

Gang fighters

by Reed M. Richards Jr.

The first time I decided to try what has now become my favorite pastime, flying multiple fighter kites on one string, was in November 1995. I was on my way to the Georgia International Stunt Kite Championships in Savannah when the idea struck me that I might be able to adapt a flight line configuration shown to me by a long time friend and lifetime companion, Ron Collie, to fly multiple fighter kites. I had seen him fly as many as twelve inexpensive sled kites using this line configuration in what he called his " Cheap Spectacle", but until then I had not thought of trying it with fighter kites. Upon reaching the beach, I quickly made up a line set, hooked on a set of fighters and within minutes discovered the coolest, most mesmerizing thing that I have personally done with a kite. The visual spectacle was so awe inspiring that I flew those kites all weekend. Since then I have flown them almost exclusively, much to the dismay of my now neglected sport kites.

The purpose of this article is to share with you some of what I have learned from my experience with this style of flying and to answer some of the questions I am most frequently asked when I am flying.

How Do You Do That?

We start with a pair of kites, each on individual leaders which are tied together and connected to the main flight line. The system forms a "Y" allowing the main flight line control over both kites which are flying on independent strings. (See Figure 1) To keep the kites from colliding, we make one of the leaders longer by 2' to 3'. The kite on the shorter leader can collide with the other kites leader but this not fatal and the kite just bounces off or loops in the opposite direction. To keep the leaders from becoming twisted, swivels are used at the intersection of the leaders and the main flight line and at the kite end of the leaders. If swivels are not used, the spacing between kites (that 2' to 3' we added to one of the leaders) can be reduced by line twisting allowing the kites to collide forming a real pretty mess as the kites come fluttering down on top of that big old oak tree. Use the 2-way swivels as indicated not the 3-way swivels which if used can lead to the same spectacular disaster. (I get my swivels at the fishing section at Wall-Mart. I use #8 thru #12. Any of these sizes are both strong and lightweight enough to do the job. If you get snap-swivels the snaps should be removed which will reduce the chances of a line getting fouled up on the swivel.

How Do They Work?

With this system, the kites divide the tension supplied by the main flight line. How much tension each kite gets is determined by its position relative to the main flight line. (See Figure 2) you will notice that the main flight line direction and the wind direction are approximately equal as the flight line naturally tries to orient itself dead downwind. The individual kites tensions may or may not be equal depending on the kites positions in the sky and that is constantly changing. Because one kite usually is flying under greater tension than the other, you will have greater control over one than the other, or what I call a "Dominant" and a "Subordinate kite.

The main flight line tension is divided between the individual kites whose share is inversely proportional to the angle between the kites leader and the main flight line such that the kite with the greatest angle gets the least share. This is the subordinate kite. The other kite whose angle is smaller will receive the greater share of the tension and is dominant. Flying in this state the dominant kite will climb, pulling the main flight line up, while the subordinate kite will loop and dive then recover. As the subordinate kite climbs it reduces its angle to the main flight line gradually increasing its share of the main flight lines tension to the point that it becomes the dominant kite. Left alone the kites will oscillate back and forth between the dominant and subordinate conditions, one flying while the other loops and dives, without the main flight line losing altitude. I call this condition when the kites are out of synch with each other the uncoupled condition. In this condition the pilot should react to the subordinate kite attempting to stabilize it and to equalize the angles between the kite's leaders and the main flight line. (Which one do you fly? Hum lets see I'm close to the ground and one kites diving.....) Always fly the one that's in

trouble.

A skillful pilot can learn to manage the angles keeping them equal. In this state the kites will behave identically and with unbelievable accuracy one kite will mirror or mimic the other kites exact position, direction of flight, visual orientation, and rotational speed. (Mirror-opposite direction, mimic-same direction) I call this the coupled condition. With the kites coupled some amazing side by side identical loops, parallel dives and passes, and crossing passes with loops are possible. As long as the pilot maintains this coupled condition, the kites will continue to mirror or mimic each other. Getting them into and maintaining the coupled or synchronous state is dependant on pilot skill but when mastered leads to some interesting ballet possibilities , which I have been exploring. (About 12 public performances to date. I fly to "Enya", Caribbean Blue, Reprise Records@1991/ so please don't weeze my song, ... Ok.)

How Many Can You Fly?

Using the following formula,(see Figure 3) this system can be expanded to fly multiple kites without suffering a catastrophic failure while maintaining somewhat equal control over all of them. (I fly up to six on 18# waxed linen and to date have had no failures.) The finite number that can be flown is limited by a number of factors; tensile strength of flight line, wind conditions, your ability to manage and control the tension created by the system,(ouch!) And field size. The size of your field and density of air traffic (other kites) will limit the number you will want to fly. Since there is a long distance between the top and bottom kite you need some field to get the system launched. Because of the leader arrangement, flying in close proximity to other kites is ill advised. Any kite that gets too close gets caught! In using this system you will notice a visual discrepancy in the spacing between the kites. (See Figure 4) This cannot be avoided. If you lengthen the top kites leader to adjust for symmetrical spacing you have to double the length of leader this kite is flying on and will lose the ability to synchronize its flight with that of the other kites on the string.

Because of this spacing discrepancy, kites #1 and #2 behave slightly differently than the rest of the kites in the system. In a 4-kite system the kites behave like two separate pairs, kites #1 being one pair, kites #3 the other. Each pair operates well together and is easy to synchronize but it is hard (not impossible) to get both sets synchronized. As more kites are added to the system, the additional kites will behave synchronous to kites #3.

With practice I have learned to synchronize an entire 6-kite gang resulting in some truly outstanding visuals.

What kind of equipment?

I recommend that you use a good waxed linen in the 12# to 18# range. The wax helps reduce line twists which can produce some mighty interesting bird-nests in this system. (If this happens, let the kites fly, they will usually pull the mess lose) The wax also acts as a lubricant reducing line burns. (you get callouses after a while, kind'a like guitar) I like to fly using a 9-inch yo-yo winder. This allows me to give a quick line burst to recover a wayward kite. The 9-inch reel has a much quicker take up allowing me to keep up with wind lulls without ending up hogtied by a mess of string around my feet.

The kites should be of identical design and construction. Rip-stop or spinnaker sails are preferred as paper sails need to have their leading edges reinforced with tape to withstand the line bumping that goes on when flying this system. Make sure that your spreaders are not susceptible to being knocked out by the line bumping. I have flown several types of fighters using this system and have found that kites that are straight tracking and not over rotational are easiest to synchronize.

All leaders should be of equal length, except for the leader for kite #1 which should be 2' to 3' longer. How long you make the leaders is determined by what kind of control you wish to have over the system. With longer leaders the kites travel a greater distance relative to the angle change making it harder to find the sweet spot where the kites will couple. Long leaders make synchronization harder to achieve but easier to maintain. Conversely, with shorter leaders, coupling is easier to achieve yet harder to maintain.

(Engineering101,subject:tradeoffs.....Life's a beach, go fly a kite!!!)

I like to use leader lengths between 25' and 40'. I am currently using 37' leaders.

To launch: (See figure 5) lay out leaders then spool off one to two leader lengths of flight line; stake line spool; stretch flight line and leaders dead downwind; unwrap twists in leaders if necessary; lay kites face down in position shown; weight down tail of kite (use any weight handy, a rock, sand, a kite bag, your sisters foot....) Now, pick up the line spool. Gently pulling on the main flight line will cause both kites to jump up in a nose up position and fly. (Oops, She forgot to lift her foot...) If one kite crashes, let the other kite fly away and take line. It will usually pick the other kite up. By altering the positions of the kites on the ground, staggered launches are possible. (I use a two part launch as an introduction of my Single line, Pairs Ballet routine.

If you, after reading this, try this system and fall in love like I did. Ask your wife (or husband what ever the case may be) to please accept my sincere apology for introducing you to your new found addiction!

See Ya On The Next Beach!

Jr.

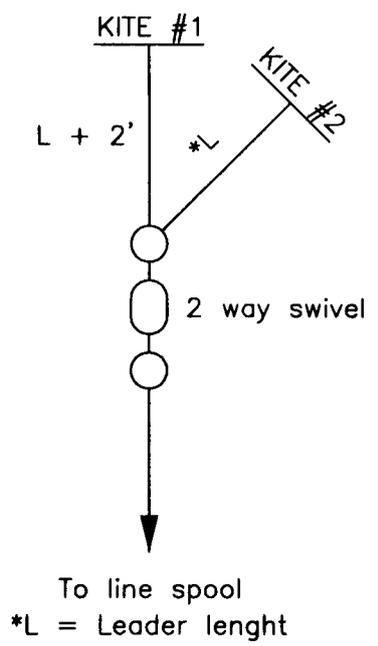


Figure 1

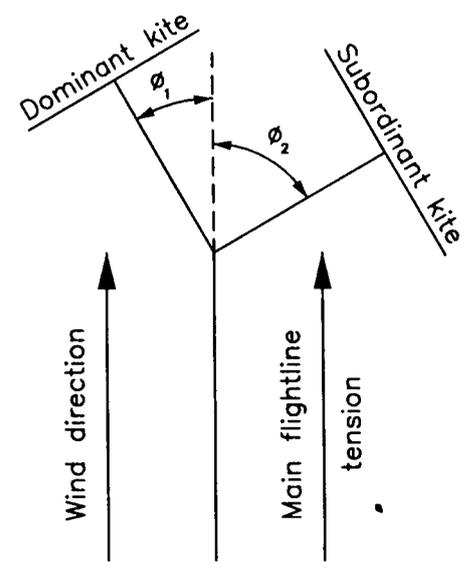


Figure 2

4 Gang fighters

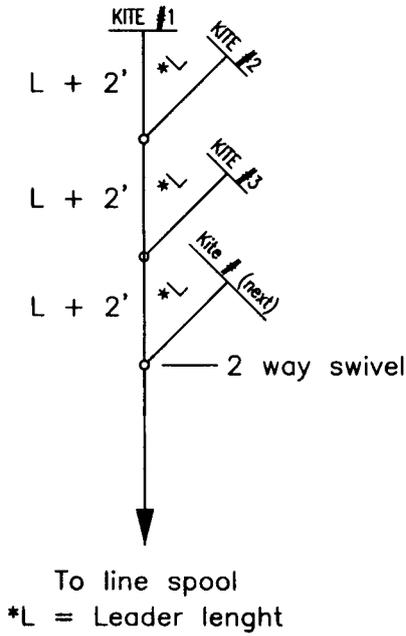


Figure 3

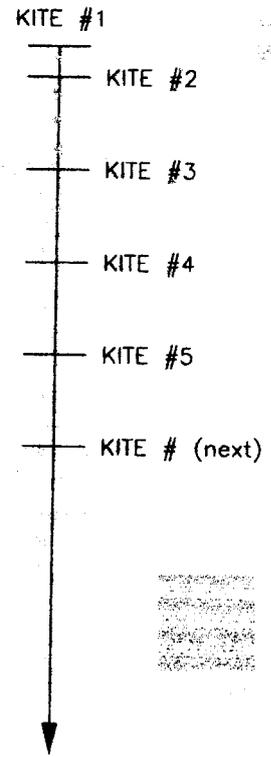


FIGURE 4

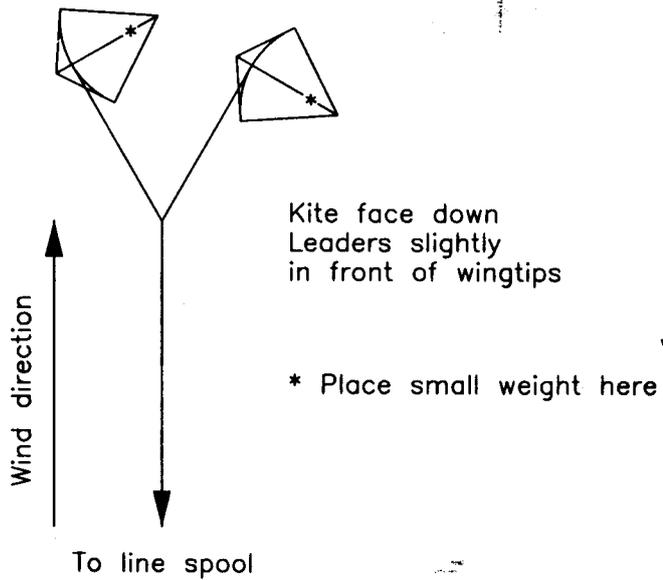


Figure 5