free.aero

WORLDWIDE PARAGLIDING AND PARAMOTORING MAGAZINE. FOR FREE.

Photo: Alexis Buisson /Albarsark-https://www.facebook.com/Albarsark

the #first...

Photo: www.apcoaviation.com

contents

Translation by Ruth Jessop

Photo: Alexis Buisson /Albarsark

my #first free.aero portfolio

Alexis Buisson is a pilot and photographer. He combines lots of modern photographic techniques (time lapse, panoramic and high dynamic range photography), so that he can capture in great detail the different stages of the flight in a wide screen picture of the site. Let's hope this is the #first in a series of portfolios.

Photographed at Marsilia, Coron in the Philippines

Above, a 'self portrait' of the talented photographer flying his ITV Siam at a take-off in the Philippines. Alexis travels a lot between Asia and France. He owns an amazing isolated house in the Verdon and you can take off from there on a paraglider, paramotor or a weight shift ULM. You can even drop in by helicopter. For anyone interested, he's thinking about selling it.

For more information about Alexis's work:
www.albasark.com

#first flight with a brand new wing.

You carefully unfold it. The new fabric smells good.
The bond is immediate.

Pierre does his first flight with his brand new Advance Iota at St André les Alpes, France.

#first top landing at this take-off

Negotiate well the approach, the climbing and the braking.
Land and savour the promise of a new take off.

Jason with his Ozone Firefly mini wing top landing and taking off again.
Site: Carmona in the Philippines

my #first beautiful cravat

Richard gets a cravat on his Gin and ends up in the water at Lake Annecy, France

my #first beautiful thermal of the day

The wing shudders, leaps forward and lifts you up. You keep control.

Thomas Daligaut taking off in strong wind.
St André les Alpes, France

my #first competition

The excitement at launch with everything to play for.

The competitors in the sixteenth Nepalese Open launching their flying machines.
Sarangkot, Nepal

my #first reserve

Child's play during an SIV…
Pokhara, Nepal

definitely #not my #first landing

Negotiate well the turn and pitch backwards. Don’t touch down in the turn and don’t fall on your back.

Jeremy Bailly, acro test pilot, lands turning on his M1 from Dudek.
Doussard, France

#first tandem

Feel your passenger's mix of excitement and apprehension before you introduce them to the pleasures of flying.

You're the first one to take them skywards.

my #first wave

Going up in wave is normally the prerogative of sailplanes.

Getting into the lift which can form with a westerly wind at Saint André.
St André les Alpes, France

my #last flight of the day

Tomorrow we'll start at #first light

Sylvain Gouget taking off on an ITV Siam, into the sunset at Bir. Himachal Pradesh, India

Alexis Buisson

http://albarsark.com

WORLD CHAMPION HONORIN HAMARD JOINS THE OZONE R&D TEAM

The Ozone R&D Team is growing! Dav, Luc, Russ, and Fred, are pleased to welcome Honorin Hamard to the R&D Team. "Hono" is 23 years old, and has been flying since age 13. His young age belies his calm and mature attitude. The Ozone team have been really impressed with his rapid progress and mature attitude in the air – an attitude that saw him win the 2015 World Championships, win the declared goal world record in 2013 (423kms), and stand on several National podiums.

He will be working closely with the boys as a test and development pilot, and brings with him a wealth of experience and talent. Not only that, but also he dramatically reduces the average age of the Ozone test team; the future is bright

The F*Lite harness is finally available. Since the first prototypes which were on display at the Coupe Icare in 2014, the main designer of this product, Fred Pieri, has spent months improving the comfort. The final model has been EN tested for load and will, from now on, be available in size M. It weighs 103 grammes: we can pardon the 3 grammes excess. At free.aero we are currently test flying an F*Lite and will give you the full test results in the next issue.

www.flyozone.com

Photo: Air Design

IN SEVENTH HEAVEN

The seventh edition of the Super Paragliding Festival in Kössen in Austria was undeniably an enormous success; never before has the weather been so good. The organizers reckon there were 7000 take offs and forty exhibitors came along. On the other hand, most of the products had already been reviewed in our magazine. The most interesting news was, without a doubt, that the French lab Aérotest is now recognized by the German authorities. The new generation single skins, here the UFO by Air Design, were very prominent.

http://www.fly-koessen.at/spt/

Photo: Sepp Himberger

A NEW ADVENTURE VIDEO FROM TUNISIA

A new episode of the adventures of Adventure in Tunisia: Pascal Vallée discovered from the air the charms of the town of Mahdia in Tunisia. Have a look at some beautiful footage taken virtually at ground level in this historic city watched by passers by. As always, it's hair raising.

http://www.3six.fr/?p=767

Internally at Adventure we've heard that the founder of this famous make, Guy Léon-Dufour, has just sold his part of Adventure. The new owner and director is Andrea Testoni in partnership with Emmanuel Layan and Pascal Vallée.

Video : http://www.3six.fr/?p=767

VICTORY FOR FRANCE AND COMMON SENSE

After decades of combat led by, amongst others, the Fédération Française de Vol Libre (FFVL) and the PMA, there is finally some very good news for non German manufactured paragliders. The German Transport Minister has recognized that tests in the French Aérotest laboratory, which belongs to the FFVL, should be considered as official certification and legal throughout Europe. Consequently, the wings, reserves and harnesses, tested and certified by Vincent Teulier's team can be marketed in Germany without further certification being necessary.

Up until now, the DHV and the other testing laboratories have claimed that only certification by German laboratories was acceptable.

The recognition of Aérotest in a letter from the German Minister is a small revolution and will finally open up this significant market, comprising around 30000 paraglider pilots (33000 licensed and 27000 estimated active pilots), to manufacturers in other countries.

The editorial team at free.aero who took part in this battle by informing the public at different levels, the federations and the German Authorities, would like to congratulate the FFVL and the authorities who participated on their success.

The sky is clearing over the German Alps. The country's Transport Minister has just clarified that certification from the French laboratory, Aérotest, will be recognized in Germany.
Photo: Stefan Wiebel

DOMINIQUE MÉREUZE LEAVES US.

On the 11th of June, the FFPLUM (the French ULM Federation) announced the death of Dominique Méreuze, President of the FFPLUM since 1998, aged 67.

1300 KM FROM MOSCOW...

This year the "Volga Air Rafting" paramotor competition will take place from the 12th to the 18th of July 2015, along the River Volga.

The race starts 80 km from Moscow and covers 1300km. The organizers have put a video online of the 2013 race showing the spirit of the race as well as its organisation: https://vimeo.com/126898915

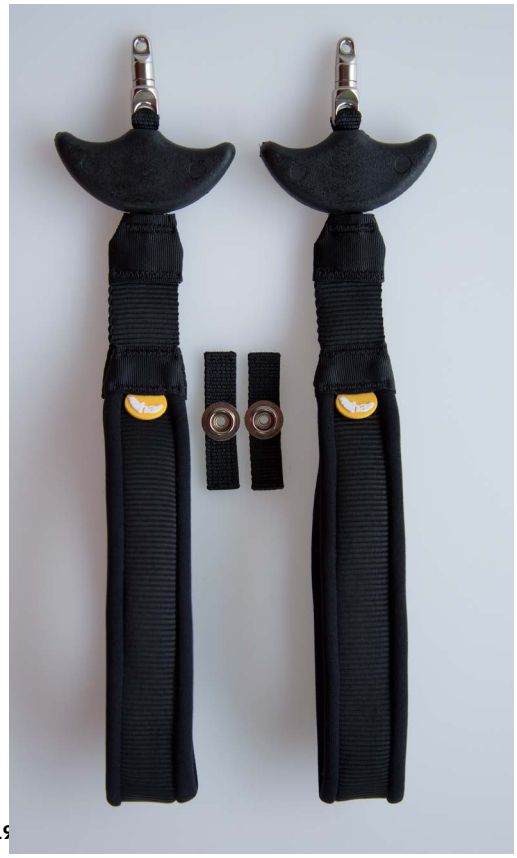
Pilots can enter with or without a support team/car on the ground.

For more information, (if you can read Russian): http://www.paraworld.ru/proekty/volga-air-rafting-15/

HIGH ADVENTURE:
HANDLES AND A LIGHTWEIGHT STEERABLE RESERVE

The Swiss company, High Adventure, have launched new brake handles. They are equipped with an extra horizontal handle just below the knot, so that without taking a wrap, the pilot benefits from a very direct contact with the wing whilst also keeping his hands in a more ergonomic position. This type of accessory is often used in acro as well, but in contrast to the majority of products of this type, the High Adventure handles are very wide and comfortable for long distance flying. Available in three sizes.
Video with multilingual subtitles:
http://www.highadventure.ch/de/xc-griff-von-high-adventure.html

High Adventure also manufactures Rogallo Beamer reserves. The owner, Urs Haari, is a pioneer of steerable reserves. The Beamer 3 exists in a lightweight version as well, weighing, depending on size, 1230g / 1420 g.
http://www.highadventure.ch/fr/beamer-3-fr.html



TURNPOINT INCROSS

The German manufacturer Turnpoint are now also selling square reserves, the "Incross 100" and the "Incross 120". This type of reserve opens very quickly and is characterized by lots of pendular stability as well as a low rate of descent.

The Turnpoint reserves are based on the Cross Orange model by Team 5 and are equipped with packing loops making packing them 'almost comparable with a round parachute'. Reserves tested by Air Turquoise.

Info:
http://turnpoint.de/incross/index.php

INCROSS 100 : 34M², 70 KG - 100 KG, SINK RATE 4,9 M/S@100KG, WEIGHT 1,45 KG, 730€

INCROSS 120 : 38M², 80 KG - 120 KG, SINK RATE 5,7 M/S@120KG, WEIGHT 1,70 KG, 780€

Video showing the stability and the slow rate of descent to the ground: http://turnpoint.de/incross/video/ICross120mit117kgLast.mp4

SOL GO REFLEX

The Brazilian manufacturer Sol, have announced the launch of their new paramotor wing the Flexus.

As its name suggests, the Flexus has been developed with reflex technology to give 'the best safety, speed, performance and ease of handling in its category', according to Sol. This wing is aimed at pilots who are looking for 'simplicity, safety and excellent performance'.

It is available in six DGAC certified sizes, the price to the public is 3250€ and it's free to have your own personal colour scheme.

The wing is guaranteed for three years.
For more information:
http://www.solparagliders.com.br

THE IBEX 3:
THE NEW VERSION OF THE NOVA MINI WING

In 2007 Nova brought out the Ibex 1 and thus started a new category of paragliders: little paragliders which aren't speed riding wings, but smaller versions of the very accessible classic models, designed to be heavily loaded and to remain relatively well behaved.

Since then, lots of manufacturers have followed suit.
Nova have just brought out the Ibex 3: a completely new version in which the Austrian manufacturer has integrated a lot of 'lightweight' technology to make this miniparaglider lighter.

Nova promise that the performance is worthy of a classic paraglider, it's a 3 line wing, with the most recent technology like "Double 3D-Shaping" and variable sized cells.

Depending on the size and the wing loading, the Ibex 3 is designed for different uses. The XXS is 'a high performance mini wing for experienced pilots', whilst the sizes XS (19m2 projected) and S (23m2 projected) are 'real paragliders' with higher performance in thermals and when gliding.

According to Nova, the three sizes offer a very high level of safety.

For more information:
www.nova.eu

The promotional video of the Nova Ibex 3:
https://www.youtube.com/watch?v=BeRG94A8-tQ&feature=youtu.be

Its ease of handling makes the Ibex 3 very well adapted to complicated alpine launches. An interesting detail: As on the Ion 3, it has 'Smartcell' technology which is characterised by the cells being a variety of sizes.

THE NEW PAP HARNESS PROTECTS THE PILOT

Our way of flying has evolved, especially in the new 'slalom' discipline, which will be having its second World Championships in Poland this year. Pilots are doing manoeuvres at very low altitudes and at very high speeds which brings with it considerable risk, and the protection they use can be insufficient.

PAP have launched a new harness which integrates the same type of airbag as in free flying paraglider harnesses which inflates thanks to the airflow.

According to the manufacturer, this airbag won't get in the way during take off or landing, whilst being transported or when using the accelerator.

Thanks to the use of specialised lighter material its weight should increase very little; a total of about 200 g more than a classic harness.

For the moment, it's an option when buying a motor, but it hasn't been ruled out that it will become standard throughout the whole range.
Available in four sizes S, M, L and XL.

http://papteam.com/index_ing.php

NIVIUK VIDEOS

Last June, an expedition was organized by Niviuk pilot Gavin McClurg and the well known photographer, Jody MacDonald. Nick Greece and Matt Beechinor took them across the African continent to Malawi. The object of the trip was to get to know the main characters in the moving story, 'The Boy Who Could Fly', Godfrey Masaouli and Ben Jordan, and give their support to the project 'The school of dreams'.

'We wanted to help them find new flying sites and inspire and encourage the inhabitants of the region to pursue their dreams', Gavin told us. This video recounts their adventure:
https://www.youtube.com/watch?v=2yE2PuAymWI

A Niviuk promotional video continues the saga of the Artik 4, a successful model for XC pilots: Roberta Perinetti explains why she chose the Artik 4.
https://vimeo.com/128113782


niviuk
SKIN P &
ARTIK P
P-SERIES
The P-Series is our new light product category, a real compromise between performance, volume and weight. Designed for Cross Country, mountain or Hike&Fly pilots in need of lightweight compact very eficient performant gear to explore new routes.
niviuk.com

THE FIRST 50 KM

THE DETAILS WHICH COUNT: PREPARATION AND PHYSIOLOGY

Photo: Ehn/Skywalk

to: Burkhard Martens

When XCs get longer, from 50 kms onwards a new stage in the learning curve opens up: you also need to take into account the physiological aspect...

By Pascal Kreyder

Photo: Urs Haar / www.highadventure.ch

A fin Before being able to fly XCs of between 36 and 70 kms, you don't just need to optimize your flying technique, but also think about your body and frame of mind.
Once your flight plan has been decided and you've studied the different transitions and emergency landing options, how do you double your previous distance?

You fly at about 10 km/h. This speed takes account of turns in thermals which aren't particularly optimal. To cover 70 km, you'll therefore need to fly for seven hours at this speed. Not an easy task! You've got it, to fly further, you need to fly faster, but also take off earlier.

Taking off on a south facing slope or very early in the afternoon on a west slope is essential.

MOJO 5

The Mojo Legacy continues… The all new Mojo 5 is lighter, easier to launch and fly, and more comfortable in the air than the Mojo 4. The Mojo 5 may be the 5th in the series, but this iteration is completely new, and was designed from the ground up to redefine this specific class of wing. The mission was to offer the highest level of performance in the beginner category without compromise in the safety and ease of use. Passive safety is even further improved over the Mojo 4, and at the same time we have refined the launch behaviour and upped the glide performance. From new school graduates to relaxed paragliding veterans, the Mojo 5 provides the most relaxing platform in the Ozone range for all-around fun flying, and basic XC missions.

Moab, UT, USA - photo: **Loren Cox** pilot: **Cade Palmer**

Photo: Urs Haar/www.highadventure.ch

Photo: Burkhard Martens

Take food which will give you energy and is easy to divide up into several pieces.

PHYSIOLOGY

To be in the air for between three and six hours, your body will burn about 3000 kcal. It is therefore essential to give it enough fuel. Even more important than the energy consumed is good rehydration, this is vital: dehydration can be the source of the brain ceasing to function. These two extremely important points could be the subject of several articles as it is such a vast and complex subject. We're going to try and give a useful summary.

During an average XC flight on a paraglider in difficult conditions, the effort required is as follows:

- Average physical activity but over a long period (3 to 5 hours)
- Exposure to sunshine (70 to 100% sun)
- Wind (air flow of 30 to 52 km/h)
- Altitude (1000 to 3000 metres)
- Frequent variation in temperature (7°/km x 2 km = 14° thermal range)
- Intellectual activity
- Emotional stress
- Use of four out of the five senses

All these different demands on our body means that it needs a specific diet starting on the evening before an XC.

Food for the night before

Mainly pasta, rice or wheat products served with fish, chicken, vegetables and dried fruit. Remember to drink more than a litre of water per day. Obviously make sure you are well rested.

Here's what your diet should look like in general terms on an XC day:

- Include sufficient liquid to ensure that you are properly hydrated
- Be low on fat and fibre to prevent gastric problems and to facilitate going to the loo
- Be rich in carbohydrates to maintain blood sugar
- Have a moderate protein content
- Be composed of food that your body is used to and can tolerate

In the morning, at least three hours beforehand:

Cheese, dried fruit, chocolate (milk or rice/milk), wholemeal bread, butter, fruit.
Forbidden: coffee, alcohol and tea.

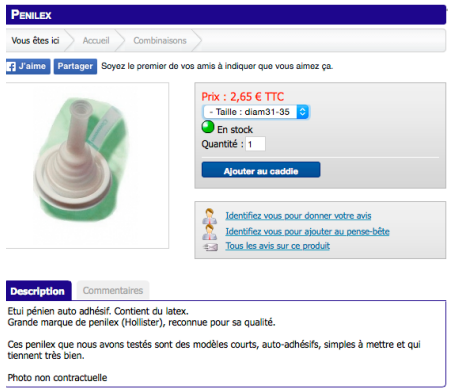
A drinks bottle for walking like the one pictured is very practical. 2 l is a reasonable size and costs 34.95 euros from sports shops like Decathlon

On long demanding flights thermal protection on the tube is also handy to stop the tube freezing, a recurring problem for professionals like Burkhard Martens.

The nipple lets you rehydrate pretty much continuously. The author of this article prefers to drink from a bottle: the action required to get it out and open it provides a real break during the flight and creates a pause at a less turbulent time. Apart from the physiological side, there is also the psychological side !
Photo: Burkhard Martens

Photo: Manuel Fasser/NOVA

Pee systems like the one in the middle can be bought over the internet or at a pharmacy. They aren't joking when they ask you your size! (Normally 2 or 3).



Eating during an XC flight.

Food intake whilst doing exercise should be aimed at replacing the liquid lost and giving sufficient carbohydrates to maintain blood sugar levels.

WHAT ARE THE CONSEQUENCES OF A POOR OR NO NOURISHMENT BEFORE AND DURING EXCERCISE?

I often meet pilots and even competitors at take-off on big XC days who insist on minimizing the importance of food. The harmful consequences become quickly apparent, without the pilot necessarily linking the symptoms with the problem:

- Diminished attention span
- Intolerance to cold
- Discomfort in the harness (cramps, problems using the accelerator, sprains when landing)
- Over emotional state
- Light headaches
- Difficulty in sensory perception
- General loss of performance
- Difficulty thinking which could lead to mental sluggishness towards the end of the flight
- Poor appreciation of the weather conditions
- Poor appreciation of safety issues
- Difficulty reacting to a crux or obstacle

It's easy to avoid this: take something with you to eat and drink. Choose food which is easy to eat and in small pieces.
Drink regularly before each mini refuelling break!

Here's an example of the basics you should take:

- A club sandwich
- A 33 cl bottle of sugary water
- A banana
- A Snickers
- Apple purée in an individual sachet

Other bodily needs

To ensure a biological balance we need to drink regularly: lots before and a little during the flight. During a flight which is several hours long, the problem of a full bladder presents itself for the first time!

There are several solutions for peeing whilst flying:

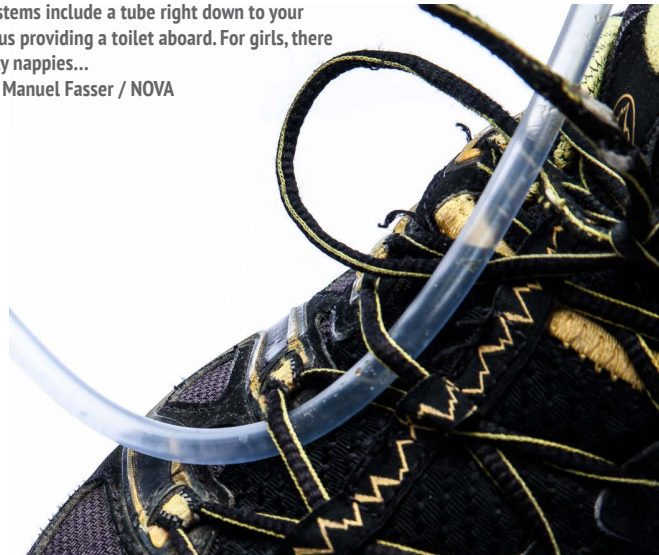
- Men can stand up on the foot strap, like going to the loo beside the road. That's the best way in my opinion and the most natural if you can do it. I do it twice per flight, during a long transition. To get ready, I tighten the waist strap in my harness and the ABS to ensure a straight and stable flight.
- Pee tubes.

It's a sheath in the form of a condom with a tube attached to the end which you thread down the length of your leg. It is difficult to fit at take-off so I advise fitting it in the morning at home to avoid excessive constriction of your 'equipment'.

- Incontinence pants.

This is one of the only solutions for women, and can also be used by men. Their capacity can exceed one litre of urine. As with the pee tube, you can easily buy them at a pharmacy.

Pee systems include a tube right down to your feet thus providing a toilet aboard. For girls, there are only nappies...
Photo: Manuel Fasser / NOVA



A cocoon doesn't just improve performance, it protects against the large temperature differences experienced during an XC flight. A pilot who isn't comfortable flies less well and isn't as safe!

Photo : Jérôme Maupoint/GIN

FLY FAST

Flying fast doesn't mean flying on the third bar, it just means flying intelligently. In fact, flying at 52 km/h instead of 46 km/h won't save you a lot of time. On the other hand, choosing the thermals that you go up in and refining your flying to put you in the best air mass could at times double your speed.

There is no point in going round in a thermal at 1.5 m/s if you go 10 m backwards with every turn.

There is no point in turning under an active cloud with a wide base. Move on!

There is no point turning as you go along a crest if you are already 100m above it. Move on!

At the end of your flight do an analysis.
Where did you make mistakes? Calculate your average speed.

TABLE OF AVERAGE SPEEDS (Statistics based on analysis of the CFD (the French XC league).

10 km/h	**First XC flights**
14 km/h	**Intermediary XC flights**
18 km/h	**XC flights of more than 100 km**
24 km/h	**XC flights of more than 180 km**
> 28 km/h	**World class pilots**

For those who want to fly high

Cross country flights become child's play with the new Flytec Element. This highly precise vario sports a new kind of keyboard for better tactile feedback – even with gloves on. It guides you high up into the air, its GPS points you in the right direction and shows the way the wind blows. Thanks to airspace warnings you always stay on the safe side. And after landing, records of your adventures are immediately available for Google Earth and online contests. **element.flytec.ch**

Flytec

A first wing, even in school during the first flights, can turn out to be very playful despite enhanced passive safety. Photo: Luc Hentsch/Niviuk

MY FIRST WING

What are the characteristics of a school wing or a first wing for a qualified pilot?

Obviously there is a difference between a school wing and the first wing that a pilot buys when leaving school. Here are some pointers. For a school wing, whether for a paraglider or paramotor, certain characteristics are essential. Here's what teachers and instructors look for in paragliders:

- Simple and reliable inflation
- Lots of travel in the brakes to make allowances for imprecise inputs
- A large amount of damping in the pitch and roll
- Well behaved in turbulence
- Very good behaviour when there is an incident in flight

The last point, one would imagine, should automatically be the case with an EN/LTF A certification. Yet it isn't always the case: a few years ago, the wings which were certified as being the gentlest possible sometimes turned out to be a problem in a spiral, and they had, in certain conditions, a tendency to stay locked in. The stability of these wings therefore worked against the pilot by locking the wing in a spiral.

It's the same with 'easy' wings which have a lot of resistance to collapses. But by staying 'solid as a rock' during a pitch forwards, under certain conditions, these wings can dive relatively far, after a stall for example, when in a less stable wing the leading edge acts more like a fuse by collapsing early, which stops the pitch forwards.

The beginner becomes a pilot under the watchful eye of an instructor – and on an appropriate wing.

Photos: Véronique Burkhardt Pilot: Sascha Burkhardt

The Atom 3 (left) and the Mojo 5 (right). Ozone have several EN A wings. The Atom 3 is designed for first flights. The Mojo 5 is an intermediate wing which can be used from the beginning right up to cross country.

OZONE ATOM 3
MANUFACTURER INFO

Manufacturer : OZONE
Mail: team@flyozone.com_Web: http://www.flyozone.com

Size	XXS	XS	S	M	L
Number of cells	31	31	31	31	31
Projected surface (m^2)	17.3	19	20.8	22.5	25.4
Flat surface (m^2)	20	22	24.1	26.1	29.5
Projected surface (m)	7.25	7.6	7.94	8.26	8.79
Flat wingspan (m)	9.25	9.7	10.3	10.54	11.21
Projected aspect ratio	3.04	3.04	3.04	3.04	3.04
Flat aspect ratio	4.26	4.26	4.26	4.26	4.26
All up weight	45-70	55-75	65-90	75-105	95-125
Weight of the wing (kg)	nc	nc	4.45	4.76	5.2
LTF / EN	In progress	In progress	A	A	In progress
Price (euro)	-	2 430	2 430	2470	2 510

OZONE MOJO 5
MANUFACTURER INFO

Manufacturer: OZONE
Mail: team@flyozone.com_Web: http://www.flyozone.com

Size	XS	S	M	L	XL
Number of cells	40	40	40	40	40
Projected surface (m^2)	18.7	20.3	22.1	24	26.1
Flat surface (m^2)	22	23.9	26	28.3	30.7
Projected surface (m)	8.05	8.39	8.75	9.12	9.51
Flat wingspan (m)	10.39	10.83	11.29	11.77	12.27
Projected aspect ratio	3.46	3.46	3.46	3.46	3.46
Flat aspect ratio	4.9	4.9	4.9	4.9	4.9
All up weight	55-70	65-85	80-100	95-115	110-130
Weight of the wing (kg)	4.5	4.77	5.03	5.45	5.83
LTF / EN	A	A	A	A	A
Price (euro)	2 840	2 860	2 900	2 940	2 980

and the new certification procedures are increasingly successful in getting rid of this type of problem, but we mustn't forget that aerodynamics is often a question of compromise.

To detect the critical behaviour which can go unnoticed during certification, the German federation, the DHV, created in 2011 a 'Safety Class', an extra rating based on in-flight tests which go further than the EN/LTF tests. Some see it more as a way of reacting to the increasing competition between the testing houses; others question certain rather surprising results.

This doesn't stop the basic idea being an efficient way of increasing safety in our sport. The DHV buy (!) mass produced wings which are on the market to test a run of the mill example of the model. They redo the tests whilst flying using modern technology, such as accelerometers in the sails.

The emphasis is put on those manoeuvres which cause the most accidents according to the DHV: asymmetric collapses, front collapses and spirals. The federation publish the results accompanied by an extra rating, between one and five, five being the least gentle wing whilst one is the safest.

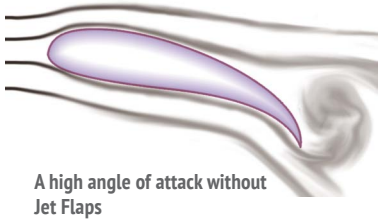
In big landing fields like here, school wings can have good performance. On more complicated sites, the instructors prefer the glide angle to remain reasonable so that coming in to land isn't too stressful.
Photo: Jérome Maupoint

The Mescal 4 from Skywalk shows its "Jet Flaps", slits situated at the back. This technology was developed for the manufacturers first ever Mescals (in 2004), to increase safety at lower speeds and to soften the behaviour during incidents. Since then, Jet Flaps can be found on practically all Skywalk's models, including top of the range wings. Photo: Tristan Shu

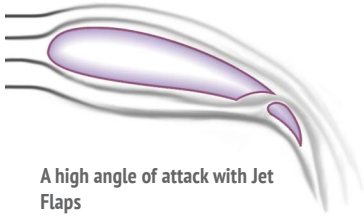
SKYWALK MESCAL 4
MANUFACTURER INFO

Manufacturer: SKYWALK - Web : http://skwalk.info
Mail : info@skywalk.org

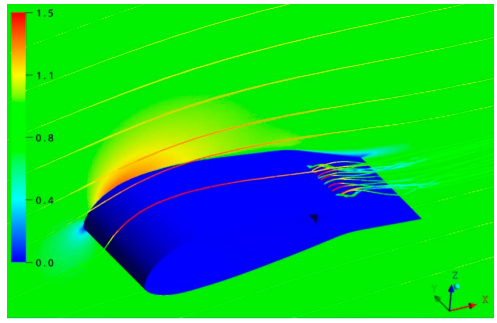
Size	XS	S	M	L
Number of cells	34	34	34	34
Flat surface (m²)	22,73	26,18	28,70	31,94
Flat wingspan (m)	10,45	11,21	11,74	12,38
Flat aspect ratio	4,80	4,80	4,80	4,80
Projected surface (m²)	19,21	22,12	24,26	27,00
Projected wingspan (m)	8,13	8,72	9,14	9,64
Projected aspect ratio	3,44	3,44	3,44	3,44
Weight of the wing (kg)	4,9	5,4	5,8	6,1
All up weight free flight (kg)	55-85	70-95	85-110	100-130
All up weight PPG	NC	100-125	105-130	120-150
Certification PPG	Non	Oui	Oui	Oui



A high angle of attack without Jet Flaps



A high angle of attack with Jet Flaps



The principle of Jet Flaps is simple: during slow flight they re-attach the flow at the back of the upper surface. Thus the stall will happen later and be gentler. The minimum speed is reduced by more than 15%: a gain in safety and a bonus in thermals. Then they discovered that the behaviour during other incidents was also gentler.

The Discus by Swing is a school wing which the pilot won't grow out of quickly.

This move could be an efficient way of increasing safety in our sport, if the results can definitely be repeated (which isn't necessarily the case with our non-rigid wings) and if the rules don't stifle development. We can't insist on idiot proof wings. That simply doesn't exist in aeronautics.

INCREASE IN PERFORMANCE

Beginner wings are becoming more fun and with better performance – the era of the 'bus' is clearly behind us. When testing entry level wings, we've frequently asked 'but why go for more performance?' The differences between a wing 100% adapted for school use and a wing in a class above, are becoming smaller and smaller.

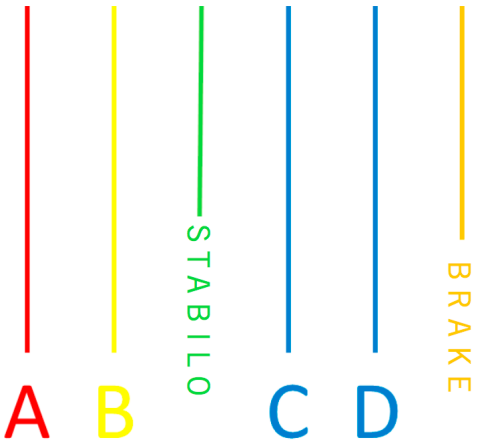
SWING : DISCUS
MANUFACTURER INFO

Manufacturer: SWING
Mail : info@swing.de Site web : http://www.swing.de/discus-fr.html

Size	XS	S	M	L	XL
Cells	44	44	44	44	44
Flat surface (m²)	24	26,5	29,8	32	33,5
Projected surface (m²)	20,5	22,7	25,4	27,4	28,6
Flat wingspan (m)	11,2	11,8	12,5	13	13,3
Projected wingspan (m)	8,8	9,2	9,8	10,1	10,4
Flat aspect ratio	5,2	5,2	5,2	5,2	5,2
Projected aspect ratio	3,7	3,7	3,7	3,7	3,7
Weight of the wing (kg)	4,9	5,1	5,5	5,8	6
Max speed (km/h)	47 ±2	47 ±2	47 ±2	47 ±2	47 ±2
Trim speed (km/h)	38 ±1	38 ±1	38 ±1	38 ±1	38 ±1
Certification LTF/CEN	A	A	A	A	A
Price (euro)	3 190	3 190	3 190	3 190	3 190

The Bolero 5 from GIN: certainly appreciated by schools.

For example, the final speed is often not as high, and beginner wings don't glide as well. It isn't because the manufacturers don't know how to make them any better, but because lots of instructors have asked for a reasonable limit to the glide angle to make landing easy when guiding pupils into narrow landing fields.
With less brake travel in the controls, wings in the higher category often become more precise, but the difference diminishes very visibly.



To make life easier for beginners (and not just them): The PMA recommend uniformity in the colour coding of the lines. More and more manufacturers are using red for the As, yellow for the Bs, blue for the C/Ds, green for the stabilos and orange for the brakes.

GIN - BOLERO 5
MANUFACTURER INFO

Manufacturer: GIN Mail: france@gingliders.fr Web: http://www.gingliders.fr/

Size	XXS	XS	S	M	L	XL
Flat surface (m^2)	22.22	24.12	26.26	28.50	30.83	34
Flat wingspan (m)	10.30	10.76	11.23	11.70	12.16	12.77
Flat aspect ratio	4.8	4.8	4.8	4.8	4.8	4.8
Projected surface (m^2)	19.29	20.94	22.80	24.74	26.76	29.50
Projected wingspan (m)	8.33	8.66	9.05	9.43	9.80	10.30
Projected aspect ratio	3.6	3.6	3.6	3.6	3.6	3.6
Chord (m)	2.7	2.8	2.9	3.0	3.2	3.3
Number of cells	36	36	36	36	36	36
Weight of the wing	4.7kg	5.1kg	5.4kg	5.6kg	5.9kg	6.2kg
All up weigh (Kg)	55-75	65-85	75-95	85-105	95-115	105-130
EN / LTF	A	A	A	A	A	A

Photo: Davy Faure

Photos: Véronique Burkhardt

The Alpha 5 from Advance: a wing with a reputation for safety and accessibility, combined with playful behaviour which pilots will not grow out of quickly.

ADVANCE - ALPHA 5
MANUFACTURER INFO

Manufacturer: ADVANCE
Web : http://www.advance.ch/fr/

Size	23	26	28	31
Number of cells	39	39	39	39
Flat surface (m^2)	23,75	25,97	28,48	31,81
Projected surface	20,40	22,30	24,46	27,32
Flat wingspan	10,75	11,24	11,77	12,44
Projected wingspan	8,75	8,96	9,38	9,92
Flat aspect ratio	5,90	5,90	5,90	5,90
Maximum speed (Km/h)	45-49	45-49	45-49	45-49
Trim speed (Km/h)	37-39	37-39	37-39	37-39
Suspentage total [m]	681	713	746	788
All up weigh (kg)	55-80	70-95	85-110	100-130
Weight of the wing [kg]	4,7	5	5,5	6
Certification	A	A	A	A
Price (euro)	2 900	2 900	2 900	2 900

Obviously higher level wings are less damped and have more demanding behaviour when there is an incident but, there too, it has become not so necessary to accept hot ships to get a wing that you can use for a large period in one's flying development.

Therefore it is becoming increasingly possible to find a school wing which can also be the first wing bought to continue the pilot's flying career. The two types of wings are getting closer: the beginner wings are becoming more and more playful and lots of wings classed just above are behaving better to the point of being able to be used in school (except in Germany where the EN A is obligatory for learning).

The Koyot 2 by Niviuk: well known amongst instructors and not just for its accessibility. Photo: Niviuk

New technology in paragliding is all about increasing safety and/or making it easier. Making wings lighter for example makes inflation easier: 1 kg more or less to lift 7 metres off the ground changes a lot.

Then of course there are the leading edge rods which help allow air to get in more easily and also give a better profile, which can increase safety. It's the same with 3D shaping or the CCB (Cord Cut Billow) from Bruce Goldsmith Design.

Other manufacturing details, not necessarily very visible, but based on the increasing experience of the manufacturers also give amazing results on a safety and comfort level.

Here we've listed and tested some examples of the first beginner wings and the first wings for qualified pilots and reprinted more in-depth tests for some models. The list is far from exhaustive; there are lots of other wings which deserve to appear in it.

NIVIUK KOYOT 2
MANUFACTURER INFO

Manufacturer: Niviuk
Web : http://www.niviuk.com

Size	22	24	26	28	31
Number of cells	37	37	37	37	37
Cells closed	4	4	4	4	4
Cells box	31	31	31	31	31
Flat surface (m^2)	21,39	23,88	25,87	27,86	30,85
Flat wingspan	10,21	10,79	11,21	11,65	12,26
Flat aspect ratio	4,87	4,87	4,87	4,87	4,87
Projected surface (m^2)	18,18	20,54	22,25	23,96	26,53
Projected wingspan	8,06	8,52	9,08	9,2	9,68
Projected aspect ratio	3,71	3,71	3,71	3,71	3,71
All up weight min	45	62	77	92	112
All up weight max	67	82	97	117	135
Weight of the wing	4,9	5,2	5,4	5,6	6
Certification EN	A	A	A	A	A
Certification LTF	1	1	1	1	1

The Ozone Spark: a wing designed primarily for first flights in school. Photos Véronique Burkhardt

OZONE SPARK
MANUFACTURER INFO

Manufacturer: OZONE Tel : 04 92 81 03 62 Mail : alixa@alixa.fr
Web : http://www.ozone-france.fr/

Size	25	27	30
Number of cells	35	35	35
Projected surface (m^2)	22	24.2	26.6
Flat surface (m^2)	25	27.5	30.2
Projected wingspan (m)	9.3	9.6	10
Flat wingspan (m)	10.6	11.1	11.7
Projected aspect ratio	3.47	3.47	3.47
Flat aspect ratio	4.54	4.54	4.54
Chord (m)	2.91	3.06	3.2
Weight of the wing (kg)	5.5	6.0	6.5
All up weight (kg)	65-90	75-105	95-125
All up weight paramotor (kg)	65-110	75-125	95-140
Certification EN /LTF	A	A	B
Price (euro)	2 460	2 495	2 540

Lightweight is important for schools too. Students have to carry their wing up the training slope.

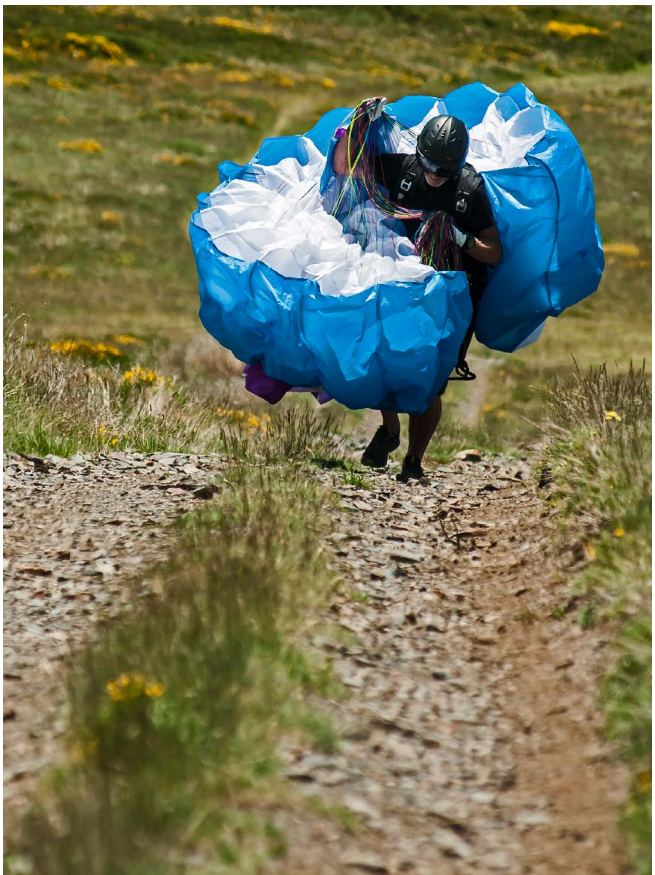


Photo: Véronique Burkhardt

Since 2012, Apco have been selling the Lift, a very accessible paramotor wing, as we found out when we tested it.

Photo: Apco

Recently a lift EZ came out, which was supposed to be even easier: the Lift EZ on the right. We've got one to test and will tell you all about it as soon as possible.

APCO LIFT EZ
MANUFACTURER INFO

Manufacturer: Apco
Web : www.apcoaviation.com

Size	S	M	L
Number of cells	42	44	46
Flat surface (m^2)	25.8	27.5	29.2
Flat wingspan	11.22	11.84	12.46
Flat aspect ratio	4.9	5.1	5.32
Projected surface (m^2)	22.3	23.5	25.1
Projected wingspan	9.15	9.65	10.17
Projected aspect ratio	3.8	4.0	4.2
All up weight min/max (free flight)	70/100	85/120	110/140
All up weight min/max PPG	75/140	100/165	125/185
Weight of the wing	5.5	5.85	6.1
Certification EN/LTF	No	No	No
Certification PPG	in progress	in progress	in progress

The all new Prion 3 from Nova includes lots of details which have been designed with beginners in mind, like the marks on the brakes and the risers. Photos: Nova

NOVA PRION 3
MANUFACTURER INFO

Manufacturer: Nova
Web : www.nova.eu

Size	XS	S	M	L
Number of cells	39	39	39	39
Flat surface (m^2)	22.54	25.54	28.55	31.61
Flat wingspan	10.25	10.91	11.54	12.14
Flat aspect ratio	4.66	4.66	4.66	4.66
Projected surface (m^2)	19.24	21.81	24.38	27.98
Projected wingspan	7.98	8.49	8.98	9.45
Projected aspect ratio	3.3	3.3	3.3	3.3
All up weigh min/max	55/85	75/100	90/110	100/130
Weight of the wing	4,7	5.0	5.4	5.7
Certification EN/LTF	A	A	A	A

The Nemo XX from Dudek includes a SharkNose: this modern feature is being included more and more in beginner wings. Photo: Dudek

DUDEK NEMO XX
MANUFACTURER INFO

Manufacturer: Dudek
Web : www.dudek.eu

Size	20	23	25	28	31
Number of cells	42	42	42	42	42
Flat surface (m^2)	20.60	23.00	25.30	28.0	31.0
Flat wingspan	10.20	10.78	11.30	11.89	12.51
Flat aspect ratio	5.05	5.05	5.05	5.05	5.05
Projected surface (m^2)	17.52	19.56	21.52	23.82	26.37
Projected wingspan	8.00	8.46	8.87	9.33	9.82
Projected aspect ratio	3.65	3.65	3.65	3.65	3.65
All up weight vol libre	45-65	55-75	70-90	85-110	100-135
All up weight moteur	45-85	55-95	70-110	85-130	100-155
Weight of the wing	4.4	4.8	5.2	5.6	6.0
Certification EN	en cours	A	A	A	A
Certification PPG	en cours	en cours	en cours	en cours	en cours

The U-Prime from Air Cross is very light (4.5 kg): an important factor in safety and in flight comfort! The DHV gave it a 2 ranking in the Safety Class so it must be very well behaved.
Photo: Air Cross

AIR CROSS U-PRIME
MANUFACTURER INFO

Manufacturer: Air Cross
Web : www.aircross.eu

Size	S	M	L	XL
Number of cells	44	44	44	44
Flat surface (m^2)	24.36	27	29.76	32.08
Flat wingspan	11.28	11.87	12.46	12.94
Flat aspect ratio	5.22	5.22	5.22	5.22
Projected surface (m^2)	20.93	23.17	25.57	27.56
Projected wingspan	8.67	9.13	9.59	9.95
Projected aspect ratio	3.6	3.6	3.6	3.6
All up weight (kg)	60-80	75-95	90-110	105-130
Weight of the wing (kg)	4.5	4.9	5.3	5.7
EN/LTF	A	A	A	A

The Senso and the Senso Sport by Trekking are intermediate EN B wings in the middle of this category. Nevertheless the manufacturer also recommends them for those leaving school. As we saw in the test that we published a few months ago, Trekking are obviously right to make this recommendation. Our preference was more for the Sport version.
Photo: Véronique Burkhardt

TREKKING SENSO CLASSIQUE/ SENSO SPORT

MANUFACTURER INFO

Manufacturer: TREKKING
Mail : info@trekking-parapentes.fr Web : http://trekking-parapentes.fr

Size	S	M	L
Projected wingspan (M²)	20,5	22,8	25
Flat surface	23,84	26,49	29,19
Weight of the wing	5,2/4,4	5,7/4,7	6,2/5,2
Height of cone	7,5	7,9	8,3
Main lines	3/4/3	3/4/3	3/4/3
Cells	52	52	52
Flat aspect ratio	5,3	5,3	5,3
Projected aspect ratio	3,97	3,97	3,97
Flat wingspan	11,3	11,91	12,5
Certified weight range	60-85	80-105	100-125
Speed hands up	38(+/-1)	38(+/-1)	38(+/-1)
Maximum speed	51(+/-2)	51(+/-2)	51(+/-2)
Best sink rate	1	1	1
Best Glide ratio	9	9	9
Certification	EN B/LTF B	EN B/LTF B	EN B/LTF B
Price (euro)	1990/2450	1990/2450	1990/2450

In 2005, Paramania, the pioneer in reflex profiles in paragliders, brought out the first full-reflex wing for beginners, the Revolution. In 2010, the Revo 2 replaced it. It's also a real 'reflex' with a speed that we measured at more than 60 km/h in a test in 2011. Impressive for a beginner wing which, in addition, was tested EN B (trimmers closed), rare for a full reflex! Trimmers closed, the wing is fairly manoeuvrable (a lot of instability in the roll), on the other hand, trimmers open and foot on the accelerator, it just wants to go straight. In this configuration, obviously, you don't touch the main brakes, but use the stabilo controls to correct the trajectory.

PARAMANIA REVO 2
MANUFACTURER INFO

Manufacturer: Paramania
Web: www.flyparamania.com

Size	20-S	23-M	26-L	29-XL
Number of cells	46	46	46	46
Flat surface (m^2)	20	23	26	29
Flat wingspan	nc	11,13	11,84	12,50
Flat aspect ratio	nc	5,40	5,40	5,40
Projected surface (m^2)	nc	19.52	22	24.62
Projected wingspan	nc	8.86	9.42	9.95
Projected aspect ratio	nc	4.02	4.02	4.02
All up weight Ppg (kg)	60-120	70-160	80-185	90-200
All up weight Free Flight (kg)	60-80	70-100	80-120	90-140
Weight of the wing (kg)	nc	nc	nc	nc
Certification DGAC (date)	-	9.11.2011	9.11.2011	9.11.2011
EN/LTF	-	B	-	-

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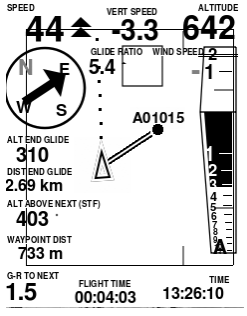

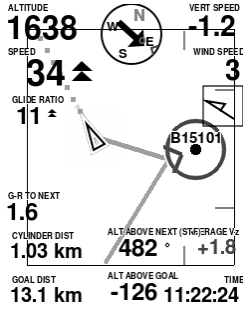

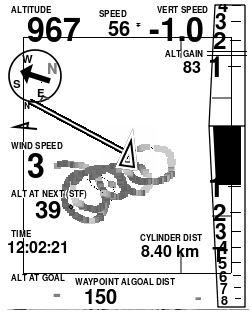

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TEST OZONE

ATOM 3

Photos: V.Burkhardt

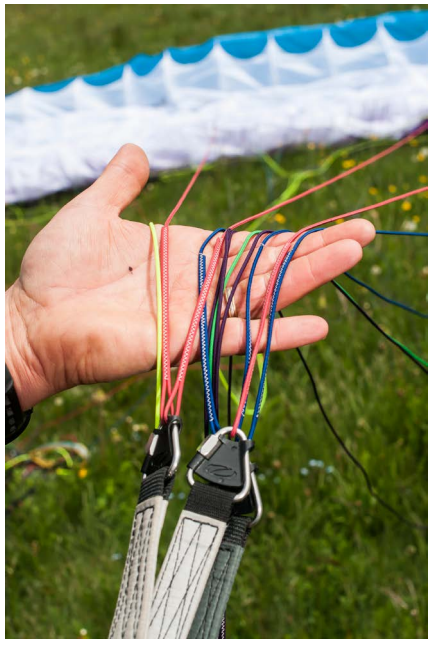
The Atom 3 replaces the Element 2 in Ozone's range. It is an entry level EN A wing, designed principally for school use.

Ozone have gone back to its old system for naming wings. Their first wing, which came out in 2001, was the Atom. With beginners in mind, the team no doubt wanted to support their assertion, 'The Atom 3 is the result of everything we've learnt over 15 years of designing wings'.

We tested an Atom 3 size M to quickly see if their claim was true that: '*It has the easiest take off we've ever seen*'.

The manufacturer is said to have particularly worked on its behaviour during inflation and ground handling.

The rear riser in detail.



The model tested doesn't follow the PMA's recommendations for line colours yet.

Photos: V.Burkhardt

TANGLES

Untangling the thick lines is very easy. The pupil or beginner stressed by an imminent take off, will hardly find this an irritant. The wing also tolerates not being laid out very carefully and the inflation is very easy: it comes up evenly, it's reliable and stops nicely above the pilot.

We've also tested the inflation with our 'hands in our pockets', without touching either the risers or the brakes, that works as it should do for a beginner wing. The wing re-centres itself very easily when it comes up asymmetrically, within the limits of what can be reasonably expected. It is also forgiving of less precise actions. The load take up whilst gathering momentum is fast.

In the air it is very forgiving of imprecise pilot input; there is a large amount of travel in the brakes and delayed reactions of the wing, which forgive a beginner's possible imprecise input. This sort of safety already existed on lots of beginner wings which were quite simply too bus-like to cause a problem.

This is the difference with a modern EN A wing, in particular with the Atom 3. As soon as the pilot wants to turn and uses the brakes and weight shift in a coordinated fashion, it isn't at all like a bus, but instead it is very playful to fly.

The relatively short cone of lines of the Atom 3, combined with the naturally small aspect ratio for this type of wing, allows it to turn more quickly than lots of higher performance wings with greater wingspans. In this type of turn, which is more inclined than on more intermediate types, it doesn't even lose much altitude, and the sink rate remains acceptable.

Therefore, turning in a thermal on an Atom 3 is far from a chore, and you get the feeling that the pilot could have fun during lots of flights before wanting to change wing. We didn't get a chance to measure the speeds in suitable conditions, but they seemed normal for a beginner wing, with a maximum accelerated speed above 45 km/h.

Photo: Loren Cox

If the pilot compensates for the large brake travel by damping the wing by flying more actively, the Atom 3 is surprisingly playful for a supposedly 'school' wing. The low aspect ratio and compactness favour turning.

STURDINESS

Obviously the wing is very solid; in the average turbulence that we encountered, at no point did the leading edge show any weakness. Without a doubt, even without pilot intervention, or late intervention, it would take a lot to collapse this wing.

As far as the pitch backwards when landing is concerned, there is nothing to say, it seemed hard not to land like a feather, or almost.

CONCLUSION

During this short test, the Atom 3 followed the trend for brilliant EN A wings; this was also later on the case with the Alpha 4 and 5 from Advance. This type of 'beginner' wing begs the question, how many pilots will need to change wings in a few months or indeed years?

Despite the great stability, the large amount of travel on the controls and a simpler design to an intermediate wing, it seems very playful and has enough performance for the pilot not to get bored soon. Even the toughest pilot will benefit from a very easy take-off and handling, for example, on steep unregulated sites that you get to by foot, high up in the mountains. Simplicity isn't the prerogative of the beginner.

Photos: V.Burkhardt

Metal pulleys for the accelerator.

TEST

ADVANCE EPSILON 7

The Advance Epsilon 7 has been on the market for two years. It is very versatile with both paragliders and paramotors. Is this middle of the EN B range a good first wing?

Advance Advance have taken their time bringing out the Epsilon 7, and a lot of R&D went into it. That's why, two years after it was launched, it still isn't out of date. The Swiss manufacturer is used to models with a long life span. The Alpha 5 is, and remains, an almost mythical EN A beginner wing, that pilots can keep (almost) for all their career. It is as good for free flying as with a motor. The Epsilon 7 is the model above, placed right in the middle of EN B for free flying; a wing which is very versatile and even more unlikely to go out of fashion.

The versatility of the Epsilon 7 is valuable whether free flying or with a motor. The motorized version differs from the free flying one by having another pair of risers as well as, depending on the size, 2, or even 4, C lines which are thicker. An Epsilon 7 'pure free flying' can be converted.

As for all wings of this type, in free flying only the foot accelerator is used, and with the motor only the trimmers.

The Epsilon 7 is 1.2 kg lighter than the Epsilon 6. At 5.2 kg, it still isn't a wing especially for hike and fly, but this decrease in weight improves, amongst other things, take off, especially with a motor. The lighter the wing, the easier it goes up, which is logical. We also know that a lighter wing is generally better behaved in the air because it has less energy, to dive for example.


Photo: Thomas Ulrich

TAKING OFF
The wing comes up straight and reliably, whether free flying or with a motor. It doesn't jump into the air like a spring; instead its behaviour at take-off is uniform which makes it easy. It keeps its course whilst gathering momentum and loads up rapidly, a good feature, especially with a motor.

IN FLIGHT
In a straight line, it flies as if on rails and is very comfortable. As far as manoeuvrability is concerned, the opinions of the test pilots differ, but it is primarily a question of wing loading. In the top part of the weight range the wing is very manoeuvrable and precise, thus always the case with a motor. A positive point for a wing is a combination of good stability and good manoeuvrability when going into a turn. In thermals, it is very efficient. Cédric Nieddu from Certika even claimed '*it will be difficult to find better than that*'.

The Epsilon 7 motorised version with the same wing.

The only difference: Two thicker C lines and trimmers on the risers. The trimmers and the foot accelerator are not used at the same time. One or the other should be operated depending on whether it is being used for free flying or with a motor.

Photo: Thomas ulrich

In any case, it doesn't produce any nasty surprises in turbulent air. It is one of the most accessible wings in the middle of the EN B range and could even be suitable for a good student coming out of school.

As for speed, with 37 km/h trim and 50 km/h accelerated, we can confirm the manufacturer's figures to the nearest km/h. With a paramotor, if the pilot wants to stick with hybrid free flying/motor wings, excluding reflex wings, it's got a very reasonable potential speed.

WINGOVERS AND SPIRALS

It is possible, despite its initial stability, to go quickly into a nice wingover, which the pilot can greatly increase by finding a good rhythm. Nevertheless, there is a limit somewhere, above which the Epsilon 7 doesn't want to go without being forced – all the better. It remains very manoeuvrable within reasonable limits. For spirals, it goes into them easily and can reach 14 m/s after two turns.

ADVANCE : EPSILON 7
MANUFACTURER INFO

Manufacturer : ADVANCE
Web : http://www.advance.ch/fr

Size	23	26	28	30
Flat surface (m^2)	19.3	21.8	23.5	25.2
Projected surface (m^2)	20.4	22.30	24.46	27.32
All up weight (kg)	60-80	75-95	85-110	100-130
Weight of the wing	4.65	5.1	5.45	5.75
Flat aspect ratio	5.15	5.15	5.15	5.15
Trim speed ((km/h)	38+/-2	38+/-2	38+/-2	38+/-2
Max speed	51+/-2	51+/-2	51+/-2	51+/-2
Mini sink ratei	1.15	1.15	1.15	1.15
Glide ratio	8.4 +/- 0.1	8.4 +/- 0.1	8.4 +/- 0.1	8.4 +/- 0.1
Certification	B	B	B	B


Photo: Thomas ulrich

To exit, by weight shifting to the outside, it sorts itself out. Watch Cédric Nieddu explain the details in the video. It also shows that this wing is equally gentle coming out of a spin.

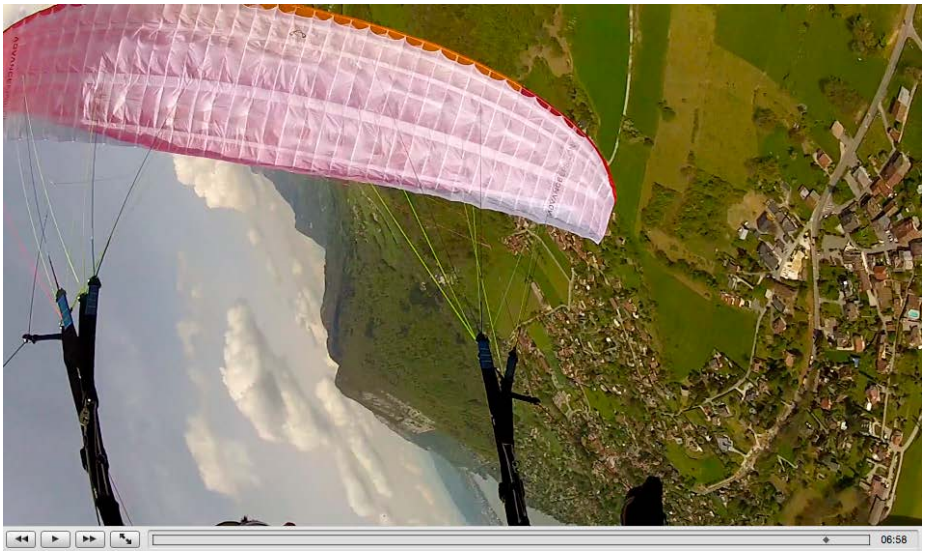
CONCLUSION

Its stability, its calm in turbulence as well as its pretty good behaviour during an incident could permit the Epsilon 7 to be classed at the beginning of the B category where it would correspond to a talented pilot coming out of school.

But as it is fairly high performance, typical of a well made middle of the EN B range, it will perhaps be a first 'real' wing for a pilot who has done a certain number of flights on an entry level paraglider. These flights could have been done on wings loaned by the school or an older EN A bought second hand.

Photo: Thomas ulrich

VIDEO TEST EPSILON 7



Left, the video of test pilot Cédric Nieddu from Certika. Unfortunately it is only in French. Below is a translation of his commentary.
https://vimeo.com/97170466

Cédric from free.aero/voler.info: I am flying an Epsilon 7 26, all up weight 95kg. The wing has trimmers for paramotoring, an Evo XC3 harness and with the chest strap adjusted to 42cm.

I am now going to do an asymmetric 50% with the trimmers off: after quarter of a turn the wing starts to reopen, flaps a bit, and the wing tips reopen a little bit later. In the end we've done 180° before it reflies in a straight line.

Let's do the same collapse, still without any pilot input. This time the wing reopens quicker and everything is back to normal between 90 and 120°. The wing also falls back less. In summary, for a gain in speed of only 2 or 3 km/h, the wing's behaviour is noticeably different.

An interesting manoeuvre to do, already in the certification, but which we are going to explain further: Half a wing and holding our course just using the controls. We're going to find the stall point, here at about 55% of the brake travel. To be certified in this category, at least 50% of brake travel is enough. So we're really close to the limit, which means that, during an incident in the same EN B category, other wings could allow a greater brake travel lessening the risks of over compensation.

Now we are going to do a gentle front collapse. The wing tips reopen last. This time we're going to do a larger collapse. The wing takes a bit longer to reopen from the middle. No tendency to go parachutal. It behaves nicely throughout.

This time we're going to do a stall: We start braking progressively and fall back. It is relatively stable above my head, I let go. I have a little cravat which turns me a bit. A bit of stabilo and it's OK. So its behaviour in a stall is really cool.

Another stall. This time we're going to redo it gently to avoid the cravat we had the first time...

Now we are going to do a full spin. I release and it reflies gently. So during the spin its behaviour was pretty cool. The surge whilst coming out was pretty gentle, not bad.

This Epsilon 7 in thermals is really very efficient. After an hour of flying at Annecy with lots of people about, I was often on the inside of the turn. The wing is very efficient for coring thermals, turning tightly. It would be difficult to find better than that.

I am going to try and do two turns as quickly as possible. Excellent. First turn, I keep my body weight on the outside of the turn. I am already centrifugal. OK I'm at the limit, vario reading = -14m/s after two turns. With my body weight on the outside, the wing comes out by itself between half and three quarters of a turn. It is always important when you have energy in a spiral to manage the exit so that you don't end up penduluming.

Now we are going to redo the spiral test but instead of doing it as per certification, I am going to keep my body weight on the inside of the turn and we'll see what happens. Still trying to get back in as quickly as possible, I stay on the inside.

Great, I release,...the wing stays in. So, there's the big difference from the certification conditions where the pilot's weight stays on the outside of the turn: In that case the wing comes out by itself after three quarters of a turn. If you try the same spiral procedure, leaning to the inside, even with hands up, the wing won't come out by itself.

Time to finish the flight with a bit of fun... The wing spins really well in a helicopter. Let's get out of it nice and smoothly; helicopters are fun but make you dizzy.

Now we are going to do some inversions. It takes a bit of time to get enough amplitude, the wing is very well balanced in the roll. All the same, I manage to get above the wing.

The Epsilon 7 really is a great wing !

Buzz Z4/ PWR

A FIRST EN B

Photo: V.Burkhardt

The Buzz PWR by Ozone is practically identical to the Buzz Z4: a good first EN B for a paraglider and/or paramotor pilot who has just come out of school and who wants to have an EN B.
Photo: Ozone

By Sascha Burkhardt

Ozone put the Buzz Z4 at the beginning of the EN B range; it's a beginner/intermediate plus wing. You can also see that in the certification report for the Buzz Z4 free flying; it got a single B for an asymmetric accelerated collapse of 75%, and another for asymmetric collapse at the top end of the weight range. All the rest were As. According to the manufacturer, the Buzz Z4 is 'an ideal choice for pilots who fly about 30 to 50 hours per year or for pilots who are more experienced and who want a wing with a high level of passive safety and comfort in the intermediate category.'

When the Ozone Buzz Z4 came out two years ago it inherited technology which

had been tried and tested on the Delta 2/ Enzo 1 and R12: Mini ribs at the trailing edge, 3D-Shaping and the use of lots of leading edge rods. By decreasing the lines by 13% compared to the previous model, the glide angle increased by 0.6 points, according to Ozone. Interestingly, the increase in performance didn't go hand in hand with an increase in aspect ratio. At 5.15 it is placed only just above the 5.10 of the first Buzz in 2005.

INFLATION AND LOAD TAKE UP

Ozone wanted a wing which would come up evenly, without a tendency to over fly. They have successfully managed that and this can be clearly seen on steep mountain take-offs. On the flat with a paramotor, this even inflation takes slightly longer but, as with free flying, we saw a simple take off with no surprises.

IN FLIGHT

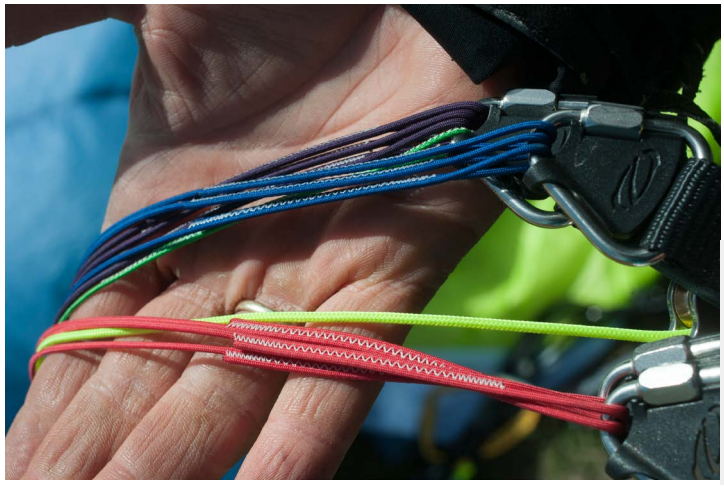
The load take up is quick and strong. It is particularly evident on a paramotor. The pilot feels the power release itself. In the air, the behaviour in turns corresponds to a pattern which is typical of lots of Ozone models: not much pressure is required on the controls to initiate a flat turn with a low sink rate, which allows the optimum use of weak thermals. The Buzz Z4's high level of stability in pitch and roll, on the other hand, means that it requires more purposeful application to put in a highly banked turn. Some paraglider or paramotor pilots could possibly want a more direct response and a quicker turn, but the comfort of this stability and the power associated with it, are much appreciated when flying and during XCs. All of which make it very suitable for use as a first wing when leaving school.

It is also possible because it is compact and remarkably resistant to collapses. Its behaviour after a collapse is also very good and doesn't hold any surprises. It is only when using the accelerator that it is, naturally, a bit livelier.

Cédric Nieddu from Certika tested a Buzz PWR equipped with trimmers for us during a few SIV manoeuvres. He confirmed that it is one of the coolest wings on the market; it is so easy and friendly. Its behaviour in a stall even makes it 'a wing which is ideal for first stalls'. All in all, it is a wing with amazing performance compared to how easy and accessible it is. No surprises either when doing big ears, spirals or indeed a SAT.

Some manoeuvres, in particular some SIV, on the Ozone Buzz M (Buzz Z4 paramotor version) carried out by Certika (unfortunately the sound is only in French) https://vimeo.com/130605349

The leading edge rods help give a good 'pre-inflation' even at rest.



Reassuring thick and easily untangled lines. The Buzz Z4 PWR ML weighed 5.6 kg on our scales (in keeping with the weight given by the manufacturer).

SPEEDS

In the free flying version, the Buzz Z4 flies well with a hands up speed of 38 km/h and an accelerated speed of 50 km/h. In the motorized version, it is faster with hands up and trimmers closed (41 km/h), while the trimmers on the rear risers add 5 km/h. The maximum speed is therefore less on a paramotor bearing in mind that it is unauthorised, according to the recommendations, to use the foot accelerator (only for use when free flying) simultaneously with the trimmers (only for use in 'paramotor mode').

The Buzz PWR is identical to the Buzz Z4, if the pilot keeps the trims closed (1). It is also possible to use the accelerator (2), whilst staying within the limits of its EN B category.

When using the motor, the pilot can open the trimmers (3), but you aren't meant to use the foot accelerator as well. It is strongly recommended that you don't use the two at the same time; that's normal for a non-reflex wing.

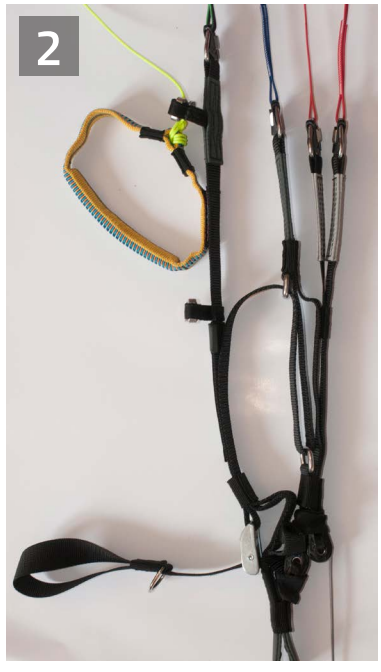


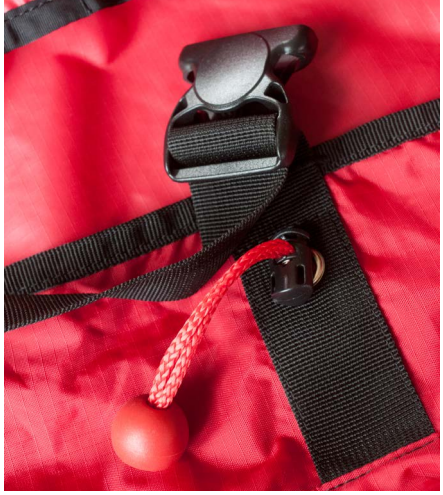
Photo: Felix Woelk

OZONE - BUZZ Z4 MANUFACTURER INFO						
Manufacturer : OZONE Mail : team@flyozone.com Web : http://www.flyozone.com						
Size	XS	S	MS	ML	L	XL
Number of cells	45	45	45	45	45	45
Flat surface (m^2)	22,20	24,10	25,80	27,30	29,30	31,80
Projected surface	19,12	20,75	22,22	23,50	25,23	27,40
Flat wingspan	10,69	11,14	11,52	11,85	12,28	12,79
Projected wingspan	8,47	8,82	9,13	9,39	9,73	10,13
Flat aspect ratio	5,15	5,15	5,15	5,15	5,15	5,15
Projected aspect ratio	3,75	3,75	3,75	3,75	3,75	3,75
Chord	2,63	2,74	2,83	2,92	3,02	3,15
All up weight [kg]	58,70	65-85	75-95	85-105	95-115	110-130
Weight of the wing [kg]	4,8	5,2	5,4	5,6	6	6,4
LTF/EN	B	B	B	B	B	B
Lines	Edelrid 8000U-090/070 - Liros DSL140/70 Edelrid 7343-230/190					
Fabric	Dominico 30D MF - Skytex 40 Hard / Dominico 30D FM					

SUMMARY

With trimmer risers and a foot accelerator, the Ozone Buzz Z4 becomes a Buzz PWR. It is a wing which is well adapted for use with both a paraglider and a paramotor for a wide range of pilots, from near beginners to more experienced pilots going on their first small or large XC flights. Its potential high level of safety, associated with very good performance in thermals and low fuel consumption with a paramotor, make up for its slight lack of precision in the controls.


Photo: Rolf Mössmer/Ozone
BUZZ4



The Ozone Easy bag is the most practical stuff sack that we have tested. Very strong, it is far from being light; we weighed it at 1.32 kg. It is, above all, designed to be used with a paramotor and not for long walk-ins with a paraglider.

Adventure Flex-One

The semi-reflex for beginners and beyond

Photo: V. Burkhardt

The Flex-one is a reflex wing for beginners and not only for them in our opinion.

According to Adventure, the Flex-One was conceived and specially designed to make students', as well as instructors', lives easier. How did Adventure do this and is the result up to scratch?

By Sascha Burkhardt

Adventure have always had a very attentive eye on the student paramotor pilot market. The resale network of the biggest French manufacturer is based on the school franchise – the close collaboration and feedback from instructors about their experiences definitely contributes to the design of a wing destined for teaching paramotoring.

With the Flex-One, Adventure hope to bring a certain amount of reflex profile into their student wing, whilst having good inflation and guaranteed manoeuvrability. But above all, the designers wanted a wing which, during an uneven inflation, didn't require sideways movement to bring it back above the pilot's head, in other words, a paraglider that the pilot could re-centre just by using the brakes.

For a student at the beginning of their flying career it isn't easy to keep up a good forward momentum, whilst re-centring under a wing which is stubbornly deviating from its trajectory. When using a trike, being able to control a wing with just the brakes during and after an inflation, becomes an even more pressing necessity.

To be able to do this, the designers at Adventure including Xavier Démoury (one of the first paraglider designers who has worked in our sport right from the beginning), worked essentially around three parameters: the curve of the wing, the branching of the brakes at the trailing edge and the profile. According to Xavier, by using a reflex profile the centre of force is moved forward giving a wing which is more responsive to the brakes. Not what intuition would initially make you think, remembering that the first reflex wings were more like buses. But according to the designers, combined with other parameters, this type of profile can bring increased responsiveness to the controls at this point in the flight.

Another important factor is the curve, in other words the arch of the wing seen from the front. A wing which forms a very pronounced arch is less roll stable and more responsive to the controls because the action of the brakes, and the increase in lift which goes with it, acts in the desired sense in this type of wing, contrary to a flat wing which reacts more by generating an upsetting inverse roll. On the next page you'll find some diagrams and explanations.

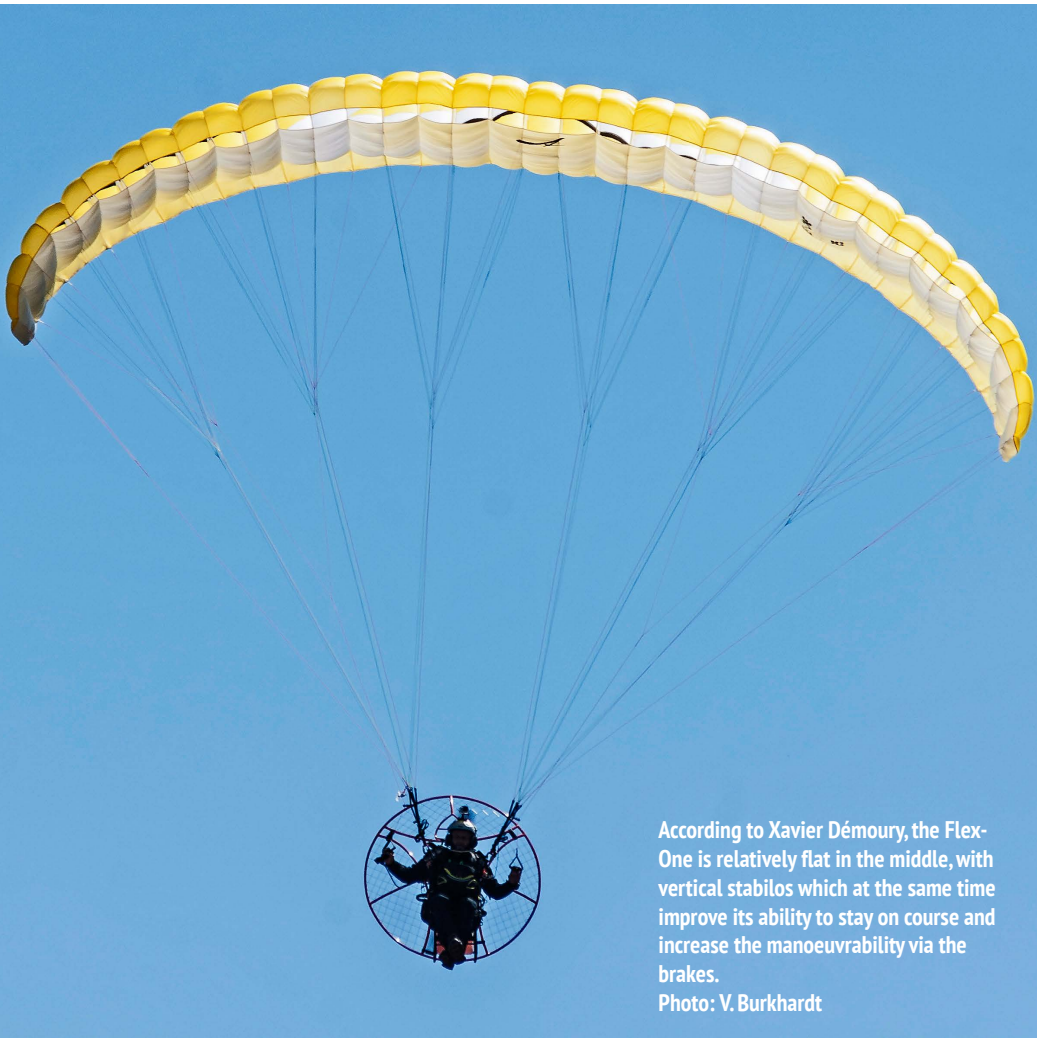
The Flex-One is, according to the manufacturer, fairly flat in the middle and the stabilos descend lower down in a pronounced manner, thus increasing the stability of direction with hands up and the manoeuvrability of the brakes. A certain amount of reflex is apparently gained by the bulge on the nose profile on the upper surface, and the move backwards of the most convex part of the lower surface. The centre of force of the Flex-One will thus be well forward.

AT TAKE-OFF
After spreading out the wing, the nose of the profile builds well thanks to the leading edge rods, and the openings are waiting for nothing other than to inflate. The inflation during a foot launch is regular; slowly but surely it comes up above your head.

And even when it does come up asymmetrically, it obeys the controls fairly well. By moving sideways, you can speed up the re-centring, but if the pilot doesn't do this, the wing comes back just by using the controls. This part of the specifications seems to be fully adhered to.

Whilst gathering momentum, the lift comes quickly, far from what we were used to on the first reflex wings.

Fairly classic, but efficient: in the outer part of the wing, the brakes shorten the trailing edge to give more manoeuvrability.



According to Xavier Démoury, the Flex-One is relatively flat in the middle, with vertical stabilos which at the same time improve its ability to stay on course and increase the manoeuvrability via the brakes.
Photo: V. Burkhardt

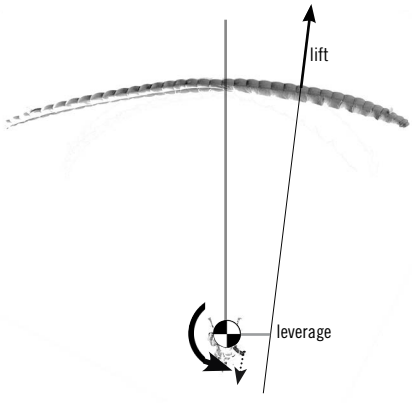
The student won't just have an easy inflation but also a very quick take off.
In the air, the wing is surprisingly manoeuvrable. By reading 'school wing' and 'reflex' in the description we worried unnecessary. Obviously, you have to pull a long way due to the very safe brake travel if you want to turn quickly, but you can get the wing into nice, pleasant turns and, in addition, the Flex-One doesn't dive much in these efficient averagely banked turns.

At one o'clock in the afternoon, the mountain air starts to move. Whether the trimmers are open or closed, the wing is very solid and reassuring, and it is very damped in the pitch – is this the reflex effect?

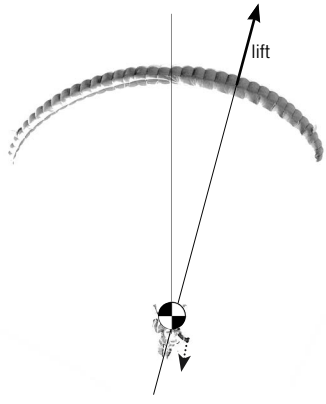
Solid in turbulence but far from being a bus, the semi-reflex profile works very well on the Flex-One, leaving it enough performance to also be used for free flying. In addition, it isn't just certified by the DGAC, but has also obtained EN A certification in free flight (in size L), at the FFVL's Aérotest lab.

It's even more reassuring, not just for the beginner, but also for the intermediate pilot who wants to fly with confidence. Adventure's promise to offer a wing not just for first flights but also for first XCs seems to be realised. As far as speed is concerned, we measured 39 km/h hands up and 47 km/h detrimmed. That's slightly below the manufacturer's figures, but it was a pre-series wing, and even if that stays the maximum, it's very good for starting to go places.

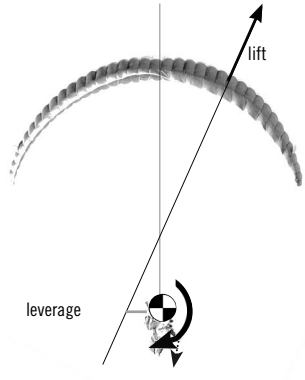
More than ten years ago, the manufacturer Olivier Caldara, Father of the Bionic, was one of the first authors to describe how the increase in lift on the braked half of the wing could help to start a turn, rather than opposing it with an inverse roll.



A wing with a very flat arch, viewed from behind: At the moment when the right control is used, the rolling moment induces a rotation to the left, thus an inverse roll, because the lift inclines towards the right, but the leverage acts the 'wrong way'.



A normally arched wing, seen from behind: At the moment when the right control is used, the lift is inclined towards the right, but there is no leverage on the centre of gravity of the aircraft.



A strongly arched wing: the leverage of the lift acts the 'right way'; it induces a roll to the right when the pilot uses the right control.

Drawings by the editor taken from diagrams by Olivier Caldara.

Flex-One

Photo: Sascha Burkhardt

Thanks to leading edge rods, the openings really want to take in air during take off.

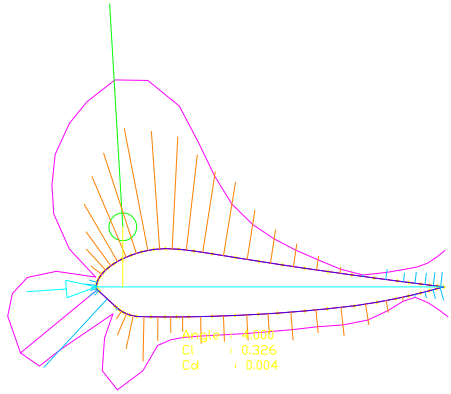
Even during a demanding landing, the Flex-One is a reliable partner. Photo: V. Burkhardt

ADVENTURE : FLEX ONE
MANUFACTURER INFO

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

Size	M	L	XL
Flat surface (m^2)	25	28	32
Flat wingspan	11,4	11,9	12,4
Flat aspect ratio	4,7	4,7	4,7
Medium chord	2,79	2,95	3,13
All up weight (kg)	70/90	80/105	95/125
All up weight Max(kg)	125	145	165
Optimal all up weight	85	95	110
Trim speed (+/-2km/h)	37	37	37
High speed pos (+/-2 km/h)	50	50	50
Min. speed (+/-2 km/h)	23	23	23
Max. glide (+/-2)	7,9	7,9	7,9
Taux de chute min (+/-0,1 m/s)	1,15	1,15	1,15
Homologation	DGAC - EN A	DGAC - EN A	DGAC - EN A
Prix en euros	2 750	2 750	2 750

A very protective packing system: the internal sack and the carrying sack are both made from strong heavy fabric. The pockets in the rucksack are very practical.



With this diagram of a profile (which isn't a Flex-One), Xavier Démoury shows the possibilities of giving some reflex to a profile, without giving it a clear S curve, as you would imagine.
Blue arrow: Angle of attack
In purple: Coefficient of pressure
In brown: Effort linked to depression
In light blue: Effort linked to compression
Green circle: Position of the centre of force at the simulated angle of attack.
Xavier Démoury:
"Moving the convexity of the upper surface forward makes the centre of force move towards the front. Moving the convexity of the inner surface backwards is liable to cause nose-up torque during low angles of attack."

www.free.aero

Two possible hang points which allow you to counter torque.

Smooth lines, and a riser with clearly colour coded straps. On the other hand, the foot accelerator present on the wing we tested had disappeared in the final version.

Nice detail, well made and with practical magnets on the controls.

The brake lines are sheathed at the most heavily used point.

This maximum speed also shows that it isn't a full reflex wing flirting with 60 km/h, but whose performance doesn't allow it to be used for free flying.

CONCLUSION

The Flex-One is a wing which keeps its promises by, no doubt, making beginners' and instructors' lives easier, whilst at the same time being surprisingly playful.
Above and beyond school, this wing and its pilot will go far together!

TEST

NIVIUK SKIN

IS IT A GOOD FIRST WING?

Photo: V.Burkhardt

Photos: S. Burkhardt

Surprisingly well damped in pitch and rolls, the Skin 18 nevertheless can do nice wingovers.

The Niviuk Skin is the first single skin wing which flies like a 'normal' paraglider, its light weight and easy use are a plus. So is it a good first wing?

By Sascha Burkhardt

Photos: V. Burkhardt

The Skin is fun to launch in any situation. You can also play facing the wing. It takes off more easily than a classic wing; as a consequence, you have to be a bit more vigilant against being lifted off unintentionally. It can be easily controlled by using the rear risers.

The single skin concept, pioneered by Ozone in 2011 with the XXLite, gave rise to hopes of a revolution in paragliding: a simple wing in the true sense of the expression, very light with its upper surface being at the same time its lower surface, incredibly easy to use and very safe for most manoeuvres. Collapses? It reopens instantly as there aren't any cells to re-inflate. The Batlite from Adrenaline is the same style of wing and appeared at about the same time. It was equally easy to use, and turned out

80 km on the Skin 18: 'a fun machine'.."
http://www.xcontest.org-italia-voli-dettaglio-Targa-7.5.2015-09-41#fd=photos.url.webloc

to be even better behaved during the extreme manoeuvres tested by Cédric Nieddu from Certika. The first two models which pioneered the single skin idea had a couple of problems: A range of speeds with too low a maximum speed and a performance too out of date for what we are used to with modern paragliders (nonetheless, an XXLite landed on top of Mont Blanc).

Another factor which stopped mass development: Without the air's inertia imprisoned in the cells, the wing is very lively in turbulence. It isn't dangerous, and the size of the movement remains small, but it is unusual and less comfortable.

Niviuk was the first manufacturer to improve the concept two years later by producing a new generation single skin: 5 closed cells and advances in the detail should compensate for the faults in the first single skin wings. The Spanish company worked on the concept for more than two years and finally brought out the 'Skin' in mass production, in two versions, ultralight and classic.

We tested the classic Skin 18 and the Skin 16 Plume (ultralight); you'll be able to read the results of our test in a future edition of free.aero. For the Skin 18 we were surprised by the progress made. Thanks to the addition of five cells and the use of Nitinol leading edge rods, this single skin is definitely up there with the rest of them!

AT TAKE-OFF

For the classic Skin, weight isn't the top priority. We weighed it at 2.7 kg. Obviously it's great for hike and fly, but it is still a bit heavier than an Ultralite from Ozone, the lightest classic wing on the market. Niviuk put ease of use and reduced volume first. For fans of lightweight, Niviuk offer the Skin Plume, whose 16 weighed only 1.67 kg on our scales.

Photos: V. Bürkhardt

The Skin 18: an ideal wing to take when travelling in case you find a site somewhere. It will play the game at any take-off you can imagine.
As far as the harness is concerned, here we used a Niviuk Konvers, but a Roamer type harness, or lighter still, will further reduce the volume of your pocket plane.

The risers on the Skin 18 are classic ones. The risers on the Plume version are lighter still, less bulky and made from chord. We are testing it at the moment and will tell you all about it later on this summer.

Photo: V. Burkhardt

The little bundle unfolds quickly, and only the very thin lines in the upper part of the line system don't untangle on their own – that's the price you pay for performance close to that of a classic wing. The Nitinol leading edge rods already keep it in perfect shape - not that it's necessary to help the inflation which is already child's play because, as there are no (or very few) cells to fill, the single skin comes up like an arrow without any effort.

The five closed cells on the Skin don't slow down this stage significantly; it's incredible how quickly the wing goes from 'on its back' to 'ready to fly' above the pilot.

Anyone who can walk in a straight line could do it first time. The only minor restriction: because it comes up very quickly, and despite its low inertia, you have to brake it a little bit, depending on the slope and the wind. By trying to inflate it with your hands in your pockets and touching neither the brakes nor the risers it can clap hands. On the other hand, it is enough to have the brakes in your hands as normal and to lower them a bit to get an almost automatic inflation.

A good point for a first wing on a school slope? Yes, it's true that it can be amazing at the learning stage, beginners having immediate results without failing. During inflation in a regular breeze, the wing is naturally a little bit twitchier, as with all mini-wings. In that case, as it comes up very quickly, the pilot needs to also work a little bit more carefully so as not to be lifted off before he is ready.

FLYING

The load take up is comparable with that of a classic wing, especially when you take into consideration its small surface! At last a single skin which has a performance worthy of a modern paraglider! This feeling was confirmed when flying and in weak thermals where it turned normally. It easily let us make the most of the thermals.

The response to the controls, which felt light and comfortable as well as having a lot of travel, was very precise and direct, and the wing was surprisingly manoeuvrable. If the pilot pulled a huge amount of brake, it made little flapping noises, but it was nothing like the Batlite which reminded us of the sail of a boat flapping in the wind.

The Niviuk Skin isn't intended for use with a paramotor, and in France it's even forbidden. All the same we decided to try it (not in France). We found it worked very well and, when taking off, it is definitely every paramotorists dream!

Photo: V. Burkhardt

As far as performance is concerned, this wing obviously can't compete 100% with a top of the range two surface wing, but its glide is surprising, especially if you consider that it isn't just a wing with a single surface, but a mini-wing as well. Moreover, pilots like Kurt Eder use the Skin like a 'grown up' wing to do impressive triangles.

Its sturdiness in turbulence is impressive, and the SIV professionals like Cédric Nieddu agree that it is very easy and safe to fly: It hardly ever collapses, and even when it does, it reopens in a flash. The certification procedure doesn't allow a single skin wing to be tested, but its behaviour corresponds mainly to an EN B, except for in the stall where the fall backwards corresponds more to an EN C.

The stability when flying is better than that of the first generation single skins. A Batlite or an XXLite move about a lot in turbulence; they're small movements but uncomfortable.

On the Skin, the 5 cells very clearly calm the movement. Obviously, it isn't as calm as on a classic paraglider with the strong inertia of the mass of air imprisoned in the cells. With the Skin, the movements are acceptable and not even uncomfortable once the pilot has realised that these movements are of no consequence to the wing's safety and that, on the contrary, the lack of inertia of the single surface gives it unrivalled passive safety.

Ok, so it moves a little bit, but these movements are of such small amplitude that the damping of the wing, especially when pitching, is better than on a classic school wing. Even whilst moving about, the wing remains very nicely above the pilot's head.

The Skin is therefore very reassuring and could actually be used as a first wing even in turbulence on condition that the beginner pilot is clear about how the single skin works and is happy with the micro movements. He also needs to be briefed not to go too far with the controls. Unlike a classic wing for beginners, a stall happens more suddenly.

The passive safety of this wing was confirmed during a paramotor flight in strong wind. The Skin isn't designed to be used with a motor but, obviously, we wanted to try it out of curiosity.

A big opening: there is no lower surface. The Nitinol leading edge rods hold the profile's nose in shape.

On all the single skin wings, triangular shaped pieces spread the strain of the lines over the upper surface.

A wing which is very easy to transport and use. Only the tangles aren't instantly undone, because the lines are very fine in the top part of the line system.

Nitinol has played a big part in making this wing possible.

The take off was extremely easy of course, so it will be loved by beginner paramotor pilots too!
Arriving in a windy, turbulent area, the wing showed the little twitches that we expected, but it didn't close even one wing tip.

On the other hand, sometimes the sink rate becomes fairly significant. Rather than penetrating in a gust, it seems as if it stops itself a bit and gently sinks out, whilst still staying above your head... Once again nothing to worry about, but surprising if you are used to classic wings.

Contrary to a first generation mono surface, the Skin flies much faster: hands up, we measured 39 km/h, and with the accelerator full on we got 47 km/h. In this configuration, there was no 'accordion' phenomenon between the leading edge and the trailing edge as we witnessed on the Batlite, but it vibrated a little bit.

With this sort of speed, miraculous for a single skin, you don't have the problem that the first single skins had where you would get pinned by the slightest breeze. The Skin advances like a normal wing, except in turbulence where it can have more difficulty when faced with gusts compared to a classic wing.

When landing, the wing is a bit faster than a classic wing and the flare is very weak; no problem for a pilot with average experience, but for learning, clearly it isn't ideal.

The Niviuk Skin 18, is almost the perfect partner for mountain take offs which are often a bit at the limit. Weighing 2.7kg (measured by the editor), it'll hardly wear you out during the walk in by foot. For fans of hike and fly, there is the Skin Plume, which is lighter still by nearly 1kg.
Photo: Sascha Burkhardt

CONCLUSION

The Niviuk Skin is the first single skin wing which can be used like a normal wing. It's nice in thermals, precise, playful, advances into wind and, most importantly, has a considerably reduced folded up volume, is very lightweight, very easy to set up and gives an exceptional take off in all conditions.

Niviuk were right to aim it at pilots who had already done a few flights, if only because of its poor ability to flare. But in the large sizes, it's possible that the Skin will be used as an initiation in certain conditions. It's lovely to see how much a beginner can improve during the first trial inflations.

Compared to a very advanced classic wing, it lacks a bit on performance, otherwise it would be a good main wing. Niviuk has aimed it, above all, for use as a second wing, easy to transport, for travelling and hike and fly. It perfectly fulfils this purpose and is more than just a wing for doing mountain top to bottoms. It's easy to understand Kurt Eder's assertion after his 80 km triangle when he called it a "Spaßmobil", which means "a fun machine".

NIVIUK : SKIN
MANUFACTURER INFO

Manufacturer : NIVIUK Web : http://www.niviuk.com/

Size	16	18	20
Number of cells	39	39	39
Flat surface (m^2)	16	18	20
Projected surface (m^2)	13,5	15,2	16,9
Flat wingspan (m)	9,38	9,95	10,5
Projected wingspan (m)	7,46	7,92	8,34
Flat aspect ratio	5,5	5,5	5,5
Projected aspect ratio	4,13	4,13	4,13
All up weight [kg]	60-85	70-95	85-110
Weight of the wing [kg]	2,3	2,6	2,9
Certification	EN-926-1	EN-926-1	EN-926-1

RAMAFLEX

THE SEMI-REFLEX FOR ALL

Compared to giants such as Dudek, Paramania or Ozone, AirDesign is a relatively unknown make in the paramotoring world. The Ramaflex is a semi-reflex wing suitable for a wide range of skills – from beginners to more experienced pilots. A first wing that will last a long time.

By Sylvain Dupuis
Translation : Ruth Jessop

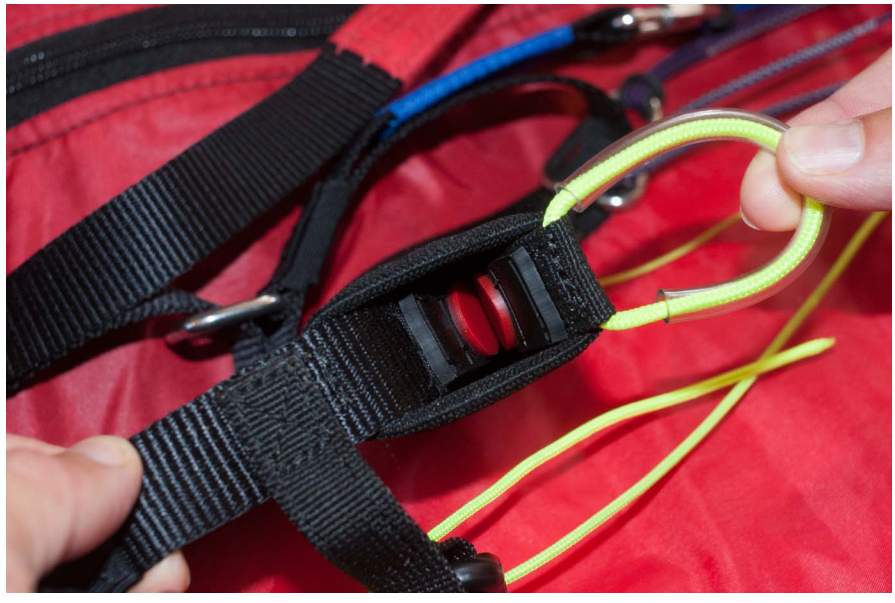
The Ramaflex is delivered in a concertina bag which is both quick and practical.

It's a lovely summer's evening with absolutely no wind and I'm off to fly a Kangook chassis motorized by a Polini Thor 100 engine. With the front risers in my hands and a little throttle, the beauty comes up perfectly straight without any effort or struggle. It's as light as a feather. The inflation is child's play.

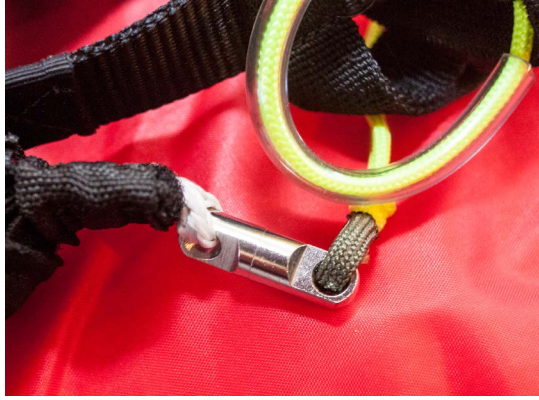
I take ten steps forward, the Ramaflex continues to behave well above me without showing any tendency to fall back, despite the lack of wind. Off we go, a bit more throttle, three steps (ok, three and a half steps), a pull on the brakes and I'm flying. Trimmed, it's got excellent load take-up; the lift comes very quickly! It climbs rapidly, so I give it a bit less throttle. It's a change from my GTR: with this, just a little bit of throttle is enough to keep my height. Yet the Ramaflex isn't like a balloon, I have absolutely no sensation at all of floating like a jelly fish and it moves forward well.

Ok, so let's turn. It feels like holding a feather between my fingertips. The Ramaflex turns effortlessly, and turns well. Its behaviour is totally predictable; it is damped in roll as well as in pitch, making it a wing which is well balanced on its axes. It's got just the right amount of playfulness for an intelligent pilot coming out of school.

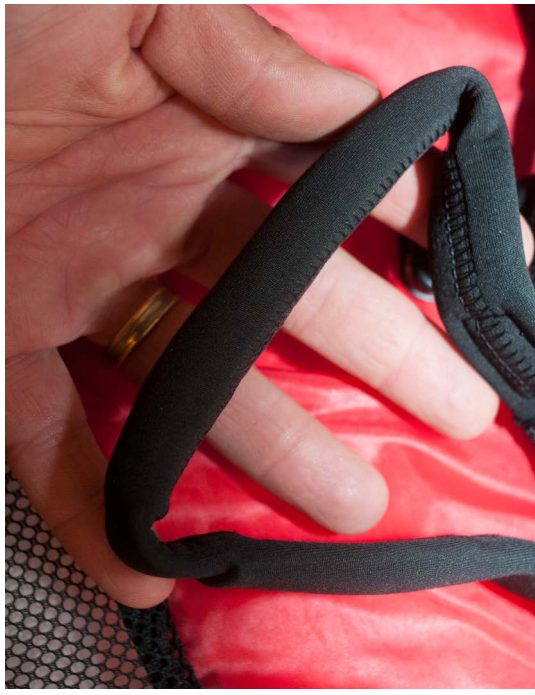
There are numerous well thought out details like this sheath on the secondary control.



Typical of a wing with lots of 'reflex' is the secondary control connected to the stabilo. On the Ramaflex, it has a proper little handle..



A metal swivel on the main control.



The brake handle is padded.

I push the wing to its limits, with steep turns at ground level. I'm pretty surprised by the handling! You can get it to do great turns by attacking a bit more in the weight shift and the controls. The controls remain light. Coming out of a turn is easy with no surprises. Damping assures safety at this point: leave it to do it if you don't know how to, it knows better than you!

Same exercise, low down, steeply banked, but this time completely detrimmed. I found very little change in the behaviour, apart from the speed which exceeded about 60 km/h.

If you want a bit more manoeuvrability, you can use the controls at the wing tips, these are very efficient. You can use them on their own or in addition to the brakes.I put the trims back on to climb up to 500m. The low fuel consumption is confirmed as I climb steeply, despite the Thor 100! I start a series of wingovers.

Cédric Nieddu from Certika did some measurements for us and observed that it has a large speed range: from 26 km/h to 60 km/h. With a minimum load, the minimum speed is 26km/h, speed with hands up 45 km/h, trims off 48 km/h, with accelerator 60 km/h. He couldn't do a normal full test, but his commentary in French during this short flight is very complementary towards the Ramaflex (easy to handle with a rock solid profile).
Video : https://vimeo.com/130544502

The paramotor manufacturer Kangook has 'customized' versions of the Ramaflex on sale with their colours. Photo: Sylvain Dupuis

After three swings, the sensation starts. The Ramaflex easily builds up energy and can go below the horizon without any difficulty as long as the timing is right.There is no tendency to collapse on the outside if you hold it a bit, it also isn't inclined to collapse at low speeds. It's almost easy! Being a very well balanced wing between rolls and pitches, you still need to control the wingovers fairly precisely to make them aesthetic, by making the most of weight shift in the harness. A timing error wouldn't be dramatic and the Ramaflex will stay damped.

Off we go on a slalom round some pylons: trims off, bar on maximum. Don't touch the brakes anymore, just the TST (the stabilo controls)! The pylon comes up pretty fast, a pull on the TST and the beauty banks readily but calmly.

The riser on the Ramaflex with marked trimmers.

The fabric on the upper surface is the reference Skytex 40 g/m² by Porcher, giving a guarantee of life expectancy! The lower surface is in Dominico. The leading edge rods ensure that the wing keeps its profile. An opening on the stabilos allows sand to be emptied out.

I release the bar, take the brakes and begin the turn, which can easily be tightened by braking symmetrically. Coming out of the turn, to counter the pitch backwards, I go back to being on full bar. To compensate for the inverse roll which augurs as you come out of the turn, a well timed pull on the TST will be enough. OK, it's not a GTR or a Snake, and you'll still have a pitch backwards that you'll need to compensate for by putting on some bar AND releasing the throttle a bit, which loses you time. Landing could have been on eggs, at the end of the day and in total calm.

CONCLUSION

The Ramaflex is a wing which will satisfy the vast majority of pilots. It dominates in one domain: flexibility. It's easy to inflate and has excellent handling which means that it is destined for pilots who want to fly no matter what the conditions or topography. The damping on its axes is a factor which directly affects comfort in flight which, associated with its good maximum speed, makes it a nice wing in the air. Lastly, its light weight and its manoeuvrability make it fun to play on, whilst being chilled thanks to having lots of passive safety. Once again, a big thanks to reflex technology!

AIR DESIGN-RAMAFLEX
MANUFACTURER INFO

Manufacturer : AIRDESIGN
Email : info@ad-gliders.com Web : http://ad-gliders.com/

Size	XS	S	M	L
Number of cells	49	49	49	49
Flat surface (m^2)	20,5	23,8	26,5	28,6
Projected surface	17,63	20,37	22,68	24,48
Flat wingspan	9,35	10,70	11,29	11,75
Projected wingspan	7,39	8,48	8,95	9,32
Flat aspect ratio	4,23	4,81	4,81	4,81
Projected aspect ratio	3,18	3,53	3,53	3,53
Maximum speed (Km/h)	57	57	57	57
Trim speed (Km/h)	37	37	37	37
Total line length (m)	349	379	400	416
All up weight (kg)	-	88-110	108-135	124-155
Weight of the wing (kg)	5	5,4	5,9	6,3
Certification	DGAC	DGAC	DGAC	DGAC
Lines	Edelrid A-8000U: 050; 090; 130 / Liros TSL: 090 & 140 & 190 & 280			
Fabric	Porcher Sktex 40 / Dominico 30D Hard.			

FROM MY FIRST FLIGHT AWAY FROM SCHOOL TO MY FIRST TUMBLING

Sylvain Dupuis tells us about some of the stages of his career as a paramotor pilot. His experiences and choices are often the same as those in free flying.

THE FIRST FLIGHT AWAY FROM SCHOOL

The first flight is a big hurdle that we all remember. But the first flight away from school, when you're on your own, faced with the whole sky in front of you, is also pretty mind blowing. On your own and with only yourself to blame, you ask yourself millions of questions. Your friendly instructor isn't there any more to pick up the pieces and to stop you making stupid mistakes. And if I break a leg? And what if I...

STOP! Take a friend with you whose very presence will reassure you and could help you if it all turns to worms. You knew how to do it in school, and you've now got a license. Pre flight checks done and redone and off you go. Once you've got over this hurdle you won't need somebody to hold your hand; you've grown up and left school now!

You're on your own for the first time facing the big open sky. This is normally the moment when all the doubts come creeping out of the bag!

"My first navigational flight was about 200km and the goal was to go and eat mussels and chips washed down by a beer by the sea, leaving the sky above Paris far behind me."

MY FIRST NAVIGATIONAL FLIGHT

As a beginner, we have a natural tendency not to stray too far from take-off and our mates. It's reassuring, the unknown is scary. But a paramotor is also an amazing way to explore a country. My first navigational flight was about 200km and the goal was to go and eat mussels and chips washed down by a beer by the sea, leaving the sky above Paris far behind me. It's no problem doing this sort of flight with several friends. Take a small repair kit with you containing some basic tools: a few metres of line, a new spark plug and spark plug key, some tape, a good pair of multi-socket pliers, the relevant Allen keys, some flat keys and a multifunction tool which will allow you to take your carburettor completely to pieces.

Last but not least, pack a 50 cl half full bottle of motor oil in case you need to mix up more. All this shouldn't weigh more than 1 kg and will solve 99% of brake downs.

As far as navigation is concerned, take a map and compass with you rather than a GPS. It is much more fun to see where you are really going rather than following an arrow. If you get totally lost you will no doubt be able to use the GPS on your telephone.

Don't fly too far away from a main road; you should be able to locate yourself easily and, in addition, it will make getting home by thumbing a lift a lot easier.

Navigating on a paramotor will let you discover some absolutely amazing places, in an altogether different fashion!

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Flying in thermals increases your horizons enormously and lets you discover an amazing sport!

THE FIRST THERMALS

A thermal and especially its turbulence, is one of the biggest worries for beginners. But they soon become less daunting. All you need to do, as always, is take it one step at a time without being over confident. The first thing is to have the right wing for your level: beginner or above. Bomb proof wings make turbulence easier because they are damped on their axes. During a collapse, an EN A or an EN B requires no action from the pilot to reopen. A vario will be an invaluable help in your first thermals. It will help you to understand the architecture of the column of warm air and will show you whereabouts you are in it. It isn't necessarily a good idea to cut the motor because the first bubbles will be weak and you probably won't be able to climb without adding a little bit of throttle, at least to reduce the extra drag from the cage and the propellor. Cut the motor to the minimum whilst looking for a climb rate of about +0.5m/s. Maximise weight shift and minimise the amount of brake. Just keep in contact with the brake so that you can manage the variations in the angle of attack. If the pressure drops on the brake, put on more to get the same pressure again.

On the other hand, if the pressure increases, raise your hand to find the correct pressure again. This is the famous 400 grammes rule which we have already talked about.

If you feel you're being thrown out of the turn, that's because the thermal is in the inside of your turn. Tighten your turn to get nearer the core!

THE FIRST COMPETITION

Lots of people consider themselves too amateur to do competitions. But what these amateurs don't realise is that most competitors are just that... amateurs! Regional competitions, for example, are very accessible and are, above all, a good way of meeting other pilots and making enormous progress.

Don't go along expecting to get on the podium; go along just for the great ambiance, the people you'll meet and the things you'll learn.

Typical tasks: treasure hunts with a map and compass, spotting the places in the photos you've been given. A bit of manoeuvring without being dangerous is always fairly entertaining, dropping in for fuel and refreshments at a different landing field, sometimes a bit of light thermalling and objectives to achieve...

Photo: Michal Mechy Elias

THE FIRST SLALOM COMPETITION

You've probably always wanted to, at least once, try playing at going round pylons, just to see what it's like. The concept is simple and fun, and has certainly rejuvenated paramotoring! Is it dangerous? No! To be precise: it's the pilot who can be dangerous if he flies outwith his abilities. You don't have to skim the pylon or do it on full bar. Start by flying with trimmers and without using the bar.

This way you'll learn to manage your trajectory depending on the wind direction around the course. This has a very big influence over when you start the turn and how you manage it. Don't try to tighten each turn, go more for a line which is wide but with a really impeccable exit on the axis. When you are perfectly at ease with the trajectory, you can try detrimming your wing. You'll see that this difference of about ten km/h completely changes the speed you do the turns. The pylons will suddenly seem a lot closer and the power necessary in a turn will be greater. You'll need to anticipate more and think about the next turn whilst you are still in the previous turn.

The steeper your turns are inclined, the more the energy builds up and the more you'll have a tendency to pitch backwards coming out of the turn. The accelerator bar comes in handy here, pressing on it coming out of the turn allows you to:

- counter the pitch backwards
- convert the energy you have accumulated during the turn into speed. This allows you to gain a shed load of time! Moreover, at this speed, you'll have barely had time to push the bar before you are already negotiating the next bend.

Therefore be careful not to use the brakes until you have completely let up on the bar.

With slalom equipment, i.e. a big motor and a small wing, it is possible to do the whole course on full throttle, and to manage the altitude and energy uniquely with the speed bar.

Great fun. A course around pylons is an activity which has brought a lot of energy and enthusiasm to the sport of paramotoring.

THE FIRST ACROBATIC MANOEUVRES

Ok so you've decided that now's the time to start doing acrobatics. Obviously you've bought a reserve, you know the basics about SIV and you've fully mastered spirals and how to get out of them.

So all you need to do now is get up to a minimum of 600m and have a practice! There is no better way to practice than by doing wingovers, they teach you how to manage the roll, pitch and yaw axes, weight shifting in your harness, braking and, above all timing! It is perfectly possible to learn to do very good wingovers on your own; you just need to do it one step at a time.

Just do two turns for your first attempt and let the second one go into a spiral. It's a sort of dynamic start to a spiral. When you are perfectly at ease, do the same but with an extra turn. From the third turn onwards, the wingovers will start to get bigger and the risk will increase gradually from this moment onwards.

My first wingovers and my first collapses on the outside of the wing!

The wingover is the exercise which opens the door to the exclusive world of acro.

The wingover is the base of all acro manoeuvres. Mastering this will help you with all the other manoeuvres, because you will have learnt how to fly your wing in virtually all dynamic configurations.

"Build up, restitution and dissipation. In the case of tumbling, the word 'restitution' is replaced by 'explosion".

THE FIRST TUMBLING.

So here we are at the Holy Grail of the non-rigid wing: tumbling and its variations. Obviously, this sort of thing can't be improvised. It takes months of planning and studying, mentally picturing the monster every evening before going to bed and thinking about everything that can go wrong. It's also endless trial runs (including aborted attempts) to get used to the take up of speed, the centrifugal force, braking as well as weight shifting in the harness and where you are in the air. Unlike a wingover, tumbling can't really be learnt little by little. In a way you need to disconnect your brain so that you dare pass the barrier and do this acro manoeuvre. It isn't the type of manoeuvre where you can improvise the exit if ever you feel it has all got out of control.

You can expect this sort of thing full of knots when you work on tumbling...

Build up, restitution and dissipation. In the case of tumbling, the word 'restitution' is replaced by 'explosion'.

Hesitation is the worst enemy when tumbling. After starting a spiral to the left and getting up to maximum speed, the rotation is inverted by a counter movement in the harness. The wing then starts to pitch backwards. Climbing, at the moment where you start the inversion, the brake is applied progressively, to get the wing to go into a SAT. At this precise moment, roll, pitch and yaw are combined with centrifugal force, inertia and the mechanics of the trajectory.

But that's on paper because, in reality, at this stage, you'll definitely have the sensation that a high speed train has hit you! A giant hand has picked you up and is shaking you about. When you look at the wing you'll see a thing that resembles alternately blue and brownish green: earth-sky-earth-sky-earth-sky...

A lot of brake at just the right time, with just the right intensity and for just the right length of time to stop everything after three turns (don't be too greedy), will do the trick...

Earth-sky-earth-sky...When it works, tumbling is the most amazing sensation that you can possibly have on a paramotor...

FIRST FLIGHTS IN THE DESERT

Benedikt Bös flew in the desert for the first time. He brought us back some stunning photographs from his aerial escapades in Dubai.

Discover flying in the desert. The most astonishing thing when you take off in the morning is the difference in temperature: for the first 10 metres, the air is warm, around 25°C. You go up two metres more and you feel as if a hot air gun is blowing at you.

The country knows how to sell its image worldwide.

Dubai, a staunch supporter of air sports.

This playground for swooping parachutists worked well for us too.

THE FIRST...

I've watched the videos of Parabatix in Dubai loads of times, dreaming of flying there too. Well here I am.

Bigger and better at every level.

What a privilege, the view from a paramotor.

Benedikt Bös

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Concept, editor in chief, webmaster Sascha Burkhardt
test pilots: Sascha Burkhardt, Sylvain Dupuis, Cédric Nieddu
Layout : Véronique Burkhardt
Translations: Ruth Jessop
iOS development : Hartwig Wiesmann, Skywind
Android development : Stéphane Nicole www.ppgps.info
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SIRET 807821319 00017

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


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