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WORLDWIDE PARAGLIDING AND PARAMOTORING MAGAZINE. FOR FREE.

HI-TECH



NEW TECHNOLOGY DESIGNED FOR PILOTS

TESTS A BLUETOOTH VARIO FOR LESS THAN 70 EUROS...

PIOUPIOU: YOUR OWN PERSONAL WINDTALKER FOR 200 EUROS

THE SKYNET NETWORK: SWARM INTELLIGENCE FOR PILOTS

SATELLITE BASED SAFETY: DELORME VERSUS YELLOWBRICK

DRONES ON YOUR HEELS

MODERN PROFILES: REFLEX AND SHARK

LIGHT: A HARNESS WEIGHING LESS THAN 100 GRAMMES...

REPORT GOOGLE GLASS: HEAD-UP DISPLAY FOR PARAGLIDER PILOTS

Translation by Ruth Jessop

PLAYING?

Like most paraglider or paramotor pilots, we love playing in the wind, enjoying the forces of nature, flying skimming the ground, coring thermals... It's totally different from playing in front of a computer – no matter whether it's the umpteenth version of Zombies or an aeroplane or even a paraglider flight simulator. Yet certain purists associate all cockpit electronics as useless toy gadgets. I find it difficult to share these pilots lack of enthusiasm and their wish to refuse hi-tech in our flight decks. Electronics onboard our paragliders and paramotors don't transform our favourite sport into a session in front of a game console - quite the opposite.

Instead they increase our chances of being able to take full advantage of the real outdoors, to make the most of our paragliders which are still the simplest aircraft imaginable, to be able to smell the warm air which heralds the arrival of the next thermal. Electronics, if used wisely, help us amongst other things, to save time and to therefore be able to fly more. Who remembers the era before FFVL (Fédération Française de Vol Libre) windtalkers told us the current conditions at French paragliding sites?

The average number of flights per pilot has without a doubt increased since we started planning our days flying by looking at the actual conditions and not by those forecast by Météo France, which are rarely accurate thanks to microclimatic phenomena.

It is therefore self evident that we should consult windtalkers, whether by radio or smartphone, relayed by 'diabolical' electromagnetic waves to the Internet and to the FFVL's server. Obviously, you can theoretically fly without a vario, at least near the ground. Certain purists actually do, but I challenge them to compare the difference, when flying far away from any relief which they can use as a visual reference. How can you tell the difference between going from a descent of -3 to -1 m/s and going from zero to + 2 m/s... both will feel the same? Looking at books and studying XC flights on servers like XContest or Cargol are far from useless 'games', and not just for those new to flying XC, who the night before a promising looking day, do a virtual flight in the footsteps of more experienced pilots, so that the next day they can throw themselves, perfectly prepared, along the same prestigious route...

And what about all the pilots whose lives have been saved since 2008 when we introduced and tested the first satellite trackers like the Spot, allowing us to follow the tracks in real time of every pilot flying with one? At the time, our articles provoked numerous comments along the lines of 'not more gadgets...' Since then, numerous pilots have started using them, and we've all heard of cases of free flyers who have had accidents and been saved thanks to their satellite trackers...

Of course, being well equipped electronically, doesn't prevent us from going on a long walk in to an unknown site without a windtalker, only to find that the wind is in the wrong direction when we get there... But neither does it prevent us from making the most of hours of meditation waiting hopelessly for a change of wind direction... And to then finally walk down on foot in the last rays of sunshine. Quite simply, those who go the furthest can also end up doing the least!

Sascha Burkhardt,
Editor of *Voler.info* & *Free.aero*

TEST: A BLUETOOTH VARIO FOR LESS THAN 70 EUROS...

BLUEFLYVARIO



Hi-tech at a low price? Is that a contradiction? Alistair Dickie, a pilot and Australian amateur manufacturer, has developed an acoustic vario which can communicate with a GSM telephone via Bluetooth... for less than 70 euros. We tested it...

The price of flying instruments has fallen considerably: This happened in the wake of manufacturers like Flymaster, Skytraxx and Syride, amongst others, (who offered the first instruments that were nicely finished off and at surprisingly low prices), moving the market trend towards affordable instruments for all pilots. Alistair Dickie, an Australian pilot and amateur manufacturer, has also now launched a Bluetooth instrument at an unbeatable price. If the case looks very rudimentary and unprofessional, the necessary functions are nonetheless all there. After ordering the vario from the

manufacturer's website 'Down Under,' the pilot then waits twelve days before receiving a plain envelope containing the instrument...

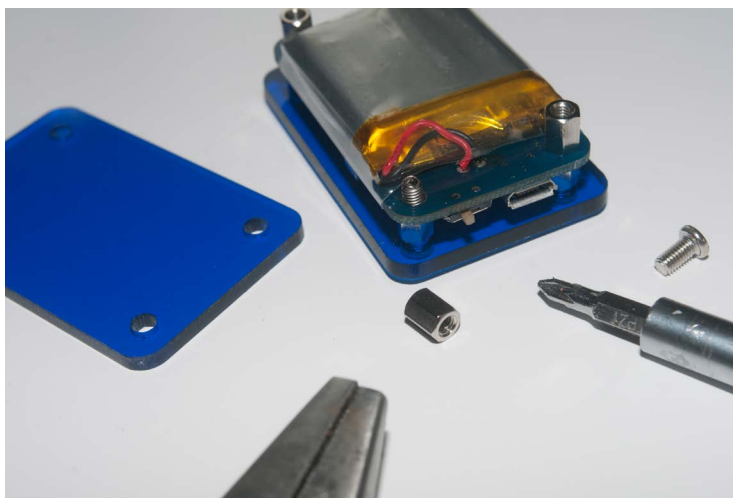
It arrives in kit form. Have a pair of pliers and a screw driver at the ready, and in less than 15 minutes the instrument will be assembled. Sending it out as a 'kit' in an envelope is part of the business model. It is the only way to offer quick delivery, postage and packing included from Australia for such an astonishingly low price... After having charged it up via its Micro USB socket (whose only purpose is for

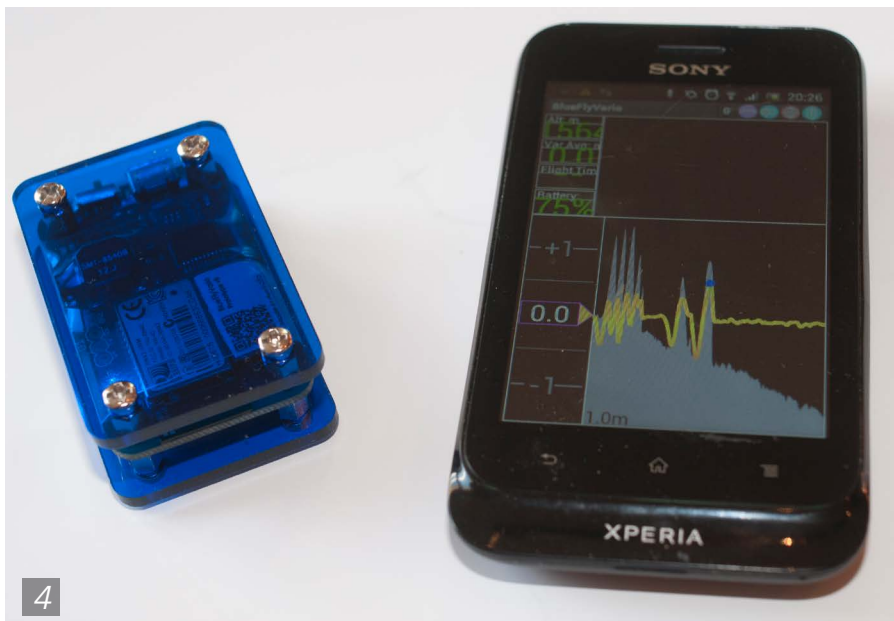
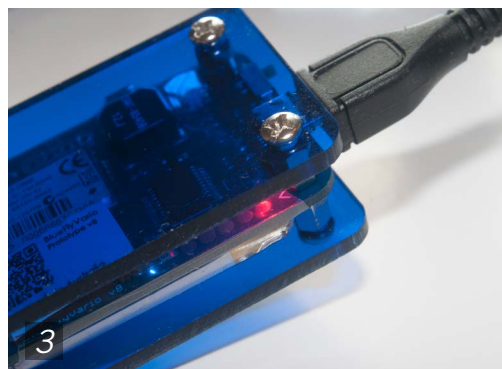
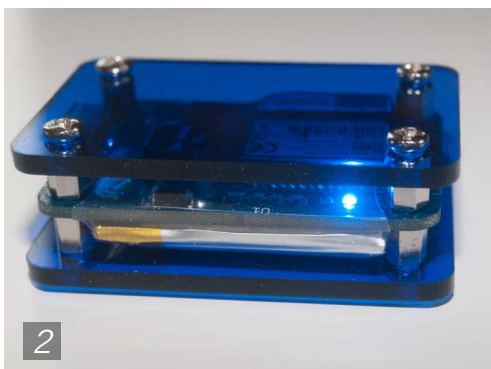
charging rather than data transmission), the instrument is ready to fly. Certainly the cover is very crude compared to conventional instruments, but it is very easy to tie a bit of line round one of the bolts which form the corners of the assembly, and a bit of Velcro sticks no problem onto any of the flat surfaces, so that you can stick it onto your flight deck for example. A helmet mounting isn't really necessary as the sound is surprisingly loud and easy to hear. In its basic setup, the acoustics are excellent. It won't distract pilots who are already used to the noise of a vario. Apart from that, its sensitivity is very good.



In less than quarter of an hour, the instrument is ready to be used. It weighs about 40 grammes. The circuit board is partially covered by a film, but the instrument is far from being sealed against dust or water. The case being mainly open contributes on the other hand to the acoustic qualities of the vario. The sound is loud and clear, in this respect the instrument is amongst the best on the market. Its sensitivity is also very good.

After ordering and paying about 70 euros via Paypal, the instrument arrives in a plain envelope. Its manufacturer is an Australian pilot and geek, who had the idea of making the Blueflyvario during a long period of convalescence after a paragliding accident...





1. The battery charges in about 2 hours, and has a life of 10-12 hours, enough for any 'normal' flight. The pilot can even plug in a supplementary power pack during flight.
2. The blue LED shows that the instrument is ready for Bluetooth pairing (classic and not LE) with an Android telephone.
3. The USB socket is only for charging the instrument, the red LED indicates that it has finished charging.
4. The Blueflyvario is amongst other things intended to be used with an Android smartphone. The designer will, if asked, send all the necessary information concerning the protocol used and the values sent by the Bluetooth serial port, thus encouraging the development of applications other than that which is offered free. The latter (see photo) in any case is already very effective. On the other hand, the Blueflyvario isn't compatible with Apple telephones or tablets.

MINI VARIO AND MORE

In addition to being used as an acoustic mini vario, the Blueflyvario can connect, via its Bluetooth interface to an Android telephone. In the Google Play-Store, the manufacturer offers a free application for an Android tablet/telephone. After establishing the Bluetooth connection no problem, the application displays a well designed, practical screen. In addition to the normal

information displayed; rate of height gain/loss, altitudes based on barometric values, it offers a comprehensive display showing a trace of the vario values and the flight altitudes over the last 60 seconds. This type of display is more and more commonly integrated by the manufacturers of classic instruments as well, a great help for getting back into the thermal. The analogue vario indicator also forms the origin of the vario

trace – very practical! The ground speed as well as the current heading are also displayed on the main screen, but these values are obviously based on the GPS which is integrated in the smartphone and don't come from the Blueflyvario. If requested, the application can also use the GPS from the telephone to recalibrate the altitude. So even the basic display is already very practical, apart from a small

full range of freeflying & paramotor wings



fault on the screen of the xPeria at the start of the range where some figures, in the factory setting, are displayed a bit too big compared to their display field. This isn't a problem as one of the strengths of the Android Blueflyvario application is the numerous configuration possibilities available. The size of the display fields, the font and the colour can be changed by a simple click of the finger. It's the same for the vario acoustics: The user can also configure the sounds produced by the telephone and by the vario. It's similar to ASI's excellent FlyNet; the vario is silenced whilst it is connected to the application, leaving the phone to look after the sound. Without the Android smartphone connected via Bluetooth, it's the vario itself which beeps. Coming from a larger company, the ASI vario communicates just as well with iPhones and iPads as with Android phones. Whilst for the Blueflyvario, its amateur manufacturer hasn't taken the lengthy and expensive steps required by Apple to be compatible with anything other than a Bluetooth headset protocol. In the air, Alistair Dickie's vario is therefore limited to the Android universe. On the other hand, at home, it can be interfaced with a

Windows computer, so that the parameters can be easily changed on a big screen with the help of a Java application. The equivalent Mac application unfortunately doesn't work with an Apple running Mavericks, being incompatible with the most recent version of the Mac operating system. In every case, the numerous settings on the vario can be changed no problem by using the Android application. The pilot can thus configure the vario's behaviour when it is disconnected from the telephone and used just as a mini vario. This is an advantage compared to the other products on the market.

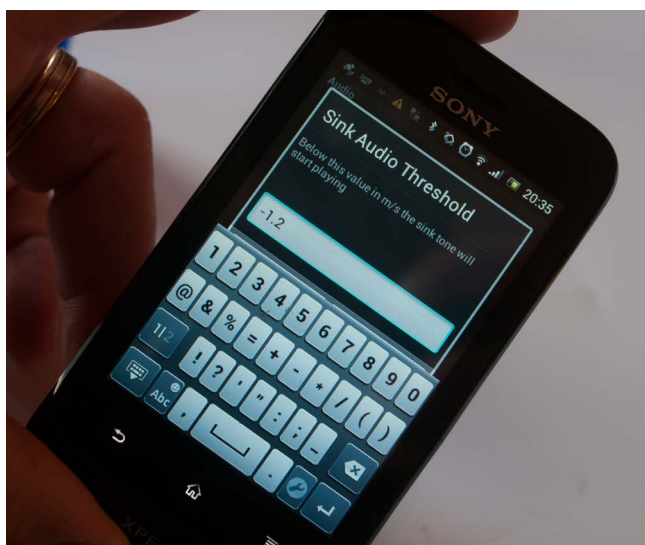
SUMMARY

Numerous adjustments are possible, whether whilst using it as a mini vario on its own or, connected to an Android application, giving the user unusual freedom. The instrument is very responsive and practical. Its case is a bit crude and far from sealed, even if the circuit board is partially protected by a plastic film. It's a shame that this vario with its numerous possible settings is limited to the world of Android. The only alternative for iPhone users: The more professional product,

better protected and easier to use, ASI's Flynet 2. In addition it also interfaces with the very professional application, AirNav Pro, on the iPhone/Pad. On its server, ASI also offers services like live tracking. More than 2000 users have subscribed and registered nearly 50,000 tracks. It is therefore understandable that the Flynet will be more expensive: 199 euros compared to 70 euros for the Blueflyvario. In addition, ASI the manufacturer of the Flynet instrument is working on a new version with a small Bluetooth 4 LE (Low Energy) chip, which makes it extremely economical and compatible with the latest technology networked instruments (such as Google Glass).

In reply to the initial question: Yes, hi-tech at a low price, it exists and it works, in fact astonishingly well, but the differences are obvious, firstly the appearance of the case, secondly with regard to the compatibility and the extra services offered by the manufacturer, as well as the amount invested in future development...

www.blueflyvario.com

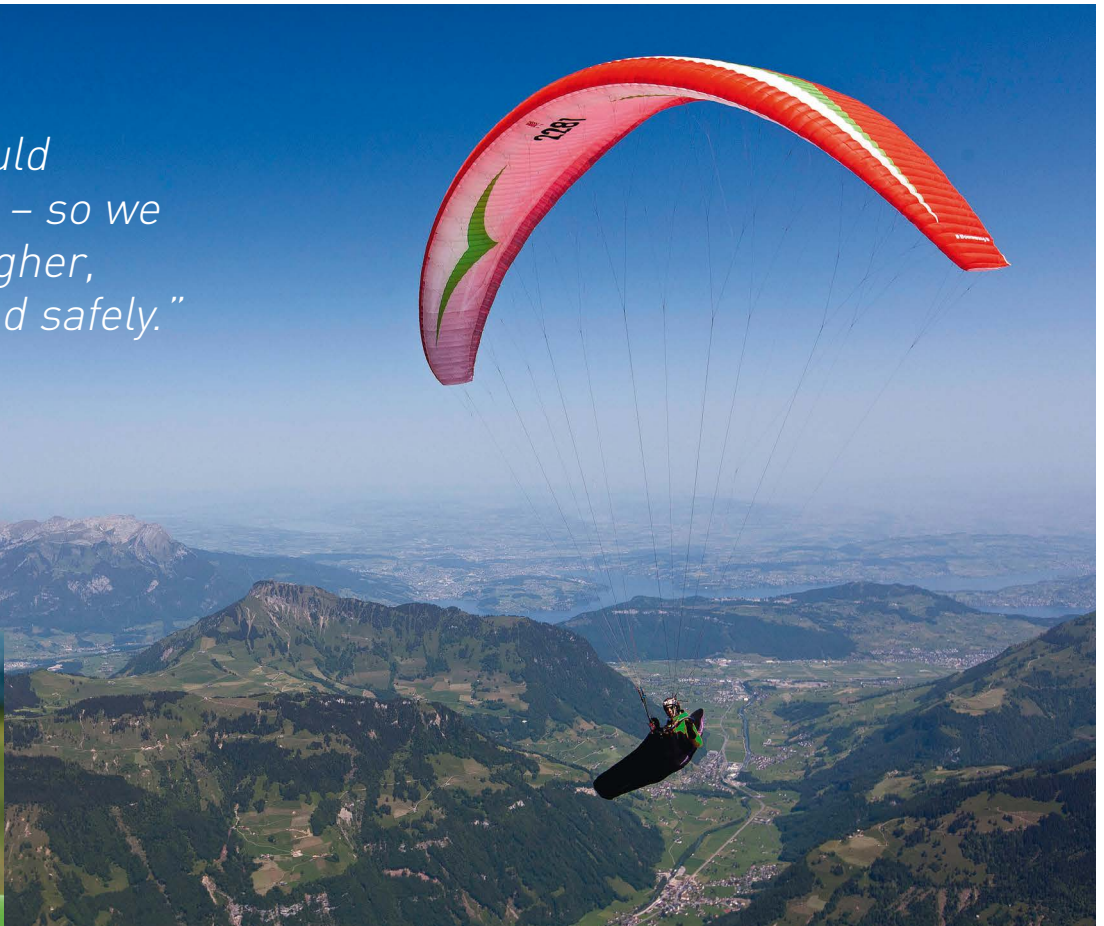


The numerous settings on the vario can be adjusted via the Android application. Not just the acoustics whilst the telephone is connected to the vario, but also the vario's settings when it is being used unconnected as a simple acoustic vario.



"Technology should support us pilots – so we can fly longer, higher, further, faster and safely."

Jörg Ewald
New head of Flytec



Flytec realizes flying dreams!

Jörg Ewald is an experienced engineer, passionate paraglider pilot and the new head of Flytec. As an active competition, cross-country and tandem pilot, he has high expectations of a variometer:

"At Flytec our goal is to build flying instruments that excite us, on the ground and in the air. To reach my goal in flight, it is sometimes necessary to thermal higher than initially planned. This too is what we are doing now with our new variometer. Our team continues its development work for our new generation of instruments in order to make sure that the end product will excite all of you too."

For the future, Flytec aims to make the joy of free flight more accessible by taking the technical support for free flying pilots to new levels. Peter Joder and Lorenz Camenzind, who established and grew Flytec for 31 years through high precision technology and ground breaking innovations, have laid the foundations. Jörg Ewald and his team will transport their legacy into a new era, where Flytec supports all pilots to realize their flying dreams.

“Tom, Dick and
Harry’s site.
Southerly
25 km/h...”



PIOUPIOU THE WINDTALKER FOR EVERYONE?



Pioupiou: The windtalker which is supposed to make the meteorological measurement network democratic. According to the designer of this online sensor which costs 199 euros, weather forecasting in the future will be shared. All the Pioupiou weather stations allow public access to their raw measurements and in real time.

The network of weather stations on sites in France is a fantastic tool for finding out about the aerology at any given time, including before and during a flight. It could now also be supplemented by information from personal windtalkers positioned on the smallest of hills...

For decades a network of windtalkers has crisscrossed the French mountains. They are particularly high performance; many were put up thanks to FFVL competitions, unique in Europe, this source of valuable information is envied by many other countries. Almost all the important sites have them. They give precise readings of the aerological conditions at take-off, and are a very reliable way of judging the current flying conditions. Initially, the

windtalkers only transmitted by radio, on 143.9875 MHz. Increasingly frequently, this means of communication which is very useful at take-off and in the air, is supplemented by information on the Internet, allowing pilots to judge the aerology whilst still at home. Due to the cost, the new technology in these weather stations isn't available to everyone, with a price tag of about 2,500 euros; this type of device is only accessible to flying clubs or other associations that are big enough.

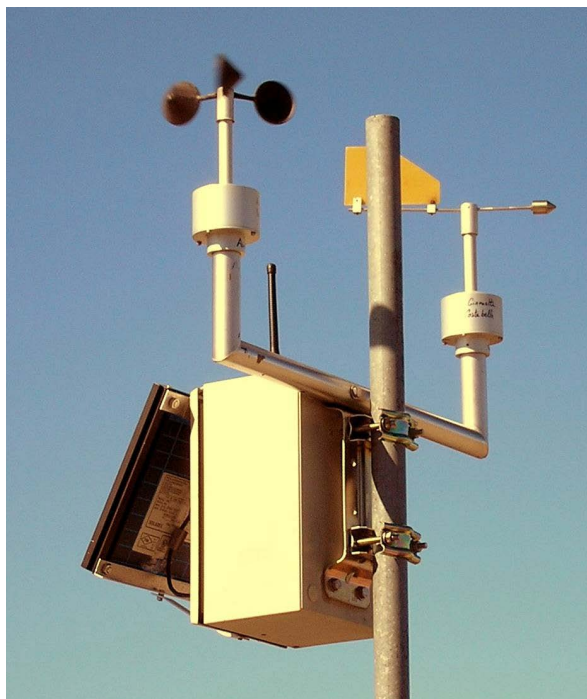
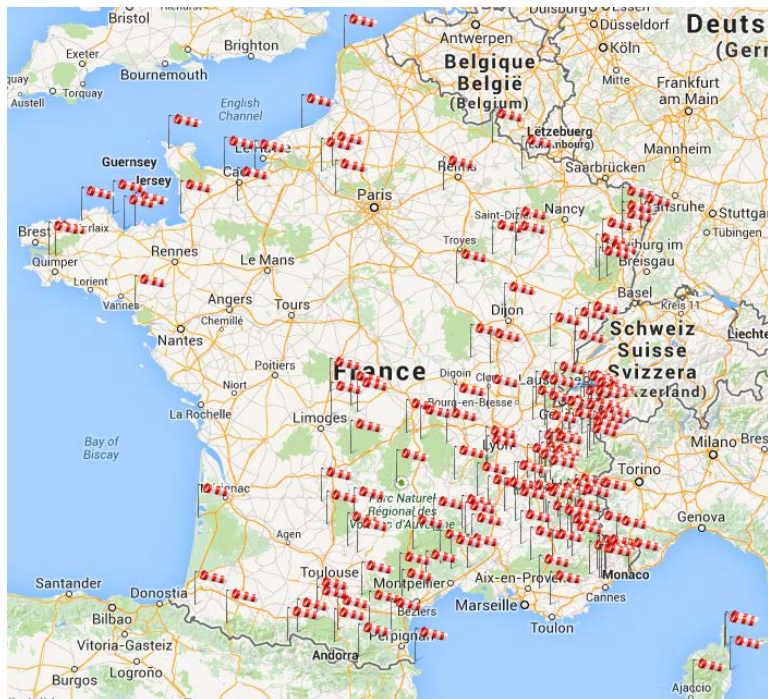


Photo : www.spirit.net

A classic windtalker like those found on the big sites in France. Good tried and tested technology, but its price of about 2,500 euros puts it out of reach of individual pilots. The Pioupiou windtalkers at 199 euros could change all that...



The site <http://carte.ffvl.fr/?mode=parapente>, shows all the sites with FFVL windtalkers connected to the internet. Unfortunately, it doesn't show the old ones which still just transmit by radio on (143.9875 MHz). The already substantial network of windtalkers could radically increase if lots of pilots start using Pioupious...

Nicolas Baldeck, a young geeky pilot, well known for his weather service meteo-parapente.com (initially based on the RASP model), would like to make the system more democratic. He wants the maximum number of pilots to be able to afford to have their own windtalker to put on their personal take-offs hidden in the mountains or next to a neighbour's field, thus giving an even more comprehensive network of aerological information. These personal windtalkers called 'Pioupiou,' will be on sale from the end of 2014 for 199 euros...It's possible thanks to the way the Pioupiou windtalker communicates using a radio network which the Toulousaine company Sigfox is developing everywhere in France and also abroad. This network, contrary to mobile phone systems, can cope with a very low band width in the order of 100 bit/s. This would certainly not be enough to transmit voice or internet data but it works perfectly for domestic alarm systems for example (just to say 'everything is ok' or 'alarm going off at sensor 1'), and also for devices like the Pioupiou (giving the wind strength and direction every quarter of an hour...).

A low band width also means it is easy to increase the range, (about 30-40 kilometres for Sigfox), by consuming little (with a power of 25 mW for a Pioupiou, the transmission would be 100 to 1,000 times weaker than that used in the GSM network). In addition, it transmits on the frequencies that you can use without a licence (868 MHz for Sigfox), which also reduces the cost. In real terms, the use of the Sigfox network will only cost 20 euros per year for each Pioupiou windtalker. That includes the use of the Sigfox network as well as the cost of using Nicolas Baldeck's internet server. The latter gathers together the information from all the Pioupious which communicate with each other via the Sigfox network and then puts it on the web (no more need for checking by radio). As it doesn't need much energy to transmit, a small solar panel (at a negligible cost) is all that is required to feed it. Hence the very attractive price of less than 200 euros for the Pioupiou. Nicolas Baldeck soldered the first prototypes in a pan from the family kitchen*; thanks to bulk production it has since taken on a more industrial look.

**Modern soldering is no longer done with a soldering iron, but by applying a uniform heat over the whole circuit board.*

An example showing the benefits of a denser network...

The site of Pic du Mauroux in the Pyrénées-Orientales is equipped with an FFVL windtalker. The values are available by radio as well as on the internet.

Eight kilometres away, the windtalker at the Angles site only communicates by radio. It's a pity because its readings often differ greatly from those at Mauroux.

Worse still, the excellent hike and fly site of Le Cambre d'Aze a dozen kilometres away, is often flyable when the other two sites are giving wind readings of far too strong, but nobody is aware of that because there isn't a windtalker. The only way to find out, is to go up on spec.

Once the area is covered by the Sigfox network, a Pioupiou could be put up on Le Cambre and let pilots across the Cerdagne region know for certain about an unexpected window of flyable weather...



FOR THE BENEFIT OF ALL PILOTS

If all goes well, the network which is already packed with 'Federal' windtalkers, will soon be completed, indeed overtaken, by Tom, Dick and Harry's Pioupiou windtalkers equipping the tiniest personal take-off, making it part of the network (which should, we hope, rapidly cover all of France, which still isn't the case today).

For numerous pilots, it would be an investment worth making to have a reliable way of knowing what the conditions are like at 'their' favourite site. It would also mean that this information would be available for all other pilots visiting the area, with internet access.

Going a step further, you could also use a local kite surfer's Pioupiou, in the same way that he could use one belonging to a model aircraft aerodrome or a farmer.

This network will be really useful: Often it is enough just to go ten kilometres from a windtalker to encounter completely different conditions. The denser the network of windtalkers, the greater will be our chances of taking off in a good weather window.

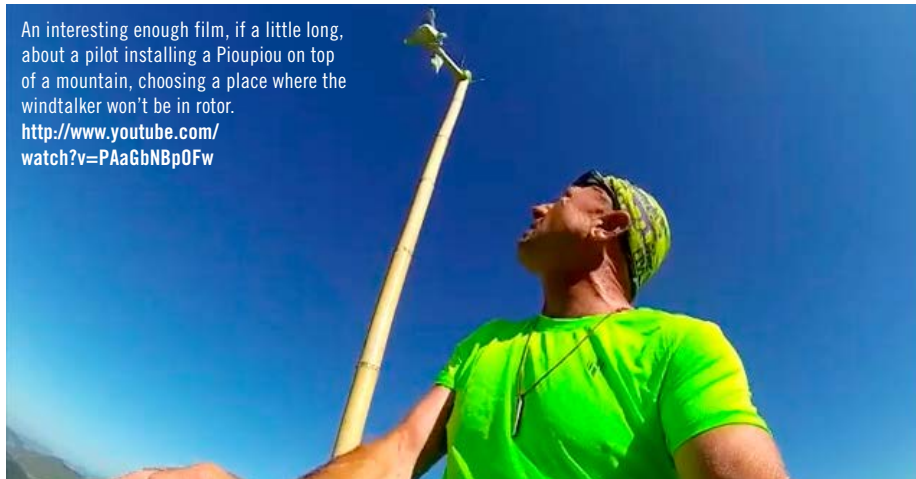
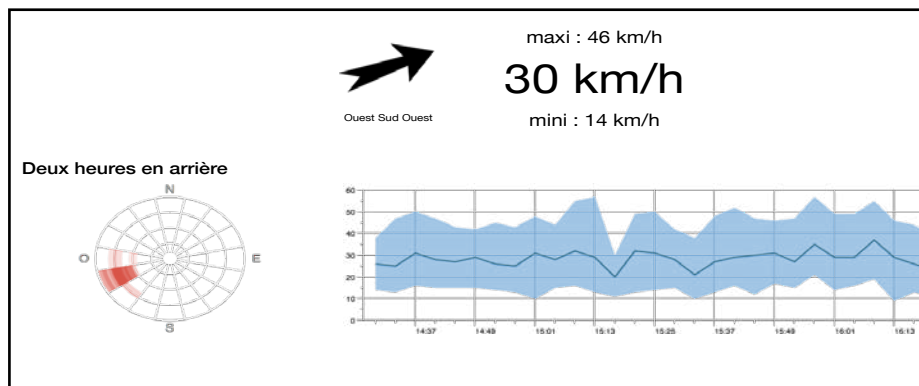
The only problem with the system is the absence of a radio transmission. To check the aerology in a neighbouring valley, the pilot in the air has to go via internet explorer on his smartphone...

For more information: www.pioupiou.fr



The electricity consumption used by this means of communication is so low that only a small solar panel is required to feed it.

An example of the information from a Pioupiou, that Nicolas's server gives everyone over the web.



An interesting enough film, if a little long, about a pilot installing a Pioupiou on top of a mountain, choosing a place where the windtalker won't be in rotor.

<http://www.youtube.com/watch?v=PAaGbNBpOFw>

SWARM INTELLIGENCE FOR A BIGGER PICTURE?

PEER TO PEER FOR PARAGLIDER PILOTS...



Photo: Team Eckert / Faculté d'Erlangen

What if all the pilots flying were to work together in a network, to better understand the aerology?

A very hi-tech project has been launched at a German university: At the centre of the team, the engineer Jürgen Eckert, who hopes to network all the pilots together, so that the whole paragliding family can make the most of a swarm or 'distributed intelligence system'. The idea being, that the varios of all the participating pilots will communicate between themselves without going through a central server and should mutually inform one another of the conditions that they are encountering at their respective positions.

We know the smartphone applications, such as ASI's Flynet app, which shows on a map on the screen the position and the altitude of the other pilots, values which are communicated via the GSM network. The main drawback is that telephone

networks are not accessible everywhere, and can sometimes end up being very expensive (roaming whilst abroad). In addition, in its current version, the ASI system doesn't give enough detail to be able to judge the quality of the thermals that your friends are using. The German university system will be totally different: The varios will communicate via their radio transmitters/receivers amongst themselves, on frequencies that are free.

Pilot A's instrument A could send, for example, its position, its altitude and its actual climb rate as a broadcast, in other words a 'round robin', by radio. Instrument B taking part, would receive the information, and show pilot B, pilot A's position, distance away and the strength of their thermal. This technology could be particularly useful around winch sites on the plain...

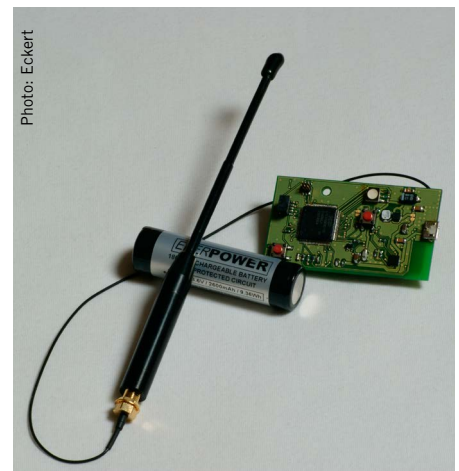


Photo: Eckert

The transceiver from the prototype currently being used by the team at Erlangen University.



Photo: Team Eckert/Faculté d'Erlangen



Photo: Air Design

Above: The method by which the transceiver would transmit the information to the pilots still hasn't been decided. A connection to a tablet hasn't been ruled out, but the team are working in particular with specific versions of the Sytraxx vario. The German manufacturer has prepared firmware adapted to the project with supplementary display pages. (Unfortunately, in this photo, none of these pages are visible). In any case, the technology will be in the transceiver.

Photo on the right: Close together like this, there is no need to be connected to a network to find out about the aerology that the other pilot is in. But as soon as the pilots get further than a few hundred metres apart, the system becomes very efficient and better than visual observations.

Below: A use for this type of swarm intelligence system in competitions hasn't been ruled out...



Photo: Daniel Tyrkas / SWING



A prototype of the SkyNet transceiver being used. Certainly in this state, the cover still isn't very sexy...

The more pilots there are, the more precise the picture that each instrument and therefore the pilot will get of the current aerology. During the first trials, the instruments could communicate over distances of up to 16 kilometres. As each instrument could serve as a node for the network, retransmitting the information to others, the information could cross mountain ranges, even whole countries. Obviously as the distance increases, the relevance of the information diminishes for those who are interested in the current aerology. Possibly over time, the system will also relay emergency calls or weather forecasts – the latter could therefore cross borders without using expensive GSM networks.

Moreover, the project also anticipates integrating windtalkers like the Pioupiou ones (see previous article) into the network.

The security aspect isn't insignificant either: Already, the top of the range instruments know how to recognize a crash by analyzing the sink rate and/or G forces. A very popular idea is that they could raise the alarm immediately with the relevant authorities, and that the rescue services would even be able to create a no fly zone around the accident, displayed on all participating pilot's instruments, to make the work of the helicopter team easier.



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- Online maps
- Nearby pilots locations and thermals proximity

New: «offline» downloadable maps (connection not necessary)



Photo - Andreas Busslinger

THE CURRENT SITUATION

At the moment, the team are focusing on optimising the transmitters to reduce their consumption. The prototypes of the transceivers, measure 8 x 6 x 4 cm (plus an antenna of 10cm) weigh 160 grammes and communicate via Bluetooth with the instruments, currently the modified Skytraxx 2.0.

The prototype tests have been conclusive: During flights in the Andes, with bases of around 3,600 metres, the participants could measure the efficiency of neighbouring thermal markers. An example: When a pilot flying at a lower

level in a thermal 300 metres away, started to climb a lot quicker than the pilot observing, it allowed the pilot observing to make the transition sufficiently early into this stronger thermal and to still be able to make use of it. The technology could equally be used in competitions, possibly including encrypted transmissions to keep the information within a team... The university team invite manufacturers and pilots who are interested to join them, to help develop this project, (if you're curious, why not admit it) in the spirit of open source/open hardware which still has a long way to go. ■

Flying in a group, already tells us a lot about the surrounding aerology by visually observing other pilots. Why not add more information by getting our instruments to communicate...?

More information is available on the project web page:
<http://www7old.informatik.uni-erlangen.de/~eckert/research/skynet/>

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TEST

IRIDIUM SATELLITES FOLLOWING YOUR TRACKS

The Delorme and Yellowbrick systems are some of the best ways to keep in contact with the rest of the world, whether flying or afterwards, wherever you are in the world...

By Sascha Burkhardt

In 2008, we tested the first SPOT satellite beacons. Since then, numerous pilots have started using them, and several rescues, thanks to these beacons, have been reported. The principle is simple: the beacon regularly transmits, for example every 15 minutes, the current GPS position of the pilot by sending the message to the Globalstar satellites which circumnavigate the Earth. The latter retransmits the signal to a ground station which publishes the

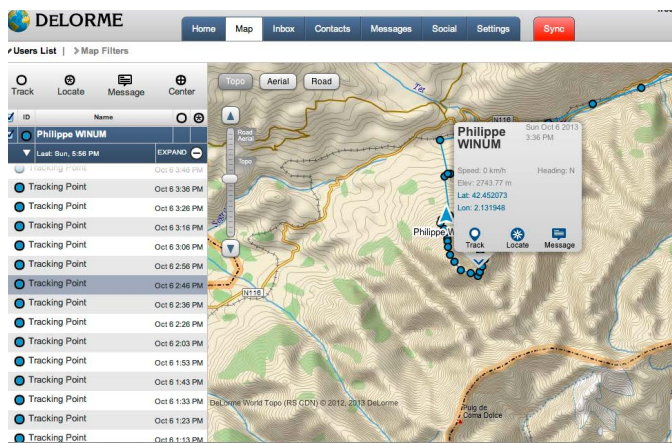
position of the pilot on an Internet map. If the pilot has an accident, he can press the SOS button to raise the alarm: A distress message with the pilot's position is sent to a predetermined recipient, or even to a rescue centre. The pilot can also press 'OK' to send a message confirming that all is well.

It's a good system which is pretty reliable, but it has serious drawbacks: SPOT doesn't transmit the altitude, and more importantly, it doesn't offer bidirectional communication. The pilot never knows if his messages or his track points have arrived. He also can't send, and worse still receive, real text messages other than 'OK, I'm alright,' or 'Assistance required', which are pre-programmed. The Delorme beacon, inReach SE, offers all that. The pilot can enter a real SMS

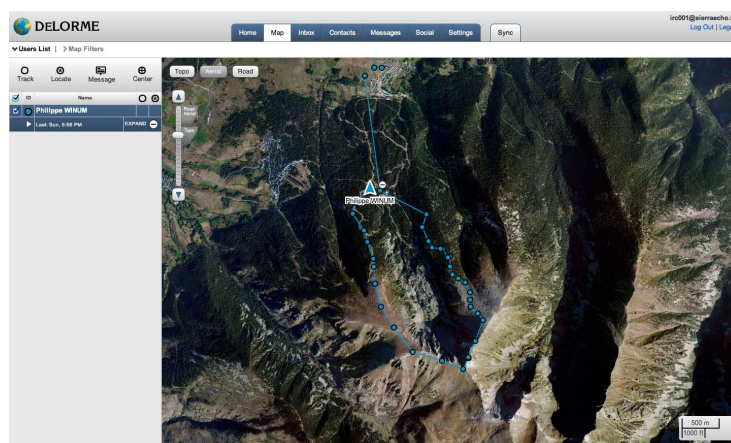
type text message using a keypad, or he can comfortably write it on his iPhone connected via Bluetooth.

The message is transmitted via the Iridium satellite network, which works anywhere in the world, contrary to the Globalstar network used by the SPOT beacon, which doesn't cover Norway for example. But above all, with the Delorme, the people you are speaking to can reply by composing an SMS type message on the company's site or indeed reply directly with their telephone.

A short time later, the message will be displayed on your satellite device or on the screen of the iPhone connected to it! During our tests, the transmission of the track points as well as the messages in both directions was always reliable.



This is how your friends and family would see your position, whether you're at the North Pole, at the Equator or simply out of phone coverage in the Pyrenees...



Obviously, it is also possible to ask for a satellite base map rather than a topographic one, for each point, the details like altitude, speed and the heading are displayed on demand.

In addition to trying it out in the air, we also tested it on a boat and whilst cross country skiing. The signal continues to get through clearly, whether you are in a forest or at the bottom of an enclosed valley. The beacon always finds a satellite in view. Contrary to other systems, this satellite system doesn't even need to see a ground station to relay the messages, the satellites pass the information on until it gets to one that can transmit it to an Iridium ground station.

This is how worldwide coverage has been achieved. It isn't just the pioneer

Delorme who uses the powerful Iridium satellite system, other service providers are using the same system. The Austrian company Pieps launched Globalfinder which equipped the competitors in the last X-Alps, so that the system would take over from a tracking point of view in areas not covered by the GSM network.

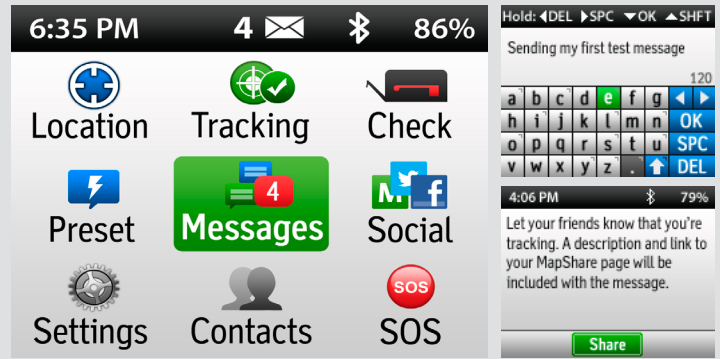
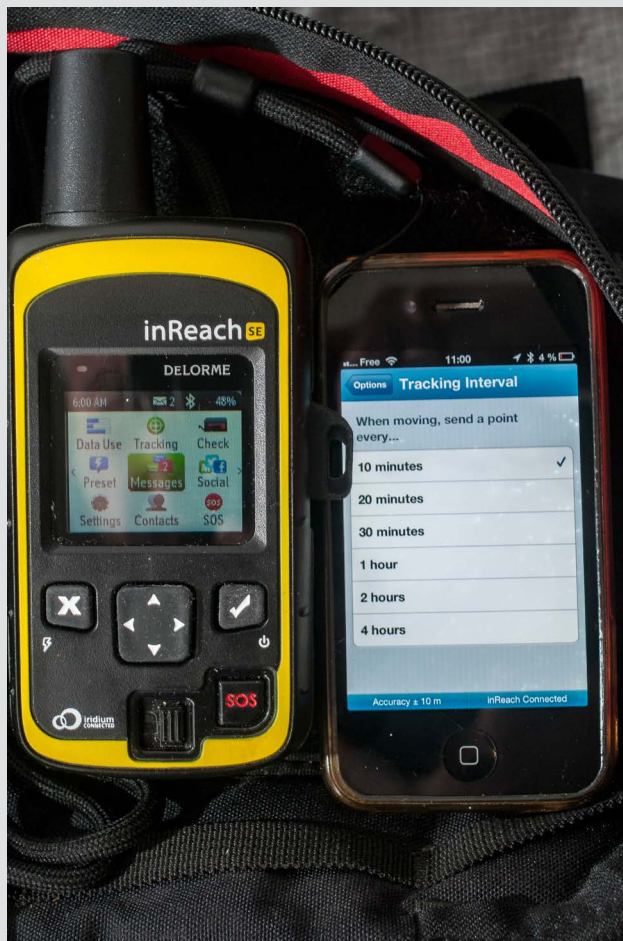
Unfortunately, despite the positive results when it was keeping up with Chrigel Maurer and the other athletes, during this first ever real-life trial, the company haven't started to mass-produce it.

The Yellowbrick is heavier than the Delorme inReach. On the other hand, its battery life is better – according to the manufacturer, for a whole month, it gives a position every 15 minutes... Much more than we need for a few days of flying before finding a USB plug again.

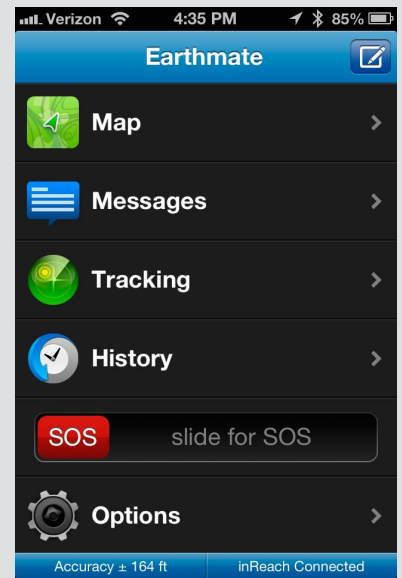
The Yellowbrick's screen only displays text. Clearly this device is particularly designed to be used paired with a smartphone. It is possible to use the YB as a 'standalone' (and even the only possibility with the cheapest version), but it is a lot more limited than the inReach one.

Photo below: The Yellowbrick charges itself via a classic USB interface.





Setting up the inReach SE is particularly straightforward in liaison with an iPhone (photo left, screenshot on the right), but you can also bypass that and set up all the functions on the instrument itself, including sending and receiving messages as well as accepting new contacts (telephone number or email) to follow your route...(screenshot above).



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Another tracker, the Cerberus, (<http://cerberus.briartek.com>), is designed more for the American market. An English company, Yellowbrick, offers an Iridium tracker in several versions. During a test outdoors we compared one of these instruments with a Delorme inReach SE beacon.

YELLOWBRICK

The principal is the same as that of the inReach SE: A beacon communicating with the Iridium system, equipped with a screen so that the user can compose messages or read the replies, without needing to plug it into a smartphone. However, in the Basic version, the simplest one costing 600 euros, the instrument only allows you to send messages to people who have been predetermined in advance.

To have more freedom, from the outset you need to choose the Yellowbrick V3 Standard (700 euros), which interfaces with a smartphone and thus gives more freedom in the configuration. The Yellowbrick can moreover use 'Hotspots' for communicating with satellites and gives a communication

service to several people travelling together, each one having their own subscription, with a separate bill...

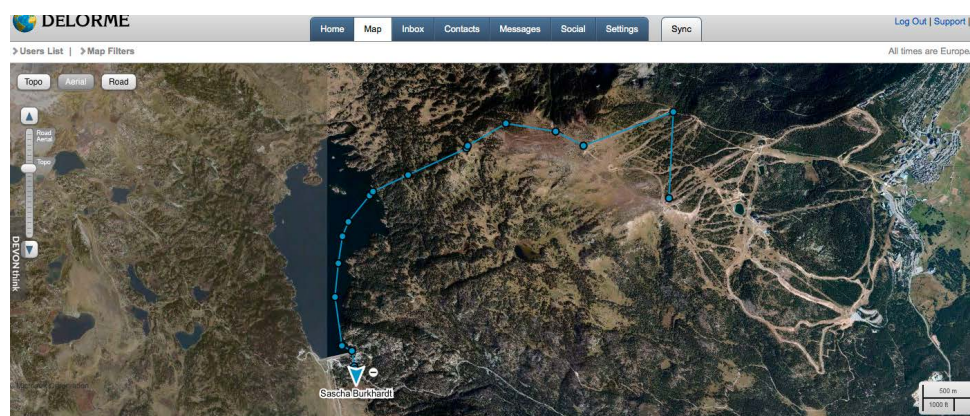
Yellowbrick is faithful to its name: It's big and heavy compared to the Delorme inReach. At 305 grammes, it is double the weight. Nevertheless, it can go into a cockpit, or even into (a big) jacket pocket. With this extra weight, you pay to be autonomous for more than a month...

SERVICES

The Yellowbrick service is billed "à la carte". Each track point and each message are billed at between 0.12 euros and 0.17 euros depending on the volume bought at the beginning. If you add a monthly subscription of 11.50 euros, you can put this on hold for several months, in winter for example. With Delorme you can also do this, but as a result, the cost of the cheapest monthly subscription goes from 9 euros to 12 euros, to have this freedom, known as the "Freedom Plan". The Yellowbrick supports a 'burst mode', which puts a track point every 5 seconds. For one hour, the cost is about 30 euros! It is obviously only for special use.



A tracklog from the Yellowbrick in fast 'Burst' mode during a test at ground level; it published its position every 5 seconds, by transmitting the position in groups of 3 (i.e a transmission every 15 seconds). It is a very detailed mode, but also very expensive: One hour costs 30 euros of credits. Such precise tracking obviously isn't necessary for normal use, and the Yellowbrick can also track in a more economical way...



Here, the same track registered by a Delorme inReach SE in tracking every ten minutes mode. At the time of our tests, it was the most detailed mode available from Delorme. It is included unlimited in the 'Recreational Plan' contract for 25 \$ per month (about 19 euros). Since then, a new 'Extreme' tariff has become available, whereby the pilot can ask for the transmission of his position every 2 minutes. Contract price: About 61 euros per month.



On the inReach SE, the SOS key is protected by a mechanical device which prevents inadvertent activation. At the time of our test, the SOS was exclusively transmitted to the telephone numbers/email addresses registered by the user. It is also now possible to configure a transmission to the GEOS centre in the USA. In our opinion, a parallel alert to close family in Europe remains essential. The Yellowbrick is also equipped with an SOS button protected by a cover. The SOS triggers its signal exclusively to contacts predefined by the pilot and not to a GEOS centre.

Delorme don't have this sort of frequency, but a new 'Extreme' tariff for more than 60 euros per month allows you to adjust the tracking to give a point every two minutes.

For our use, tracking at a rate of one point every ten minutes is amply sufficient. At Delorme, a tariff of 19 euros per month includes unlimited use of this latter rate of one point every ten minutes. It certainly isn't a give away, but it is the price you need to pay for safety and the comfort of being able to communicate, wherever you are in the world. With this tariff, there are also 40 free messages included. Each extra satellite SMS costs 40 cents.

It is also true for incoming messages: On the Delorme website, anyone who knows your 'Delorme address' can update your position (if you aren't in tracking mode) and send you a message at a tariff that will be deducted from your credit.

Hence the need to protect this access with a password that you only give to your friends and relatives once. At Yellowbrick, people's names and their email addresses must be pre-authorized; this allows them to easily send you an email that Yellowbrick then sends to your receiver. With Delorme, you can't send a mail directly to the tracker; you need to either go onto the Delorme website and enter it into a form, or reply via SMS from a telephone, after having yourself received an SMS from the tracker. After that, the conversation can

easily continue as an SMS exchange. A big disadvantage with Yellowbrick is that if the instrument isn't in tracking mode, you can't locate it via the website and automatically check the messages. The Delorme on the other hand always stays 'listening' to everyone else and also allows you to refresh the position remotely.

SUMMARY

For us, the verdict is clear. The basic tracking function works very well on both. On the other hand, the Yellowbrick is bigger, heavier and less flexible to use. Billing 'à la carte' isn't an advantage; it is best to choose a Delorme with either a 9 or 19 euros a month tariff, the latter having the advantage that it offers unlimited tracking.

Another big advantage of the Delorme inReach SE is the possibility of using it on its own; without a connection to a smartphone, you can adjust and do everything on its integrated screen. The connection to a smartphone is an added comfort, for example for entering SMSs, but it isn't an obligation, contrary to the Yellowbrick, in which the possibilities are limited in the absence of a smartphone.

Compared to a Spot, the Delorme inReach SE is 100 euros more expensive (279 euros versus 179 euros for the SPOT), but the freedom to be able to communicate in both directions isn't just an element of convenience, but also one of safety. ■



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**Créations originales
imprimées à Annecy**

DELORME INREACH SE

- Iridium satellite network, covers the whole globe
 - Two way communication (sending and receiving of text messages, transmission of positions)
 - Colour display
 - Dimensions 62 x 26 x 149 mm
 - Weight 172 g
 - Watertight: IP 67 (under 1m of water for 30 minutes)
 - Shock resistant
 - Works all over the world. Can be used on its own or combined with an Android telephone or iPhone/iPad.
 - Battery life of about 100 hours in tracking mode 1 point/15 minutes.
 - Price: about 279 €
 - Examples of tariffs: (<http://www.inreachdelorme.com/product-info/subscription-plans.php>) 'Safety Plan' tariff, 9.25 euros per month, 10 messages included, extra messages 0.39 euros, tracking 0.08 euros per point, maximum frequency of tracking 1 point/10 minutes.
 - 'Recreation Plan' tariff 19 euros per month, 40 messages included, extra messages 0.39 euros, unlimited tracking included, maximum frequency of tracking 1 point/10 minutes.
- <http://www.inreachdelorme.com>



YELLOWBRICK V3

- Iridium Satellite network, total global coverage
 - Bidirectional communication (sending and receiving of text messages, transmission of positions)
 - Monochrome display
 - Dimensions 144 x 76 x 36 mm
 - Weight 305 g
 - Watertight IP 67 (under 1m of water for 30 minutes)
 - Battery life of about 1 month in tracking mode 1 point/15 minutes.
 - Price according to the version, change of version possible via software update.
- Some examples:
- YB with Basic tariff about 600 euros, works without connection to a telephone, limited possibilities. Sends messages to predefined addresses only, tracking possible.
- YB with Standard tariff about 700 euros, liaison with an iPhone, iPad or an Android telephone via Bluetooth, sends messages to a recipient of your choice.
- Monthly cost: 11.50 euros, with the possibility of temporary suspension of the tariff. Tracking: Each track point and each message are billed between 0.12 euros and 0.17 euros according to the amount of credit bought in advance.

<http://www.yellowbrick-tracking.com>

As a comparison

SPOT GEN 3

- Globalstar satellite network, limited worldwide coverage
- One way communication (sending of predefined messages, transmission of positions)
- No display
- Dimensions 87 x 65 x 25 mm
- Weight 114 g
- Price 179 euros. Tracking tariff 14 euros / month

www.findmespot.eu/en/ and www.sierraecho.fr





Photo: Véronique Burkhardt Pilote: Sascha Burkhardt

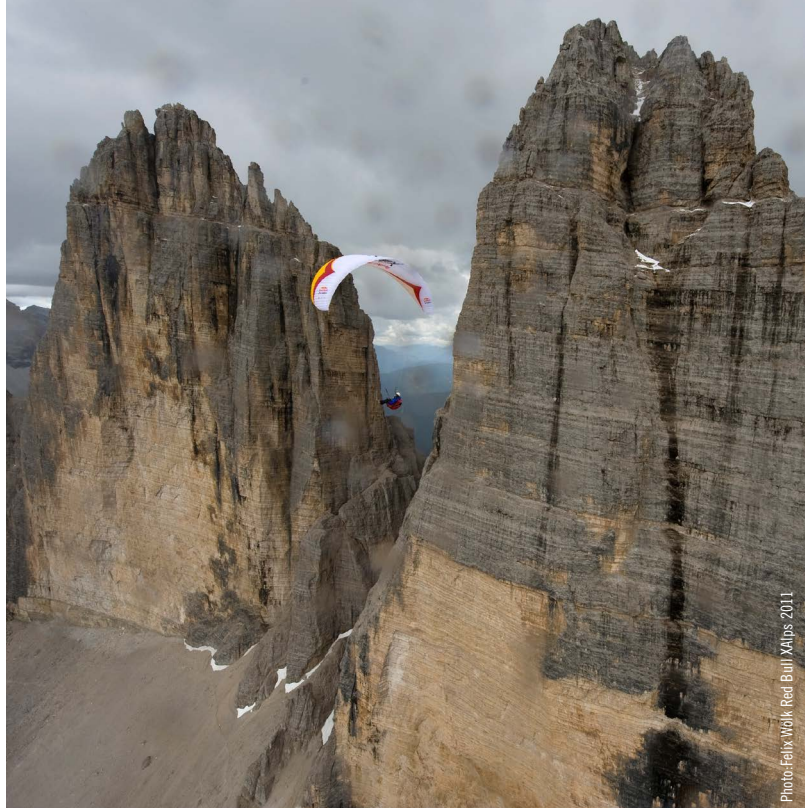


Photo: Felix Wolk Red Bull X-Alps 2011

OUR POINT OF VIEW...

APPALLING, INADMISSIBLE...

Five years ago, the Rio-Paris flight disappeared into the sea; it took two years to find it. At the time, most paraglider pilots asked themselves, how could this possibly have happened, with all our modern technology, how could these highly sophisticated planes be so poorly tracked? The absence of regular tracking meant that the rescue team looking for potential survivors wasted a lot of time.

We all imagined that obviously that would quickly change, because even XC pilots on a budget of just several thousand euros are tracked by satellite, relaying their position every ten minutes. This type of 'minimal' tracking which costs little could have changed everything; in ten minutes, an Airbus only travels about 150km, that would have allowed a radical reduction in the search area after the loss of signal following the destruction of the plane, or its sinking. In March 2014, the Malaysia Airlines plane with 239 passengers onboard disappeared. There, without reliable tracking, the search really took on a ridiculous size. The authorities didn't even know whether to look in the northern or the southern hemisphere...

And yet it's acknowledged that a simple tracking system like the Delorme one would be able to function just as well onboard a Boeing 777, at an altitude of 10,000 metres, at 900 km/hr, as onboard a paraglider at an altitude of 3,000 metres at 30 km/h. Of course, after adaptation and especially the essential heavy aircraft certification, the device would no longer cost only 250 euros.

But the price would without a doubt be nothing like the search costs resulting just from looking for the last two planes which have disappeared. The cost of looking for Air France AF 447 was estimated at between 80 and 100 million euros, the search for MH 370, the Malaysian Airlines plane, which is still ongoing, exceeded that figure within the first six weeks... It isn't just appalling, but also inadmissible that in 2014, we don't even know which hemisphere to look in for a missing plane, which cost 300 million euros, with 239 people onboard, when the XC flights of a growing number of paraglider/paramotor pilots, flying alone on an aircraft costing less than 8,000 euros, are continuously tracked...

Sascha Burkhardt

Left: LED navigation lights put together totally legally on a paramotor – no need to have them certified...

Moreover, the freedom that we enjoy in ultra-light aviation often encourages the adaptation of new technology to our needs, well before it appears in heavy aviation, which is subject to certification obligations.

An example: In the nineties, when the first portable GPS like the Garmin 38, were being widely used by numerous paraglider pilots, some airline pilots still hadn't even seen this type of instrument... It was only a lot later that GPSs, after certification, had the right to back up the inertial navigational systems...

For satellite trackers it's the same; a pilot who wants to equip 'his' plane with a Delorme style satellite tracker officially has no right to do so, as it is an uncertified transceiver...

Photo on the right: The Red Bull X-Alps races are now tracked both by systems using GSM and by systems using Iridium, to assure continuous tracking... It isn't just for security, but also and especially, for media coverage of this fantastic event...



A CAMERA FOLLOWING IN YOUR TRACKS...

GoPros and other Action Cameras have also invaded the skies, attached to our helmets or telescopic perches. Pilots can bring home superb souvenirs of their flights. The composition is even better if the camera follows you from a dozen metres away...

Drones are being used more and more in photography or for aerial filming. They even represent serious competition for paramotor photographers who use their aircraft as a work tool.

Recently, drones have also been used in paragliding, for example, to film competitors flying in the Paragliding World Cup. The organization photographer, Philippe Broers, has a DJI Phantom 2 (<http://www.dji.com/product/phantom-2>), which cost less than 700 euros. The stabilized system has a GoPro 3 onboard.

Its battery life is unfortunately limited to 20 minutes of flight, but out with this restriction, the gain in freedom it gives for shots is remarkable. In 4 well planned flights, the drone can cover the most important moments in each competition.



A film containing scenes shot by Philippe's drone:
<http://vimeo.com/101270219>

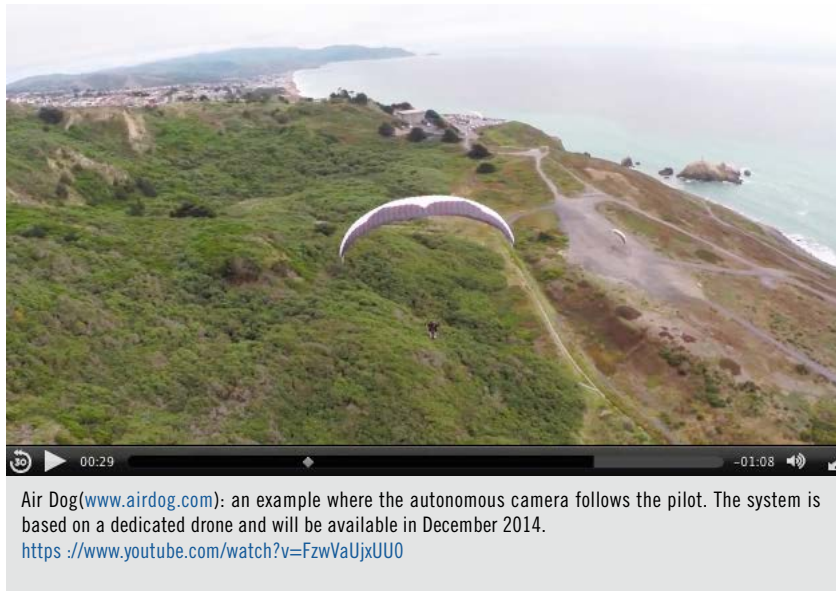
Left Philippe Broers, cameraman and chief PWCA film maker
(Photo: Ulric Jessop)

Theoretically, at least in the footage shot near take-off, Philippe could use a smartphone to see what the camera is filming, but there is a non trivial delay in transmission.

Philippe is therefore happy to fly the drone 'by feeling' and to visualise the current frame. He can fly pretty close to the competitors, but leaves big security margins.

YOUR PERSONNAL ROBOT CAMERAMAN

Soon, you'll be able to be followed by your own autonomous system. For outdoor sportsmen and women, from skiing to paragliding, there are at least two companies who are working on guiding systems for drones which, after taking off don't need human intervention.



Compact power

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Watch the movie!



ADVANCE SIGMA⁹

Thanks to an app on the sportsman or woman's smartphone, communicating their position, his/her speed and other information related to movement (i.e. a gyroscope), the drone receives the position of its 'target' and follows it exactly, whilst respecting a predefined separation distance.

We still haven't had the chance to test this equipment, but the system has no doubt got potential...well beyond that shown in the first films produced by the designers. With an anticipated price of around a thousand euros, the budget for the automatic cameraman doesn't seem prohibitive. On the other hand, the poor autonomy of drones is a severe limitation – they wouldn't be able to follow you on an XC flight, even a small one... ■



Vanessa Andrieux



The Hexo + system: On sale soon, the autonomous cameraman doesn't come with a specific drone, but will be adaptable to a multitude of drones available in the shops. The shot can be adjusted on the sportsperson's smartphone which acts as a beacon...

<http://nextlevelaerialfilming.com>

Senso Sport

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Photo Michel Farrugia

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Reflex wings with a bit of bite thanks to elaborate algorithms: On wings like this Ozone Viper 3, the reflex technology is coupled with a SharkNose. It is without a doubt, the new trend...
Photo: Ozone

HI-TECH FOR WINGS AND HARNESSSES

Hi-tech isn't just synonymous with electronics. In the design of our wings and our harnesses, hi-tech brings performance and unexpected reductions in weight. Examples...

By Sascha Burkhardt

In paramotoring, reflex profiles have brought gains in speed as well as a stability which would have been unthinkable a decade ago. The first prototypes and the first production wings from the 'God of Reflex', the Brit, Mike Campbell-Jones from Paramania raised suspicion, particularly amongst pilots. But the technology wasn't even new, as it was already used by gliders in the middle of the last century, but it's the application to our paraglider's flexible wings that seems incongruous.

THE REFLEX STARTS TO BITE...

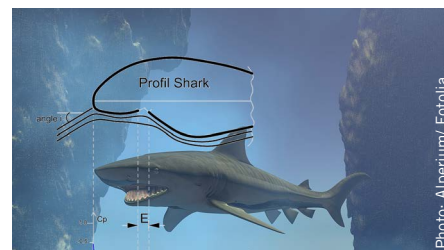
Today, almost all the manufacturers of wings for paramotors have adopted this type of profile for at least one wing in their range. The next little revolution will be the addition of a thoroughly 'hi-tech' SharkNose: Our article 'SharkNose' examined the subject in detail, looking at the first prototypes from Ozone which appeared four years ago. Today, more and more manufacturers are adding a SharkNose to their paraglider/paramotor profiles, because the advantages seem undeniable.



As in the picture of this Niviuk Kougar 2 reflex wing, the SharkNose is being added to more and more intermediate wings, both paraglider and paramotor.

The distinctive feature of the SharkNose profile is their capacity to maintain a high internal pressure over a wide range of angles of attack. The wings which are thus equipped stay, for example, more solid at high speed. Logically you would therefore first think of using it on competition wings, where speed is of prime importance. But very quickly the benefits for flying slowly with large angles of attack were realised. The wing retains its shape longer at low speeds, the brake travel increases, the tendency to go negative diminishes. Even taking off becomes easier. To get these

results, the designers had to optimize the shape of the air intakes, using calculations and advanced simulations, another example of how hi-tech has brought advantages that were unimaginable even just a few years ago. By combining reflex technology, the construction of paramotor wings has therefore made huge advances. Reflex paragliders still being more sluggish wings to launch and to handle, adding a SharkNose to the Ozone Viper 3 and others like the Niviuk Dobermann, gives them an extra bite at this stage of the flight as well...



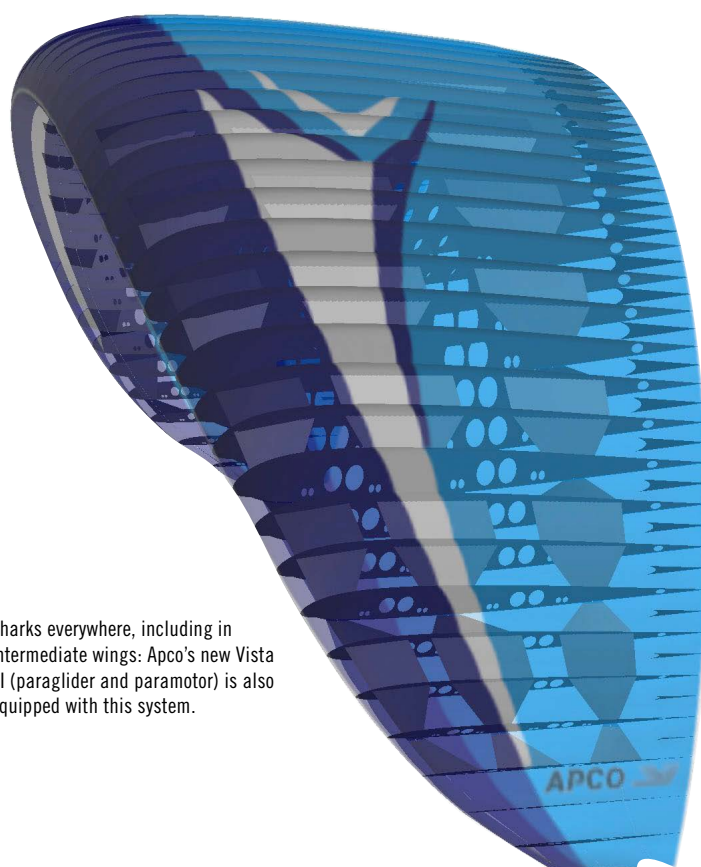
The nose trend: The manufacturers are discovering that the benefits of SharkNose are evident over a range of angles of attack, and especially in the low speeds...



Ozone's Viper 3 is a wing for experienced pilots, but the new Roadster 2, an intermediate wing, will also combine reflex and SharkNose. Photo: Ozone

This technology also perfectly supports another current trend: the reduction in surface areas, in the order of 15m^2 and 250 cm^3 in paramotor slalom competitions. Small surface areas are normally more sensitive at low speeds, reducing brake travel and the margins before stalling (true for paragliders as well as paramotors). With the Shark, you are able to compensate at least partially for the short comings of smaller wings...

Obviously these advances will be combined with other significant improvements over the last few years. Thanks to light modern hi-tech cloth like the Skytech 27, the wings are not only lighter when walking in, they also inflate more easily, they are more damped despite seeming more responsive, they dive less, open quicker...



Sharks everywhere, including in intermediate wings: Apco's new Vista III (paraglider and paramotor) is also equipped with this system.

The patent for the SharkNose: Putting into practice this precise geometry is easy thanks to modern tools like leading edge rods.

54 VOILURE CREUSE AVEC OUVERTURE DISPOSEE AU SEIN D'UN RENFORCEMENT DANS L'INTRADOS.

57 Une voilure creuse dont au moins un caisson (39) dispose d'un profil (32) qui présente un renforcement (31) dans son intrados et une ouverture (30) formant une prise de pression qui permet de garder une surpression interne. L'ouverture se situe au sein du renforcement qui s'étend en avant et en arrière de l'ouverture, de manière à accompagner l'écoulement sans décollement avant et après l'ouverture. Cette voilure selon l'invention peut par exemple être appliquée à la voilure d'un parapente et présente l'avantage de conserver des coefficients de pression interne élevés sur toute la plage d'angle d'incidence de vol tout en générant relativement peu de traînées parasites.

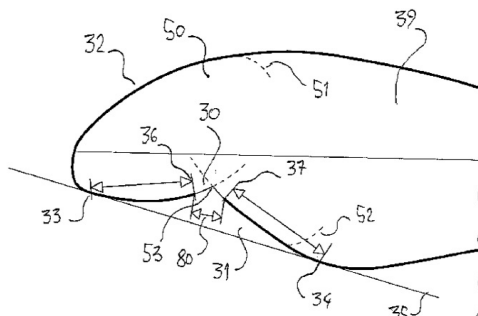


Photo: Jérôme Maupoint/GIN



Photo: Veronique Burkhardt

Leading edge rods: A revolution which is already a bit old. Lightening the leading edge by using them isn't just an advantage during take off. But it is true that during this part of the flight, thanks to them, the wings have made phenomenal progress, particularly paramotors like in this wing (picture on the right) with a completely classic profile and without a SharkNose, the Relax from Fly Market (model registered with the DGAC, Direction générale de l'aviation civile - The French Civil Aviation Authority).

Leading edge rods, a small revolution which is already quite old, has also contributed to reducing the weight of wings. Paramotor pilots in particular appreciate the advantages gained from being able to take off early in the morning, despite the absence of any breeze to help them inflate. Often, the difficulty of getting wings up is a real show stopper for those little morning flights, which are otherwise very safe. With modern technology reducing the weight of the leading edge rods holding the air intakes wide open, the manufacturers have undeniably widened the flying window available to the average pilot. ■



Photo: Veronique Burkhardt/Pilote: Sascha Burkhardt

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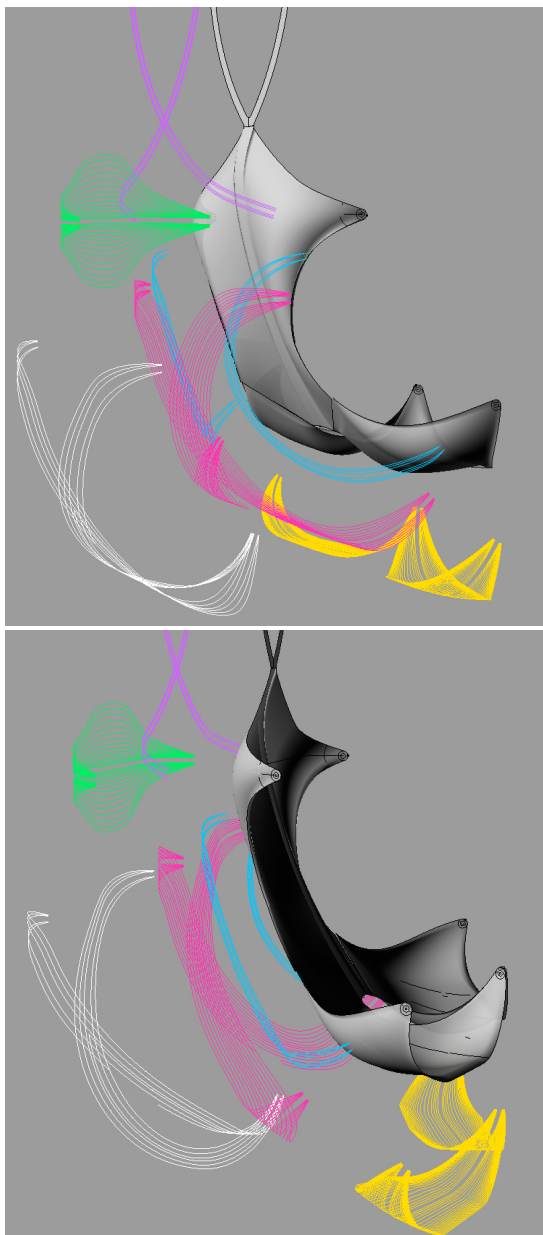
THE BET: A HARNESS WEIGHING LESS THAN 100 GRAMMES...

THE NEXT REVOLUTION IS ON ITS WAY

Reducing the weight of paraglider wings could go even further. Ozone launched a new ultra light harness at the Coupe lcare, weighing only 99 grammes. Going from 300 grammes to less than 100 grammes, is massive. The revolution isn't just about the impact on the hike and fly side of our sport, but it will also totally change the way we design our wings...

To be able to make the prototypes of the F*Lite harness, (title in full F*&%%\$%& Lite harness), Ozone are said to have completely rethought their way of designing. The designers precisely calculated the harness's force vectors, whether in tension or compression, and have placed Dyneema stitching (for tension) and carbon fiber (for compression) only at these points.

According to Fred Pieri whom we interviewed about it, the material on the harness, Porcher Skytex 27, only serves to keep the load bearing structure in position.



The calculations and the hi-tech materials: All the forces are calculated and represented in a network. The Dyneema lines and the carbon fiber are arranged according to the force vectors. It is therefore the thin Dyneema threads for example which support all the tensile load.



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Progress is happening very fast according to Fred Pieri from Ozone.
The techniques applied to the F*Lite harness could be used for designing paragliders as well.
An extra reduction in weight, of an unexpected magnitude, could be about to take off...

Fred Pieri: *'For years the problem has been how to transfer a linear load to a surface load. (Note from the editor: For example transferring a load along a strap to a surface), which often requires reinforcements which are heavy.*

For this harness where the goal was for it to weigh less than 100 grammes, we had to put the material only where it was absolutely necessary, the Dyneema lines are positioned precisely one by one. We developed an algorithm specially for that. The lines were organised in groups where each one had a role. The loads in the harness are always taken up by one of the networks, often even by a combination of several networks.'

Ozone are said to have passed the load tests at 1500 kilogrammes no problem. If this technology, undeniably very 'hi-tech', is equally transferable onto the construction of our paraglider and paramotor wings, we could make more significant gains in weight reduction whilst keeping the same life expectancy. There are certainly more surprises to come... ■

The F*Lite during and after the load test which allowed the concept to be validated. Not a single broken fiber...

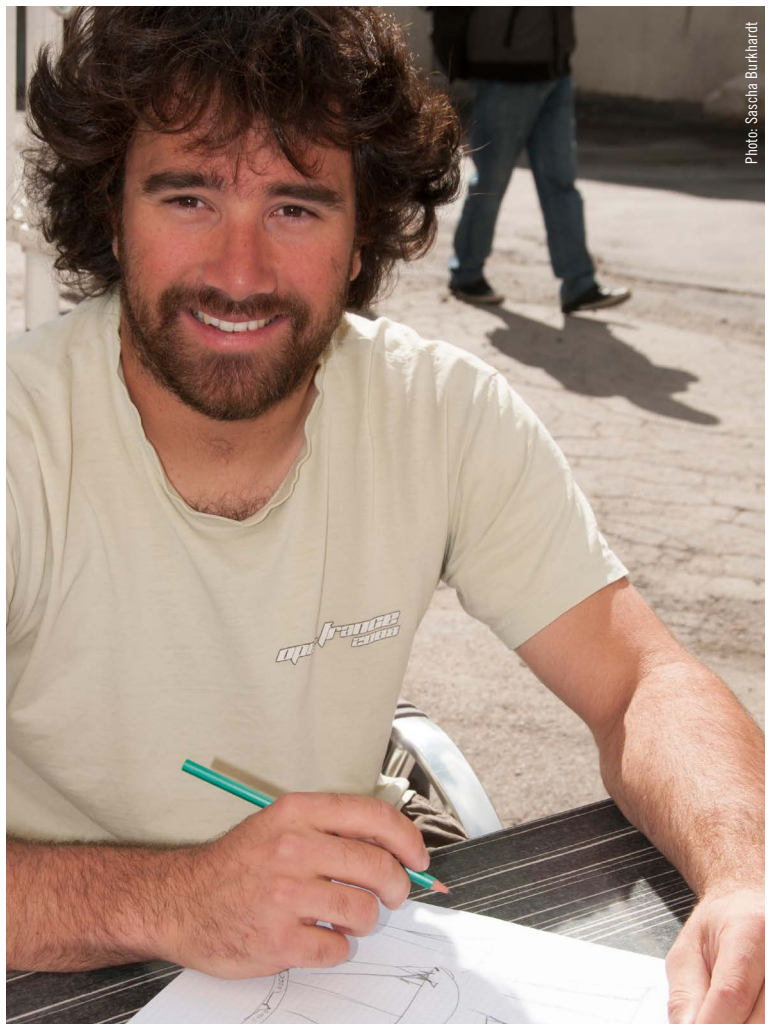


Photo: Sascha Burkhardt

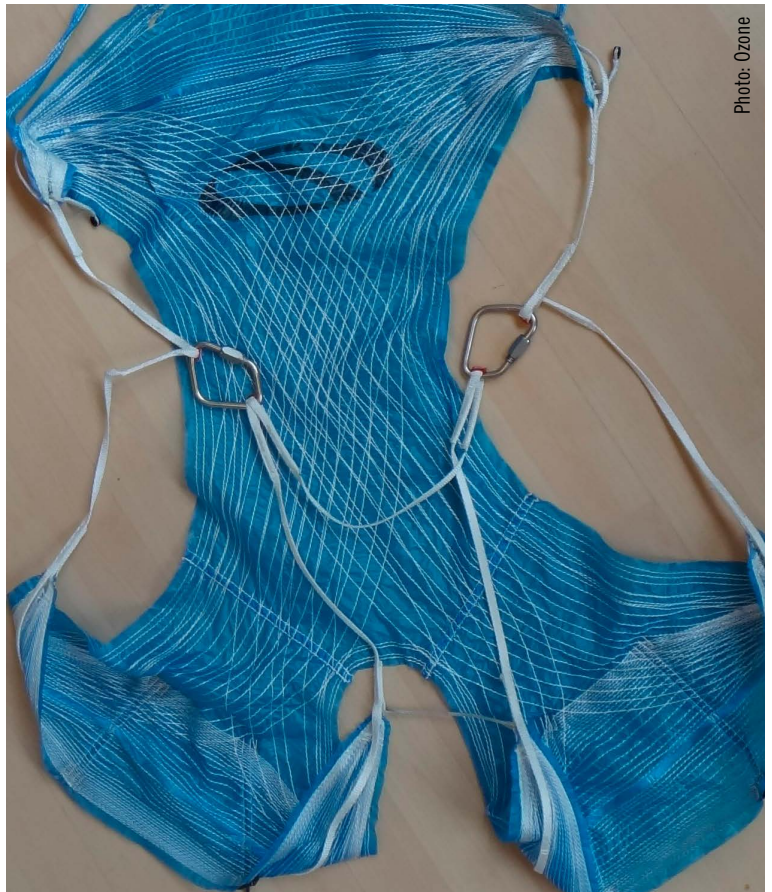


Photo: Ozone

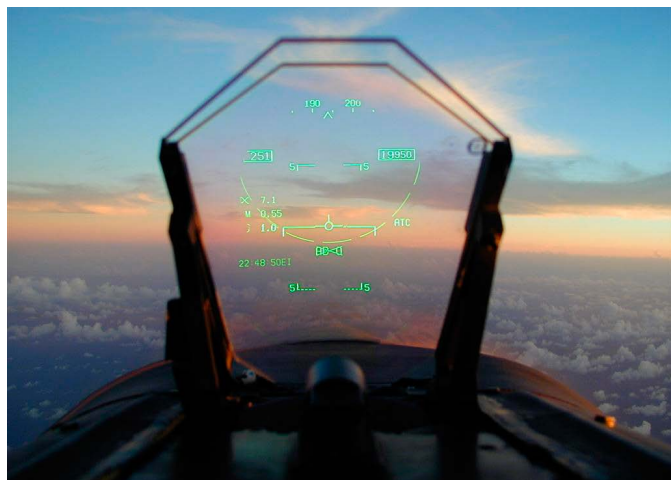


Photo: Ozone

GOOGLE GLASS : "HEAD UP DISPLAY" FOR PARAGLIDER PILOTS



Simulation of a pilot's vision wearing Google Glass (here the image displayed is a bit big).



A real Head-Up Display in commercial aviation: the display is transparent across a big part of the windscreen.

A very hi-tech gadget, Google Glass, seems destined for use in flight.

By the editor, with the participation of Karl Rege.

Google Glass is already being talked about a lot, even though it isn't being mass-produced yet. It is a pair of glasses which interface with an Android telephone and which display information top right in the user's field of vision. A driver, for example, could display the information from a route navigation app onto them. That obviously brings to mind the 'head-up display' used by military pilots: The information is displayed in the pilot's field of vision, on the jet's windscreen. Karl Rege from Zurich University of Applied Sciences, who is also a paraglider pilot, is working on an adaptation of Google Glass for paragliding and paramotoring.

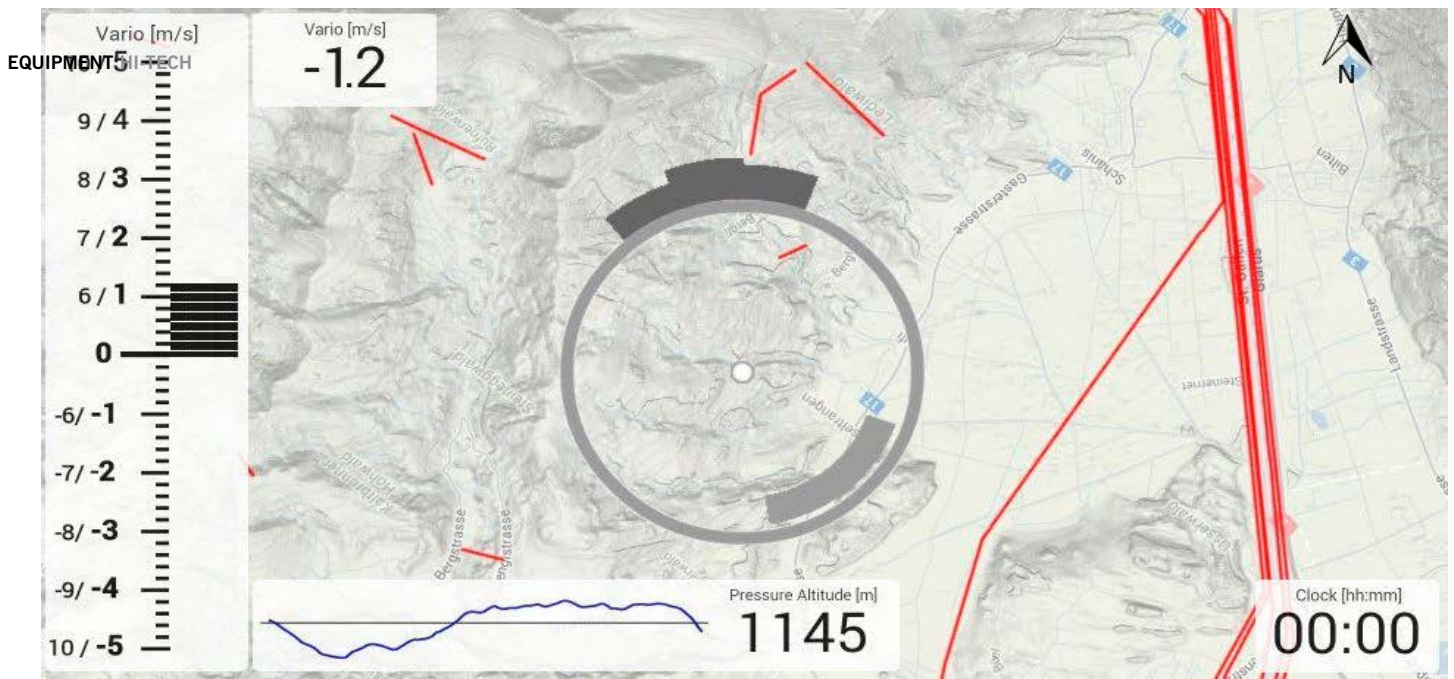
It would be useful to be able to see the vario readings and the altitude constantly in your field of vision. Better still, it would be possible to display airspace maps and even warnings about cables and other objects.

In principal, everything we need exists already, top of the range instruments or smartphones have airspace maps. Obstacles are already marked in certain countries like Switzerland, by means of anti-collision systems like FLARM.

And there is obviously nothing insurmountable about displaying normal figures like the climb rate or the altitude onto a remote screen like the one integrated in Google Glass. Karl Rege and his students are working on a project to program a Google Glass app which will bring together all this information, and include extra functions like thermal optimization. To do this, Google Glass will be interfaced with a Sensbox from Flytec/Bräuniger.

GOOGLE GLASS TECHNOLOGY

Karl Rege explains in the magazine *Swiss Glider*: 'With the aide of a prism, Google Glass projects a small screen directly into the field of vision of the user. The prism is placed above the right eye so that it only marginally interrupts normal vision. From an optic point of view, the screen is extremely clear and looks as if it is about two metres away; therefore it is less tiring, as you don't have to keep looking away. The presentation of the application has been kept deliberately simple. Only information which is important for the pilot is displayed: Climb and sink rate in digital and analogue form, as well as their evolution, altitude above sea level, speed/ground and time.'



The screen of the application developed for Google Glass by Karl Rege's team. Everything is there, including a topographic map as well as being able to integrate obstacles taken from the FLARM database.

The Magic Circle, developed in collaboration with Flytec, is a simple and efficient aid to finding the centre of thermals. For orientation, a simple 2D map is inserted in the background. It also shows the take-offs and landings, as well as the airspace and obstacles in the airspace: As you approach, according to your distance, you'll receive a message; a warning sign or a visual message and acoustic (vocal signal) warning of danger. The first test flights have been done by the acro pilot Gabor Kezi. Apart from the actual concept of the app, it has also allowed us to remove a few anomalies which we are currently

working on. The app is being perfected in collaboration with Flytec to make a product that will be accessible to all.'

The day that Google Glass is mass-produced at a reasonable price, (for the moment, the samples are being sold to developers for 1200 euros), this glass combined with Karl Rege's application will no doubt be useful for flying. In addition, the pilot will be able to photograph and film the best moments of his flight by simply asking Google Glass out loud, to film exactly what he is seeing and experiencing... ■



<https://www.youtube.com/watch?v=0t4Ujc8ILzs>

Google glass has also been tested in bigger aircraft, here at the flying school in Adventia in Spain. Photo: Pilot School Adventia.
On the right: The first tests by Karl Rege's team have been promising. Photo: Team Rege



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