turbulence but, on the other hand, I realised that it wasn't very easy to handle. It was difficult to turn when flying and the best way to do a quick turn was to stall half the wing with the brake, so that it would go backwards and then let it re-fly normally.

...the best way to turn quickly: stall half the wing...

Francis Heilmann making it onto the raft at Sochaux in 2015. Photo: Françoise Hurlin


IKUMA &
PEAK 4
We explore all levels of most pressing importance to help you discover a new passion.
niviuk.com

The Batlite from Adrenaline, based on the Barretina plans, shown here when we tested it at the beginning of 2013. The Batlite is the most lenient wing, as far as handling is concerned, out of all the single skin wings. Photo: Véronique Burkhardt

The XXLite from Ozone (2012): still the first generation of single skins, but with relatively good performance compared to the Batlite. On the other hand, as far as handling is concerned, the XXLite is one of the most demanding single skins. Photo: Loren Cox/Ozone

THE SINGLE SKINS: GO UP

In the world of 'hike and fly', 2015 was the year of the first single skins that could really be used like 'proper paragliders'.

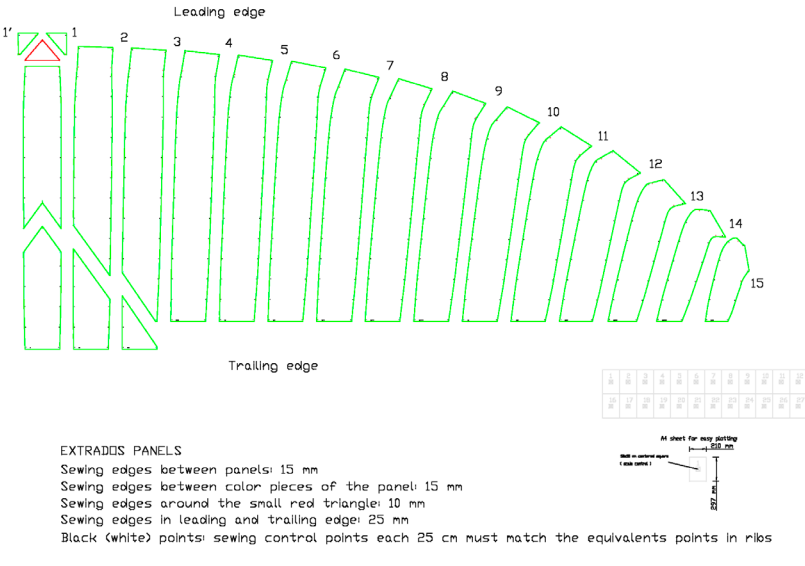
Remember, the modern single skins were launched by two independent developers. First of all there was the Open Source project by Pere Casellas with his Barretina Hyper Lite in 2010-2011 and the XXLite by Ozone, mass produced from 2012 onwards after several years of R&D.

The Barretina Hyper Lite served as a base for Adrenaline's Batlite as well as the Just One by Trekking. These wings could quite easily serve as a second wing to do ballistic flights, but are relatively slow.

Ozone's XXLite is different, but still a bit too slow to use as an everyday paraglider. Yet as far as efficiency in thermals is concerned, an XXLite has already made its mark by landing on the summit of Mont Blanc.

Single skin wings with a motor: it works. We've tried it with several models, but the interest is limited. Photo: Véronique Burkhardt

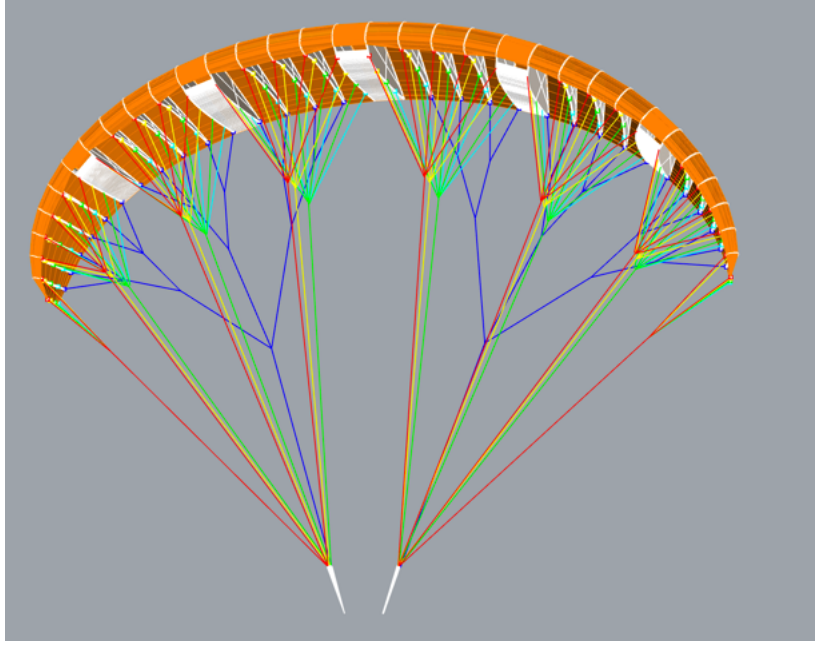
The Just One by Trekking is also based on the Barretina (see plan on the left). Trekking are now working on a version for use on the ground in schools. Photo: Trekking



EXTRADOS PANELS
Sewing edges between panels: 15 mm
Sewing edges between color pieces of the panel: 15 mm
Sewing edges around the small red triangle: 10 mm
Sewing edges in leading and trailing edge: 25 mm
Black (white) points: sewing control points each 25 cm must match the equivalents points in ribs

The real break through for hike and fly pilots happened in 2015 with the UFO by Air Design and the Niviuk Skin. These two models brought a real bonus to the mono skin concept and bring this type of wing closer to the classic wings.

Contrary to what we've heard here and there, the UFO and the Skin aren't very alike; there are notable differences in their design as well as in their use.
See the comparative test over the next few pages.



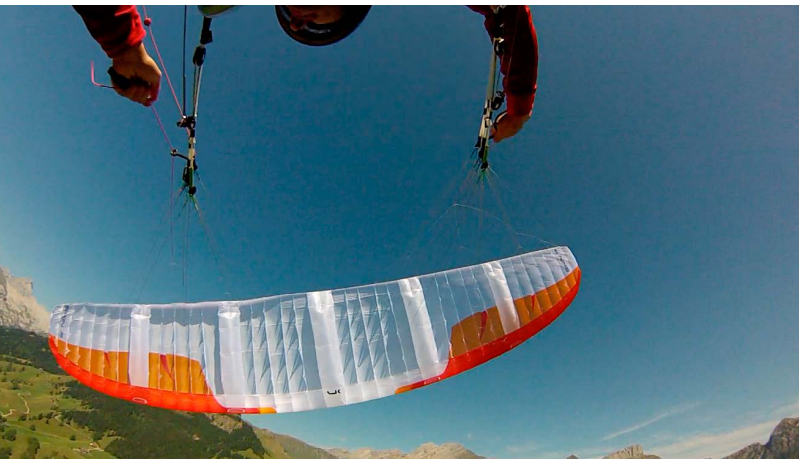
Trekking are also working on single skin second generation prototypes but haven't announced a launch date.

The Niviuk Skin Classic marked the new generation of mono skin wings. (See test in free.aero 'First' article). Photo: Véronique Burkhardt

At the same time, Air Design launched the UFO. Photo: Véronique Burkhard

NIVIUK SKIN PLUME

AIR DESIGN UFO



Photos: Cédric Nieddu pour voler.info
Pilote: Cédric Nieddu

FACE TO FACE

In 2015, the manufacturers Air Design and Niviuk brought out single skin wings which were significantly different from the first generation of single skins. Both models brought tremendous progress. But contrary to what has been said or written elsewhere, there were several differences between the two new wings.

Photos: Véronique Burkhardt
Pilote: Sascha Burkhardt

The Niviuk Skin Plume is a real multi-purpose paraglider, especially if you choose size 18 (or 20 for heavier pilots). For pilots who fly a lot of hike and fly, it could even be their main wing.

Niviuk was the first manufacturer to give us a totally new generation single skin: 5 closed cells and improvements in the detail which should compensate for the faults in the first single skin wings. We published our test of the Skin 18 in the summer of 2015 in our article 'First'.

Since then we have also tested the ultra-light Skin Plume. It is made entirely of Skytex 27 and its lines are unsheathed, unlike those on the classic version. Niviuk offer three sizes in the lightweight version (Plume). A very good idea because the classic Skin 18 nevertheless weighs 2.7 kg on our scales, which is even a bit more than Ozone's classic ultra-light wing, the Ultralite 19, that we weighed at 2.36 kg.

The Skin Plume 16 weighed 1.67 kg on our scales, the Plume 18 1.82 kg (less than the manufacturer claimed). It really is as light as a feather! And obviously the folded volume is ridiculously small; it really is a 'pocket aircraft'. The UFO by Air Design is only made in two sizes, 14 and 16 which weigh respectively 1.6 kg and 1.7 kg. Therefore there isn't a classic, heavier version.

But the versions in thicker fabric of the Skin do have a purpose: they are more robust. The lighter fabrics are undeniably a bit more fragile and the manufacturers don't hesitate to advise being more careful with the equipment.

Just like the Skin Plume, the UFO comes with unsheathed lines. You obviously need to bear this in mind and treat all these wings more carefully. As far as untangling goes, the unsheathed lines turn out to be very nice. Those on the Skin Plume are, for example, a lot smoother than those that are a mixture of sheathed and unsheathed on the classic version of the Skin.

The UFO in a turn: playful!

DIFFERENT GEOMETRIES

The geometry and the conception of the Skin and the UFO are pretty different. The UFO has a flat aspect ratio of 4.26 and projected of 3.04 while the Skin Plume has a flat aspect ratio of 5.5 and projected of 4.13. It's an enormous difference. The Niviuk wing is therefore a lot nearer to being a classic paraglider from point of view of shape and the UFO more like a speedflying wing. The way that the little cells are made is also different. They seem smaller, and have less volume on Air Design's UFO and they are cut differently. On the UFO their form in cross section seems triangular. Another particularity: on the trailing edge, there are little holes in the cells. On lots of models, Air Design's designer, Stephan Stiegler, adds this type of opening (often in the stabilo) to alter the air flow.

AT TAKE-OFF

Both models seemed to take off perfectly: very easy to handle, even on inhospitable terrain high up a mountain. The inflation was, as with all single skins, equally perfect, it came up all by itself, quickly and required no effort. A dream. All the same you still need to apply a bit of brake so that these wings don't overfly, despite their large amount of pitch stability once flying.When there is strong wind, the behaviour of the single skin can be ambivalent. If you don't pay attention, it can very easily pull the pilot off the ground, but at the same time, it can be easy for an experienced pilot to control it on the ground using the rear risers. The handling as it gathers momentum is fairly good for both models.

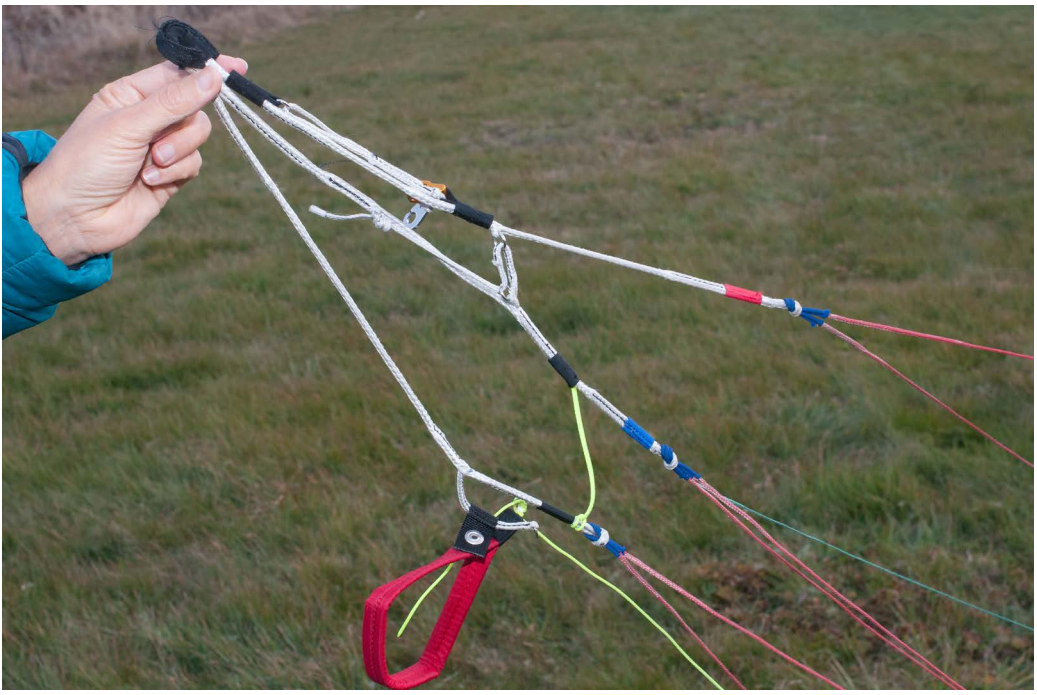
In the air, compared to single skin wings, there are no big surprises as far as the basic behaviour of both models is concerned:

- Impressive pitch stability
- Not much effort required through the controls to make it react
- Significant micro-movements in turbulence…
- …but of small amplitude.

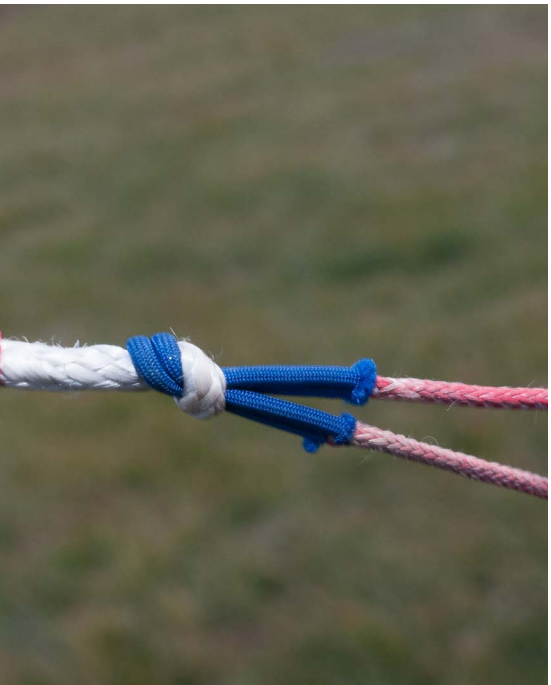
It is surprising that the Skin, despite its greater aspect ratio, gives more confidence than the UFO, whose movements seem a little less coherent. It is also worth noting an obvious difference between the classic Skin tested earlier and the Skin Plume. The Skin Plume, having even less inertia, has a bit more movement than the classic Skin, but the amplitude is even less and so it is even more reassuring.

Once again this is the proof that every kilo less above our heads improves the behaviour in a very positive manner and

The unsheathed lines on the Air Design UFO 16, are mainly made from Edelrid Aramid.



The plaited risers in Dyneema on the Air Design UFO 16.

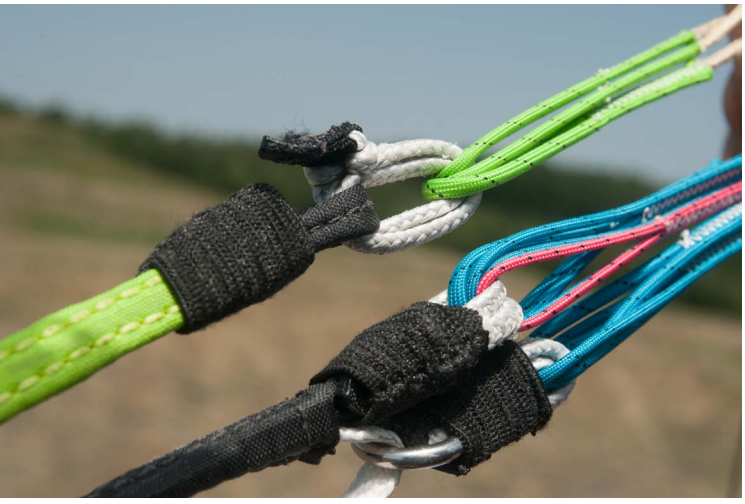


No maillons: the join between the risers and the lines on the UFO. Right, it folds up well in its bag. The parcel with the wing inside even fitted into the editor's letter box!

The lines on the Niviuk Skin. Smooth and unsheathed, an interesting mix of Vectran 1.4 mm, Aramid and Dyneema.
The Vectran is expensive, but has many advantages: Excellent resistance to traction, doesn't stretch much, very good resistance to UV, to cutting and to water, high melting point and good dimensional stability.

In strong wind, a single skin like the Skin can very easily 'jump into the air' and pull the pilot off the ground if he isn't paying attention. But at the same time, it is very easy to control it on the ground using the rear risers, even in very strong gusts.

The plaited risers of the Skin Plume can be clearly seen.



On the Plume, the lines and the risers are joined by Niviuk's 'LI-NK' softlinks.

Obviously, a friction ring replaces the brake pulley on this ultra-light wing.

contributes without a doubt to increase safety. Remember that all the single skins bring a big reduction in the dynamic weight of the wing. The material missing from the lower surface is one thing, but what counts the most is the missing weight of the air imprisoned in the wing, about 5 kg which certainly weighs nothing from a static point of view, but which is part of the mass which moves when the wing moves.

As far as the performance is concerned, the Skin Plume clearly shows that it is closer to a paraglider than a speedflying wing: you can fly thermals with it as you would a classic paraglider. The Skin is at least as efficient as many low end classic wings. Obviously the UFO can also climb very well in a thermal and even do short distance flights, but it is less efficient and has a character which makes it closer to a speedflying wing than the Skin.

The speed of both models shows that effectively, it is finally possible to go forward into wind with a single skin wing. The Skin Plume 18 with an all up weight of 82 kg has a minimum speed of 29-30 km/h, trim speed 39/40 km/h and a maximum speed of 48 km/h. The UFO 16 by Air Design, despite being smaller, has the same all up weight and has a minimum speed of 30 km/h, trim speed 40 km/h and a maximum speed of 45 km/h.

The trim speeds are comparable, but the Plume allows you to accelerate a bit more. In both cases these results are very encouraging for single skin wings: Finally things are improving!

Still in rough air this type of wing often penetrates a bit less than they should, given their speed readings. On trim, there is sometimes a bit of difficulty penetrating into a bubble of rising air just in front. The wing seems to be stopped by it momentarily, perhaps due to a lack of inertia.

In turbulence, in fact, the Niviuk Skin Plume showed the nicest and most coherent behaviour, obviously



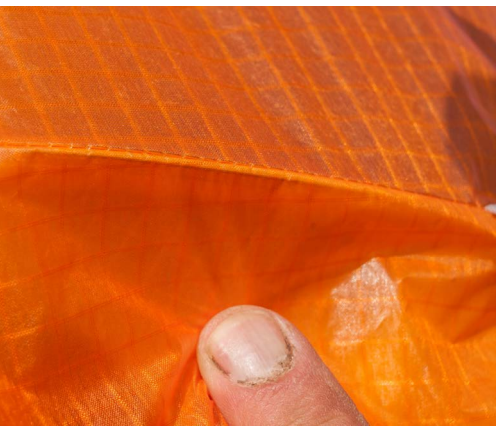
Different parts of Air Design's UFO: despite the minimalist principal, the manufacturer has worked on the details.

accompanied by typical micro-movements of little amplitude. Thanks to its higher aspect ratio, big ears can be done very easily. The collapses were pretty much without consequence and reopened instantly. After a big collapse, the UFO went more clearly into a turn and often responded with a small secondary collapse on the opposite side. Nothing nasty, but its behaviour was less balanced.

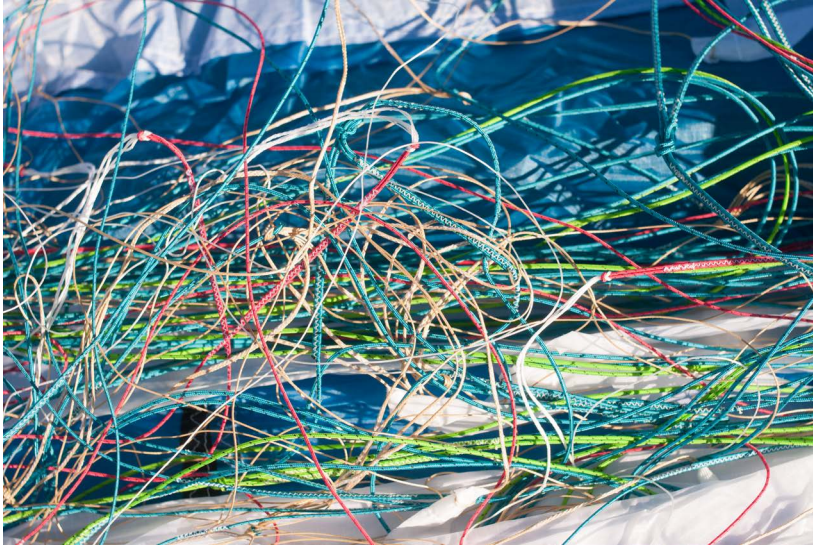
Approaching a stall, these wings plunge very abruptly in quite a surprising way. It's one of the reasons why wings of this type are not beginner's wings despite their ease of handling, stability in turbulence, good reactions and instant reopening after collapses (in particular wings like the Barretina (Batlite) and the Niviuk Skin Plume). The UFO and the Skin allow turns to be initiated very easily and precisely and they are also very efficient in spirals. The playful side of these single skin wings is guaranteed. Coming out of a spiral is impressive, but very safe for both. The ease with which they come out of the spiral is unbeatable. When coming in to land you can easily 'pump' the Skin. With each pull it descends almost vertically, so you can kill the glide angle easily (which is still substantial for a single skin). But at the same time, taking into account the very abrupt stall on this type of wing you need to keep a good margin of minimum speed, especially when the pilot is near the ground. This is, unfortunately, the other reason why even the Niviuk Skin isn't a wing 100% compatible with beginner pilots. As far as the flare is concerned, it's

Minimalist equipment for maximum temperatures: a pocket aircraft weighing less than 2 kg, including the F*Lite harness from Ozone, in the warm summer air of 2015.

The detail on the Skin Plume: a major part of its excellent profile is no doubt the work of the Nitinol leading edge rods.



The unsheathed lines on the Skin Plume 18 were easier to untangle than ...



... the mix of sheathed and unsheathed lines on the Niviuk Skin Classic that we tested a few months earlier. They weren't as smooth!

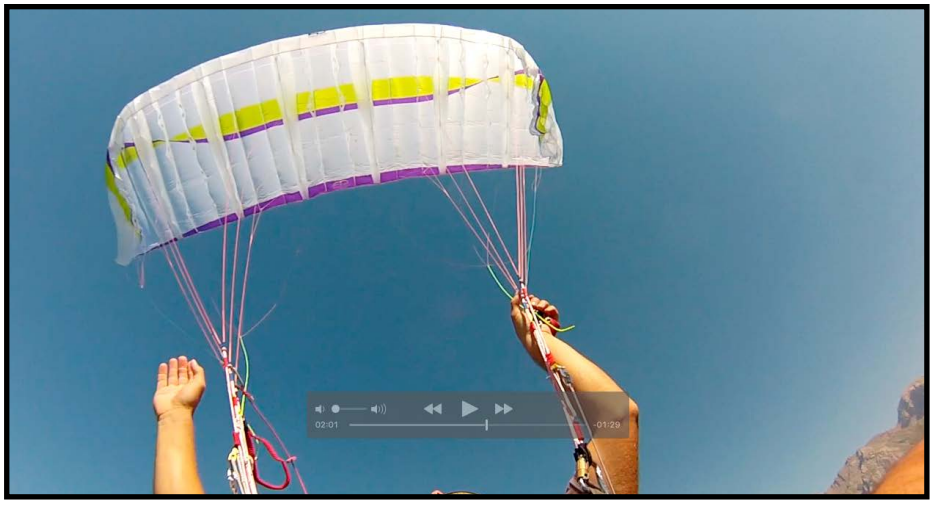
a big weakness in the single skin wings; it is almost ineffectual. There too, the Skin is closer to a real paraglider compared to the others, but on a stony rough landing field it is best to stay vigilant and have good timing.

CONCLUSION

Out of all the single skin wings, on a performance and behaviour level, the Niviuk Skin Plume is ahead of the others and very close to a real paraglider, with the advantage of, as with the others, a very easy take off, very small volume when folded, as well as a weight of less than 2 kg. In addition, at take off, the handling and stability in turbulence make it very playful. The UFO is a bit nearer to a speedflying wing and a little less coherent in its behaviour, but very easy to handle and reactive, and obviously very easy to transport, almost in your pocket.

Video: The Niviuk Skin Plume 18 being tested for us by Cédric Nieddu
https://www.youtube.com/watch?v=93_9bNV5ov8

Video: The Air Design UFO 16 being tested for us by Cédric Nieddu
https://www.youtube.com/watch?v=2DztECQMXns



It is very easy to do big ears on the Niviuk Skin Plume. Their effectiveness is limited to about 1 m/s extra, but it allows you to cut the glide angle.

The UFO by Air Design: closer to a speedflyer despite the complex 6 cell design.

THE SECOND GENERATION SINGLE SKINS

WING	SKIN			SKIN-P			UFO	
MANUFACTURER	NIVIUK - http://www.niviuk.com Mail : info@niviuk.com						AirDesign - http://ad-gliders.com/fr Mail us: info@ad-gliders.com	
YEAR OF RELEASE	2015			2015			2015	
SIZE	16	18	20	16	18	20	14	16
CELLS	39	39	39	39	39	39	6	6
FLAT SURFACE AREA [m²]	16	18	20	16	18	20	14.50	15.99
PROJECTED SURFACE AREA [m²]	13.5	15.2	16.9	13.5	15.2	16.9	12.13	13.37
FLAT WINGSPAN [m]	9.38	9.95	10.5	9.38	9.95	10.5	7.86	8.25
PROJECTED WINGSPAN [m]	7.46	7.92	8.34	7.46	7.92	8.34	6.08	6.38
FLAT ASPECT RATIO	5.5	5.5	5.5	5.5	5.5	5.5	4.26	4.26
PROJECTED ASPECT RATIO	4.13	4.13	4.13	4.13	4.13	4.13	3.04	3.04
ROOT CHORD [m]	2.11	2.24	2.37	2.11	2.24	2.37	-	-
HEIGHT OF LINES [m]	5.9	6.3	6.6	5.9	6.3	6.6	-	-
NUMBER/LENGTH OF LINES [m]	388/356	388/378	388/399	388/356	388/378	388/399	222/226	-222/237
ALL UP WEIGHT [kg]	60-85	70/95	85/110	60-85	70/95	85/110	50-120	55-120
WEIGHT OF THE WING [kg]	**2.3**	**2.6**	**2.9**	**1.65**	**1.95**	**2.25**	**1.60**	**1.70**
CERTIFICATION	926-1			926-1			EN 926-1:2006 / LTF 91/09	
Material	Skytex 38			Skytex 27			Skytex 27 Classic II. Dominico 20D	
PRICE [€]	2300			**2500**			2350	

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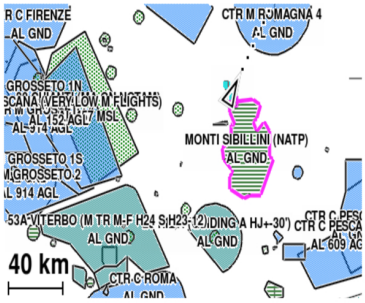

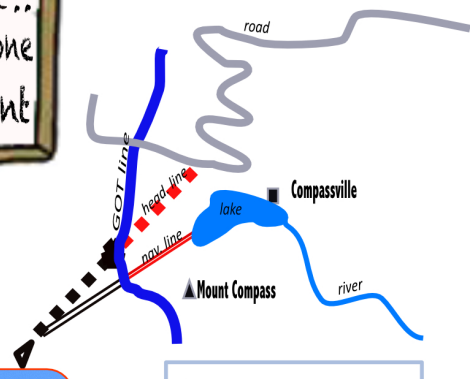

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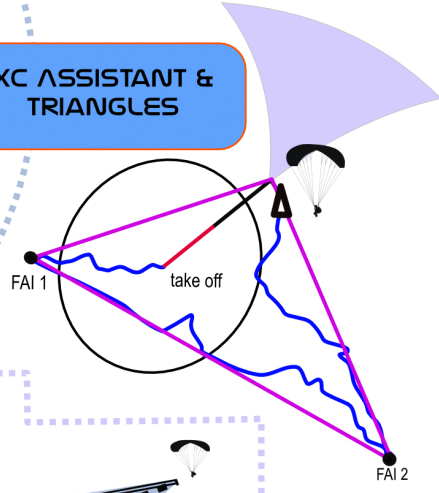

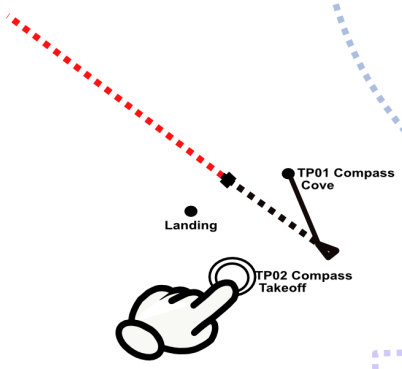

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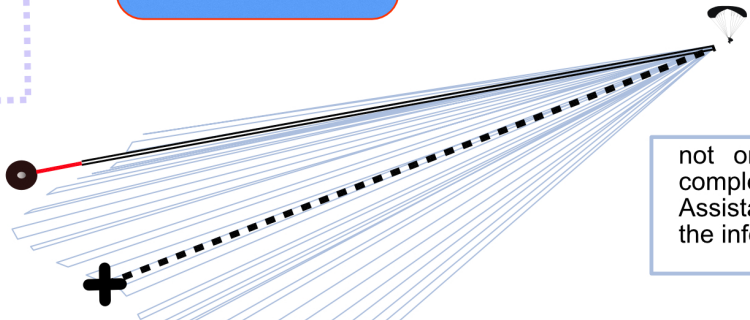
choose a "goto" by a simple touch in the map. Move and zoom the maps



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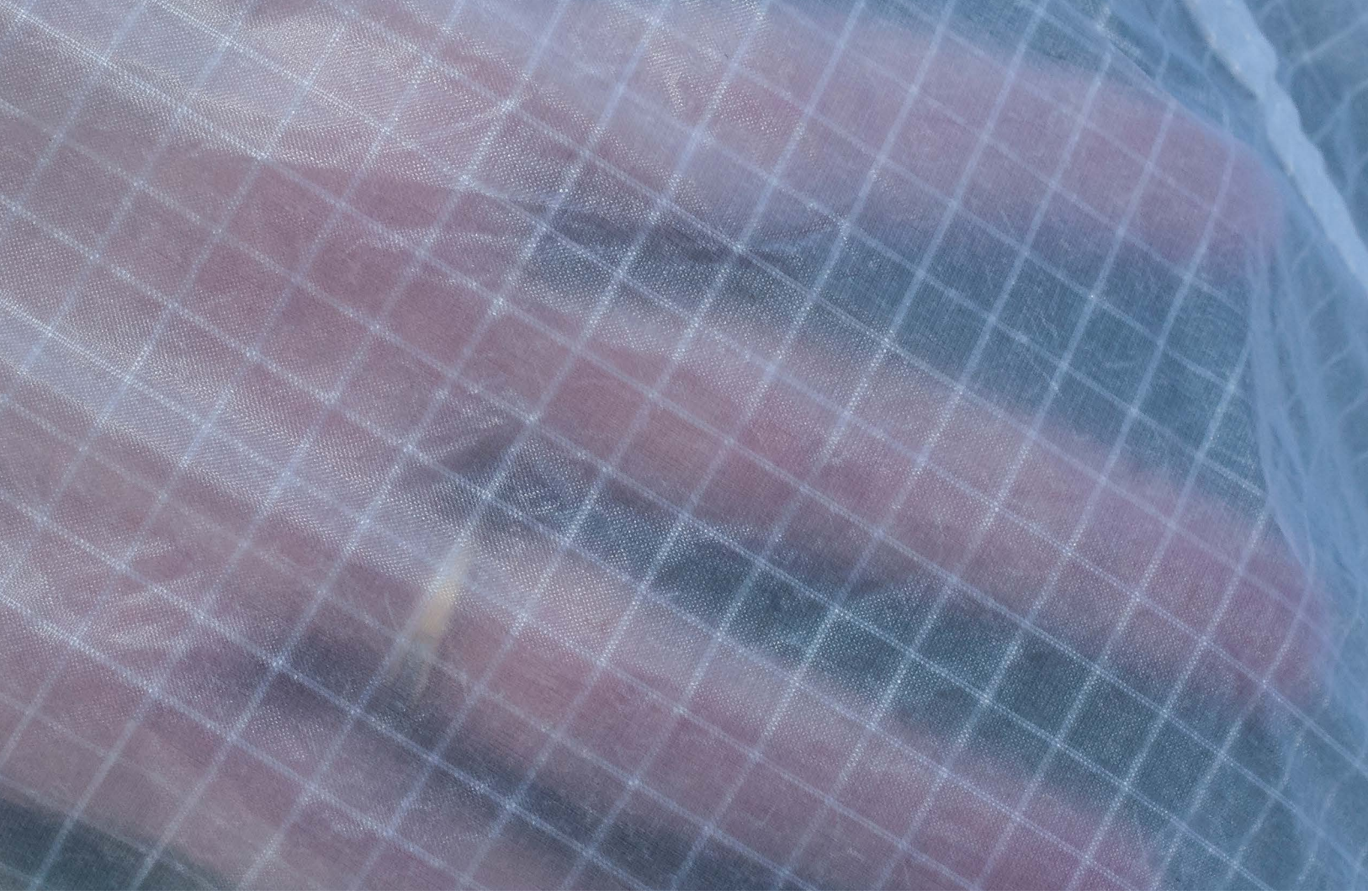


LIGHT WEIGHT WINGS: THE **PROS** AND **CONS**

What are the advantages of a lighter wing? Above all, it's the difference when flying which is of interest to us...

A rocky mountain take-off. Photo: Felix Woelk/Ozone

We've had more and more opportunities to test the lightweight version of wings with identical geometry to the classic version. We've had more and more opportunities to test the lightweight version of wings with identical geometry to the classic version.

When the manufacturers launch a lightweight version of a classic wing, they often save more than a kilogramme. A kilo and a half can seem a small difference. But the proportion is enormous: a wing like the Ion 3 which goes from 5.7 kg to 4.05 kg in the lightweight version, saving 1.65 kg, corresponding to nearly 30% of the weight of the wing. That's a big difference, especially if you consider the movement of weight during dynamic manoeuvres.

Example: the wing which dives forward. Even if you take into account, in this case, a minimum of 5 kg of air in the wing increasing the mass of the classic wing to 10.7 kg and the lightweight version to 9.05 kg, the saving in the lightweight one is still 15%.Part of this saving, several hundred grammes, is hidden in the lines, but the majority is in the fabric and reinforcements in the wing, seven metres above the pilot, far from the centre of gravity.

COMPARISON OF WINGS AVAILABLE IN BOTH CLASSIC AND LIGHTWEIGHT VERSIONS

	SIZE	CLASSIC VERSION WEIGHT IN KG	LIGHTWEIGHT VERSION WEIGHT IN KG	DIFFERENCE WEIGHT IN KG	REDUCTION %
NOVA ION 3	S	5.70	4.05	1.65	29 %
NOVA MENTOR 4/MENTOR LIGHT	M	5.6	3.9	1.7	30 %
NIVIUK SKIN/NIVIUK PLUME	18	2.6	1.95	0.65	25 %
NIVIUK ARTIK4/ARTIK P	23	4.9	3.8	1.1	22 %
OZONE MOJO/JOMO	M	5.03	3.77	1.53	29 %
TREKKING SENSO CLASSIQUE/TREK	S	5.05	3.85	1.2	24 %

Here's a look at all the advantages and disadvantages of making a wing lighter, whether for a paraglider or a paramotor.

- Easier to transport and handle.
- During take off, inflation is easier because a lighter wing comes up easier. This difference is pretty important!
- At take-off, ground handling is easier because the lightweight wing, with less inertia, doesn't go as far when it moves and it is easier to regain control when it does.
- In flight, with less inertia, it moves a bit more. This is a disadvantage from a comfort point of view, but an advantage for pilot/wing communication and gives more feedback about the aerology encountered. This can also be a disadvantage for performance as the profile doesn't cut through turbulence as well.
- A wing which is less inert can react quicker to the pilot's commands and can be more agile.
- The size of movements is less; for example, the wing dives less. This is an advantage for comfort and safety.
- It is also less likely to collapse.
- When it collapses, there is less fabric involved, so it will re-open more quickly.
- With less inertia, after an incident, the wing comes back up above the pilot's head more easily.
- When landing, if the wind is strong, a lightweight wing is easier to control.

But there are also disadvantages. First of all the price: lightweight fabric can cost more than double that of classic fabric. Obviously this difference is reflected in the price of the wing.

Another big disadvantage of lightweight: the aging of the materials. There is no miracle and the fabric manufacturers, like lots of wing manufacturers, confirm that an ultra-lightweight fabric needs to be treated with more care.

Photo: Gudrun Öchsl

Photo: Franck Simonnet/www.paramoteur-evasion.com/

The Jomo is almost identical to the Mojo 5 except that it weighs 3.77 kg in size M compared to 5.03 kg for the Mojo, which is equivalent to a saving of 1.53 kg or 29%. Nearly a third; that changes the wing's behaviour significantly.

According to Ozone it is a high performance lightweight wing at the low end of the intermediate range, aimed at a large spread of pilots who like hike and fly. It's a safe wing, fun and easy to fly, for pilots who are new to XC flying, newly qualified pilots and pilots who have built up a bit of experience. The light weight of the wing reduces its inertia, making it more pitch stable and lighter to control.

Photographer: Loren Cox
Pilot: Cade Palme

And even if some lessons which have been learnt from the experience of lightweight wings over the last three or four years are encouraging, the principal remains that the longevity of lightweight fabric can not be the same as that of heavier material. Nicolas Brenneur has noticed that on his clients' wings, as with his own products, that the life span of Skytex 27 is 30 to 40% shorter than that of Skytex 38.

A wing made with lightweight fabric which ages badly can exhibit unexpected behaviour. As with heavier wings, this can result in a tendency to go parachutal if the fabric becomes porous.

Another possibility is diagonal distortion of the fabric, notably the cell walls, which affects the shape of the profile. Unlike porosity, this deterioration can't be detected by measurements in a workshop.

On the other hand the concept established by the Certika workshop (www.certika.org) could very well sound the alarm for this sort of problem, because a flight which looks at weaknesses, particularly at low speed, is part of the protocol.

We're going to look more closely at how fabric ages in a later edition. For the moment, in the following pages, there are some explanations about why as a general rule, an unsheathed line ages less well

A Yeti 4 doing a wingover: it has all the advantages of a lightweight wing. It is the new lightweight version of the Bolero 5.
Photo: Jérome Maupoint/GIN

Dynamic manoeuvres are better behaved on a lightweight wing.
Chrigel Maurer in the X-Alps 2015
Photo:
Sebastian Marko/Red Bull

The Artik 4 in size 23 weighs 4.9 kg. The Artik 4 Plume in the photo only weighs 3.8 kg giving a saving of 1.1 kg, in other words, 22% less weight.

UNSHEATHED LINES: WHY THEY NEED TO BE TREATED

Unsheathed lines give a weight saving of about 50% in the lines. But they are a lot more fragile. Here's why.

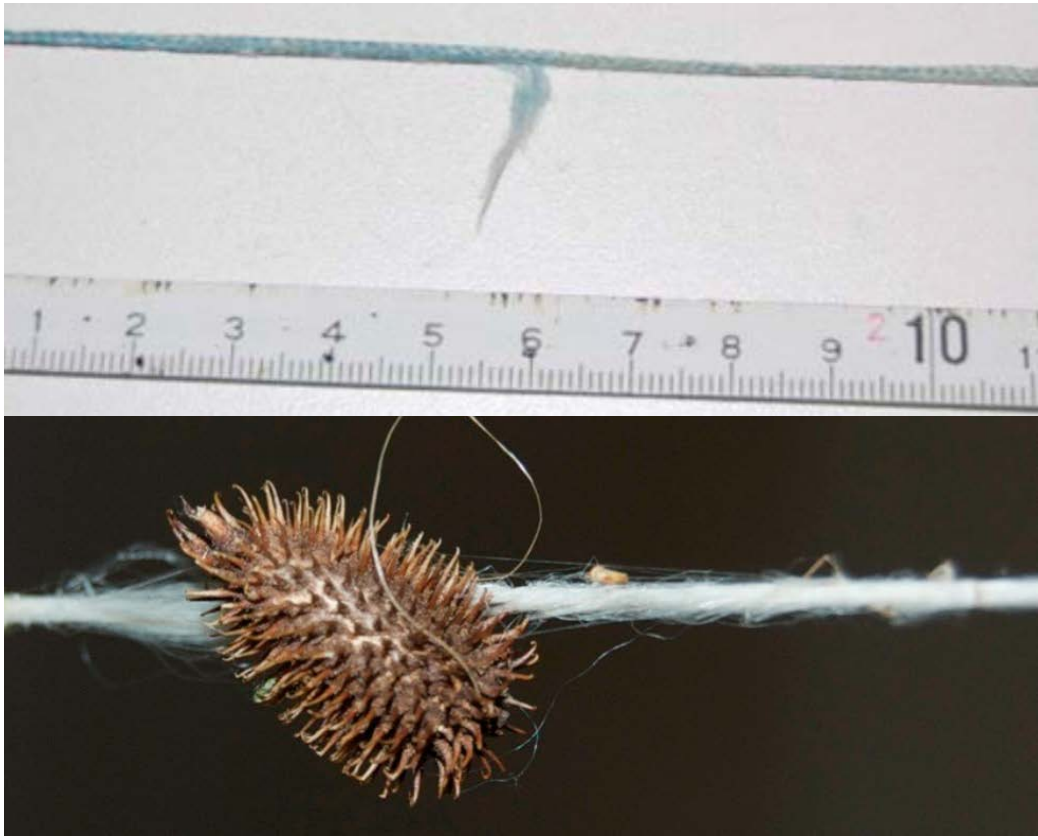
The repair workshops confirm: the lines age with use and unsheathed lines do so even more. The latter are used by most designers, who often advise just to be a bit more careful with unsheathed lines. The Nova and Ozone workshops, for example, are even pleasantly surprised by the longevity of their lightweight wings after intensive use.

Nicolas Brenneur from the Horizon Réparations workshop is also a designer with Trekking. He has gone the opposite way and has made a radical decision: No unsheathed lines on his wings, even on the very lightweight wings. His explanations for the ageing of this type of line seem in any case interesting, even if some of his arguments are particularly true for Dyneema but less so for fibres like Vectran, a very stable and resistant aromatic polyester which is being used more and more.

For unsheathed lines, the manufacturers use Dyneema (above), Aramid (below) and Vectran. Dyneema is often white whilst the others are brown, but the colour doesn't always tell us the difference. Dynema is dimensionally less stable than the other fibres.

THE PROBLEM IS SHRINKING RATHER THAN BREAKING

The problem isn't so much the resistance to breaking. Even though, very often in workshop tests, there is a clear noticeable weakening in this respect, sufficient margin remains. The real problem is the lines shrinking, and this is even more so the case for unsheathed lines. In the workshop, the technicians frequently note changes in trim, often even at the tolerance limit. And these changes are almost exclusively due to shrinkage in the C and Ds.



Unsheathed lines easily fall victim to pilling. Photo: Trekking

It isn't the resistance to breakage which suffers the most during misadventures, but rather the length of the lines, which can decrease according to Nicolas Brenneur.

WHY DOES A LINE SHRINK?
A line is a plait made up of lots of fibres. The fibres have more or less good dimensional stability, but the plait as a whole can be modified by different factors.

• Expansion due to humidity: water gets in between the fibres and separates them. Mechanically, the gain in width of the line leads to a decrease in the length (see diagram on the right). Even if the separation is small and scarcely visible to the naked eye, according to Nicolas Brenneur, the addition of all the spaces along the line plays a significant role.
• Same effect if dirt and dust penetrates into the plait and separates the fibres.
• Pilling

Breakage of non sheathed lines: this can happen, but it isn't the main problem with them. www.profly.org

Lightweight material is naturally a bit more fragile, and is often used in environments which are tougher on lines and fabric. www.profly.org

WE DON'T LIKE BITS OF FLUFF!
According to Nicola Brenner, pilling is the main reason for line shrinkage, particularly in the Cs and Ds, and especially in Dyneema, where the fibres already shrink naturally. The effects add up.

What is pilling? At take-off, the lines are dragged across the ground and damaged by plants and rocks. The fibres remain attached and are pulled out of the plait, and thus shorten the total length of the line.

Understandably, this phenomenon affects unsheathed lines in particular. Without a cover protecting the plait, outside factors can damage the fibres more easily and nothing maintains the diameter of the plait. Why don't all the lines shrink in an even manner which would leave the trim unchanged? There are at least two reasons for this:

- At take-off, the Cs and Ds are in contact with the ground more often than the As and Bs, and therefore more frequently and easily worn.
- In the air, the Cs and Ds are loaded less, because the majority of our weight is supported by the As and Bs. As a consequence, the load on the front lines re-stretches the A and B lines, whilst the Cs and Ds which have less strain on them, keep their shorter lengths more easily. As a consequence, the changes in trim tends to make the wing go nose up more and more, with the problems that we all know, notably a more marked tendency to go parachutal.

WHAT TO DO?
All the same we like our unsheathed lines. On the Skin Plume for example, in addition to the saving in weight, we find this type of line smoother and nicer. The use of fibres like Vectran which are more expensive, decrease the possible problems, but don't resolve them completely.

Table comparing the dimensional stability of the different types of lines according to Horizon Réparation. Due to lack of time, it doesn't include Vectran.

High and middle	Low	Stability
Sheathed Aramid	Sheathed Aramid	9
Sheathed Dyneema	Sheathed Aramid	8
Sheathed Dyneema	Sheathed Dyneema	7
Unsheathed Aramid	Sheathed Aramid	6
Unsheathed Dyneema	Sheathed Aramid	6
Unsheathed Aramid	Unsheathed Aramid	5
Unsheathed Dyneema	Unsheathed Aramid	4
Unsheathed Dyneema	Unsheathed Dyneema	2

Some competitors increase the length of life span of their unsheathed lines with wax designed for the strings used on archery bows. This seems to work and without a doubt protects them a bit more against tearing. This could also possibly stop the dirt which theoretically separates the fibres in the untreated plaits and damages and/or shortens them. But it isn't an official remedy.

We have to, in any case, take into account a certain amount of extra fragility compared to sheathed lines. Scrape the lines as little as possible, avoid getting them dirty and avoid storing them in damp conditions.

In addition, regularly check your equipment, especially lightweight equipment which is often more sophisticated and also more demanding - a bit like a racing wing. In the worst case scenario, at some point, a complete change of line set could be worth doing because, by that stage, even lightweight fabric is often still far from the limits of acceptable ageing. With a new set of lines (300€ to 500€), you can give your lightweight wing a second lease of life.

The Blacklight from U-Turn over the sea. The lines are made from Armid and are unsheathed. Aramid is commercialised under names such as Kevlar, Nomex, Twaron or Tecnora. Advantages: light, excellent resistance to traction, they don't stretch much and have very good resistance to temperature change.. Disadvantages: poor resistance to UV, to being cut and to water.

Stephan Gruber (AUT3) taking off in the Red Bull X-Alps at Lermoos, Austria, on the 7th of July 2015.
Photo: Vitek Ludvik/Red Bull Content Pool.

EQUIPMENT TRIED AND TESTED
BENEFITS FOR ALL PILOTS

As with the previous editions, the Red Bull X-Alps 2015 was an amazing event and extremely captivating for the spectators. It is also a formidable testing ground for the development of equipment that we all benefit from.

Some of the equipment used by the Red Bull X-Alps athletes can now be bought and used by any pilot, whether for simple hike and fly or a vol bivouac competition over several days. If the wings are relatively specialised, and therefore mainly reserved for a very small group of pilots, the harnesses and accessories used by the X-Alps competitors are a lot more accessible. Over the following pages you'll find examples of products which have been put through their paces in the X-Alps…or not.

KOLIBRI PRO

KOLIBRI

QUICK TEST

KORTEL KOLIBRI PRO

The Kolibri Pro is the X-Alps version of the classic Kolibri which we tested in our 'Harness' article. Both models have similar geometry, but there are enormous differences in the detail.

Kortel Design Kolibri (1.9 kg)

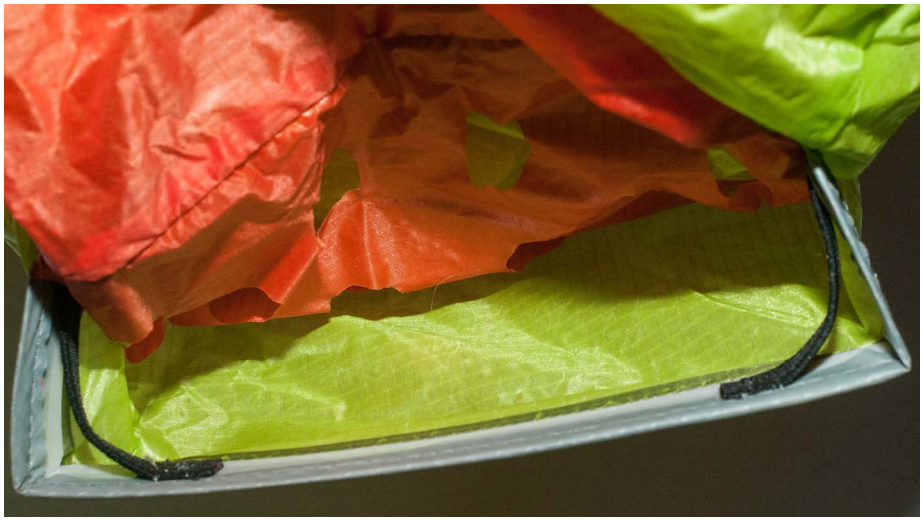
Kortel Design Kolibri Pro (0.88 kg)

The classic Kolibri weighs 1.9 kg in size M, which is already not bad for a cocoon harness with a carbon plate at the end of the cocoon, and a comfortable foam pad under the pilot. For the X-Alps, Kortel wanted to do a lot better from a weight point of view. To do this, they took out the foam, and the harness is made only from paraglider fabric, and Dyneema straps and lines as well as reinforcements in dacron.

In addition, glass fibre slats take the compression forces. It is a principle comparable to the F*Lite that we tested in our 'Harness' article, but achieved differently.

For example, using glass fibre slats rather than rods aims to avoid exactly what happened with the prototype of the F*Lite which we tested, where a rod pierced through the casing.

One of the first prototypes: it's the fabric which gives, not the rest!
Photo: Kortel



The opening for the airbag in the Kolibri Pro.

The glass fibre slats for the compression forces.

When looking at the Kolibri Pro close up you can see how complex a concept it is. It isn't the scrap of cloth that it resembles on the ground, but a collection of well calculated elements, placed, glued and/or stitched to the precise millimetre, to spread out perfectly the tension and compression forces.

The result: the harness tested weighs less than half that of the classic Kolibri, 880 g compared to 1.9 kg, but it is also comfortable, perhaps even more so! How is this possible? Max Jean-Pierre explains that working with this flexible fabric (Skytex 32 g), not hidden by the foam, the slightest fault in position was visible straight away, allowing lots of little details to be improved upon.

It's a pity that, for the moment, Kortel are not selling the Kolibri Pro, as it comprises between 300-400 different parts, it requires 1000 operations by hand.Its price would be: 2500 € and there would be no guarantee of wear over time. The examples used in the X-Alps held out, but the very fragile fabric used for the bag wore out too quickly.On the other hand, the parts which took the load held up no problem, as on the classic Kolibri which is certified EN/LTF.

www.korteldesign.com

Manufacturing the Kolibri Pro is clearly a work of art: 1000 different operations by hand.

QUICK TEST

SKYWALK RANGE X-ALPS

Photos : Veronique Burkhardt

Skywalk Range Air (2.1 kg)

Skywalk Range X-Alps (1.77kg)

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.

The classic Range Air tested in our 'Harness' edition was a harness which was initially designed for the X-Alps in 2013. Two years later, a much lighter version took part in the most recent X-Alps and is now being mass produced. We tried the Range X-Alps to compare it with the Range Air. Both looked like a shapeless pile of cloth when they weren't in the air with a pilot inside, especially the streamlining which needs to be inflated by the air flow.

Skywalk Range X-Alps (1.77kg)

Skywalk Range X-Alps 15 cm Foambag

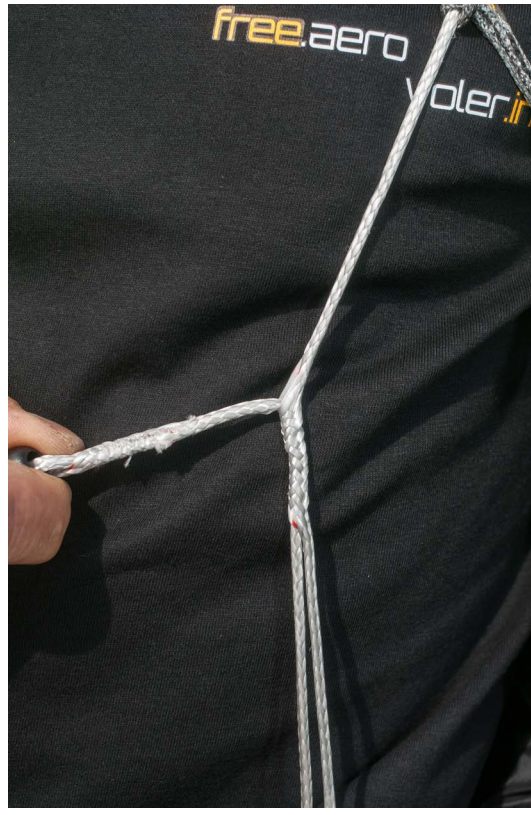
But there is a difference in size: in the Range Air, there is also an inflatable airbag under the pilot's seat which allowed the EN/LTF certification, despite its weight of 2.1 kg in size M. The reserve must be fixed in a front container, because all the space under the pilot is needed for the Airbag.

On the Range X-Alps, the section which inflates is limited to the back part. The reserve is therefore under the pilot's bottom and for the EN/LTF certification, Skywalk had to add a foambag protection.

To make the whole thing lighter, amongst other modifications, the cocoon is made from paraglider fabric (more fragile). So, in competition configuration without the removable foambag, the weight of the harness drops to 1.4 kg and to 1.7 kg with protection.

Accelerator

Adjustment



Skywalk Range Air: the straps and buckles to secure it.

Skywalk Range X-Alps: Dyneema chords instead. of straps

Skywalk Range Air

Skywalk Range X-Alps

It is low enough for a full cocoon harness and, in addition, this one includes real karabiners.

As with the classic Range Air, the volume of the Range X-Alps when folded is very small. In flight, the Range X-Alps is as comfortable as the Range Air, therefore very good for such a lightweight harness. It is also possible to fly sitting upright and not supine: An argument which is always very important for landing on difficult terrain.

The Range X-Alps harness costs about 1240 € and the Range Air classic 1000 €. The choice is difficult: the classic version certainly weighs 400 g more, but it will be harder wearing.

http://skywalk.info/en/

Skywalk Range X-Alps. Photo: Skywalk

QUICK TEST

SKYMAN COCONEA

The Coconea has been on the market for two years, and it was developed after the 2013 X-Alps in collaboration with Toma Coconea. The X-Alps athlete works for the Austrian manufacturer Skyman, founded by Markus Gründhammer. Two fans of lightweight hike and fly, who also produce products which are not too extreme.

X-Alps athlete Toma Coconea is an integral part of the Skyman team.

Markus Gründhammer, the founder of Skyman, is the madman who flies wings with an aspect ratio of 13 and who has been converted to the sport of hike and fly.

Right, the detail on the Coconea. At 3.9 kg, it isn't radically lighter, but surprisingly light bearing in mind its solid and comfortable construction.

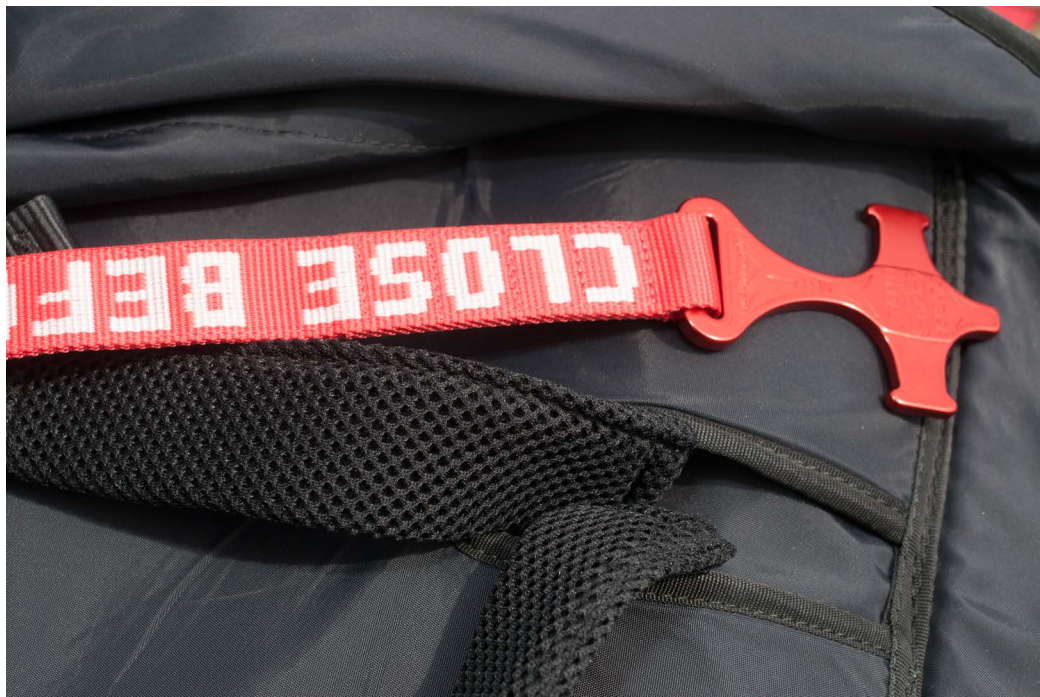
The Coconea harness is an example: it isn't radically lighter, nor is it the harness that Coconea used in the X-Alps. But the designers have tried to make it as light as possible whilst continuing to use robust and very comfortable materials.

They kept below 4 kg. The harness is given as 3.4 kg, but that was no doubt measured without the cockpit and without the board under the seat which can be removed if the pilot wants. Without it, it is still comfortable and from a piloting point of view the difference isn't enormous. Moreover it's a cocoon harness which can also be flown in an upright position. You can easily get in and out of the bag which can also be removed for cleaning/repair/replacement.

Fully equipped, we measured the M at 3.9 kg. That's still very good for a harness which has evidently been designed to last and with lots of thoughtful detail like the thick hems.It would also be a shame to make economies with the removable cockpit of 139 g: it is rigid enough to show the instruments, attached by Velcro, at the correct angle. The foambag is 17 cm thick under the pilot's bottom and goes very high up the pilot's back, giving extra comfort and safety which are part of the 3.9 kg, well done!

A small failing is that if the space behind the pilot isn't properly filled, the back of the harness is a little less aesthetic.

www.skyman.aero



The cockpit is very practical and weighs 139 g.

Above, the plate at the end of the cocoon weighs 212 g. The board under the pilot's bottom is 220g.

Size : M-L
SIZE OF PILOT (cm): : 160 - 180 - 170 - 195
MAX LOAD: 120 kg
WEIGHTS IN KG: 3.4, 3.6
HEIGHT OF HANGPOINTS (cm): 47, 49
SIZE OF THE BOARD (L, XL) (cm): 28 x 28, 30 x 30
CERTIFICATION: EN/LTF
PRICE: 890 €

THE X-ALPS 2015 – FOR ALL

TEST

AN ENLIGHTENED CHOICE

For a vol bivouac, and even more so, for a race which can be won thanks to a Night Pass, you really need a head torch.

Photo: Kevin Trautman/Red Bull Content Pool

One of the sponsors of the Red Bull X-Alps in 2015 was the company Led Lenser which make 'hi-tech' head torches with powerful LEDs. This type of LED consumes relatively little, but casts a better light than the incandescent filament our Grandfathers used.

For the X-Alps, the specialist manufacturer equipped the competitors. Initially the idea was to give the athletes the make's Rolls Royce, the Led Lenser XEO 19R. According to LED Lenser, this is the lamp for those who have a taste for extremes.

It really is the top of the range head torch, whichever superlative you choose. Firstly for the price: 299 €. But also and above all, for the rest: It is made up of 2 high-powered and independently adjustable LEDs.

The light capacity can reach up to 2000 lumens, and it can illuminate up to a distance of 300 metres. And even better, we had the chance to be able to test one. We've never seen such a powerful head torch; it was like having a car headlight on your head. It isn't just the power which is amazing, but the light was also comfortable.

As the focus of the two 'photon guns' is adjustable, you can concentrate one beam to see in the distance, and have the other one fairly wide for the sides of the road. You can also use only one of the two. Lastly, there is an automatic mode which is rather 'intelligent': if you light up an object which is fairly near, the lamp can tell by measuring the reflected light and automatically reduce the luminosity. Its battery life is given as four hours in the most powerful mode and drops to twenty hours in the most economic mode. The battery is a big block which needs to be recharged with a special supply. One advantage: there is a USB socket to recharge a telephone.

Disadvantages: the choice of modes thanks to buttons on top of the lamp isn't very intuitive; it takes quite a bit of practice to understand it all. But above all, and this is the reason that the competitors ended up not using it: for vol bivouac, it is too heavy weighing 481 grammes. With a paramotor, it can be used as a landing light to land a SS + 30 almost as if in full daylight, but to carry it for hike and fly, a pound is too much.

Photo: Harald Tauderer/Red Bull Content Pool

In the end, the Red Bull X-Alps athletes used the H7R from the same manufacturer. This lamp still isn't a give away (89 €), but it is a lot lighter. It 'only' produces 300 lumen but, all the same, carries up to 160 metres. That's already a lot better than a cheap lamp from a supermarket, as Yvonne Dathe (GER) told us. She also confirmed the long battery life of sixty hours claimed by the manufacturer. In addition, the lamp can be recharged with a car socket, or even a USB socket. This is an important argument, because more and more pilots take a solar panel with a battery and a USB socket when they go on a vol bivouac.
https://www.ledlenser.com/uk/

Photo: Ledlenser

Stephan Gruber during the 2015 X-Alps with Komperdell poles made entirely from carbon. Photo: Kevin Trautner

X-ALPS: THE RETURN OF THE POLES

During the X-Alps all the competitors were equipped with walking poles, amongst others, from the make Komperdell. Here's a close look at a pair.

The Komperdell Expedition Tour 4 can be used both for skiing and for walking in the summertime. Komperdell have another ultra-light pole, the Ultralite, which is made entirely from carbon, each pole weighs about 180g and they cost 190 €, but obviously they are more fragile. The Expedition Tour 4 tested is made from metal (titanal) and only the middle part is in carbon. This mix weighs 240 g with ski baskets and 220 g without. That's pretty good for a walking pole which is tough enough that it can also be used for skiing.

If you load it really violently jumping off a rock for example, it creaks and twists a little but resists very well. The Expedition Tour 4 can be very quickly adjusted in a range of 110-145 cm. After being quickly folded up, they are only 45 cm long and slide very easily into a backpack. The wrist strap is also very comfortable in bare hands, as is the foam handle. The foam goes fairly low down allowing, for example, the baton to be held lower when walking across a slope. The price of 140 € seems about right.

http://www.komperdell.com/index_e.php

Photos: Veronika Burkhardt

The mechanism for frequently changing the size (climb/descent) is very quick and easy.

Adjusting the wrist strap is a little bit slower and less precise, but will hardly ever need to be changed.

To fold it, just turn the screw a few times; it's pretty quick.

Left: we took the ski baskets off which took only a few minutes and saved 40 grammes in total.

LEATHERMAN
THE MULTIPURPOSE TOOL

On vol bivouac, at the very minimum you need a knife, but often also a saw and even a pair of pliers. The Leatherman with its famous multifunction tool was one of the 2015 X-Alps suppliers.

There is no doubt about it, the famous aluminium Leatherman tools are extremely robust, very well thought out and practical. Both the blades on the knife can be pulled out with one hand, for example, with just the thumb. The mechanical guard efficiently stops it reclosing until you press (still with one hand free) on the catch to refold it. If you have maillons on the risers, the pliers are very practical for undoing them if need be.

On the Leatherman Surge, there are 21 functions, many of which are pretty useful on a vol bivouac:

1. Needlenose pliers
2. Normal pliers
3. 154 cm wire cutters
4. Shears/154 cm cutter
5. Wire cutters
6. Crimping tool
7. Wire stripper
8. 420 HC knife
9. 420 HC serrated knife
10. Saw
11. Scissors
12. Punch
13. Ruler (19cm)
14. Tin opener
15. Bottle-opener
16. Wood/metal file
17. Diamond file
18. Blade adaptor
19. Adapter end-piece
20. Big flat screw driver
21. Small flat screw driver

It is 11.5 cm long and taking into account its obvious robustness, it isn't surprising that the manufacturer guarantees it for 25 years. And rightly so because at 184 € (130 € - 160 € approx on Amazon), it can be considered as a life time investment. Clearly, those who have one will never want to be apart from it. But, and there is a big but: at 350 grammes, it is really heavy for a pilot who has just paid several hundred euros extra to have a wing which saves one kilo.

So, for camping and short walks when bivouacking, yes, but for following in the footsteps of the X-Alps, you would think twice before taking one.

http://www.leatherman.fr/

A BATTERY TOUGH ENOUGH FOR THE TOUGHEST RACE?

One of the official X-Alps 2015 products was the Powermonkey Explorer 2, a high performance portable battery. But there are also some interesting alternatives to take with you to provide power on a hike and fly.

The Powermonkey 2 is waterproof and the long cable is held in place by the cover which screws together over the joint. That also stops it coming undone in a rucksack. The Powermonkey 2 can be recharged with a solar panel.

On a vol bivouac, you need to take an energy source. Even if most instruments have enough battery life for several days flying, a smartphone, on the other hand, needs to be recharged en-route. We tested the Powermonkey Explorer 2 used in the 2015 X-Alps. It consists of a 6000 mAh lithium-ion battery, with a USB entry and exit for charging. 6000 mAh is good: The Powermonkey can recharge an iphone 5, itself very energy hungry, at least twice. The Powermonkey manufacturer says it can charge an iPhone 5 three times, which may be the case. But it isn't revolutionary, because we have already tested 8800 mAh chargers which weighed 244 grammes, 40 grammes less than the Powermonkey.

The Powermonkey is above all very tough. In its aluminium case, it is waterproof to IP67 standard, it can be submerged for 30 minutes to a depth of 1m despite having a back-lit screen which is very practical for showing the remaining charge.

As a consequence, its case is a little bit bulkier. But we don't often go swimming with hike and fly equipment so it is a bit of weight (286 grammes) and volume which it isn't necessary to carry. Nevertheless it is a lovely product, very robust, and very practical for supplying a smartphone, with the help of a long cable which can be firmly fitted to the Powermonkey.
Price: 90 € approx.

www.powertraveller.com

For pilots concerned about saving weight down to the last gramme, there are products which are more suitable.

As a general rule, for trips including a night outdoors, a low cost battery 800 mAh/1A (weighing approximately 70 grammes) for less than 10 euros can do the trick.

That allows the phone to be recharged enough for the second day but the smartphone mustn't be used too often for cartography. We have already combined one or two simple battery packs of this type with a Goal Zero solar panel. This 7 W folding panel with a USB 5V socket gives a maximum of 500 mA (in reality a little bit more).

It therefore allows this sort of battery to be recharged, as well as the Powermonkey. In flight, the panel can be fixed onto the rucksack, but it is bulky (17 x 24 cm folded, 33 x 24 cm unfolded) and fairly heavy (430 grammes). The company Stodeus, known for their BipBip minivario, have recently started to produce a product which is perfectly adapted to our needs: the SolarPad is a 2.5 W solar panel, 16.5 cm by 16.5 cm, barely 1 cm thick which, in addition, already has a 5600 mAh Li-Ion battery and two 2A max USB sockets. It is therefore completely capable of feeding a smart phone or a tablet in the air, by compensating (totally or partially) their discharge with the solar panel. Thanks to four notches, it can be easily fixed onto a rucksack, or an instrument bag. At 220g, it is lighter than lots of other batteries, whilst including its own solar charger. And to cap it all, it also includes 2 strips of 4 very powerful LEDs transforming it into a torch. To fully recharge it in three hours, it needs to be plugged into a normal power supply at home or in a car. To charge it fully by solar, it takes 20 hours. It costs 70 €, not expensive for something so multi talented.

www.stodeus.com

The manufacturer of BipBip varios has gone solar, with an integrated battery and torch, really practical and not even very expensive.

VIDEO RED BULL X-ALPS 2015 : THE DOCUMENTARY

In December, the X-Alps organisers put a 30 minute long video online retracing the 2015 race. It's full of amazing footage, really worth watching.

https://www.youtube.com/watch?v=P3DglRaMEEk

TEST

THE KARPO FLY FANTOM EXTRA LIGHT IN MONGOLIA

For our three-week expedition through Mongolia this summer we were looking for a pod harness in the lightweight category up to 4 kg. It was supposed to be light and robust at the same time and on top of that score with a lot of safety margin. In the Czech Republic we found what we were looking for.

Report and photographs: Alfredo Briccola, Fly Chingis Khan
Test pilots: Alfredo Briccola, Karl Capiaghi, Peter Portmann
Translation : Alfredo Briccola

GO ON A DIET, BUT NOT AT ALL COSTS. We deliberately avoided equipment that was merely ultralight because that means very sensitive. However we had to pay attention to the weight. On the one hand because every kilogram of excess baggage creates costs on the flights to and from Mongolia and on the other hand in case we had to walk long routes to reach the launch sites or to get back when we bombed out somewhere in the pampas. There is one crucial disadvantage to extreme lightweight harnesses for such expeditions: the materials are mostly very fragile and on-site-repairs hardly possible. This is why in future manufacturers need to do a balancing act between light and robust.

The Fantom Extra Light is not only light enough but has also a robust material mix. It has an inflatable, certified protector. Kind of a safety-air-mattress for the back. A real airbag that does not fill up through the airstream during flight, it does fill before take-off through the lung capacity of the pilot and therefore can immediately perform its work. The surprise when unpacking the parcel: a whole harness only measures 13 x 34 x 37cm. Nicely wrapped in a Cordura bag with mesh lining. An A4 file could hardly be smaller. Let's put it on the scale. According to the producer, in size L it shouldn't weigh more than 3.58 kg, the product is located in the highly competitive 3 kg class. In fact, the scale displays more than 4 kg.

We figured out the reason for this difference thanks to a colleague pilot who still had a harness from the early series of the Fantom Extra Light. Ours basically looked the same but was quite different in the details. The speed bag alone showed immediately that the new harness was sewn much more elaborately and that the material used was significantly better. And now it has two giant side pockets with zippers where there were none before. Also the protector's outer cover was made out of more solid material. The Czechs have really come up with great improvements and maybe on the way they simply forgot to adapt the weight indications. They may be forgiven as we all really appreciate the new features...

SIMPLE IS GOOD

One advantage of the Fantom Extra Light lies in its simple design. No strap is too much, no buckle superfluous. Everything is scarce that you could believe something was missing. But still it is complete and makes a very robust impression. The simplest standard components from the industry and ball bearing casters combined with ingenious ideas ensure a really simple but stable harness. The Fantom is built based on the hammock model, without seat plate. The rescue chute container is simple and sized large enough even for Rogallos. A complex coverage of the rescue handle plastic wires deemed not necessary. It may look a bit unfinished at first but it has the advantage that one is able to see at a glance if everything is where it should be.

BLOW-IN

The airbag is equivalent to a 17cm foam protector and its volume is correspondingly large, which needs to be put in shape through the pilot's lungs via an air tube and a valve. Well trained users

A flying trip in the land of Genghis Khan

Nicely finished off.

might take two minutes but that can seem like an eternity. Of course the harness can be flown with an empty protector. But then the straps will pinch the hips and one must accept a clear loss of safety. Junk like a rucksack, bags etc. find their place easily in the huge back pocket. There's even an extra compartment for a big drinking bag, which is absolutely necessary on expeditions in to the outback. The rest of the stuff can be stowed in the quite large cockpit compartment.

THE ASTONISHING LIGHTNESS OF BEING.

At the take off we're amazed by how light and comfortable the harness feels. No pinch nor pressure. Everything sits loosely. A bit too loosely for the first impression. But still it fits like a glove. If you have to wait a little while for the right upwind or if there's too much of it, as it happened quite often on our expedition, you barely notice the Fantom. The only slightly annoying part is that the foot plate, although very light, hits against the Achilles tendon while walking around or running to get airborne. In exchange it's sized in a way that even if you call yourself a big foot you'll fit easily on it.

GET IN AND TAKE YOUR SEATS, PLEASE!

On our flights in Genghis Khan's empire it was important to us, that we could get into the speed bag fast right after take off, because we had often just two hundred meters to get into the thermals to fly XC. With the Fantom it's quite easy to get in the speed bag.

Pretty strong material. It's not surprising that it isn't that light.

Even the well known inflatable back protector is certified!

The sensation of flight in the Fantom is very good. As a pilot who's used to seat plate I found my way with it very quickly. Maybe just because it seems more like a hybrid rather than a pure hammock. As a consequence controlling your glider by weight shifting is a bit easier. Although, regarding this point, it is no match for harnesses with seat plates.

Even on long flights the Fantom Extra Light does not get uncomfortable. If in case of heavy turbulences you need to get into an upright sitting position fast, the protector's support is astonishingly efficient. The straightening for the landing is just as easy. You feel surprisingly well supported. And should you touch down with retracted landing gears, the protector lives up to its expectations. Even on rocky terrain as we discovered ourselves in Mongolia. By the way, it is recommended to get out of the speed bag in good time before landing, as because of the stretching system there's always a little tension on it and it's easy to get tangled up in the tissue if things go faster.

The reserve's grip is not installed in the pilot's field of view. However you can find it instinctively because it lies exactly on a vertical line with the carbines and the risers. From an aerodynamic point of view, the Fantom makes a good impression, with nearly no folds or wrinkles in the tissue, provided that you've chosen the right size. We noticed that the speed bag has an extremely long cut. With shorter legs you might reach the limits of the adjustment possibilities. If you shorten it with an additional knot, it fits well but the speed bag creases a bit because mainly it's made from robust Cordura and therefore seems less elastic.

A LOT OF LIGHT AND A WEE BIT OF SHADOW.

After three weeks of intense flying and testing in the rough vastness of Mongolia we discovered also a few kinks. As an example the oversized side pockets. They have indeed a sewn-in safety loop for cameras or radio equipment but we discovered it way too late. If you don't know about these loops, the gadgets

The pilots had a chance to try the new Gin Carrera + with these harnesses.

Full report by Paratest:
http://www.voler.info/cms/contents/report_fantomex-tralights.pdf

para-test.com
paragliding by air turquoise

Air Turquoise SA
Rte du Pré-au-Comte 8 | CH-1844 Villeneuve
tel. +41 21 965 65 65 | mobile +41 79 202 52 90
info@para-test.com

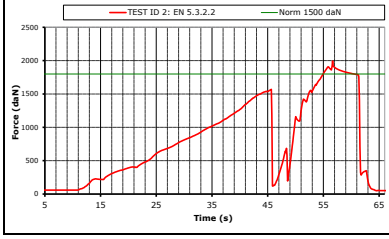
Harness Test — **Test ID 2**

Item:	Fantom extralight race series	
Manufacturer	KARPO FLY s.r.o.	
Test place & date:	Villeneuve	March 20, 2013
Test responsible:	Alain Zoller	
Temp. [°C] & Humidity:	24.6°C; 29 %rel	
Maximum certified pilot weight [kg]:	120	kg
Standard	EN 1651	
Test standard §:	5.3.2.2	
Test setup:	Default flying position	
Anchoring: Attachment points:	Both main riser attachments (3, 4)	
Dummy:	Default, hip fixed (7, 8)	
Required load in g:	15	g
Min load [N]:	15 000 N	
Required test load in kg:	**1800**	**kg**
Min. duration [s]:	5s	

Results

Duration of maintained min. load [s]:	**5.7 s**
Any signs of structural failure after this test:	**No visible failure**
Test result:	**Passed**

Graph:



Air Turquoise SA certified by
ISO 9001 BUREAU VERITAS Certification

Air Turquoise S.A. - Certification of paraglider equipment
Tested in accordance with EN 1651:1999 and 2.DV LuftGerPV§1, Nr.7c

Annex TEST ID 2
Prepared by RE
Rev.0. 25.01.2011
No. 71.9.3

disappear during the flight into the inaccessible depths of the harness. Or the pretty neoprene protective covers on the shoulder straps' connections that shift all the time and show the buckles. It doesn't influence the safety at all but still it's somehow annoying. Also irritating: over time the tube for inflating the protector tends to bend sharply, which makes it difficult to fill or empty it without manual intervention from the pilot. We further discovered poorly made metal rings in the speed bag which caused in two cases the tension cords to wear of completely in only two days. A more thorough quality control could remedy this problem. There is also potential for improvement for the cockpit itself. It could be a little wider, to take in more than only a vario and a radio. Also an outlet in the cockpit bag for cables would be desirable. Furthermore, there's no removable bracket for the instruments.

CONCLUSION:
The Karpo Fly Fantom Extra Light is a great XC-light-harness, which however is located in the 4 kg class, despite its name. With the certificated and innovative protector, it's a robust mixture of material and the extremely small pack size, it's a great companion for tough long distance expeditions or simply for day-to-day flying on the domestic front. It is available for way below 1000 euros.

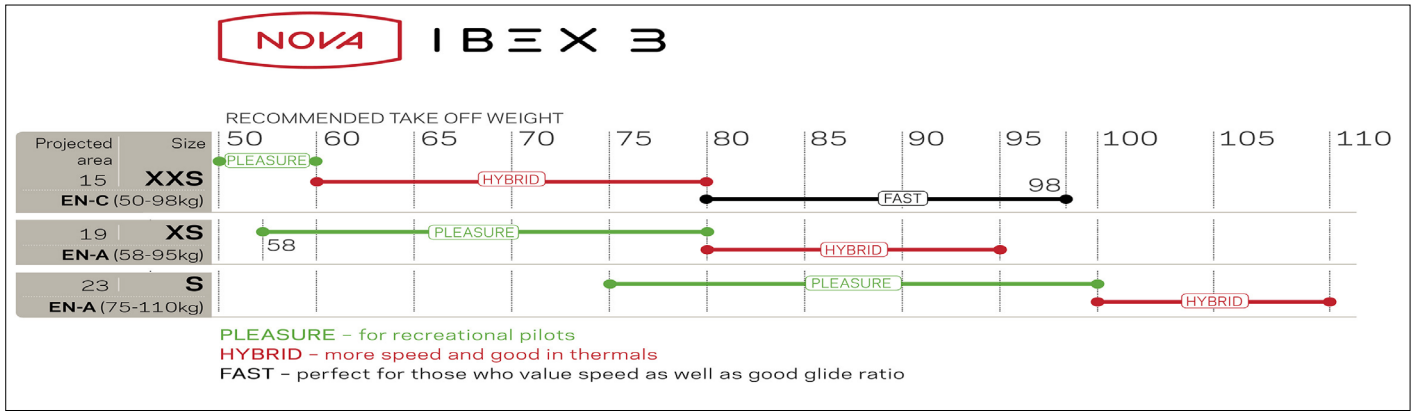
HANDS ON

NOVA IBEX 3

In 2007, Nova invented a new category of paraglider: small wings which were neither speedriding nor speedflying wings, but smaller versions of very accessible, classic models, designed to be heavily loaded and to remain relatively well behaved to the point of being able to be certified. This last point was revolutionary. But they weren't beginner wings. The Ibex 1 was DHV2-3 in sizes 15 and 17 and DHV 2 in size 19. The Ibex 2 in 2011 was EN D in both sizes.

The Ibex 3 comes in larger sizes and, as a result, it is even certifiable EN A, at least for the XS (23 m2) and S (27 m2). The XXS (18 m2) is EN C. As a function of the pilot's weight, the character of the wings is supposed to change radically, from a speedflying type wing, but with a nice glide angle, to a paraglider for thermalling.

As a function of the all up weight, the character and pilot type changes dramatically.

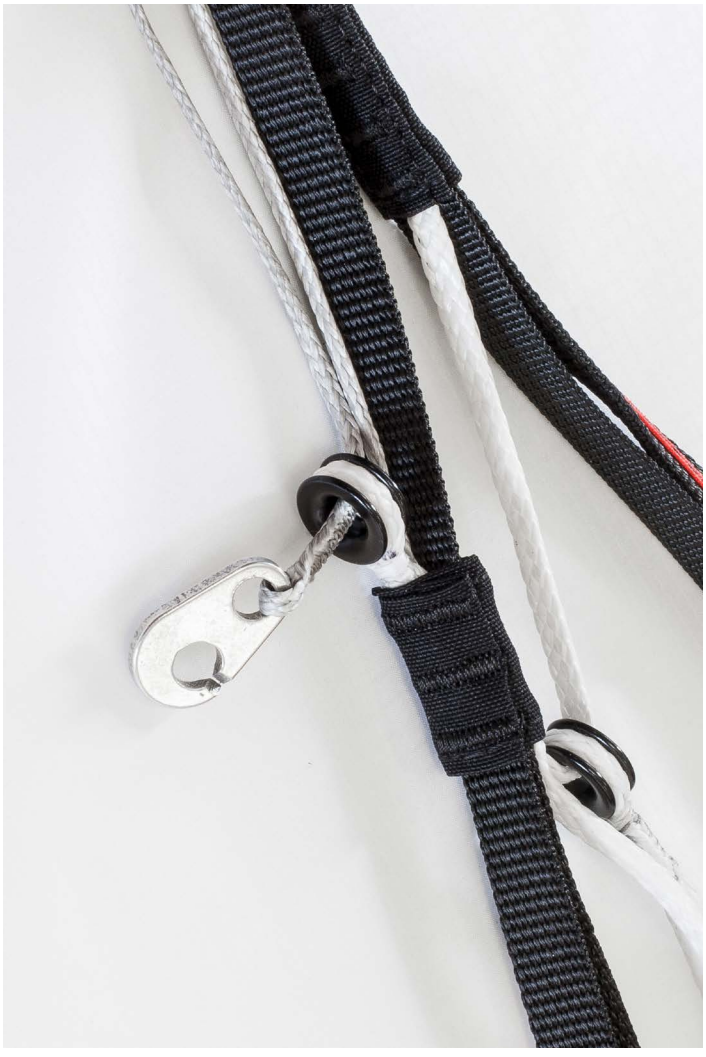


It is a wing which is very easy to ground handle. Here, we held it effortlessly just above the bramble bushes waiting for the right window to take off. https://www.youtube.com/watch?v=bzKQop4y35s

We briefly tested the Ibex XS at a little over 82 kg all up weight, right at the limit between a ‘paraglider for thermic flying’ and a ‘hybrid’ (a fast wing which can be used in thermals).

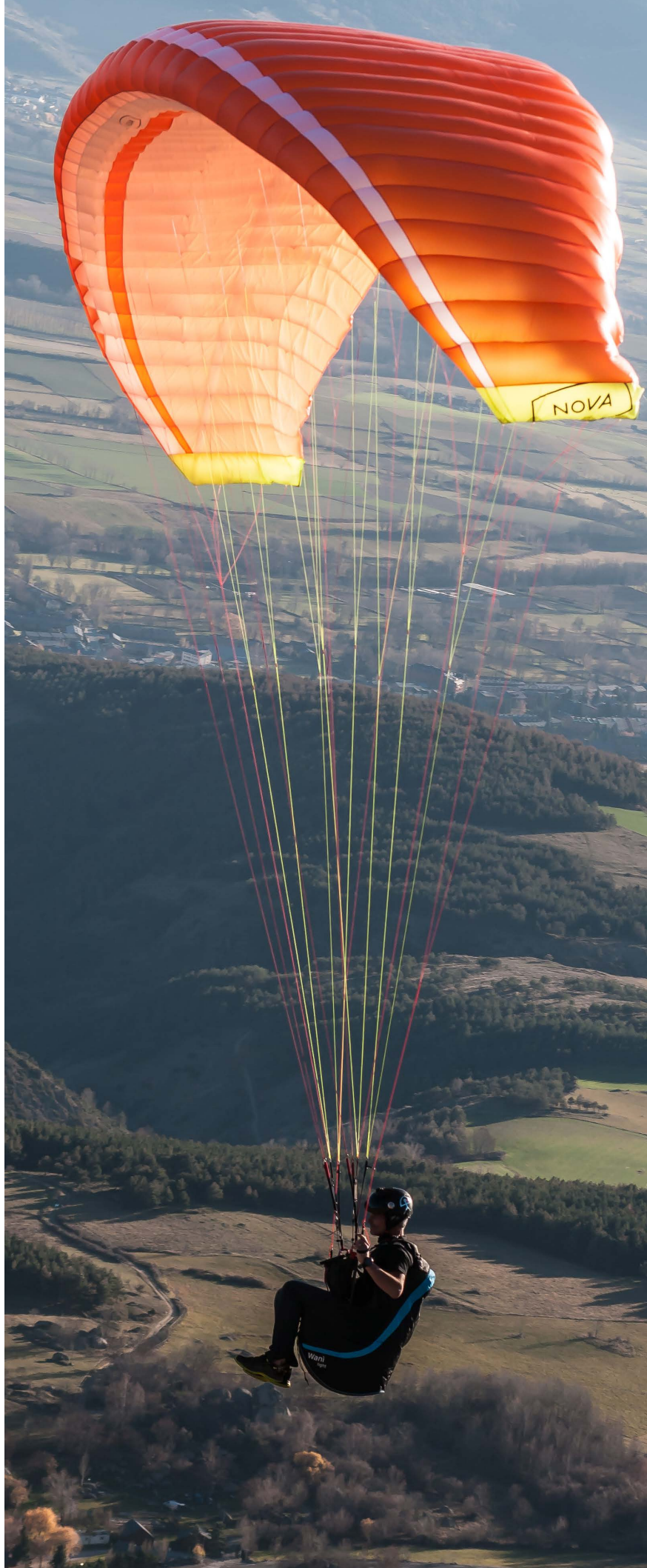
Untangling it is very easy, it is a 3-liner with only 2 As, 2 Bs and 2 Cs below. This is perhaps also why in the wind, you can play very easily with this wing and keep it at a 45° angle for example.

In the air, clearly, it’s an EN A with good stability in roll and in pitch, substantial travel on the controls and good behaviour at low speeds.



At the same time, the Ibex 3 is very manageable and precise in turns and performs well in thermals for an ultra-light mountain wing. The manufacture includes lots of modern technology used on the 'big' wings such as 3D-Shaping and SmartCells (variable cell width), but it doesn't have a SharkNose.

In summary, Nova seem to have succeeded in reaching the compromise they were looking for. The Ibex 3 in size 20 loaded in the middle of the weight range (or slightly over), is an all round mountain wing, a real 4x4 with good safety which can make the most of thermals, even weak ones.
A small criticism: at the leading edge, the wing is a bit more creased than with the manufacturer's other wings. But it is just aesthetic because the performance apparently doesn't seem to suffer.



IBEX3 - TECHNICAL DATA

Manufacturer : NOVA - Web : www.nova.eu Mail : sylvain@nova.eu
Tel: +33 6 25 37 16 31

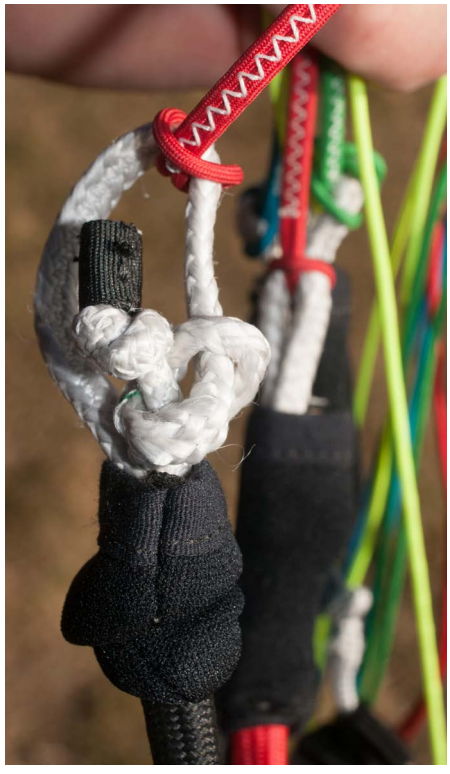
YEAR	2015		
SIZE	XXS	XS	S
CELLS	39	39	39
FLAT SURFACE AREA [m²]	17.7	22.6	26.9
PROJECTED SURFACE AREA [m²]	15.2	19.4	23.2
FLAT WINGSPAN [m]	9.11	10.28	11.23
PROJECTED WINGSPAN [m]	7.19	8.12	8.87
FLAT ASPECT RATIO	4.68	4.68	4.68
PROJECTED ASPECT RATIO	3.39	3.39	3.39
ROOT CHORD [m]	2.42	2.74	2.99
HEIGHT OF LINES [m]	5.42	6.13	6.69
TOTAL LINE LENGTH [M]	187	212	232
ALL UP WEIGHT [kg]	58-98	58-95	75-110
WEIGHT OF THE WING [kg]	2.5	3	3.5
CERTIFICATION	C	A	A
Material	Top Surface : Dominico 10D. 26 g/m² bottom surface : Dominico 10D. 26 g/m²		
PRICE [€]	3 100	3 300	3 500

HANDS ON
ICARO SITTA

An aspect ratio flat of 5.1 and 3.8 projected.

The weight has been reduced though the choice of fabric and by using Dyneema risers.

Icaro Paragliders is a German manufacturer which has been in business for 15 years. We all still remember acro wings like the Nikita, created by Michael Nesler's flair. Not long ago, Icaro changed designer and design, the latter being very modern and very 'tribal'.



The softlinks on the Sitta are different: they comprise a lark's head knot blocking against a stop knot.

The Sitta is clearly a lighter version of the Aquila, EN D Freestyle/Acro, also designed for use in thermals.

One of the differences is that instead of Dominico Dokdo 30, the Sitta is made using Porcher Skytex 27 and 32. So the 20 weighs 3.5 kg instead of 4.5 kg for the Aquila 20, giving a 22% reduction, nearly a quarter.

The idea was therefore to make a very playful mountain wing, which was nonetheless accessible. After several initial evaluation flights to look at the handling, we can confirm several positive points for in the mountains:

- Small weight and size to transport
- Thick lines which are quick to untangle
- Very compact inflation
- Rapid load take up
- Brake handling: lively, but not too exaggerated
- Rolls quickly
- Very efficient weight shifting
- Possible to use in thermals and playful

It's a hike and fly wing which is supposed to be very versatile. This goal seems to have been achieved, but it's a shame it is an EN D because it's a wing which remains relatively accessible.

It got lots of As and Bs and some rare Cs; the D was due to the locked in spiral which needed pilot intervention to exit. Not surprising given its roll instability which makes it a very playful mountain wing.

SITTA - TECHNICAL DATA

Manufacturer : ICARO - http://icaro-paragliders.com/en/products/gliders/sitta/
Mail : icaro@icaro-paragliders.com Tel :+49 (0)8034 / 909 700

YEAR	2015		
SIZE	18	20	22
CELLS	36	36	36
FLAT SURFACE AREA [m²]	18	20	22
PROJECTED SURFACE AREA [m²]	15.2	17	18.7
FLAT WINGSPAN [m]	9.6	10.1	10.6
PROJECTED WINGSPAN [m]	7.6	8	8.4
FLAT ASPECT RATIO	5.10	5.10	5.10
PROJECTED ASPECT RATIO	3.8	3.8	3.8
ALL UP WEIGHT [kg]	65-90	75-95	80-105
WEIGHT OF THE WING [kg]	3.3	3.5	3.7
CERTIFICATION	EN D		
Material	SKYTEX 32 / 27		
PRICE [€]	2700	2700	2700

REPORT

OZONE UL3 19

The first Ultralite dates back to 2007-2008. The third version, which has been on the market since 2012, is still on sale and still current. But until when?

L'Ultralite 3 is still amongst the lightest mountain wings. The 19 is given as 2.15 kg to the nearest 50 grammes; we measured it at 2.36 kg. It isn't much more than the Skin 18 Plume (1.82 kg), and less than a Skin classic in the same size (2.7 kg). The single skin XXLite 19 from Ozone is given as 1.4 kg by the manufacturer, effectively a kilo less than the UL 19. But we can see that, for a double surface with all the advantages that that brings compared to a first generation single skin, the UL 19 remains very well placed in the market. In addition, its behaviour during take off proved this. It is, quite rightly so, considered as one of the best in this discipline. Only the single skins are doing much better.

As at Ozone, the XXLite, also from 2012, deserves to be brought up to date to stand against the new second generation single skins. We can well imagine that the manufacturer will soon bring out a combination of the XXLite and the Ultralite as the next 'mountain ultra-light' model.

Detail of the Ultralite 19. An amazingly light wing for a double surface.

In addition, the three year old example that we had, clearly showed that the traces of wear which are seen more on an ultra-light wing, are normal. This seems in theory, to be just an aesthetic problem.

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The chord risers, contribute greatly to reducing the weight of the wing. There is, all the same, a small disadvantage: if you separate the harness from the wing, the risers twist easily and need more time to untangle.

Below, softlinks instead of maillons, a tried and tested solution.

UL3 - TECHNICAL DATA

Manufacturer : OZONE - http://flyozone.com/paragliders/fr/products/gliders/ultralite-3 Mail : team@flyozone.com, bill@alixa.fr
Tel : +33 4 92 81 03 62

YEAR	2012			
SIZE	19	21	23	25
CELLS	35	35	35	35
FLAT SURFACE AREA [m²]	19	21	22,9	25
PROJECTED SURFACE AREA [m²]	17	18.7	20.2	22
FLAT WINGSPAN [m]	9.3	9.6	10.2	10.7
PROJECTED WINGSPAN [m]	7.8	8.2	8.4	8.7
FLAT ASPECT RATIO	4.5	4.5	4.5	4.5
PROJECTED ASPECT RATIO	3.6	3.6	3.6	3.6
ROOT CHORD [m]	2.55	2.67	2.79	2.92
WEIGHT OF THE WING [kg]	55-90	55-90	55-90	65-110
WEIGHT OF THE WING (KG) (+ or - 50 g)	2.145	2.33	2.495	2.7
CERTIFICATION EN/LTF	B			
MATERIAL	Upper surface: Skytex 36/ Skytex 27 Lower surface: Skytex 27 Classic			
PRICE [€]	2200	2250	2300	2400

HANDS ON

SKYMAN CROSSCOUNTRY

Skyman, specialist in lightweight wings, brought out an EN B version in 2015 of the CrossAlps (EN C) model: the CrossCountry is aimed at a wide audience.

Markus Gründhammer, Toma Coconea and the designer Anupa Chardraratne used the concept and the profile of the CrossAlps whilst reducing, amongst other things, the aspect ratio. (Aspect ratio flat/projected: CrossAlps 6.4/4.37, CrossCountry 5.7/3.92). Like its big sister the CrossCountry surprised us with its fabric and other unusual details. The fabric is Dominico 10D which has a special coating that Skyman call "LongLife" which makes it very silky and nice to touch. It only weighs 25 g/m2 and thus contributes to the reduction in weight: 3.9 kg for 25 m^2. Yet the lines on this three liner aren't really lightweight: the lower lines are very think and sheathed. All the lines are particularly smooth to untangle which is definitely an advantage in high mountains.

During inflation, the aspect ratio can obviously be felt, the wing yaws a little bit and the ears can rustle a bit but, as it happens, that has no effect; it comes up very well and stops without a tendency to overfly. The load take up is immediate.

(Continued on page 105)

The Dominico 10D from Skyman: very silky.

Unusual: the curvature and the placement of the leading edge rods.

Despite the light weight of the wing, the risers are not chord.

Above: very practical, pegs integrated in the leading edge hold the wing in place during take off.

Right: very smooth lines, unsheathed above, thick below. Softlinks instead of maillons.

(Continued from page 102)

You can see that the designers who work with Markus Gründhammer have spent a lot of time on demanding take offs in high mountains and have built a wing with that in mind. It has an exemplary inflation and launch for a wing with this sort of aspect ratio. The fabric is, without a doubt, light for a reason.

Overhead, this fabric can also be felt. The movements are gentle and damped. Despite its aspect ratio the wing gives confidence. As far as turning, it wants to turn flat, with relatively little effort. To bank it over, the effort on the controls needs to increase a lot. It has roll stability and nice pitch stability. When it moves a bit, the wing continues to reassure. During a collapse, it shows behaviour typical of a lightweight wing: it is well damped and doesn't hold any surprises. Accelerated, the leading edge remains solid. As far as performance is concerned, without having taken precise measures for this hands-on, the CrossCountry seems very well placed in its category, mid EN B. There is, no doubt, potential. We're looking forward to seeing more fully what it can do.

An unusual wing with some very pleasant surprises.

The bag is too small; it is quite difficult to get the wing into it, despite its small volume.

CROSSCOUNTRY - TECHNICAL DATA				
Manufacturer : SKYMAN - Web : http://www.skyman.aero Mail : info@skyman.aero Tel: +49 (0)8364 98 33 - 0 (Autriche)				
YEAR	2015			
SIZE	23	25	27	29
CELLS	55	55	55	55
FLAT SURFACE AREA [m²]	23	25	27	29
PROJECTED SURFACE AREA [m²]	19.05	20.7	22.36	24.02
FLAT WINGSPAN [m]	11.45	11.93	12.4	12.85
PROJECTED WINGSPAN [m]	8.64	9.01	9.36	9.7
FLAT ASPECT RATIO	5.7	5.7	5.7	5.7
PROJECTED ASPECT RATIO	3.92	3.92	3.92	3.92
TOTAL LINE LENGTH [m]	230	241	252	263
ALL UP WEIGHT [kg]	60-80	70-90	80-105	100-125
WEIGHT OF THE WING [kg]	3.65	3.9	4.1	4.35
CERTIFICATION	EN/LTF B	EN/LTF B	EN/LTF B	EN/LTF B
PRICE [€]	3 500	3 500	3 500	3 500

HANDS ON

GRADIENT DENALI

On the outside of the wing there are very small openings covered with gauze.

At Gradient, the Denali is the hike and fly wing for everyone.

Denali is the name of the highest mountain (6190m) in North America. Incidentally it was called Mt McKinley until the summer of 2015, when the USA renamed it in honour of its original name given by the Alaskan Indians. The Denali model is far from the extremes of this summit. With this wing, Gradient wanted to create an easy mountain wing, an EN A for everyone. Even the concept 'mountain wing' doesn't go far enough. It has classic risers, classic lines and lots of reinforcements which will, no doubt, give it a good long life.

The fabric is part of the Everlast family, specially designed by Porcher in collaboration with Gradient, and for a long time reserved just for them. With its 32 g the fabric isn't as radical as the 27, but lighter than the 38. The coating on both sides of the fabric will also encourage good durability.

Therefore, the wing isn't destined to break records for light weight. 4.2 kg for the 26 is about right. If you compare it with the Gradient Bright 5 in size 26, on the other hand, you gain barely 700 grammes. We need to make the comparison because, obviously, the Denali was developed based on the Bright 5; the technical data is almost identical.

The Bright 5 is Gradient's EN A beginner wing and a great starting point as far as the design of an easy mountain wing is concerned.

Untangling the lines is average and, they aren't particularly smooth. The lines are sheathed low down and, high up, there are different types of fine unsheathed lines.

A classic riser with lots of details which make it comfortable to use like real pulleys and swivels: it's a relatively lightweight wing which has all the features of a normal one.

Leading edge rods in the large openings: inflation is very easy, the load take up progressive.

During take off, the wing comes up very easily and evenly. It needs a little pull to stop it once it is overhead. The load take up is progressive, the wing wants to go, it doesn't nose-up, even in wind.

In the air, it glides well for a typical EN A beginner's wing. It goes into thermals easily. It is also pretty manoeuvrable for this type of wing, it goes into flat turns well and yaws quickly, before rolling a bit more. Depending on the harness, it is fairly reactive to shifts in the centre of gravity. As intended, there are no surprises when landing either.

Without having taken precise measurements for this evaluation, we came to the conclusion that it was a 'soft' lightweight wing and really was for everyone, being pretty versatile on a performance and handling level. The saving in weight is relatively small compared to its heavier sister, but that was Gradient's choice. The small difference will, all the same, be felt during hike and fly, and it seems to be felt at a damping level too.

DENALI - TECHNICAL DATA

Manufacturer : GRADIENT WEB : http://www.gradient.cx/en/Denali/tech
Mail : gradient@gradient.cx_Tel : +420 257 216 319

YEAR	2015		
SIZE	24	26	28
CELLS	40	40	40
FLAT SURFACE AREA [m²]	23,88	26,77	29,48
PROJECTED SURFACE AREA [m²]	20,24	22,7	24,99
FLAT WINGSPAN [m]	10,73	11,36	11,92
PROJECTED WINGSPAN [m]	8,62	9,13	9,58
FLAT ASPECT RATIO	4,82	4,82	4,82
PROJECTED ASPECT RATIO	3,67	3,67	3,67
ROOT CHORD [m]	2,74	2,9	3,04
LENGTH LINES [m]	275,5	291,8	306,2
ALL UP WEIGHT [kg]	60-80	75-100	90-120
WEIGHT OF THE WING [kg]	3,9	4,2	4,5
CERTIFICATION	A		
Material	Skytex Everlast 32		
PRICE [€]	2350	2350	2400

QUICK TEST

TREKKING TREK

Photo: Michel Farrugia

After the Trekking Senso and the Senso Sport which we tested in 2014, here's the Senso Trek, the lightest version of this model.

This version is almost identical to the two others, except that the manufacturer has managed to make this wing even lighter still. The leading edge is made from Skytex 32 and all the rest of the surfaces of the wing are in Skytex 27. In addition, the risers are in chord, but you can also order it with classic risers. This increases the weight by 120 g. The size S, for example, weighs 3.85 kg, compared to 4.4 kg for the Senso Sport (Skytex 38, 32 and 27), and 5.2 kg for the Senso classic that we tested in 2014.

In addition, Trekking made the latter lighter in the 2016 version, by putting Skytex 32 in the lower surface; it is now only 5.05 kg. All the better; the Senso Classic was a little bit more sluggish when climbing compared to the Senso Sport that we clearly prefer and this is no doubt a very good compromise between light and long life.

The Trekking manufacturer recognise that the Trek still needs to lose a few hundred more grammes to have a clear place in the mountain wing niche. We nevertheless tested it to compare it with the two other Senso wings.

Here's a quick summary, the Trek has the same advantages as the Senso Classic and the Sport, it's a well behaved EN B wing, at the limit of being able to be used by schools but nonetheless with sufficient performance. The performance in thermals, as in weak dynamic lift, is good enough for the pilot to keep it for several years and go XC on it.

Trekking have stuck stubbornly to the principle: no rods in the leading edge. But as the wing is light it climbs more easily than the Senso Classic.

As our colleague Cédric Nieddu noted, the behaviour during incidents, of this wing is very damped (see video), and even more so than that of the Sport and the Classic.

Clearly, as you would expect, each reduction in weight in the range brings even better behaviour. And as even the heaviest version is already exemplary, what more can you ask for...

On the other hand, the manufacturer didn't hesitate to openly emphasise that a wing made from Skytex 27 won't have the same life expectancy as one in 32. It is an undeniable fact which needs to be taken into account when deciding what to buy

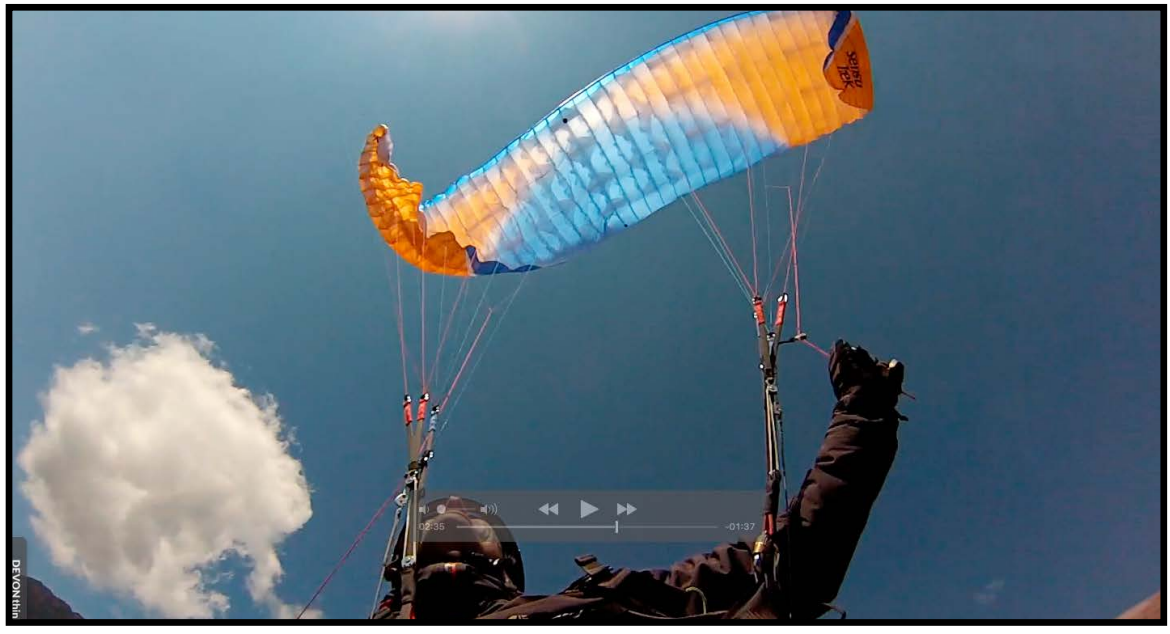
TREK - TECHNICAL DATA

Manufacturer : TREKKING -Mail : info@trekking-parapentes.fr
Web : http://www.trekking-parapentes.fr/index.php/fr/
Tel : +33 (0) 695 239 282

YEAR	2014			
SIZE	X	S	SM	M
CELLS	52	52	52	52
FLAT SURFACE AREA [m²]	21,2	23,84	25,2	26,49
PROJECTED SURFACE AREA [m²]	18,3	20,5	21,7	22,8
FLAT WINGSPAN [m]	10,6	11,3	11,6	11,9
FLAT ASPECT RATIO	5,3	5,3	5,3	5,3
PROJECTED ASPECT RATIO	3,97	3,97	3,97	3,97
HEIGHT OF LINES [m]	7	7,5	7,7	7,9
ALL UP WEIGHT [kg]	50-75	60-85-	70-95-	80-105
WEIGHT OF THE WING [kg]	3,42	3,85	4,08	4,28
TRIM SPEED [km/h]	38 (+/-1)	38 (+/-1)	38 (+/-1)	38 (+/-1)
MAX SPEED [km/h]	51 (+/-2)	51 (+/-2)	51 (+/-2)	51 (+/-2)
FINESSE MAX	9	9	9	9
MIN SINK RATE [m/s]	1	1	1	1
CERTIFICATION	En cours			
MATERIAL	Extrados : Skytex 32 universal et 27 Classic Intrados : Skytex 27 Classic			
PRICE [€]	2650	2650	2650	2650

A nicely finished wing which, from now on, will be made in France. Photo: Michel Farrugia

The wing exists with a choice of classic or chord risers.



The video of measurements and behaviour in a stall, collapse, spin... https://www.youtube. https://www.youtube.com/watch?v=uYtxa-GYKBg

TEST

NOVA ION3 LIGHT

The Ion 3 Light from Nova came out in 2014 a little after the classic Ion 3 which has recently been replaced by the Ion 4. It really shows the advantages of going lightweight as far as behaviour in flight is concerned.

The Ion 3 classic was a very interesting EN B wing, virtually school leaver, with a performance that could almost be compared to that of the Mentor 3, the high end EN B which came out a year earlier. As far as technology is concerned, Nova have already given it everything: Smart Cells, Air Scoop (SharkNose), 3D-Shaping. Even though the Ion 3 has been replaced since February 2016 by the Ion 4, it remains a good second hand purchase.

The Ion 3 Light has reduced the weight of this pretty successful model. The reduction in weight is due to, amongst other things, using Dokdo 35g/m3 on the upper surface and Skytex 27 (instead of Dokdo 41 g/m3 everywhere) for the lower surface, and increasing the size of the cell openings.

As far as performance is concerned, it is identical to the classic Ion 3. (I have a great memory of climbing up in restitution above the sea with it...) Speed measured: 39 km/h trim speed, 49 km/h accelerated.

But also, the advantages of going lightweight need to be added: it is gentler, even more damped, it comes up a bit easier at take off, and less effort is required in the controls. Needless to say, the difference isn't enormous in the controls, but it is obvious. The question can seriously be asked: why buy a classic Ion 3?

Two reasons: even if Nova seem positively surprised by the durability over time of many of the lightweight materials, the lifespan will be, even by protecting it, less than that of the classic.

Reminder: measures and manoeuvres following incidents.
Video: https://www.youtube.com/watch?v=mgF3WBCbm1w

The interior of the Nova Ion 3 Light: very light and airy

The Air Scoop, Nova's SharkNose.
Photo: voler.info

Smart cells: different sized cells.
Photo: voler.info

And then there's the price: the official selling price of about 3800 euros instead of 3200, that's nearly 19% more expensive for 29% less weight. But in our opinion it's well worth it.

An interesting development: the new classic Ion 4 only weighs 4.65 kg, therefore barely 600 grammes more than the Nova Ion 3 Light.

Phillipp Medicus, Nova designer.
Photo: Nova

ION 3 LIGHT - TECHNICAL DATA

Manufacturer : NOVA Web : www.nova.eu Mail : info@nova.eu Tel : +43.5224.66026

YEAR	2014				
SIZE	XXS	XS	S	M	L
CELLS	49	49	49	49	49
FLAT SURFACE AREA [m²]	22.10	24.59	26.99	29.44	32.06
PROJECTED SURFACE AREA [m²]	18.56	20.65	22.58	24.63	26.82
FLAT WINGSPAN [m]	10.61	11.19	11.73	12.25	12.78
PROJECTED WINGSPAN [m]	8.17	8.62	8.99	9.39	9.80
FLAT ASPECT RATIO	5.09	5.09	5.09	5.09	5.09
PROJECTED ASPECT RATIO	3.58	3.58	3.58	3.58	3.58
ROOT CHORD [m]	2.56	2.70	2.83	2.95	3.08
TOTAL LINE LENGTH [M]	219	232	243	254	265
ALL UP WEIGHT [kg]	55-80	70-90	80-100	90-110	100-130
WEIGHT OF THE WING [kg]	3.55	3.80	4.05	4.30	4.55
CERTIFICATION EN/LTF	B	B	B	B	B
MATERIAL TOP SURFACE	DOKDO 20 DMF WR 35 g/m²				
MATERIAL BOTTOM SURFACE	Porcher Sport Skytex 27 Universal 27 g/m²				
PRICE [€]	3 200	3 200	3 200	3 200	3 200

ADVENTURE LIGHTEN UP
X-RACE LITE

The X-Race LT which has been on the market for just over a year at Adventure was the French manufacturer's first step in the light direction, a successful concept down to the last detail.

Sascha Burkhardt

In the past, Adventure was rather conservative: robust engines, but also relatively heavy. The fashion for light seemed to wash over them. But apparently, the designers working with Emmanuel Layan, now one of the co-owners of the make, wanted to do things properly. By keeping the concept which has for a long time been unique to Adventure, the motorisation of a moulded shell, they had to do a lot more than reduce the diameter of a few tubes.

They had to redesign the shell completely, by economising each gramme wherever possible. That's what they had to do, to get an engine with an electric starter down to only 23 kg!

• A carbon chassis optimised with layers of fabric and foam inside to give the required strength. Adventure assure us that the tests have been done to validate this threshold. On the shell, you can clearly see that it has been slimmed down and made a bit lighter everywhere. The result: the whole shell, equipped with wiring harness, is 1.7 kg, half the weight of the X-Race classic shell which is 3.4 kg.

• Use of titanium for the insert tubes.
• A lightweight harness weighing only 2.4 kg (1 kg less than the classic harness).
• The weight of the Tiger motor has been reduced by using a titanium exhaust pipe. The result: a saving of 2 kg (12 kg instead of 14 kg for this 22 HP motor).

The result is clearly spectacular from a weight point of view. Only the attachment system doesn't seem to match the rest: big tubes fixed on with enormous bolts. But that's acceptable as Emmanuel Layan explained; with the attachments you can't lighten it too much.

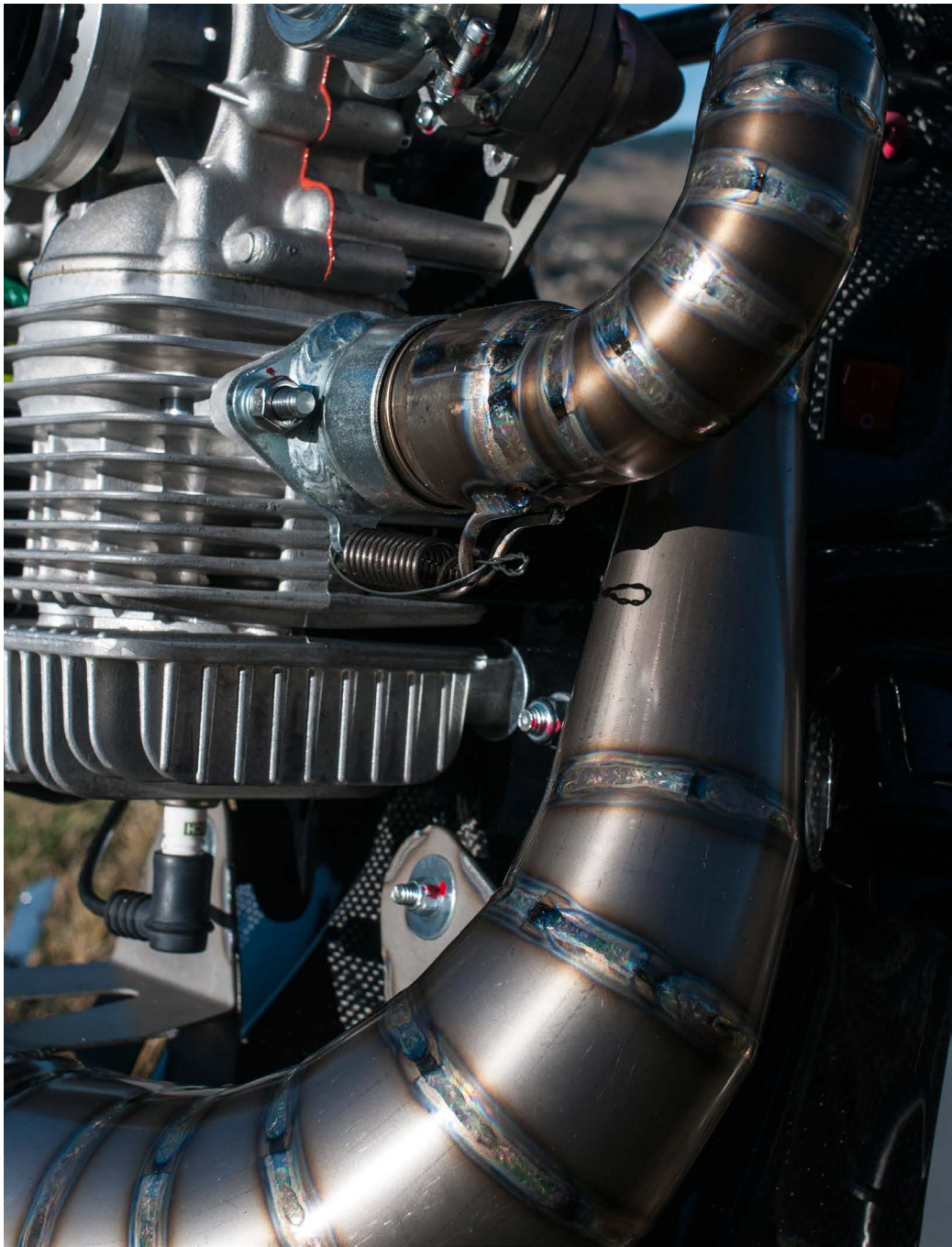
The swing arm system is pretty original, we already looked at it in our 'Harness' issue in the summer of 2015. The arms are, as always, mobile upwards and downwards. Given their geometry and height, they give very efficient handling from the harness, whilst keeping enough stability for 'new' pilots. Then later, when the pilot wants to make it more reactive, he just needs to turn a washer in the attachment system so that the arms have more lateral freedom, they can then move to the right and left, separate and come closer. The result, the machine is a lot more reactive to weight shift.

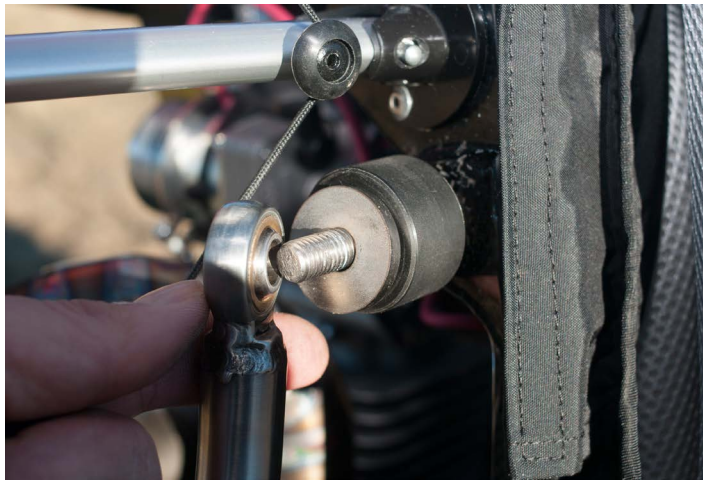
It's difficult to go any further in saving weight, but in any case, at 23 kg it's not very far off some of the minimalist motors which are a lot less comfortable, less solid and a lot less powerful.

As far as putting a motor on the X-Race LT is concerned, apart from the titanium exhaust, nothing has changed in this tried and tested engine and which, right from the very beginning, showed a very good power to weight ratio!

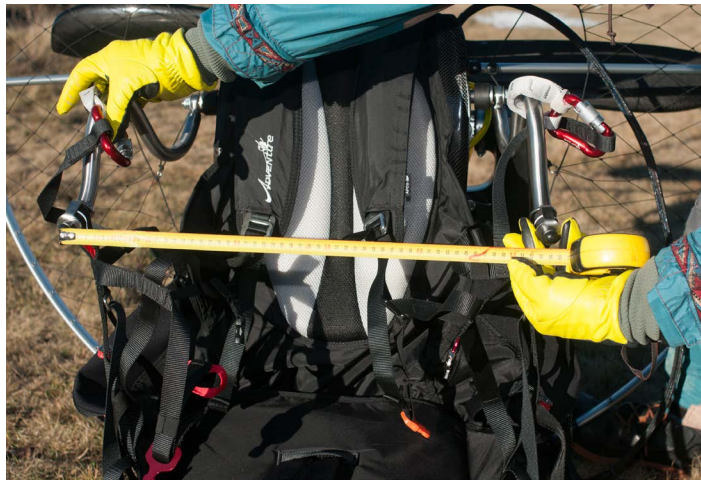
It is moreover a specially modified version for, and by, Adventure of a Simonini known for its reliability.

It should be acknowledged that Adventure were right to wait before getting into lightweight and fine tuning this machine down to the last detail. This seems to clearly be the lightest in this category of engine, comfortable, aesthetic and powerful, equipped with an electronic starter.





The handling is adapted to the pilot: very reactive once the laterals are freed, more stable when the arms are blocked. Blocking them is done by inverting a washer in the attachment system. The latter seems almost outsized, leaving no doubt about its robustness...



The machine exists in a version with 115 cm or 130 cm propellers. Our tests were done with the former, whose thrust is claimed to be 60 kg, which seemed realistic to us. The big, inevitable disadvantage with Adventure's lightweight models, is the rather heavy price. We tested the full setup, which corresponds to a maximum reduction in weight, including all the options and a set of spare parts such as, a rod and hoop for the cage and a replacement propeller, just in case!

The whole thing costs 8 990 €. It's expensive, but it seemed difficult to find a fault with this beautiful engine which would have justified a reduction in price.

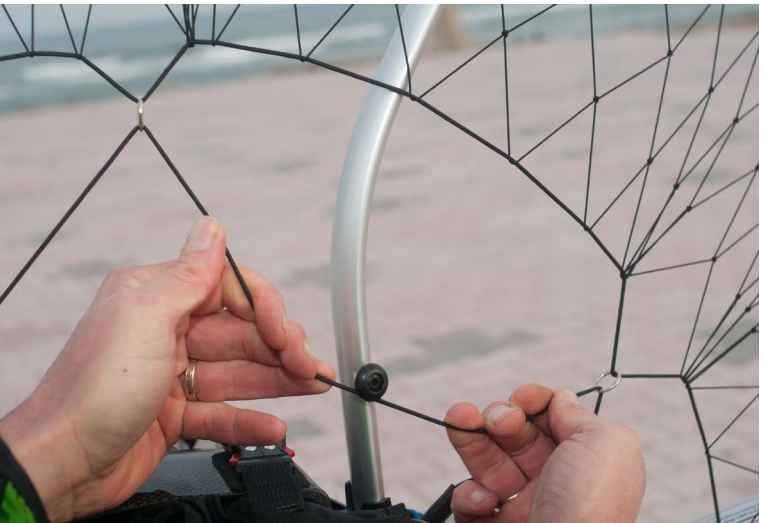
It's worth bearing in mind that owners of a classic X-Race can 'upgrade' their machine progressively, or in one go, by buying the lighter chassis, the titanium exhaust pipe, the lighter harness...

http://www.paramoteur.com

23 kg on your back, that's a life changer. Especially since the Adventure frames are already very compact. Even in the air, the least bit of inertia is noticeable. The Tiger 160 cc is clearly powerful.

A very classy design for this carbon shell

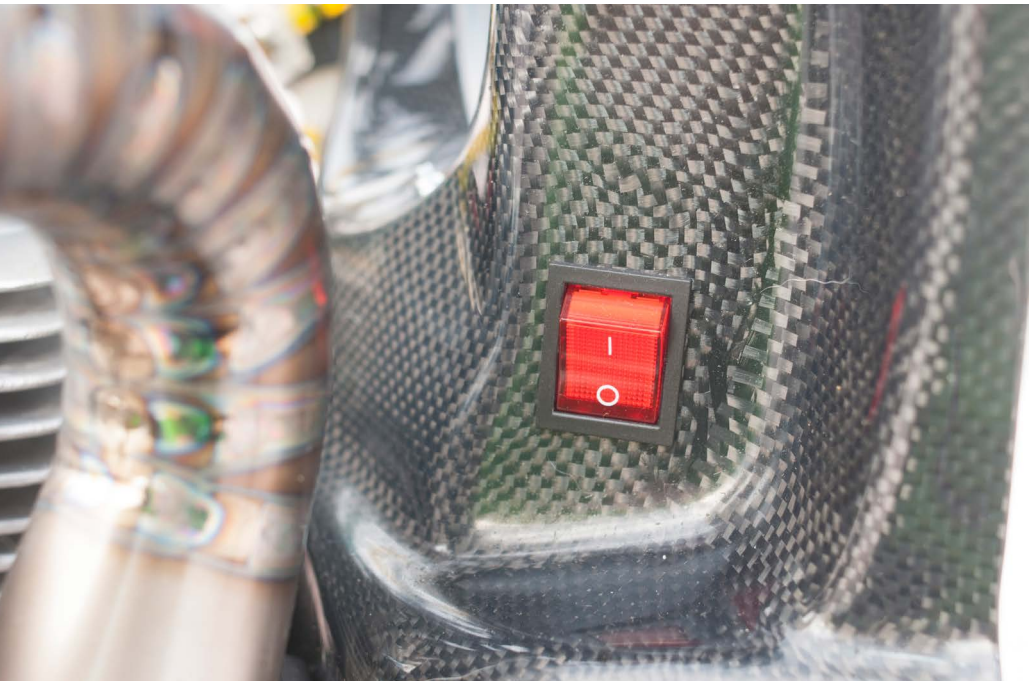
The bag to transport it is part of the pack. It's well thought out and practical.



Assembling the cage is simple, it's the same principal throughout the whole X-Race range.

One of the ways of economising on weight: the battery compartment doesn't have a cover, which doesn't cause a problem.

As always at Adventure, the Li-Po battery isn't charged by the engine but must be charged at some point from a mains supply.



Each detail has been carefully thought out and integrated into the frame.

The aluminium cage is identical to the other X-Race ones.

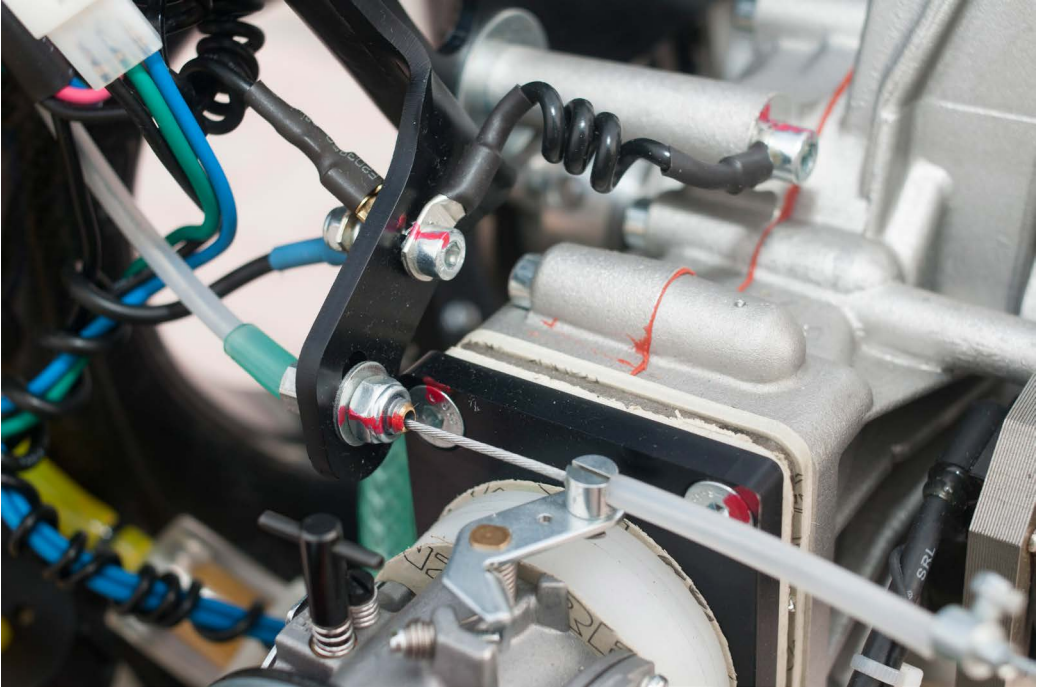
Like all the Adventure chassis, the engine is very compact on the pilot's back and leaves him lots of freedom. In addition it weighs 30% less than the numerous other engines with the same power.

The hoops are very robust thanks to their profile, despite being so thin and light.

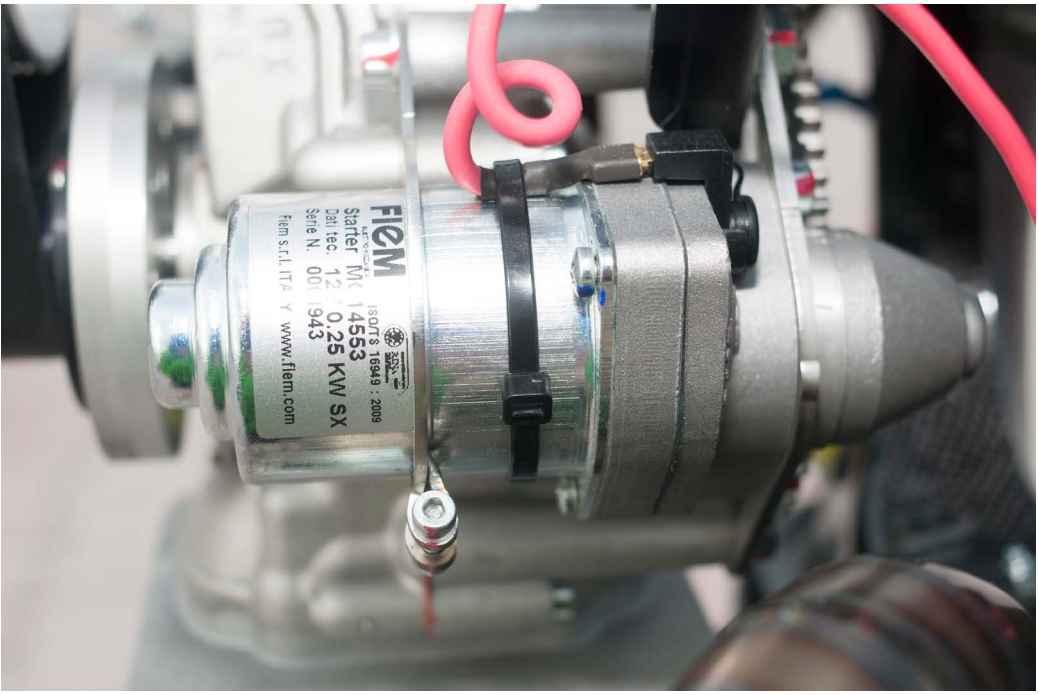
When travelling, it all packs into a relatively small space.

The titanium exhaust pipe saves 2 kg, the new frame 1.7 kg: nearly 4 kg just for this part!

The motor can be adapted to pilots at every level, whether for beginners or experts (here with a Viper 3). On the other hand, to equip a beginner for the first time, the engine is a bit expensive.

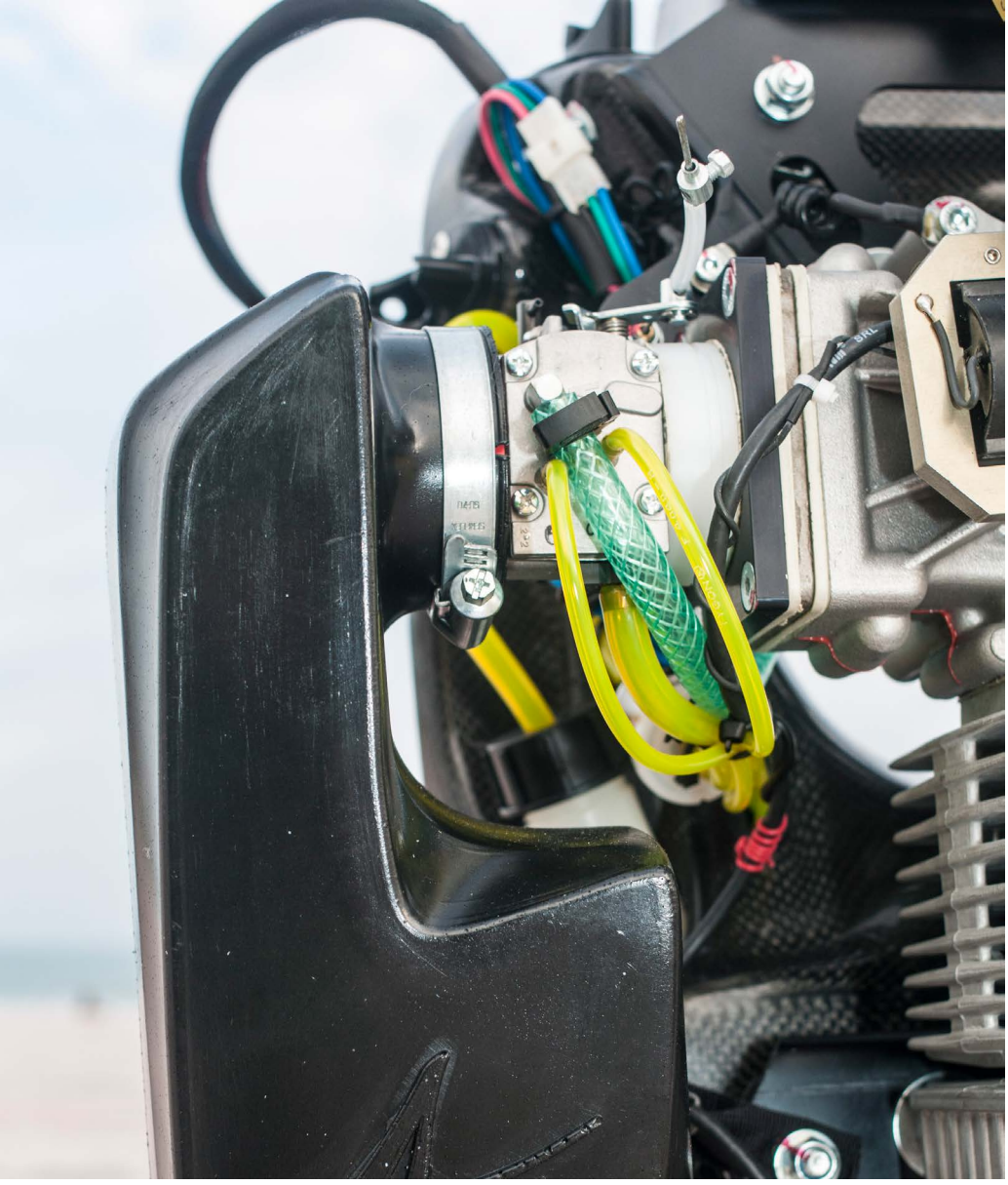


An Adventure tradition: bolts marked with a red line. At a glance the pilot can see if a bolt is coming undone.



The electric starter is obligatory on Adventure engines, it's part of the manufacturer's safety philosophy. Without that, it would be down to 20 kg.

The attachment of the swing arms appears outsized



Another detail which is an Adventure speciality: A modification of the carburettor by putting two pipes directly into the priming bulb.

ADVENTURE X-RACE LITE	
ENGINE	Tiger 160
DISPLACEMENT [cm³]	160
COOLING	Air
REDUCTION	Courroie
CARBURETOR	Walbro à membrane
POWER [CV]	22
FUEL TANK	15,5 l
CAGE MATERIALS	Aluminium
MATERIALS HULLS	Carbone, Titane
ATTACHMENT SYSTEM	Cannes basses mobiles 3D
PROPELLER	Carbone 115 ou 130 cm
WEIGHT [KG]	23
CLUTCH	No
PRICE [€] COMPLETE PACK	8 990 €

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PRESENTATION

A LIGHTWEIGHT MOTOR: THE MODERNISED MINIPLANE

Miniplane, the pioneers of lightweight, are going to launch a new version of the Top 80.

The Miniplane was and is one of the most advanced paramotors of its time: A lightweight chassis and lightweight motor, which is nonetheless very reliable, has made it a favourite machine amongst pilots who like to go places. This machine was under the 20 kg barrier well before their competitors even thought about it. As far as reliability is concerned, it is amongst the best of all the motors on the market as our colleague Sylvain Dupuis who is currently working on the subject 'typical breakdowns of different engines' confirmed.

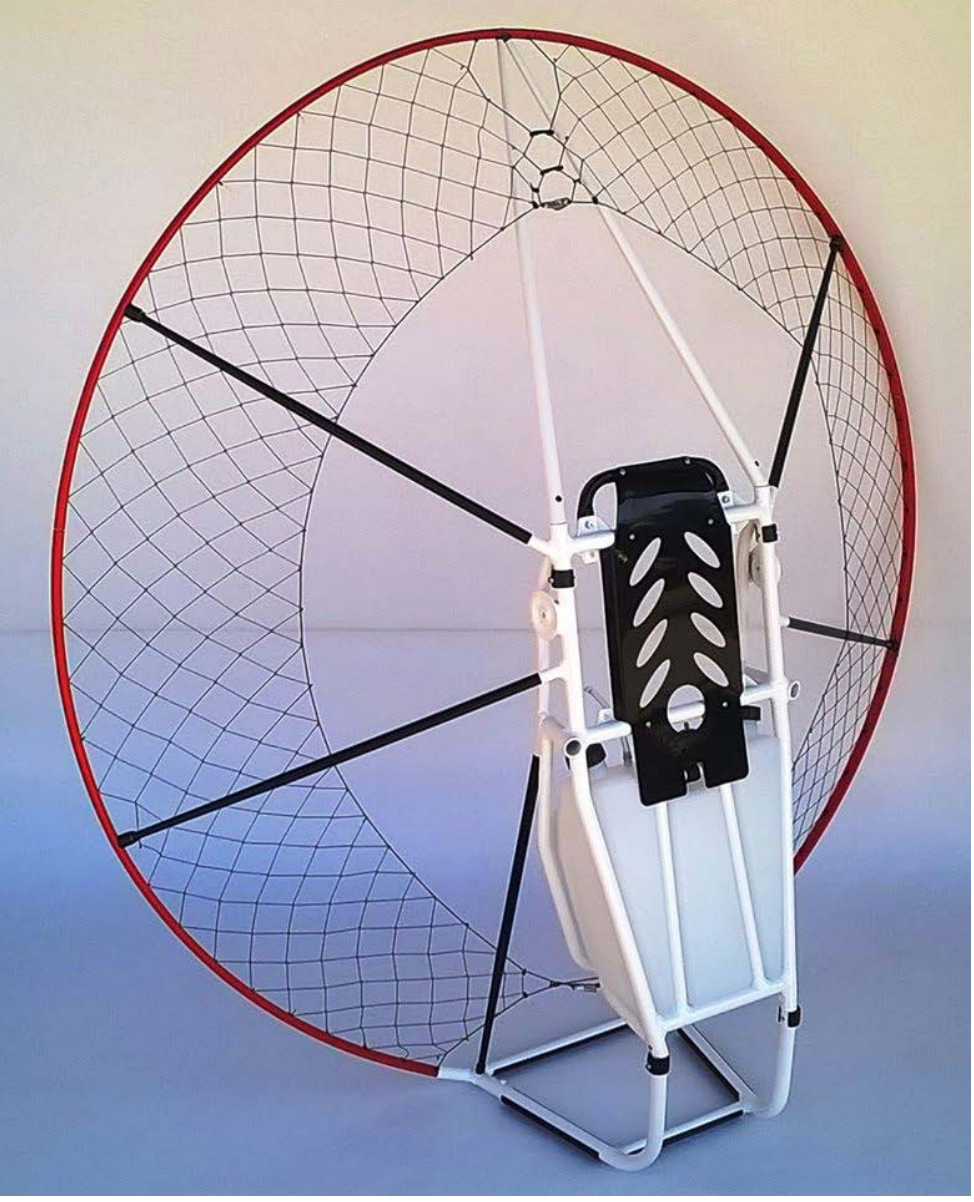
A classic Miniplane on the ground and flying. The manufacture of the 'tent hoops' style cage is practical and light. The only disadvantage: it's relatively fragile when it is compressed by the lines during take off. There is a real risk of contact with the blades if the pilot does a Powerstart.

Photo: Apco

Nevertheless, the Italian manufacturer is working on a new range which will see the light of day in 2016: a new 80 cc engine as well as another of 100 cc. Both come with a choice of carburettor or injection in a new chassis with a thinner base.

Both machines are completely new with new geometry and generous use of carbon. The cooling will be guaranteed by two fans instead of one, and the power curve will be more linear. The weight will remain pretty much in the same range, with a slight increase for the 100.

www.miniplane.net



The new Miniplane chassis with a shorter lower part. The principal for assembling the cage remains the same.

Photo left: the new baby 80 is born, but is being fine tuned. The new 100 (on the scales) will take a bit longer.

PRESENTATION

POLINI LIGHT: THE THOR 80

This very light little monster is a real hit. Despite the water cooling system, the engine without the chassis weighs only 11.4 kg according to the manufacturer and 11.7 kg on the editors scales. On the market for less than a year, this motor has been adopted by lots of paramotor manufacturers, allowing them to build very light and incredibly powerful machines.

In the opinion of several professionals, this engine's career has got off to a better start than that of its predecessors. Obviously, as for all new models, the sceptics are on the look out for the slightest problem, but since the summer of 2015, there hasn't been much to point out, apart from two bushes which needed to be replaced on the engine mounting in December 2015.

We are testing this promising little engine at the moment with several chassis, we'll publish the results before this summer.
www.polini.com

POLINI THOR 80	
POLINI ENGINE	Monocylindre 2T
DISPLACEMENT[cm³]	86
COOLING	water
COMPRESSION RATIO	14:1
CARBURETOR	CP Polini Ø21 Walbro WG8
POWER [HP]	17.2
RPM	10450
ENGINE WEIGHT [kg]	11.4
CLUTCH	Centrifugal clutch
PRICE [€]	approx. 2770 €

Photo: Bruno Kapeller / Simplify

SIMPLIFY PPG
X1 ADVENTURE

"Simplify PPG", this relatively new German paramotor manufacturer has chosen, as its name indicates, the principle of simplification.

SIMPLIFY X1 ADVENTURE- TECHNICAL DATA

Manufacturer: SIMPLIFY PPG - http://simplify-ppg.com/_
Mail: info@simplify-ppg.com Tel: +49 (0)174 9968882 - Allemagne

SIZE	90	100	125	86
ENGINE	HE R90	EOS	HE R125	THOR 86 ES
COOLING	Air	Air	Air	water
CAPACITY (CC)	90	102	125	86
RPM	9 800	9 200	9 800	10 450
THRUST [kg]	> 50	> 50	> 63	> 63
WEIGHT [kg]	19.20	17.50	21.2	20.90
PILOT WEIGHT [kg]	Max 83	Max 83	Max 95	Max 95
CENTRIFUGAL CLUTCH	yes	yes	yes	yes
FRAME DIAMETER	140 cm	140 cm	140 cm	140 cm
ADV. BOX (cm)	44/60/80	44/60/80	44/60/80	44/60/80
CARB.PROPELLER 2 BLADE	125 cm	125 cm	125 cm	125 cm
PRICE [€]	5 990	6 290	6 290	6 538

Titaniun is very transportable: the whole X1 Adventure fits into this packing box.

Photos: www.simplify-ppg.com

They try to make engines which are as user-friendly and simple as possible and obviously as light as possible. Getting under the 20 kg barrier was one of the priorities, at least for the small engines designed for foot launching. The company went for titanium to produce light but nonetheless robust chassis. They managed 17.5 kg for the X1 with EOS 100 motorisation. As the reliability of the EOS 100 still isn't at the level hoped for by Simplify, the manufacturer also sells the Polini Thor 80 or the HE 90/125. The latest version is the heaviest but, even so, doesn't exceed 22 kg, including the harness and reserve container.

The X1 Adventure version shown here has space to fit all the equipment in a 44 x 60 x 80 cm transport box. The price is around 6000-6500 € depending on the motor.

In addition, the manufacturer is looking for commercial partners in other European countries.

http://simplify-ppg.com/?lang=en

Photo: www.simplify-ppg.com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