

Steerable kites in the UK up to (about) 1990

George Webster

1 Introduction

‘Regular Readers’ will know that whenever I write about kites, I have specifically excluded those with more than one line or, at most, only mentioned really important landmarks. However, recently (e.g. in Issue 142) Alex Kraaijeveld has written about ‘early’ two-line kites in the UK. Some of his emphasis is, I think, wrong but rather than be negative –I’m all for encouraging the good guys who fly old as well as new two-liners– I thought that I could at least give my version of what happened. Although I was around in the period 1975-90 I flew very few steerable kites, so writing this has involved Tony Cartwright and especially Andy King helping me to describe the evolution of what happened in kiting during this period rather than my usual focus on kites themselves. Some of the background is given in my *Kites On a Line* (<http://www.johndobson.info/John's%20Kite%20Site/George/writings.html>). Ron Moulton’s two books [1,2] have details of the kites. But still nothing from me on power kites.

2 Definitions

The general term is dirigible kites, i.e. kites which are steerable left/right and capable of looping when required. Those interested could enter an argument as to how much movement and how precise must it be to count as steerable. Roks are a case in point. They can be moved; but a team rok ballet? On the other hand, nothing could be more dirigible than an Indian fighter kite; but they can’t ballet either.

I’ve split dirigible kites into 3 sections:

- 1) Single line
- 2) Four/three line
- 3) Two line.

3 Single line

The first attempt at steering a kite probably followed soon after the first flight as the flier sought the best place for fishing. I suspect that the Indian fighter type was the first to have steerability comparable with 2-liners (*Kites on a Line*, p. 139 (Chapter 6)). I don’t know of a claimed first date but since paper was necessary for the cover it cannot be before about 500 AD. Indian fighters were known in England by 1909 being sold under the name Vakata in Gamages (a London department store). Sets were made up in two colours, red and blue, the game being teams of boys competing in cutting down the opposing team’s kites.

In 1969 Dinesh Bahadur introduced Indian fighters to New York when he made them part of the range in his kite store, and they were quickly on sale at Come Fly a Kite in San Francisco. As a result they were “Americanised” during the 1970’s by patented versions such as the Vic Fighter and the Grandmaster. These used more modern, more durable, and more expensive materials so that the rules of fighting took account of the value of the kites — as opposed to the highly expendable originals. The Kite Store stocked Vic Fighters and Indian Fighters in the late 1970s, and also Viv Comma’s KisKeeDee (see *Kites on a Line* p.157 (Chapter 6)) which was designed to dance not fight.



KisKeeDee

Many other Asian countries have single line fighters but in the 1970's I remember seeing only Korean and Japanese ones in the UK. In the 1980's I bought a Brazilian cotton/wood papagaio which we were told was the kite to be seen on Copacabana beach. Some time later Brazilians didn't seem to have heard of them and used pipas which are essentially lightweight modified rokakkus.

Although in the 1970's and 80's there were some Indian fighter competitions held at UK festivals it was noticeable that they didn't usually involve Asians. For years there was an all-Asian competition held at Blackheath — I remember someone who was a specialist in bridling them sitting down with a used matchstick making holes in the paper cover. It was there that I learned a way of modifying them for high winds by burning a series of holes in the wings using a cigarette.

4 Four/Three line kites

This category comprises specialist kites developed in the West. Not my concern are some 19th century kites which required multiple lines to fly at all.

The first specialist 4-line kite was developed by George Pocock whose patent was granted in 1829 (*Kites on a Line* p. 24 (Chapter 2)). Pocock used archtop kites and early on felt that they were reliable enough to lift his daughter on a swing seat. However, his kites needed to be large, 12 feet by 15 feet, and transportable. As a result, development was hampered until he designed a system of pushing out the supports for the arch head by a two-dimensional version of an umbrella's system. He used a top and a bottom line for fore/aft control of rise and fall and reaction to wind changes. A line to each corner changed the angle of the kite to the wind. Together these controls allowed passenger vehicles to travel on roads sometimes at record speeds. For me his greatest exploit was to beat the stagecoach from Hounslow to the White Bear Inn on Piccadilly Circus. He was not the only person to use the system — it was also used to drive boats. The Duke of Cambridge had a set of silk kites and used to drive up and down the Harrow Road. (Has Peter Lynn ever provided a traction system to a member of the Royal Family?)

The next use of a four-line kite was by the Wright Brothers who in 1898 flew what was to become a biplane glider as a kite rigged so that the wingtips could be twisted. Known as 'wing warping' this was the test bed for their method of trimming and turning their first man-carrying aircraft.

I don't remember any 4-line flying for most of the 1980's except that at one or two festivals someone used to fly a Malay with a line to each corner controlled by a wooden cross (as used with puppets). It would hover while inverted. His name was Phil Morley (see Moulton and Lloyd [2] p. 168).



Phil Morley (from Moulton and Lloyd)

In 1981 Richard and Kathy Davey in Australia produced the Playsail.



Playsail

Essentially a sheet flown from two loops, one fixed bottom/top left and ditto right, it was introduced into the UK by George Peters.

Then in 1988 right at the end of my time slot the Hadzicki brothers developed the Revolution, the first production model arriving in January 1989. The design has remained essentially unchanged with its use of 4 lines to twist the kite, linking back to the Wright brothers wing-warping. Designers may have thought that something more symmetrical would be more accurately manoeuvrable, but still the Rev is supreme.

The only other 4-line kite which I have seen regularly –but rarely– at festivals is David Davies Skydancer with a curved leading edge which changes shape in the wind — again a 1990's development.



Skydancer

One or two 3-line kites have appeared, for example the Synergy 333 in the early 2000's, which has three separate lines connected to a tetrahedral frame held in one hand, and an Eolo-Gayla Joystick kite in 1996, which has two handles, one with two lines for controlling its flying and one with a single line which controls the angle of attack, and so requires two hands to fly.



Synergy 333



Eolo-Gayla Joystick

5 Two-line kites

Back in 1894 J. Woodbridge Davies in New York designed an octagonal rescue kite for getting a line on to a wrecked ship. By using two lines he could fly 'off the wind' covering an angle of 270° . Varney [3] mentions Potter flying a cellular kite to a thousand feet and using a 'supplementary cord' by which the kite could be controlled to an angle of 60° on either side of the wind.

It is said that photos of the boat and kite rig which Cody used to cross the Channel in 1903 show a second line which provided him with additional control.

In 1914 Miller [4] wrote 'a double bridle with a kite line to each makes a dirigible kite possible ... which can give much amusement in kite antics'. There is also a simple plan (page 17) showing each bridle attached to a wing tip and the rear of the spine of a Malay-type kite. This was of course at a time when stability of flight was a highly desirable quality in a kite. Are there any references out there to it being done?

However, the most important 2-line development prior to the 1970's was in 1942 with Paul Garber's Target Kite.

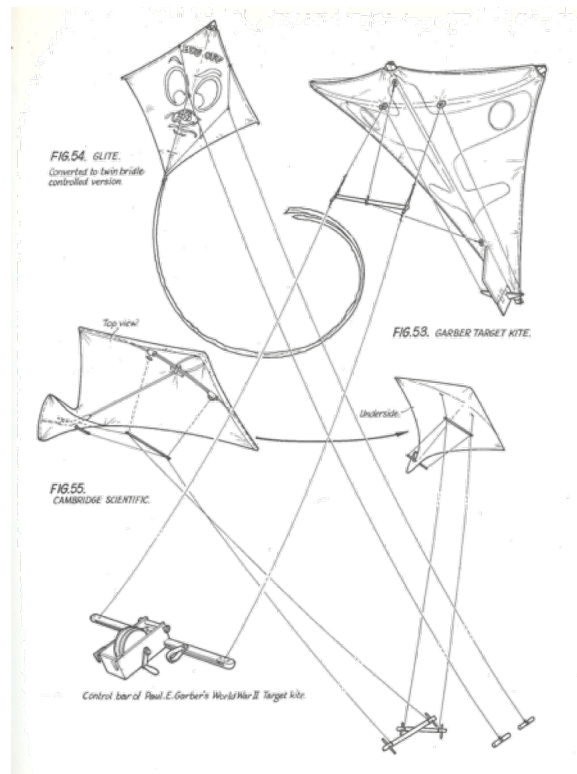
This was a system to help train gunners of small arms to be effective against enemy aircraft. It used a 5-foot Malay kite with a Japanese or German aircraft printed on it manoeuvred by two lines. A control bar was held by the flier and pulling on one side

pulled that wing of the kite forward and also turned a rudder under the tail by using a spreader bar on the kite. This was heavily made with a plasticated cover and a cross spar of 45 x 10mm, but in a strong wind or being flown from a moving ship could be moved quickly on 80-metre lines. Paul Garber was an aeronautics expert, a great populariser of kite flying who held a senior position in the Smithsonian Museum in Washington. So I have often wondered why he used two techniques to cause the kite to turn — pulling forward one wing as used by almost all 2-line kites since, and a rudder. I have heard him defended by the argument that a rudder is better for low wind speeds and a kite flying flat on the wind. I've never seen a complete real Garber kite, still less seen one fly, but I have to say that a kite of that wing loading needs a strong wind and all the operating instructions and still photos I've seen show it at a steep rather than shallow flying attitude — which I would think fits with the requirements for target practice.



Target Kite

The system was successful and 125,000 were made. The closest descendant of this kite is the Cambridge Combat of 1976 which used a shift in the tail as well as tilting a wing. Alex Kraaijeveld has written about them in *Kiteflier 142*, and thanks to him I've had a close look.



from Moulton

The plastic cover is formed in to a vertical pocket at the tail and this can be moved as a rudder by a small cross spar. It looks unlikely that the system would exert enough force to make the rudder effective and he agrees. Unlike Moulton's judgment he is sure that movement comes from advancing a wing tip. But it is an interesting kite.



Cambridge Combat

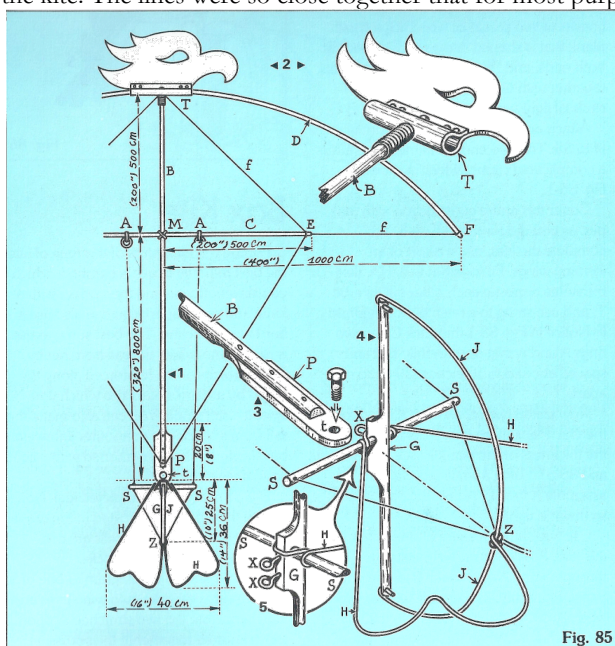
Perhaps another Garber feature used later was the control bar as originally supplied with the Flexifoil rather than the two handles which were a later standard.

I don't know of any recorded 2-line flying demonstrations, still less any such kites being made in the next 20 years. Kites were sometimes flown on two lines while being developed to check their trim. So Rogallo's Flexikite (Pelham[5] p. 80) is shown as being flown on two lines but was produced as a single liner.



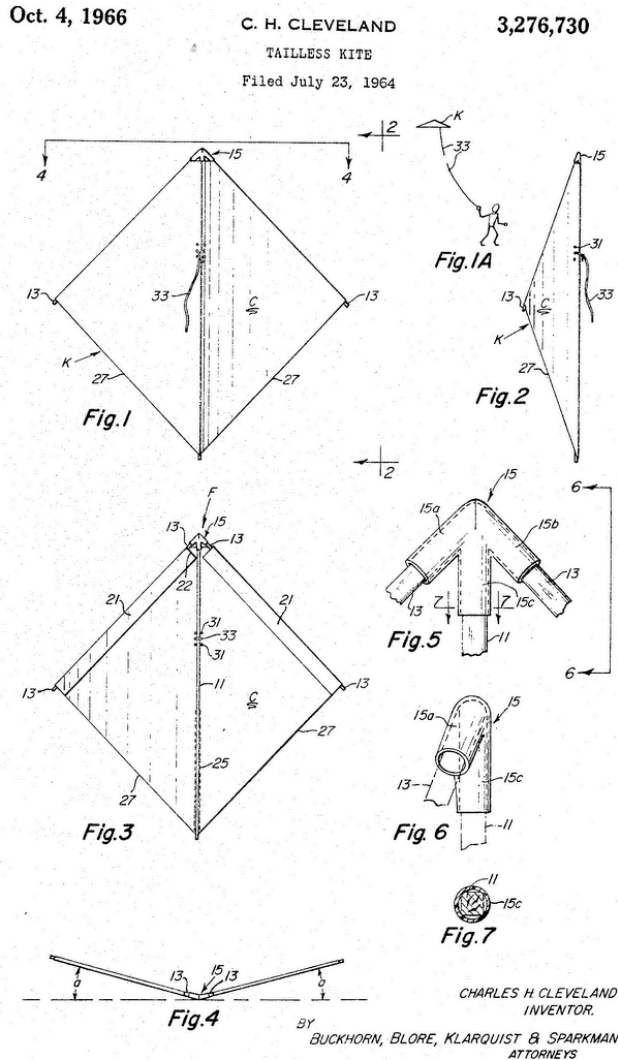
Rogallo and Flexikite

In Pelham (published 1976) the Peter Powell stunter is the only dirigible kite which receives a mention and a plan. I don't know –and would be most interested to find out– if any other 2-line flying was seen. I've come across an extraordinary plan (in Thiebault[6] p. 73) for a Hawk kite similar to those used in shooting in the UK, but with two lines side by side on the flying reel which are used to turn a rudder on the kite. The lines were so close together that for most purposes they must have acted as one.



Hawk Kite (from Thiebault)

In 1964 in the USA the patented Cleveland Glite was first produced — in many ways a cross between a Rogallo Flexikite and a delta. The plastic cover was printed with the points needed to rebridle it as a 2-line dirigible — single line flying was straightforward from the line to a designated point on the keel. In 1972 there was an article in the AKA magazine praising its 2-line performance. North Pacific Glites were sold in the UK but I don't remember ever seeing one on two lines. For a lightweight toyshop kite they were great fliers.



Cleveland Glite patent

At this point, before we delve into a quickly-changing timeline of 2-line kites it might help to give a general overview.

1. We have the development of Malay/Diamond kites *e.g.* Peter Powell, Ace, Barnstormer.



Barnstormer

2. Deltas had minor development e.g. the Glite and then on to slow-moving Vertical Visuals Gryphons. However, the most fruitful source of most innovation was that which led to the Top of The Line Hawaiian Team Kite. A family of rigid deltas with three cross spars, this was the basis for most of today's delta wing stunters.

3. Soft framed kites, starting with Keith Stewart's deltas with inflated spars in 1977, were developed to allow power kiting and, later on, kitesurfing, e.g. the Wipica around 2000. Not covered here.

4. The advances in soft (frameless) kites, both 2-line (e.g. the Peel Wing of 1987) and 4-line (e.g. the Quadrifoil of 1990) enabled increased power to be available for buggies, all-terrain boards and to some extent kite surfing. Not covered here either.

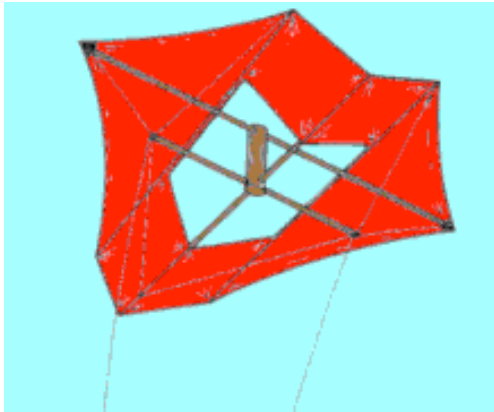
5. We have the unique sparred and inflatable Flexifoil. Development started in 1971 but the kite design which first flew in 1976 remains basically unchanged. Despite first appearances the Flexifoil is not a development of the parafoil. Its inventors, Merry and Jones, were able to show that they had not infringed the parafoil patents. Surprisingly for a kite noted for its speed and ability to fly in train, it was also the first 2-liner which I saw demonstrated indoors — Isle of Wight 1994.

6. As usual we have a rich vein of exceptions — these range from the Dunford Flying Machine to the Cambridge and to Joel Schultz's F16.

6 A timeline of 2-line kites

1964 US Glite marketed with instructions on how to convert to 2 lines. Three types were sold: the standard, a larger size. and a tandem formed by large before standard on a common keel.

1972 (patented 1970) The Dunford Flying Machine (see Kiteflier 142 and Moulton) was the first and most successful of 2-line kites designed by Donald Dunford. It most resembles a Conyne with no upper surface to the central V cells – but the subtle cut of the material and sparred shape produced something much more complex aerodynamically. A heavily wing-loaded kite with wooden spars, plastic tube to form the 90° fitting at the centre and using cotton cloth, it needed a fairly heavy wind to fly. But in expert hands it was capable of precise manoeuvres well ahead of its time. It was marketed as a tool for photography and crop spraying. Many found it difficult to fly and that its 90° fitting made it fairly fragile in a crash. It was also slower than the Powell stunter, having been developed for precise placing in the sky as opposed to the Powell's strength of exciting speed. Dunford's later 2-line developments were lighter, quicker kites but not so commercially successful.



Dunford Flying Machine



Schultz F-16 Fighter

1972 was the year the Peter Powell stunter was introduced. It sold well even before becoming Toy of the Year 1976 and had a greater impact on kite flying in the UK than any other single kite (probably by a factor of x10). The original kite had wooden spars (later replaced by aluminium ones) and a blue plastic cover.



Peter Powell Stunter

The leading edge spars met in a 3-way joint with the keel spar (compare the Glite). The spreader was sprung metal and alloy tube and the whole thing nearly indestructible. For 2 or three years no open space seemed to be free either from father learning quickly or his family learning even more quickly. The press coverage was exceptional and the marketing was brilliant e.g. the story of Peter demonstrating the kite from a bridge over Tokyo harbour and the groan from watchers as it hit the water followed by gasps as it was relaunched. Peter at a kite festival flying from a car as it drove around. Usually, of course, the kite had the magical touch of a tubular tail which enabled the flier to see the memory of the kite's path in the sky. Supreme for several years throughout the period to 1990 the kite remained a good choice as the basic serious piece of kit. Called the Peter Powell Stunter, it gave its name to a whole class of 2-line dirigible kites and became the generic name for such kites. In the later models fibreglass replaced aluminium tubing and ripstop was introduced in 1984.

The obvious public demand led to a rush to meet the market. Some were sort-lived rip-offs (the Aerobat), others such as the Wembley Barnstormer (made by the UK's largest toy maker) were more lightly built with a dramatic image on the clear plastic cover. The Ace was smaller, very nimble and popular with those wishing to fly a train.



Skynasaur Aerobat

1976 The Flexifoil's first public flight. Still flown today, it became during the 1980's the kite for speed records and for big kite trains.

1977 In the USA 'homegrown' stunters were being developed, e.g. Sky Tiger, Windjammer and Sky Cat. In the UK. Mark Cottrell became the first UK stunt kite champion at the Japanese Airlines Kite Festival on Parliament Hill. Steerable kites were used to cross the Channel.



Sky Cat

1978 The range of stunters was growing in both the UK and the USA. In the US Red Braswell suggested compulsory figures for controlled flying competitors (as with ice skating, for example).

1982 saw the next great technical development with Don Tabor's Hawaiian kites. These were essentially high aspect ratio kites in plan but with rigid frames and three cross spars. Collectively they could be termed 'Big Wing 8' Deltas'. Don was originally with Action Kites, who produced the Phoenix and the long-lived SkyDart, and left for Top Of The Line in 1985.



Super Skydart

1983 An Aerobatic Kite (as they were called by the Kite Store) appeared for the first time on the front cover of the Kiteflier. It was the Go(o)se.

1984 The AKA National Convention featured 'stunters'. There were now over 20 types on the US Market including the Rainbow and the Skynasaur.

1985 Tony Cyphert's Avenger (4 foot wing span).

1986 Hawaiian Team, Action Kites Sky Dart, Super Sky Dart, Phoenix.

1987 Joel Schultz produced the F16; a stunter shaped like the outline of an aeroplane. Tony Cartwright and Andy King went to the AKA Convention and filmed stunters in competition. T.C. informed me, and others, that we were flying static kites — they were the past and this was the future.

1988 By now the Kite Store stocked 36 aerobatic kites. In addition to those already mentioned there were Avenger, Revenger, Trlby, Hyperkite, No-na-me, Spinoff.



trlby



avenger



no-na-me stack



fire dart

Other US kites were the FireDart, SpectrumDart, SkyDart. Felix Mottram won the single line fighting competition at the Brighton Festival. This was the year of the formation of Stunt Team and Competitive Kiting. STACK was started by Tony Cartwright, Paul Jobin and Mike Ward with a prime aim of developing and enforcing a set of competitive rules. Competitions were held at York (May), where there were two UK pairs (called teams), Fear&Loathing and Battle Star, and Bristol (September). This was the time when competitions grew to include individuals, pairs and teams.

The famous Blitz team was formed comprising at various times Tony Cartwright, Andy King, Paul Jobin, Mike Ward and Neil Wills. and occasionally Mark Cottrell and Martin Lester. Why the name? It would seem that at a practice on Parliament Hill the American Team Chicago Fire's name was mentioned and looking south over London someone said that London's equivalent was the Blitz; this is also a move in American football. Anyway, Blitz was aerial combat. They gave a demo at the Washington (Sunderland) Festival and subsequently went to Chicago. However, the stars at Sunderland in 1989 were the US teams.

1989 The Blitz, flying Spin Offs, went to Wildwood USA and came 6/6 but they were the only 5-person team and the first 5-man team to fly in competition (T.C. and Andy ask me to mention).

In the USA stunt kites had taken off over 5 years resulting in the development of skills virtually unknown here.

Ron Reich flew three kites at once. Two were Hawaiian Team kites linked by a 150-foot tail where the inner line for each was attached to his hip and the outer to his hand. The third kite, a Spin Off was controlled by a line to the ground and one to his hips. Robbie Sugarman flew a train of Peter Powells through a dog stake so that he was just behind the kites. Eric Wolff, Sue Taft and Lee Sedgwick were all flying through dog stakes at about the same time. Records were made, e.g.

a train of 253 Hyperkites

Using Rainbows, 2911 figures of eight were achieved in one hour (!?)

There were five British teams:

Blitz (flying Spinoffs, LiteFlites, Hawaiian Teams)

Decorators (formed 1988, originally flying Indian fighters, later one of the world's outstanding 4-line demonstration teams) flying Spinoffs, Phantoms, North Shore Radicals, Rare Air Flashangels

Wicked Allsorts flying Spinoffs

Double Trouble flying Speedwings

Organised Chaos flying Phantoms

Top of the Line were still the winners in everything in which they competed in Europe and the US.

1990 The term Sport Kites (previously stunters) started to be used.

New kites appeared: Jester, Rare Air, Phantom, North Shore Radical. Mark Cottrell's LiteFlite was the first commercially available carbon-framed kite.



North Shore Radical



LiteFlite



Jester

Whereas Robert Brasington moved from his 2-line Jester to become one of the world's outstanding single line sparred kite designers, Tim Benson produced his first kites (single line deltas, rollers, multi-boxes etc.) before becoming an outstanding stunt kite designer of which the Phantom was the first.

There were at least half a dozen flyins/festivals which had stunt kite demonstrations.

I'd like to leave the timeline here.

See also <http://flyingfishkites.blogspot.co.uk/2012/12/evolution-of-dual-line-kites.html>

But other developments were still to come in the 90's and beyond, for example:

US domination overthrown (1995)

Decorators and Blitz in rivalry

First European Cup, Blackheath, July 1990

Truly international World Cups (1990 Seaside, Oregon where Blitz flew a six-person ballet; 1991 Second World Cup at Bristol)

Airkraft start and then become world champions in 1995

The development of air brakes, standoffs, whiskers etc.

Tricking

May 1991 The Kiteflier. Announcement by the Kite Society of a new festival at Weymouth 'to overcome the apparent dominance of stunt kites in major events'.

7 Some Thoughts

Why was there such a strong upsurge in dirigible kite flying 1975-90? There was a good basis with kite flying having grown due to advances in single line design plus the 1960's increased leisure and interest in ecologically friendly activities. Think of all those kites with rainbow designs.

Secondly there were the design breakthroughs originally by Peter Powell. You would still find Dad and children on the beach with unequal tangled sandy lines, but controlled flight could now be an adult interest with a range of American (and later British and European) rigid deltas to look at. It could become a competition activity at individual, pair and team level. There were serious fliers, some of whom in their single line days would have kept up-to-date by making a new design from plans, or from looking at or buying a hand-built kite from the designer. Now competition meant that all kites of a type were similar and so you updated by buying a new commercially produced kite.

Materials changed: spars moved to fibreglass (from the late 1970's) and then carbon (from 1989), ripstop became better quality and from the late 1980's low-stretch slippery lines were the norms for the competitor.

The abilities to fly high, or to fly at all in some conditions were unimportant. Now it was how skilful was the individual or the team in using the qualities of a given model of kite. Precision and teamwork both meant a hitherto unknown time commitment to kite flying.

Displays could showcase skills and invention, interest spectators and introduce music to the hitherto silent field.

Undoubtedly there was conflict between single line and 2-line fliers — principally over the space required by the latter. Remember that in 1970's and most of the 1980's it was quite usual at a festival for all space to be open to fliers and the public.

In the end having two or three flying areas divided between single and dual line kites solved most problems, and tolerance the rest.

(Acknowledgements: in addition to John Dobson's editorial work and providing the illustrations, Section 6 in particular relies on contributions from Tony Cartwright and especially Andy King.)

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