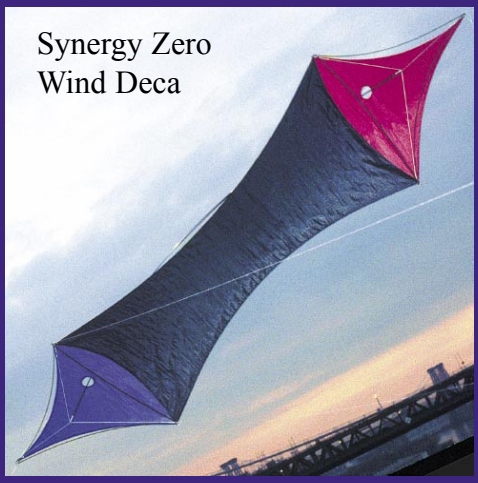


Synergetic Series Kites

Introducing Zero Wind Kites

What is indoor flying? It's flying a kite in an enclosed environment without the use of an available wind source. The kiteflier becomes the wind force in order to move the kite through the air by pumping the kite with smooth actions of the wrists and arms; by twisting body movements that lead the kite into flight; or by walking in a backwards direction to create a consistent lifting force for the kite. This opens the range of movement of the kites to a full 360ў.

"Indoor flying" is not a contradiction in terms. It is becoming a legitimate sport that is gaining popularity in North America, Europe and Japan.

The Synergetic Series Zero Wind Deca, Zero Wind Great Deca, and Minergy Zero Wind Deca are a new breed of kite; they are among the most efficient low wind kites on the market, capable of amazing control and flight with minimal effort. These Zero Wind kites are for oudoor flying as well, in winds up to 15 mph. Your Zero Wind kite will give you the ability to fly in places you never thought possible, and do maneuvers that will amaze yourself and onlookers, so get ready to take a journey into Zero Wind Flying.

This manual is set up to cover all three Zero Wind Deca models.
Where there are significant differences between the models, for example in assembly, information is given separately.

SYNERGY ZERO WIND DECA™
Wind Range: 0-12 mph (0-20 kph)

Fly Line (included): 13 feet (4 m) , 50 lb (23 kg) Spectra™ x 4

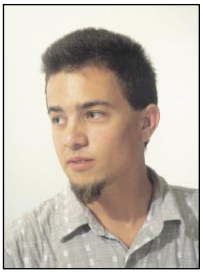
MINERGY ZERO WIND DECA™
Wind Range: 0-12 mph (0-20 kph)

Fly Line (included): 10 feet (3 m) , 50 lb (23 kg) Spectra™ x 4

ZERO WIND GREAT DECA™
Wind Range: 0-12 mph (0-20 kph)5

Fly Line (included): 16 feet (5 m) , 50 lb (23 kg) Spectra™ x 4

The Synergetic Series of Kites are designed by Marc Ricketts.



produced by:

InVento Klein Feldhus 1 D-26180
Rastede-Neusudende Germany
Tel: 49 44 02 92 62 0

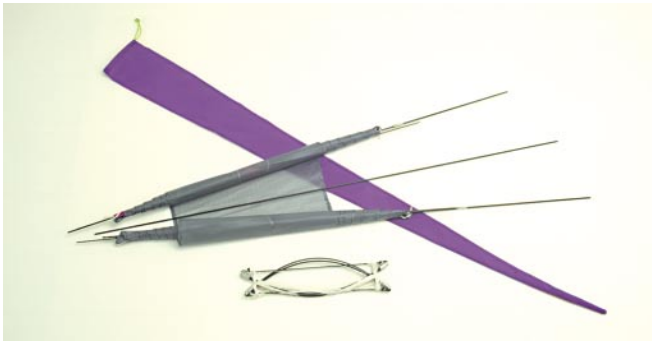
Your Synergy-Deca is warrantied against defects in workmanship and materials.
When you fly this stunt kite you are taking responsibility for its control. The manufacturer, designer, and distributors cannot accept responsibility for damage due to improper or careless use of this product.

Synergy Zero Wind Deca

The newest addition to the Deca family, the Synergy Zero Wind Deca is affordable and well sized for easy learning. This Synergy will do all the amazing Deca inverts and invert hovers in Zero Wind. The Zero Wind Deca also has Ricketts newly developed multi- piece carbon bow system. This makes the kite incredibly light for indoor flying and virtually unbreakable, with an optional spar for stiffening the bow and tensioning the sail when flying outdoors in up to moderate winds. Wind range: 0-14mph

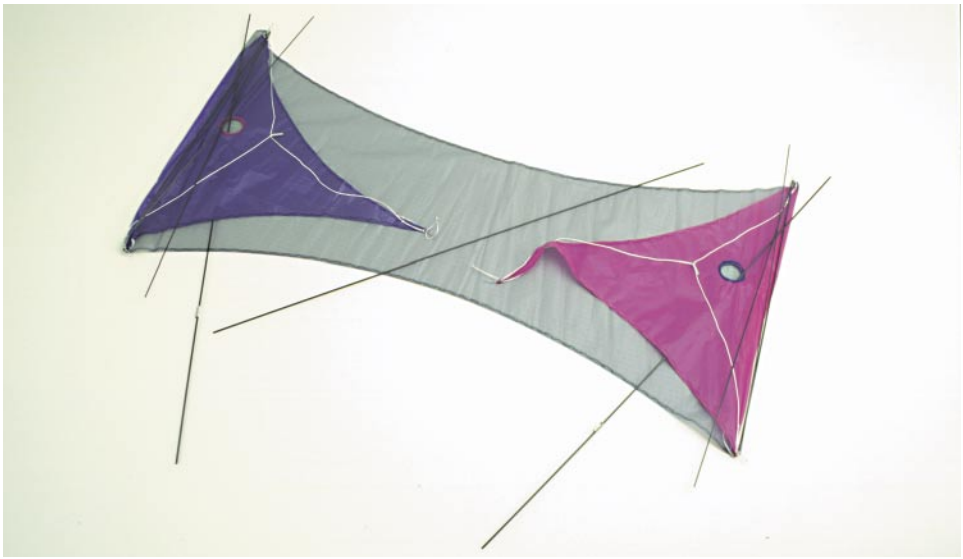
Assembly:

Instructions for your Synergy Zero Wind Deca



The Zero Wind Deca comes complete with kite, lines and handles, and bag.

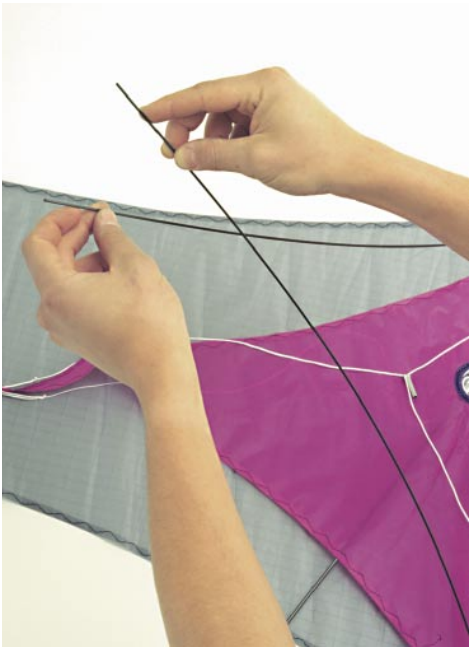
Set the lines and handles and the loose spar to one side and start unrolling the kite.

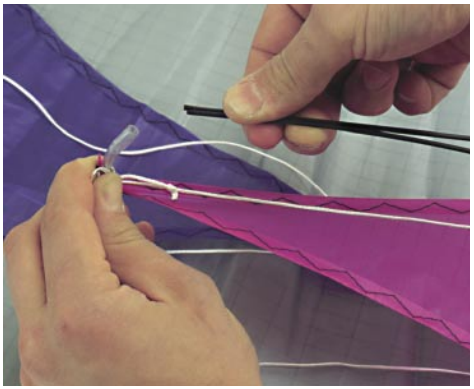


With the kite fully unrolled, the two wings should be on the top side with the logo also facing up, partially hidden by one wing. Each of the kite wings should have 3 spars connected to them: a shorter one running from tip to tip, and two medium sized spars attached at one end to either tip. As well, one long spar runs through the hole in each wing.

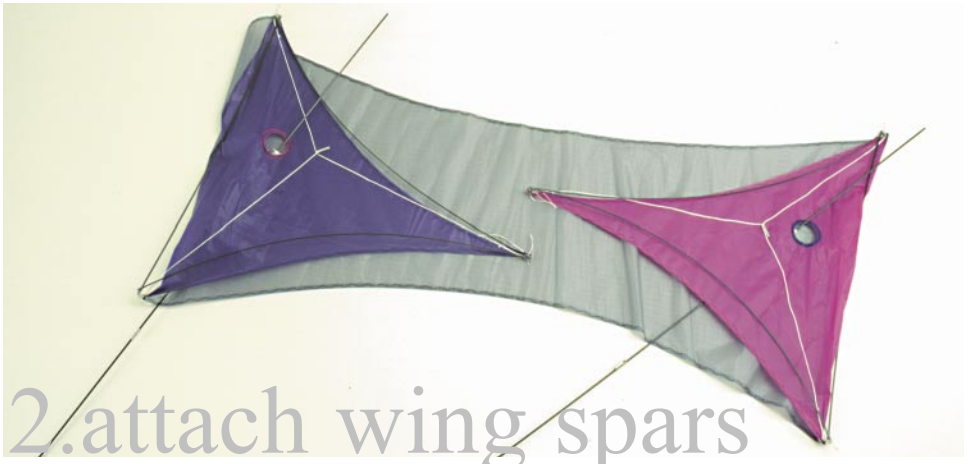
1.unroll the kite

Take the free end of each of the two medium length spars (extending from one tip past the other). Bring the ends of both of these spars together, by moving them towards the wing tip (the very end of the kite, without spars).

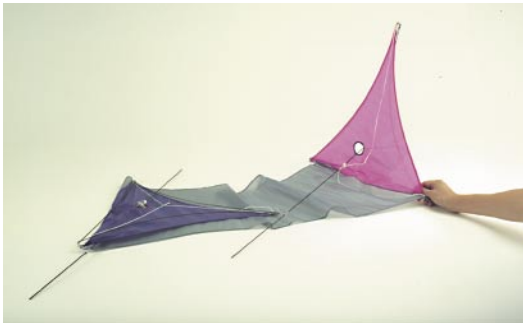




Holding both ends together, insert them into the vinyl connector at the wing tip. Do the same to set up the spars on the other wing. Your kite should now look like this:



2.attach wing spars



Now flip both wings of the kite out, so the wing spars you just inserted are on the under side, and the logo and the two long spars are on the top side facing you.

3.assemble the bow

Take the two long spars and connect them together, by overlapping them and inserting each of their ends in the connector located slightly down the other spar.

You must insert both spar ends at the same time.

The two long spars should now be assembled into one piece, which runs through the two circular holes on the wings.

4.attach bow ends

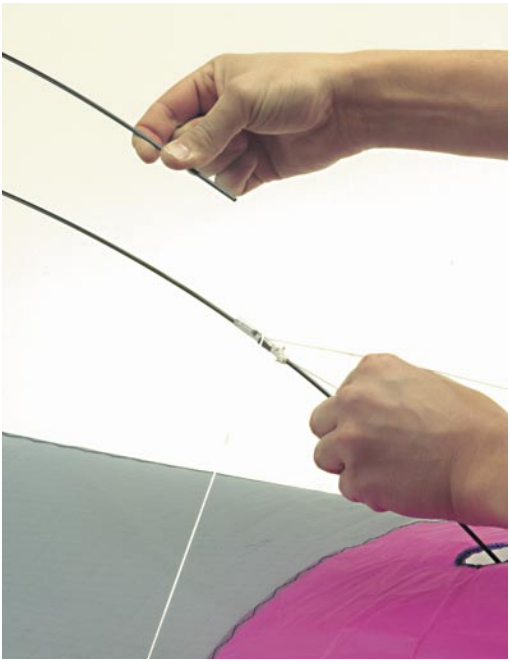
Reach under one wing and find the metal cap, which is attached to three lines. Insert the end of the long spar into it, making sure that there are no twists in the lines.

Reach under the other wing and do the same, bowing the spar and tensing the kite.

Now the kite is fully assembled and ready for very low wind or zero wind flying! (see handle & line section for attaching the fly lines)

Your Synergy Zero Wind Deca comes with the optional feature of a bow stiffener for flying in light to medium winds. This stiffener is the extra spar you set aside in the beginning. To use it, insert the spar one end at a time between the connectors on the largest spar, at the point at which the lines attach.

With the extra spar in place you can fly your Zero Wind Deca in winds up to 14mph / 22 kmh.



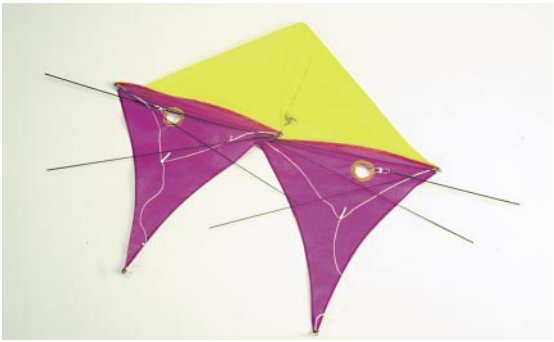
When disassembling your kite, it is important to carefully follow these steps in the reverse order. You will soon learn how to do these without the manual, making breaking down and setting up your kite quick and efficient.

Minergy Zero Wind Deca

A scaled down version of the Synergy Zero Wind Deca, the Minergy Zero Wind Deca has all the flying abilities of the larger kite, plus it allows you to fly down hallways, fly in a crowded room, or in just about any available space.
Wind range: 0-14mph

Assembly:

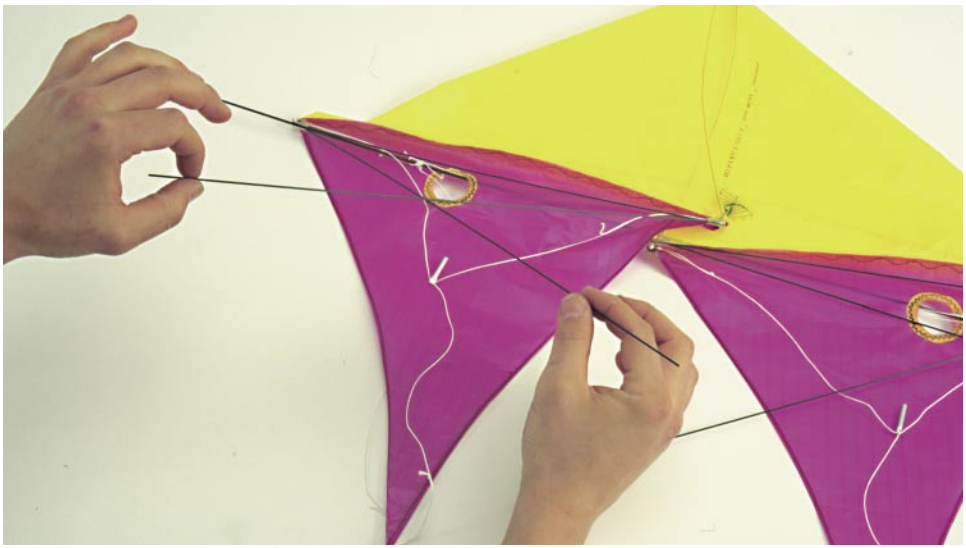
Instructions for your
Minergy Zero Wind Deca



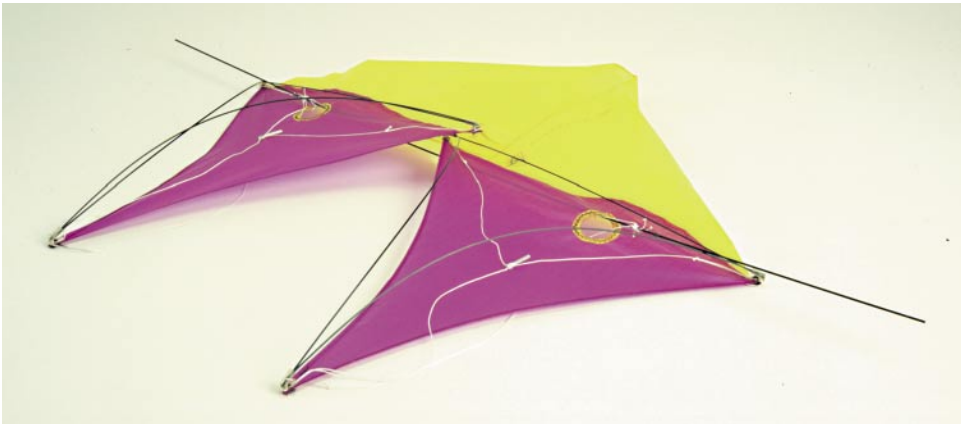
Remove your Minergy Zero Wind Deca from its bag and unroll the kite, setting the lines and handles to the side for the moment. Flip the two wings down so your kite looks like the photo.

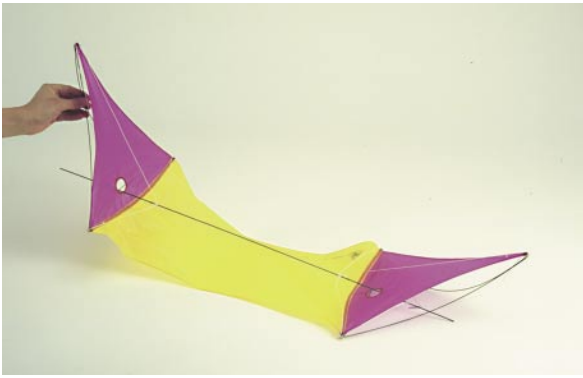
1.unroll the kite

On one wing take the free ends of the two medium length spars extending just past the wing and bring these two spars together by moving the ends towards the wing tip. Holding the two spar ends together in one hand, insert them into the vinyl connector at the wing tip. Then do the same for the other wing.



2.attach wing spars

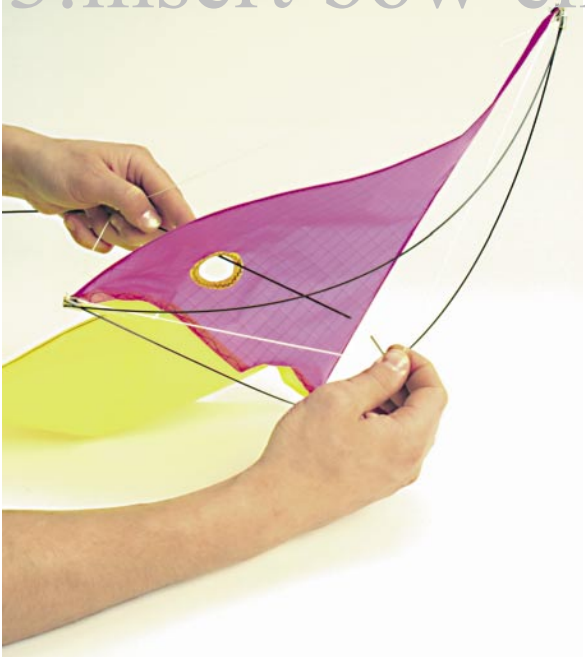




The spars for both wings are now in place, with the bowed spars following the wing edges.

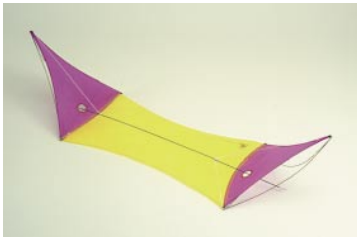
Now flip the wings out on your kite, spreading out the sail fully.

3.insert bow ends



Reach under one wing and find the metal cap attached to three lines. Insert one end of the long bow (or spreader) spar in it, making sure there there are no twists in the tension lines. Now do the same on the other wing, carefully bowing the spar and tensing the sail.

Your Minergy Zero Wind Deca is now fully assembled and will look like this:



Zero Wind Great Deca

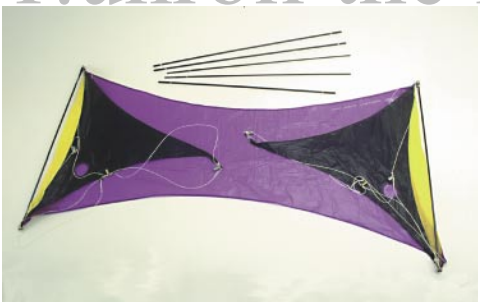
The largest and most elegant of the Decas, this kite's slow, graceful swoops and glides through indoor spaces command everyone's attention. Not only is it the world's leading indoor kite, it is also an amazingly precise quad-line outdoors in light and moderate winds. For high winds you can purchase a High Wind Bow Set to expand your possibilities even more. Range: 0-14mph, with high wind bow: 5-22mph

Assembly:

Instructions for your
Zero Wind Great Deca

1.unroll the kite

Take the Zero Wind Great Deca out of its bag. Set the handles and bag to the side and start unrolling your kite, pulling out the five separate spars, two of which are coded with silver and three coded with gold.
Notice that your kite is rolled like a scroll; this keeps the lines on the sides of the kite from becoming tangled during transport.



Your Synergy should now look like this, with the the two wings folded in on the side of the kite facing you. On top of each of the wings, the lines of the tension system are attached to gold and silver caps. Check to make sure they are untwisted and the three lines from the disk are under the wing. Also notice the two uncoded (black) vertical spars - these stay permanently attached to your kite.

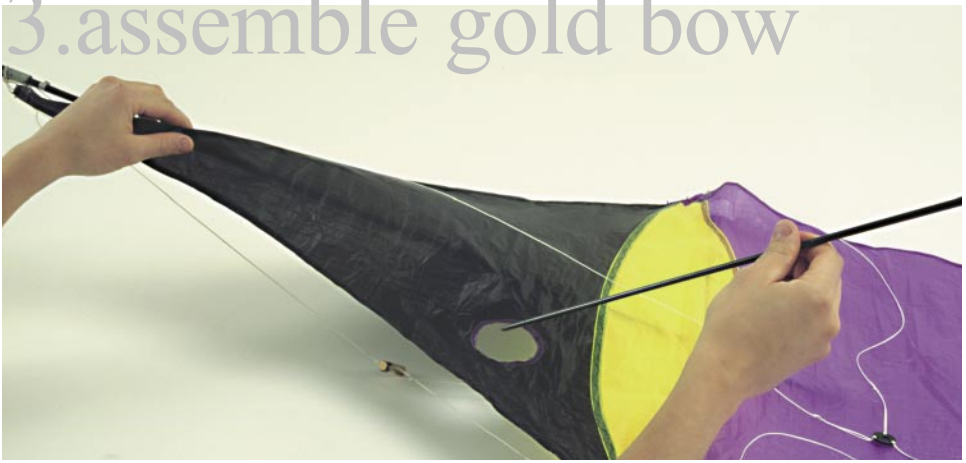
Now locate the silver cap closest to the black vertical spar on one side of the kite, and insert one of the silver spars. Then find the other silver cap found at the wing tip and insert the other end of the same silver spar.

2.attach wing spars

Do the same for the other silver wing spar on the opposite wing, and flip out the wings on the kite.

Pick up one of the two spars with gold coding on only one end. This is a tapered Avia Sport Skinny (wrapped graphite) spar, with a ferrule glued on one end. We call this spar the gold side bow.

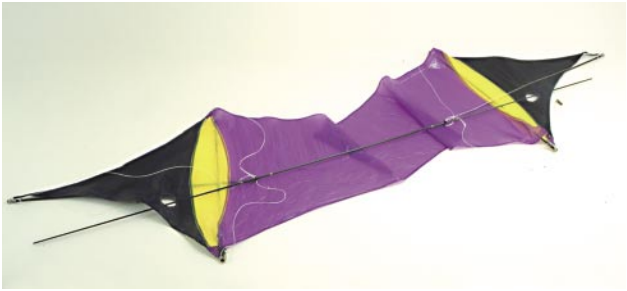
3.assemble gold bow



Insert the smaller diameter end through the hole in one wing. Locate the small black disk at this end of the wing. It has three lines coming from it - check to make sure these are not twisted up. Insert the wider end of the spar (with ferrule) into the disk. Do the same with the other gold side bow at the the other wing.

Find the spar with gold bands at both ends. This spar, the gold center bow, is an Avia Sport Excel (wrapped graphite). Take the gold center bow and slide one end over the ferrule at the disk end of the gold side bow.

Then do the same for the other end and the other gold side bow.



Now the gold bow, made up of three pieces, is fully assembled.

Reach under one wing to find the gold cap. Making sure there is no twist in the lines, insert one end of the gold bow carefully into the gold cap.

4.attach bow ends

If this is difficult, double check for twist, especially lines wrapped around caps.

Go to the other wing, find the gold cap there and insert the other end of the gold bow by carefully bowing the entire three-piece spar.

Your Zero Wind Great Deca is now fully assembled!

When disassembling any of these kites, it is important to follow these steps in exactly the reverse order.

Handle & Line setting the fly lines

For Synergy Zero Wind Deca, Minergy Zero Wind Deca, & Zero Wind Great Deca

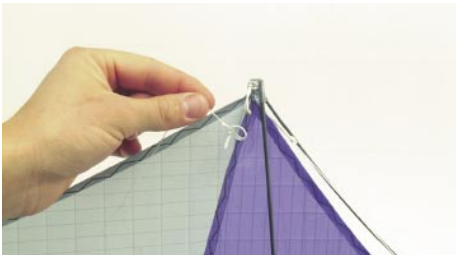

SZWD & MZWD


ZWGD

Take your handle set with wound up lines and find the line ends. Begin to unwind them until a little more than an arm's length has been unwound.

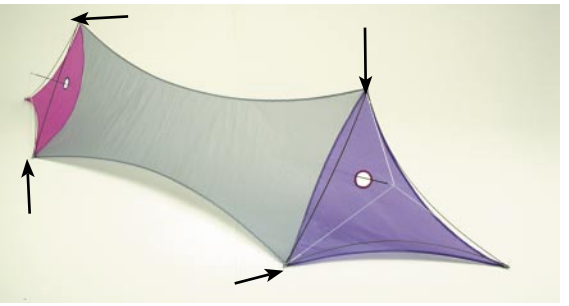
Separate the two pairs of line. These are joined because one pair goes to one side of the kite and the other pair to the other side; this helps to keep the sides separate.

Separate the two lines in each pair by pulling on the tab of line and loosening the lark's head loop.



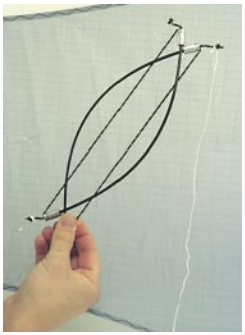
Attach one line to the top and one to the bottom line attachment at each end of the vertical (black) spar, using a lark's head loop.

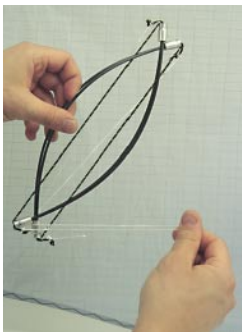
Now do the same for the other pair and the loop attachments on the other side of the kite.

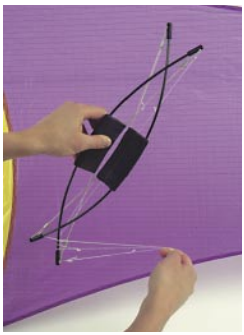


How to make a lark's head loop

rewinding







Then bring the lines back up through the same centre notch to the corresponding notch at the top of the handles. Figure-eight the lines around the handle ends here, too. This will keep the handles securely together.

Once both ends of the joined handles have been wrapped together, you can quickly wind up the rest of the line. Wrap around the top and bottom ends of one of the handles in a figure-eight pattern (this will mean that most of the line is wound on only one side of the joined handles).

When you get close to the kite, detach the lines. Make sure to join the lines from each side together right away with a lark's head loop, so the lines are set up for your next flight.

Finish unwinding your lines, walking upwind if you are outside. When you get to the end, separate the two handles. This is done for the Zero Wind Great Deca by sliding one out of the other, one end at a time.

Untwist your lines until they run parallel to the kite without crossing each other. You are now ready to fly your Zero Wind!

For Synergy Zero Wind Deca
& Minergy Zero Wind Deca

Hold one handle in each hand so that the double bows face each other. Slide the two handles together. A bowed spar from each handle slips between the two bowed spars of the other handle. They will hold snugly against each other (This is also the position for single hand flying).

For Zero Wind Great Deca

Slip the end caps of one handle between the bow and string of the other, one end at a time. They should hold together like in the photo.

For all three: It's very helpful always to rewind your lines properly, to minimize the amount of time spent sorting out lines the next time you fly. Don't detach your lines from the kite until you are nearly finished rewinding. Once the handles are joined, take all four lines in a hand and pull them together through the 'notch' at the bottom between the two joined handles. Figure-eight the lines a few times around the two bottom ends of the handles.

picking a flying space

True Zero Wind flying must be done in an indoor flying space, as there is always a little breeze outside which interferes with flying, especially when you are first developing your Zero Wind technique. Places to try include community centers, schools, indoor activity centers, gyms, tennis & basketball courts, large warehouses or loading docks (when not in use). The ceiling should be at least 20 feet high (unless you are flying a Minergy) and have a clear, even area roughly 40 feet in length and width. This is important as you will be walking backwards with your eyes on the kite. Once you have learned Zero Wind techniques you will be surprised to find that you can fly almost anywhere: streets and alleys, rooftops, bridges, etc. Also remember your Zero Wind Deca has a wide wind range, so you can fly in clean wind on normal flying fields in up to medium winds. In these situations you can fly on lines longer than those provided. If you have never flown a Deca before, it is easier to begin flying in a normal wind situation and then move to indoor flying.

When flying outdoors, find an open field with no power lines, or roads crossing through it. Also make sure that there are no thunder storms in the area, as wet lines can conduct electricity.The more open and spacious the flying space the better the wind. A building, hill, or big bank of trees at either end of your field will cause turbulence which may interfere with learning to fly. The smoothest wind is that coming from a large lake or the ocean. Locate yourself as close to the center of the clearing as possible, as the smoothest winds will be there.

Flight:

Basics for flying in wind

Launching

Stand with your arms fully extended in front of you with the handles in each hand parallel to each other. To launch when the kite is upright (bow at top), simply tilt both wrists upwards (tops of handles point to your face), and pull both hands gently toward your body. In lower wind it is also helpful to take a few steps backwards as you start the launch.

If when you launch the kite starts up, then flips forward and falls to the ground, your motion is too quick or jerky and/or the tops of your handles are tilted back too far. If the kite goes off to one side when launching, make sure your handles are evenly tilted. Should the problem continue, you should turn the kite as it is going up (see 'turning').

When the kite is upside down, hold the handles the right way up (with a twist in the lines) and put your wrists in the reverse position (handles point away). Pull both handles evenly toward your body. The kite will untwist itself once in the air.

If the kite has fallen to the ground with the front edge of the kite on the ground (convex side up, bow towards you) and the wings pointing up, give one of the handles a long quick pull to flip the kite to a launching position.

Forward/Backward

To move your Synergy-Deca forward, tilt the tops of your handles equally toward you (as in a normal launch). This brings the top leading edge of the kite into the wind, and the wind shedding off the bottom of the sail moves the kite forward.

The Synergy-Deca's airfoil is very efficient, and will respond to even a slight tilt, so if the front edge is fluttering and cavitating, tilt the handles a little less. If in low wind you tilt the handles and nothing happens, give a little pull to help the kite get started in the direction of travel.

To give your Synergy-Deca reverse motion, tilt the bottoms of your handles toward you. This brings the bottom edge of the kite into the wind. The wind sheds off the top of the sail and the kite moves in reverse (downward).

Hovering/Neutral

To maintain a neutral position (hovering), keep both handles even, without tilting. Neutral position can be

Neutral position

Moving forward

Reverse / Moving backward

found while the kite is right-side up, upside down, or vertical to the ground (flying on one end). When the kite is vertical, the handle corresponding to the side of the kite pointing to the sky must be pulled toward your body in order to maintain its altitude.

Spinning/Turning

To turn or spin your Synergy-Deca clockwise, tilt the top of your left handle and the bottom of your right handle toward you. This lifts the left side of your kite and lowers the right side. The shedding of wind off the bottom edge of the left and the top edge of the right sends the kite into a clockwise spin. The opposite signals will spin the kite counterclockwise. To decrease the radius of the turn (tighten the spin) pull back on the hand that is tilted down.

Turning is like doing a partial spin.To turn to the right, gently tilt the top of the left handle and the bottom of the right handle toward you. To turn to the left, do the opposite.

Moving sideways

Moving sideways is a more difficult maneuver. Pull the handle on the side of the kite which points in your desired direction. While pulling on one side, you must also give that side a small amount of forward lift by tilting that handle toward you (reverse if the kite is upside down), and give the trailing side some reverse motion (tilt the handle slightly away from you). This takes a bit of practice.

The Synergy-Deca can also slide vertically. Starting from the position of vertical hover, bring your top hand back toward you. This will make the kite slide up. By pushing your top hand away and your bottom hand toward you, the kite will slide down.

Fly safe!

Avoid power lines, cars, roads and people. Don't fly near airports or in hazardous storm conditions.

Zero Wind Flight

Flying in very low wind and no wind situations

There are major differences between low wind and no wind (or indoor) flying; however some of the following techniques can be used in both situations. It is a good idea to review the basic control signals for flying in wind if you are not familiar with them before beginning this section.

In low wind flying, the minimal available wind must be worked with, and can be supplemented using Zero Wind techniques. Where there is no available wind (i.e. indoor flying) the flier can use the complete surrounding hemisphere to work in.

Zero Wind flying requires a fair bit of concentration and practice, but the rewards are ultimate control and the freedom to fly anywhere. The basic premise of low and no wind flying is to keep the kite moving. Movement of the kite increases airflow over the airfoil, thereby increasing lift. The launch and 360° are the fundamentals of Zero Wind flying, and you should practice these until you have them down.

Launch

Start with your arms fully extended. This gives you the maximum advantage of force you can exert on

Spin

360°

the kite. Then start taking a few steps backward with your wrist in the forward /launch position. As you walk backwards and the kite begins to lift, pull your hands closer to your body, to increase the pressure and accelerate the kite. If the kite's motion is jumpy and tends to flip immediately forward, your wrists are tilted too far backwards and/or your motions are too fast and jerky. Smooth and slow movement is key to Zero Wind - the slower you go, the slower the kite goes and the more time you have to adjust and control its flight.

360°

The next steps happen simultaneously with the launch. Turn the kite so you are flying across the horizon, not straight up. Flying straight up is the most difficult in Zero Wind, vs. sideways or a circle (360°). To turn the kite as it is moving up, start at about the time the kite reaches eye level and pull one hand back even more towards you, tilting the top of its handle even further back. This will raise that side of the kite. At the same time, push your other hand away from you, tilting the kite so that the lower side of the kite is further away from you. The pressure zone under the lower wing that this creates helps keep the kite aloft.

Hints: If you get the kite up and turned and then it flips forward falling out of the air, you merely need to return the hand controlling the top of the kite to a more neutral position (not tilted back so far).

When moving the kite to a vertical (turning) position, get the top wing of the kite slightly ahead of the bottom wing of the kite. This ensures that the air flows down the entire sail. Your control of this angle depends almost entirely on the hand controlling the top wing. The adjustments for control of the 360° are very slight and constant; watch the sail closely and control the angle and speed of the kite with small changes in the tilt of your wrist.

Hold your handles parallel to the vertical spars: this especially makes a difference in indoor flying where the kites are very sensitive.

Practice starting and stopping while going around the circle, as well as changing direction from forwards to backwards. This is done by changing only the pitch of your wrist keeping you arms in the same position. When changing direction, make sure you adjust the tilt of the kite so the wing on top is leading in the direction of travel. With all of the Synergetic Series Zero Wind Decas it is possible to refine your 360s to the point where you are barely moving, just rotating on one foot.

Turning while circling

To turn the kite to circle in the opposite direction, you need to switch the position of your two hands. Bring your lower extended hand towards you while giving an upwards turn signal (tilting your wrist to bring the top of the handle closer to you) and at the same time extend your other hand which was closer to you to be farther away. In order to make a turn in zero wind or low wind condition it is necessary to not only give the wrist motion, but also bring the arm back towards you. This will give it the force needed to turn up. When turning down it is not necessary to give much, if any, of a downward turn signal, since the pull of gravity will lower the side of the kite for you if the pressure is let up a little on that side.

Spins

As in the description for standard wind, hold the handles so that one tilts forward and one backward. Move your arms in and out in time with the kite, giving a pull back on the side going up to give a constant increased pressure on the rising side of the kite.

Up and over

Learning to take the kite fully overhead is another primary indoor maneuver. This is accomplished like a launch that continues going up, keeping your arms fully extended. As the kite rises, adjust the pitch of your wrists, keeping with or just slightly ahead of the kite. At the point where the kite reaches about 65-70° or about 80% of the way to straight above, stop walking backwards. In order to keep the kite moving, slowly start lowering your arms which should be fully extended. The lowering of your arms keeps a slight and steady pressure on the sail as the kite travels over you. When the kite is directly overhead, rotate your body so you are facing the direction in which kite will descend. As the kite passes overhead you also need to change your wrist position so that your thumbs are pointing away from you (this is essentially telling the kite reverse but it will continuing gliding away from you and down as long as you don't walk backwards)

Hints: The slower you take the up and over, the easier time you will have at the top. If you are moving very quickly backwards when the kite reaches 70° it will be very difficult to keep it moving.

If the kite gets overhead and then falls out, you need to adjust your wrist differently, maybe sooner or more. Try to keep both handles parallel to the vertical spars at all times through the up and over. Once you get confident with this movement, you can play the descent and let the kite float away from you by slowly walking towards the kite. There are also many maneuvers you can do on the descent, including flat spins, wall slides, and inverts.

Inverts

You can make the kite roll around its own lines so its back faces you and back out again. This is a well

known trick for the Deca in wind conditions. To do this in Zero Wind, begin with the kite in an elevated horizontal position. Take a few steps towards the kite, letting the strings go slack. The kite will roll forward either over the top or under, depending on the angle you have the kite. If you walk backwards at the moment the back of the kite is facing you, you can get the kite to hover in this backwards position. If you wait for the kite in the slack line position, it will revolve forward and then back again. At the point it is back in flying position take a few quick steps backwards, filling the sail with pressure again. If you have inverted the kite over the top side (top towards you) it is necessary to give a even pull on the lines to get the kite to return.

Wall slides

You can perform wall slides in the descent from an 'up and over' by merely flying into a wall in the forwards direction. When the kite runs into the wall the bow and front caps will come in contact with the wall holding the kite in a position where it will slowly slide down the wall. You can also do this against a pole by bringing the center of the sail and the bow in contact with the pole.

Flat spins

While descending from an 'up and over' it is possible to get the kite to spin parallel to the ground plane. This is a very difficult maneuver. The kite must be in a very flat position (parallel to the ground) and as still as possible. Pull on a line coming from the corner of the kite that is furthest away from you. As the kite rotates, pull on the next line which is now furthest from you in order to keep the kite spinning,

Flying in Zero Wind is the most challenging of all flying, but it is also the most rewarding. Once you have learned no wind flying, your flight abilities in city flying, in wind, in any situation will skyrocket.

Glossary of terms

agility- the ability to respond with quick and easy movements through the flexibility and stability of the kite. Synergetic Series kites and their Tensegrity frames provide the perfect combination of flexibility and stability for total agility in kite flight performance.

airfoil- a surface that gains lift when air is run past it due to its shape. This shape usually has a curved cross-section like an elongated tear drop with the convex side facing up and the more rounded end leading.

angle of attack- the angle of a kite's wing in relation to the wind, controlling its position and movement.

carbon- the most basic and abundant molecule in nature. Carbon is easy to produce, poses no environmental hazards, is a very strong molecule for its weight, and bonds very well with epoxy for the production of compression materials (spars, sheets)

clean and dirty wind- wind with no turbulence, caused by obstacles such as trees and buildings, is often called 'clean' by kiters. Dirty wind is turbulent, unpredictable.

compression- the force pushing in from two ends on a material.

deca- greek for ten. This is the number of end caps on your Deca.

design science- the study and use of nature's principles of design and building. Knowing and understanding the possibilities of form, structure and movement, the design scientist analyzes the needs and goals of a particular project and proceeds to find the most efficient and economic shape and structure to satisfy those needs and goals.

downwind- the direction the wind is traveling in (going towards) ie. when you drop a leaf it blows downwind.

k upwind- the direction the wind is coming from. ie to walk into the wind is to walk upwind.

durability- the ability to withstand wear and tear. The Tensegrity framework of Synergetic Series Kites accomplish this with tough, plastic caps as their outer barrier – the sail is never directly exposed.

ferrule- short piece of tubing (or spar) used to connect two spars together end to end.

flexible wing control- first used by the Wright brothers to steer Kitty Hawk, the ability of the kite or airplane wing to flex (twist) to control its movement.

flying lines- the tension lines (strings) that run between the handles and your kite, which on the Synergetic Series have been set precisely even to ensure the proper response of your kite to your control signals.

lark's head- a loop system used to attach lines

together which need to be removed and reattached, one end forming the loop or lark's head, the other tied in an overhand knot.

lift- the upward force created by the movement and angle of a kite.

line attachment- our term for the knotted loop attached to the kite's and handles' caps to which your flying lines are attached by a lark's head.

Minergy- a mini Synergy-Deca

ripstop- a pattern woven into cloth that greatly strengthens it without much additional weight, and helps to keep puncture holes from ripping.

k Ripstop Nylon- traditional high-tech sailcloth using woven nylon fibers and a plastic or silicon coating.

k Ripstop Polyester- the latest, greatest sail cloth using woven Polyester fibers and a plastic or silicon coating. The advantages of Polyester are its low stretch and slow fade (polyester has five times greater resistance to the harmful effects of UV light).

spar- a compression member (stick or strut) usually made of carbon or fiberglass combined with epoxy in modern kites, traditionally out of wood or bamboo.

k pultruded carbon spars- spars produced by running carbon fibers impregnated with epoxy through a die. The fibers in these spars run lengthwise; the spars can be made hollow, solid, round, rectangular, or practically any shape in cross-section. Pultruded carbon spars are strong, light and economical - their only weakness is that the fibers may split down the length of the rod when over stressed.

k micro carbon- a pultruded carbon spar that is solid in the center and usually under .25 in / 5mm

k wrapped graphite spars- spars produced from carbon fibers which are impregnated with epoxy and wrapped in a spiral around a mandrel(metal rod) which is removed after curing.These hollow spiral wrapped spars are the strongest and lightest way to produce a carbon compression member.

k bow spar (gold)- in a Synergy-Deca, the main tension spreader for the kite spanning the width of the kite, normally made up of two to three spars connected via ferrules.

k wing spar(s) (silver)- these spars run from the wing tip towards the center of the kite.

k vertical spar(s) (black)- these are the two spars which run vertically between the top and bottom tips of Synergy Decas, at whose ends the flying lines are attached.

Spectra™- a smooth man-made high tech fiber with extremely low stretch, low weight, and high strength. All this makes it a great fiber for fly lines. The Spectra™ fiber is developed and produced by Allied Signal corp.

stability- consistent flight characteristics when exposed to different wind conditions. Synergy Decas™ have ailerons which permit air to flow out of the sides which locks the kite into position. The center panel flexes to develop a directional air flow that also channels the air during forward and reverse movement.

synergy- in principle, the whole equals more than the sum of its parts, i.e. the action/interaction of two or more parts produces an effect of which each part is individually incapable. The sum of the parts of a synergetic kite produce a higher effect of stability, response, and performance than that of an ordinary kite design.

tension- the force of pulling out on two ends of a material.

tensegrity - a system in which the spars do not touch each other, but are suspended in a continuous network of integrated tension lines. Tensegrity is the shortened form for tensional integrity. Tensegrity is one of the lightest yet strongest structural systems known and therefore makes a great kite structure!

tension suspended airfoil- the unique patented feature of all Synergetic series kites in which the efficient shape of the airfoil is formed by the tension pulling on a sail which is suspended in a resilient shape.

tension system- the network of tension lines (strings) and caps connected to the sail of a Synergetic Series kite. This system holds the spars and controls the shape and flexibility of the kite.

wind range- the minimum to maximum wind speed a kite is designed to fly well in.

wind window- the term used to describe the possible flying range of the kite in reference to the kite flyer. This is always part of a sphere which is centered at the kite flyer, with the flyable area located down wind (if there is wind). The size in degrees of the window depends on the wind and the efficiency and shape of the kite. When flying in Zero Wind your window is 360° around you, and on bridges your window can extend almost 360° vertically above and below you.

Zero Wind- no available wind source to propel the kite. In these conditions you must use your movement and the efficiency of the kite in order to fly it. Synergetic Series Zero Wind kites, while designed for true Zero Wind conditions, are also great in light winds and because of their tensegrity-suspended structure can even be used in medium winds.

Why Synergetic Series Kites?

Dynamic and sculptural in design, Synergetic Series Kites are optimally three-dimensional and feature a state-of-the-art Tensegrity framework combined with a tension-suspended, aerodynamically-shaped sail. The Tensegrity framework of the kite forms one of the primary differences between the Synergetic Series Kites and other kites.

Tensegrity, short for tensional integrity, is a system where the spars do not touch each other, but are suspended in a continuous network of integrated tension lines. Tensegrity is one of the lightest yet strongest structural systems known (which is why it makes a great kite structure!) So, while your Synergetic Series Kites look elegant, even delicate, for their size and weight they are by far the strongest kites on the market. So have fun as you learn to fly your Deca through more and more of the infinite possibilities of movement in flight.

If you wish to find other information about kite flying, try the following:
-Talk to the store you got your kite from or to a kite store in your area. They are your best source of information for everything from magazines, kiting events, to where to fly in your area or get new help with any problems you have.
-Talk to the kite flyers you see in your area, and contact the American Kite Flyers association:
1559 Rockville Pike, Rockville, MD 20852
(800) AKA-2550, (408) 647 8483
- Attend kite festivals and competitions. Your local AKA kite shop will have a schedule for your area.
- Pick up one of the kite magazines; there are many good ones on the market, so look them over and see which has the information which most appeals to you.
-There are also many good books on kite flying (check our bibliography for a few suggestions):

Bibliography on flight:
Hosking, Wayne. Kites, Friedman publishing group, 1994.
Streeter, Tal. Art that Flies, Daytona Art Institute, 1990.
Veen, Harm Van. The Tao of Kiteflying (the dynamics of tethered flight), Aeolus, 1996.
Bibliography on form:
Fuller, R. Buckminster. Synergetics (1975), and Synergetics 2 (1979), Macmillan.
Fuller, R.B., and Marks, R. Dymaxion World of Buckminster Fuller, Anchor, 1973.
Hertel, H. Structure, Form and Movement, Rheinhold, 1966.
Kapraff, J. Connections: The Geometric Link Between Art and Science, McGraw-Hill, 1990.
Otto, F., ed. Tensile Structures M.I.T., 1973.
Pearce, P. Structure in Nature as a Strategy for Design, M.I.T., 1978.
Thompson, D.W. On Growth and Form, ed. J.T. Bonner, Cambridge Univ. Press, 1961.
Periodical publications:
Kitelines - America
American Kite - America
Drachen magazine - Germany
Kite Passion - France (in english also)

Replacement parts:

Synergy Zero Wind Deca spars:

where	# per kite	length in / cm	type
Side Bow	2	35” / 88.9	Avia Micro Carbon .110 / 3mm
center bow	1	35” / 88.9	Avia Micro Carbon .098 /2.5mm
wing	2	23” / 58.4	Avia Micro Carbon .080 / 2mm
wing (Big)	2	23.6 / 60	Avia Micro Carbon .080 / 2mm
vertical	2	20.2 / 51.4	Avia Micro Carbon .098 / 2.5mm

Zero Wind Great Deca

spars:	where	# per kite	length in / cm	type
gold	Side Bow	2	26.8 /68	Avia G-Force Skinny
gold	center bow	1	32.5 / 82.6	Avia Excel 1 UL
silver	wing	2	32.5 / 82.6	Avia Excel 1 UL
black	verticle	2	28.75 / 73	Avia Excel 1 UL

Minergy Zero Wind Deca spars:

where	# per kite	length in / cm	type
bow	1	33.75 / 85.7	Avia Micro Carbon .080 / 2mm
wing	4	15.5 / 39.4	Avia Micro Carbon .050 / 1.5mm
vertical	2	12.75 / 32.4	Avia Micro Carbon .050 / 1.5mm

For parts, supplies and additional information contact your local kite retailer or Nova Design Group (see back cover for address).

This manual will introduce you to 3 of the most efficient low wind kites on the market: the SYNERGY ZERO WIND DECA , MINERGY ZERO WIND DECA , and ZERO WIND GREAT DECA. Topics covered include:

- -assembly
- -field set-up
- -flight
- -advanced control
- -glossary of terms
- -replacement parts

designer profile

Marc Ricketts
A kite flyer from a very young age, Marc experienced the explosive development of high-tech, high performance sport kites and has been competing since the early 80's. Following his interest in design and structure he studied architecture at Pratt Institute in New York City. There the focus of his studies moved away from architecture to geometrical structure and stability - in particular tension structures. He applied this knowledge to aerodynamics, developing and patenting the "Tension Suspended Airfoil".

Marc released the Synergetic Series kites in the beginning of X94. Immediately recognized for their innovation, they were awarded "Best New Kite" from the Kite Trade Association, and "Best Multi Line Kite" from the Smithsonian Institute. With the recent introduction of his 3 line series, Marc continues to transform the kite world through innovative design.

Marc Ricketts' kites are being manufactured by Invento, so you can expect their high production quality. All the kites come with their own Ricketts-designed carbon-fibre handles and Spectra€ lines.

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