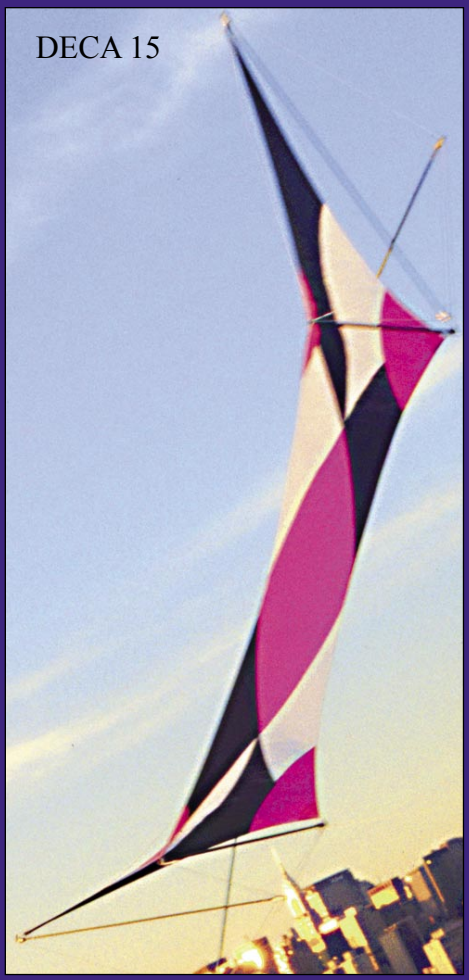


SYNERGETICS SERIES™

DECA 15
DECA 6
DECA A-1

Synergetic Series Kites

This manual will give you a short and concise introduction to 3 of the worldXs most advanced kites: The SYNERGY-DECA A-1, DECA 6, and DECA 15. 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.

Graphic Design & editing by:
Brigid Garvey and Steven Kay
Photography: Alex Garant
Some photos by Tara Beall & Steven Kay
Written by: Marc Ricketts
Printed in Canada

Why Synergetic Series Kites?

Dynamic and sculptural in design, Synergetic Series Kites are optimally three-dimensional, featuring 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.

Another feature of the Synergetic Series Kites is their exceptional durability. The Synergetic Series Kites are specifically engineered to withstand high-impact crashes and heavy wind loads. If a Synergetic Series Kite crashes, the tension lines disperse the stress equally throughout the kite, while allowing freedom of motion between the spars in order to relieve the stress. Synergetic Series Kites give you the stability and flexibility you need for performance, plus the resiliency you want for durability.

Enjoy flying your Synergy-Deca!

SYNERGY - DECA™ A-1
Wind Range: 7 - 45 mph (12 - 72km/h)
when learning it is best to fly in winds of
12 - 22 mph (18 - 35 km/h)
use caution in winds above 25 mph (40km/h),
kite extremely fast

Fly Line (included): 32feet (10m) , 80 lb (45kg)
Spectra™ x 4

SYNERGY - DECA™ 6
Wind Range: 5 - 30 mph (8 - 48 km/h)
when learning it is best to fly in winds of
7 - 20 mph (11- 32 km/h)

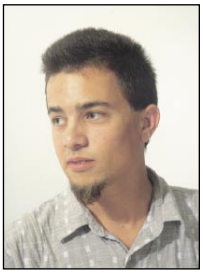
Fly Line (included): 50feet (15m) , 80 lb(45kg)
Spectra™ x 4

SYNERGY - DECA™15
Wind Range: 4 - 35 mp/h (6 - 56 km/h)
when learning it is best to fly in winds of
7 - 20 mph 11- 32 km/h

Fly Line (included): 50feet (15m) , 80 lb(45kg)
spectra x 4

Synergy-Deca™ trademark owned by Marc Ricketts
Spectra™ is a registered trademark of Allied Signal
Ventex™ is a registered trademark of InVento

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.

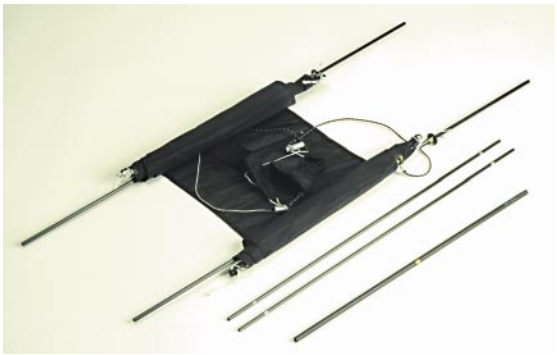
Assembly:

Instructions for Synergy-Deca A-1, and Synergy-Deca 6 & 15

The Synergy-Deca is one of the most advanced and controllable kites on the market. This manual will walk you through all of the steps to get you up and flying. We recommend you review the instructions before flying your Synergy-Deca even if you have had previous quad line experience, as the structure and shape of the Synergy-Deca make it extremely unusual to set up and fly. It requires its own touch, but after a little time we guarantee you will find more possibilities with it than you imagined. We start with assembly, which we recommend you go through a few times indoors to become familiar with the kite before going out to the flying field.

Remove your Synergy-Deca from its bag.Your Synergy-Deca includes the kite with 4 spars rolled in it , 3 loose spars, and fly lines and handles.

(Note: This manual shows primarily the Synergy-Deca A-1. Any differences in set up between it and the Synergy-Deca 6 and the Synergy-Deca 15 will be shown; however the basic process of assembly is the same for all three kites.)



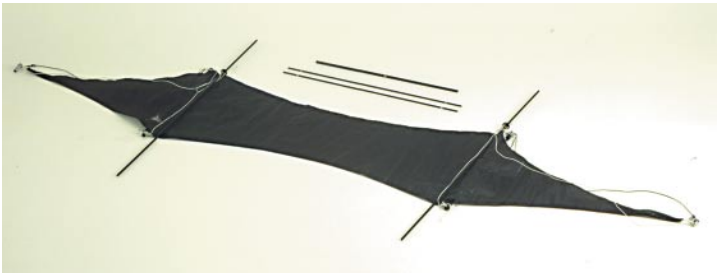
Set the handles and bag to the side and start unrolling your kite, pulling out the three loose spars, two coded with silver and one with gold.

Your Synergy-Deca is rolled like a scroll, to keep the lines on the two sides of the kite from becoming tangled with each other during transport.

Your Synergy-Deca should now look like this, its two wings folded in on the side of the kite facing you and the two semi-attached gold coded spars tucked between the wings and the center of the sail.

You have also exposed the two black vertical spars that stay permanently attached to the kite (never removed during break down).

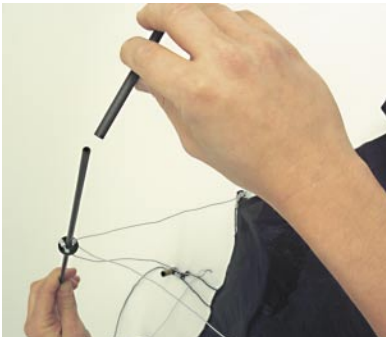
1.unroll the kite



Flip the two wings on your kite out. On the side of the kite now facing you are the two gold coded spars, which each go through a small disk with three lines running to the kite tips.
Check the logo, printed at the left corner on this side of the kite, to be sure you have your Synergy-Deca with the right side facing up.

Lift up one of the attached gold coded spars and point its long end toward the wing tip. Check the lines coming from the disk to make sure they go directly to their respective tips without any twist (around each other or the spar). If the lines get badly twisted the spar can be slid out of the disk, the disk untwisted, and the spar reinserted.

Synergy-Deca 6 owners must first remove the aluminum ferrule (short tube) if they want to remove the disk.



Now taking the loose gold spar, slide it over the short end of each of the attached gold spars, making one long spar.

Once all three gold spars are joined together, find the gold cap under the wing on one side and insert the end of the spar into it.

Synergy-Deca 6

Synergy-Deca 6 owners insert the separate gold spar into the aluminum ferrule (tube) at the end of the attached gold spar.

Synergy-Deca 15

Synergy-Deca 15 owners: Join the gold spars by sliding the loose gold spar over the ferrule at the disk end of the tapered gold spar.

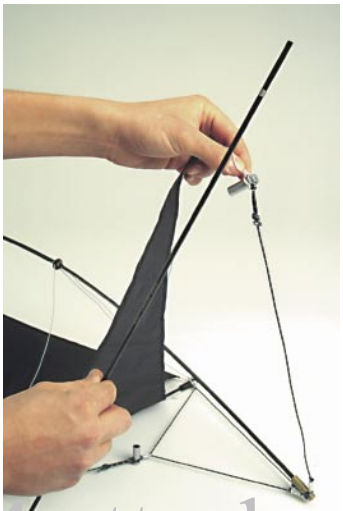
2.assemble gold bow

Once the long gold spar is inserted into the gold cap on one end, attach the other end to the gold cap on the kite's other side, bowing the 3-piece spar (the gold bow). As you bow it, check that no lines are wrapped around any of the spar tips.

3.attach gold bow

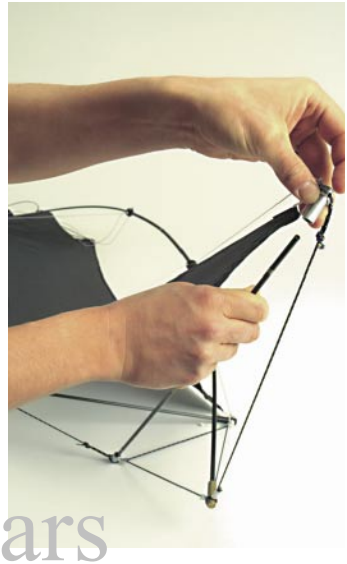
Your kite should now look like this.

At this point it is good to double check to make sure all lines are clear of twist and run between their respective attachment places directly.



Taking one of the two unattached silver-coded spars, lift the wing on one side of the kite and find the silver cap below the sail. Insert one end of the silver spar.

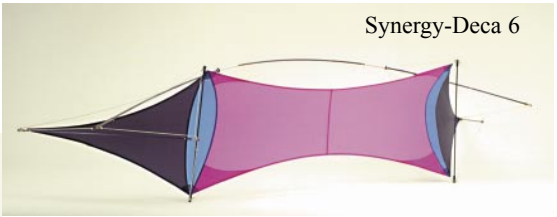
Then, holding the other silver cap at the wing tip, push down on the spar while pulling up on the wing to insert the silver spar. This requires bowing of the silver spar.



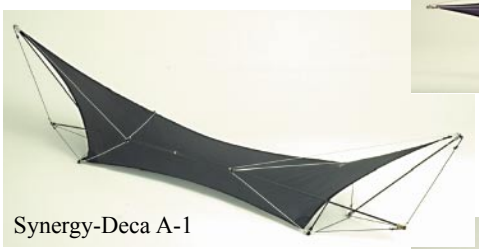
4.attach wing spars

Now attach the other silver spar to the wing on the other side of the kite, and go back over the kite checking for lines twisted around spar tips, spars or other lines.

Your Synergy-Deca is now fully assembled.



Synergy-Deca 6



Synergy-Deca A-1

Synergy-Deca 15

When & where to fly

Try to find an open field with no power lines, or roads crossing through it. 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 you will find 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.

For your first time out you want a nice steady breeze of 10-18 mph (leaves and small branches should be moving, and flags flying fully extended). Too light wind will reduce the lift of the kite and make learning to fly more frustrating, and in strong wind the kite can move very fast making it more difficult to learn, since your reactions will have to be very quick. Also make sure that there are no thunder storms in the area, for the lines when wet can conduct electricity.

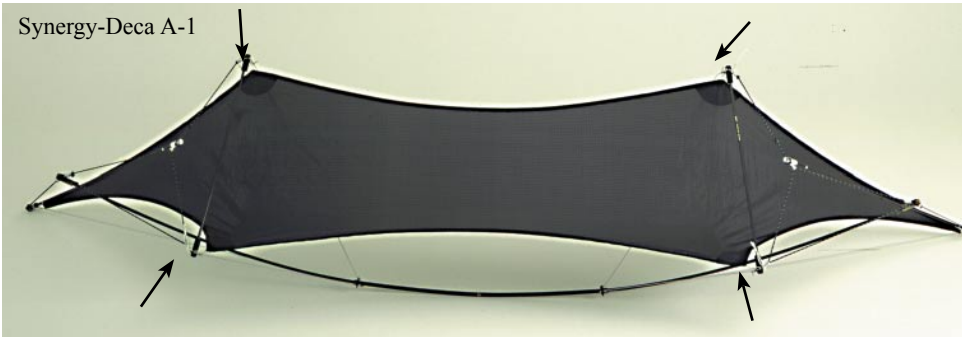
As you become more proficient with your Synergy-Deca you can try flying in areas with obstacles and turbulence. These can make fun challenges and help advance your level of flying, but don't try this until you have mastered all the basic moves.

Fly safe!

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

Field Setup

Place your assembled kite downwind so that you back into the wind while unwinding your control lines. The back side of the kite with the 3-piece gold bow should face away from the wind, with the bow and wing tips resting on the ground. In this position the wind will push the kite into the ground and hold it in place.



Unwind about 6' of the 4 lines, separating the two pairs of lines. Each pair goes to one side of the kite. Take one of the pairs and separate the two lines by loosening the larks head by pulling on both small tabs. Attach one line from each pair to the line attachments on the kite found at the spar tips at the top and bottom of the vertical (black) spar, using a lark's head loop (see illustration below).

Do the same for the other pair, connecting them to the other side of the kite. Then finish unwinding your lines, backing away from the kite into the wind - notice how the lines are wound in a figure eight pattern. Later you will rewind them the same way. For the beginner, untwisting lines can be a tedious part of the set-up process, but with experience it will generally take less than 2 minutes. When you get to the end, separate the two handles and untwist your lines until they run parallel to the kite without crossing each other.

Your kite has been placed on the field upside down (standard flight position is with the bow on the top side). Put the handles together and rotate them 180° to get a half twist in the lines. In this position you can launch in reverse and unspin in the air (see Launching section). Or if you have a friend along who can rotate the kite for you so that the bow is on the top, you can do a standard launch. You are now ready to fly!

Flight:

The Synergy-Deca Series has unique flying characteristics. You can maneuver forwards, backwards, sideways and invert (roll the kite around its own lines). With a little practice of the proper hand movements, you'll be well on the way to becoming a skilled flyer, discovering the possible variations and combinations of flight control.

Don't be too afraid of crashing your kite. This happens a lot when anyone is beginning to learn to fly, and the Synergy-Deca is designed to absorb and distribute the shock of impact without breaking. So think of crashing as the ground getting in the way of your flight path - reverse and keep flying!

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 initiate the launch.

If when you launch the kite starts going 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 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 convex side of the sail and wings pointing up, give one of the handles a long quick pull to flip the kite to a launching position.

Moving forward

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

Moving backward

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 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

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

Turning is a bit 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.

Helpful hints

The speed of your Synergy-Deca is completely controllable by the handles' range of motion between maximum tilt or slide and neutral. The closer your handles are to neutral position, the less the movement/lower the speed of your kite.

The Synergy-Deca will fly in a whole range of orientations. If the kite seems 'upside down', simply reorient your signals, keeping the kite as your frame of reference. If you use quality Spectra lines and your control lines become twisted, the Synergy-Deca's flight characteristics will not be affected. Note whether the kite is upside down or not, and adjust your signals accordingly.

The Synergy-Deca is unique among Quad line kites in liking arm movement, so don't be afraid to move your arms back and forth a good bit while executing different maneuvers. Don't be afraid to experiment with different arm and wrist motions.

Neutral position

Moving forward

Reverse / Moving backward

Spin

Advanced control:

The Synergy-Deca can do many unique tricks. Do not be discouraged if you can't master all of them right away - as your feel for the kite improves, so will your flying.
Keep practicing!

Inverts

Your kite can actually flip backwards, wrap around its own lines and then be unwrapped in the air. To do this dramatic trick, you must give the kite a quick, hard reverse motion with both handles and the immediately throw your handles forward, keeping the top of the handles pointed away from your body. This trick can be achieved with the kite in any part of the sky.

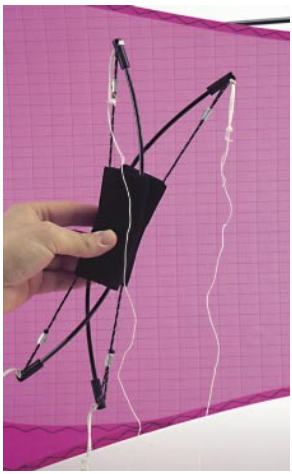
Invert & Hover

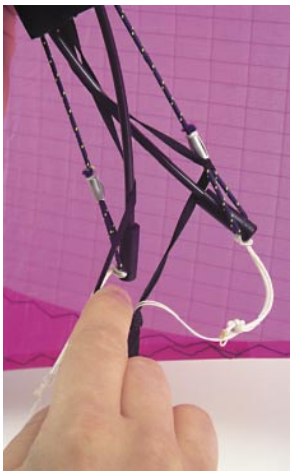
Your kite can also invert and hover with the front of the kite facing the sky and the wing-tips pointing down. This move can be very beautiful and give you a break while flying. To get into this hover, give the kite a hard reverse motion evenly with both handles and keep them in this position; the kite will flip gently into a hover. The hover can be maintained, or the kite can be flown using dual line kite motion techniques - pulling right with both handles to turn right, and pulling left to turn left (remember to keep your hands in reverse position. You can get out of the the hover in one of two ways:
1) Pull one handle back until the kite turns all the way over and pops back into the wind by itself; or
2) Throw both hands forward with the top of the handles tilted away from your body and then immediately return your handles to the neutral position.

Reverse invert

Your kite can also do an invert by flipping forward, with the front of the kite falling over toward you. This move looks great if you begin it at the top and center of the wind window. Once flipped this way, the kite will fall quickly. To accomplish this move, take your kite to the top of the window and give a quick, hard forward motion. This will flip the kite over and it will begin to fall. To get out of the flip, you must throw the handles forward while holding the bottom of the handles away from your body, and then immediately return the handles to the neutral position. This should pop the kite back to a normal flying position. The closer the kite is to the ground before it comes out of the flip, the more dramatic the trick will be.
The Synergy-Deca is also capable of doing a reverse invert hover starting from upside down or invert from any place in the sky. Try experimenting with other combinations of controls and kite positions. We are sure you will find possibilities of which we never dreamed!

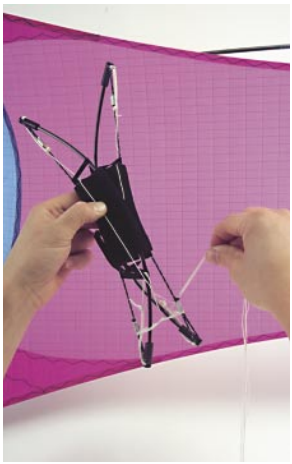
Rewinding lines





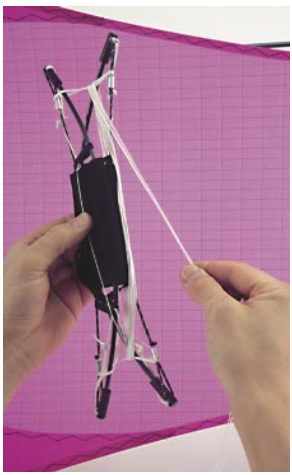
When it comes time to break down, it's very helpful always to rewind your lines properly, to minimize the amount of time spent sorting out lines the next time you fly. Don't detach your lines from the kite until you are nearly finished rewinding.

Hold the two handles overlapped, so the bows face each other (convex to convex). Pull the handle elastic over one end of the handles. Then pull the elastic through the 'notch' between the two handles at one end, bring it through the notch at the other end and wrap it around this end of the handles.



Once the handles are joined, take all four lines in a hand and pull them together through the notch at the bottom. Figure-eight the lines a few times around the two bottom ends of the handles.

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. This will save you a lot of time and confusion.

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 of 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 searches for the most efficient and economic 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 crosssection. 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.

Replacement parts

Synergy-Deca A-1
spars

	where	# per kite	length in / cm	type
gold	Side Bow	2	28.5 / 72.6	Avia .220 Carbon /5.5mm
gold	center bow	1	16.23 / 41.1	Glassforms CP-15 .256
silver	wing	2	20 / 50.9	Avia .180 Carbon / 4.5mm
black	vertical	2	13.56 / 34.5	Avia .180 Carbon/ 4.5mm

Synergy-Deca 6
spars

	where	# per kite	length in / cm	type
gold	Side Bow	2	28.5 / 72.4	Avia .265 Carbon / 6.5mm
gold	center bow	1	28.5 / 72.4	Avia .265 Carbon / 6.5mm
silver	wing	2	32.5 / 82.5	Avia .220 Carbon /5.5mm
black	vertical	2	20.25 / 51.5	Avia .220 Carbon /5.5mm

Synergy-Deca 15
spars

	where	# per kite	length in / cm	type
gold	Side Bow	2	28.5 / 72.4	Avia G-Force Super UL
gold	center bow	1	28.5 / 72.4	Avia Center-G (custom double taper)
silver	wing	2	32.5 / 82.5	Avia Excel 1 UL
black	vertical	2	19.25 /48.9	Avia Excel 1 UL

For parts, supplies and additional information contact your local kite retailer or Nova Design Group.

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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.
-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 kite shop of AKA 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):

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