Discourse

from the end of the line

December 2010

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On the Cover: Kites photographed at Burning Man by Jose Sainz. Burning Man is an annual arts festival and alternative community gathering held in Nevada's Black Rock Desert. More on page 41.

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Drachen Foundation
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increase and diffusion of
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worldwide.

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FROM THE EDITORS

Discourse continues to receive interesting input from the world kite community. My thanks go out to all contributors, and we will continue to publish interesting articles from Drachen friends the world over. It's nice to catch up with Carl Robertshaw and hear more about his collaboration with Ivan and Heather Morison. Carl was one of the "young guys" on the crest of the sport kite wave of the 1990s and has continued to make his way in the art world. Frits Sauvé gives a hands-on tour of the restoration of a historical kite, while Holm Struck and Ralf Maserski report on the 10th Historical Kite Workshop. Thierry Nénot shows us the amazing work of Robert Devautour, kites made in France before the late century kite renaissance that we are all a part of. A photo-essay of 1957 university kites shows there is plenty for us to learn by looking back.

But there are forward-looking articles as well: Foundation board members Joe Hadzicki and Dave Lang give a report of the Airborne Wind Energy Conference, showing the possibility of kites in our energy-producing future. Jose Sainz reports from Burning Man, an arts festival in the Black Rock Desert, where the kiting spirit may influence a number of new artists. There are reports of current aerial photography projects in Mexico, and Gary Hinze brings us more paper kites to keep us busy this winter.

Thank you contributors!

Scott Skinner
Board President
Drachen Foundation

Contributors

Oscar Frey
Puerto Vallarta, Mexico

Oceanologist and whale researcher Frey has used kite aerial photography (KAP) to study whales since 2004. For the last three years, he has used KAP in the national parks and natural protected areas of the Yucatán Peninsula.


Keith May

Joe Hadzicki
San Diego, California

An engineer, inventor, and entrepreneur, Hadzicki is one of three brothers who started Revolution Enterprises, the first to make a completely controllable four-line kite. The Rev has been the standard for the kite industry for twenty years.


Ben Dantonio

Gary Hinze
San Jose, California

One of the first contributors to the Drachen *Kite Journal*, Hinze continues to follow his own path in kiting. He is a serious researcher of kite performance who can't pass up the chance to try something new and put it to the test.


Gary Hinze

Dave Lang
Vashon Island, Washington

A veteran aeronautics and space dynamics engineer, Lang designed the flight simulators on which all NASA astronauts trained for the Gemini, Rendezvous, and Apollo lunar missions.


Jane Lang

Martin Lester
Cornwall, England

A successful kite businessman, Lester tours the world giving exhibitions and lectures on the sport of kiting. His whimsical, sparless, "soft" kites in anthropomorphic shapes draw smiles wherever they are flown.


Keith Yoshida

Contributors

Ralf Maserski
Dortmund, Germany

A former vice president of the German Kite Fliers Association, Maserski edited the club magazine, *Hoch Hinaus*, and has made kites for more than 15 years. Visit his website at www.maserski.de to see his kite designs and event photos.

Werner Luehmann

Patrick Parrish
New York, New York

A modernism dealer in NYC, Parrish owns the gallery Mondo Cane in Tribeca. He has an MFA from the School of the Art Institute of Chicago and is a collector of books, geometric paperweights, and trout.


Patrick Parrish

Jose Sainz
San Diego, California

Sainz is the Horatio Alger of American kite making. Renowned for his elaborate, beautiful kites with Aztec motifs, he has conducted kite making workshops around the country and is a board member of the Drachen Foundation.


Jose Sainz

Frits Sauvé
Diemen, The Netherlands

Sauvé spends a great deal of time in the world of historic kites. He collects everything that can be collected and visits archives, flea markets, and antiquarian bookstores. He also lectures, writes articles, and rebuilds classic kites.


Inge Sauvé

Scott Skinner
Monument, Colorado

A former Air Force instructor pilot, Drachen's board president has flown and designed kites for three decades. Skinner's military training created the structure for him to express himself as a visionary kite artist.


Jose Sainz

Contributors

Holm Struck
Bliedersdorf, Germany

Struck has worked with kites for more than 25 years. In the last decade, Struck organized workshops and taught kite classes in Germany, Denmark, and the US. His great passion is old books on scientific work with kites.


Werner Luehmann

Leland Sutton
Seattle, Washington

Sutton started dragging around the world with his mother, Drachen's Ali Fujino, at an early age. Now a junior at Seattle's Northwest School, and after a year of photography work, he was honored to work on Oscar Frey's KAP project.


Oscar Frey

10th Historical Kite Workshop

Ralf Maserski & Holm Struck

Ralf Maserski and Holm Struck

Above: The 10th Historical Kite Workshop logo.
Below: Participants with all the Workshop kites.

In 2001, Achim and Sabine Kinter, supported by Drachen Foundation, organized the 1st Historical Kite Workshop in Haltern, Germany. Since then, this event has taken place every year in Germany or in The Netherlands. It is always organized by different people without any kind of fixed structure or an elected committee.

The 10th Historical Kite Workshop took place in Stade, a small town close to Hamburg, Germany, on April 23-25, 2010. The event was organized by Werner Luehmann, Ralf Maserski, and Holm Struck.

Friday

In the afternoon, the participants arrived at the youth hostel in Stade. After moving into the rooms, the first kite talks began. The dinner and the official welcome opened the event. First we heard a very interesting lecture from a lawyer about inheritance and how to write a last will. This is not only important for owners of a valuable kite collection, it is important for everybody who has something to pass on.

Then we did a tour guided by two night watchman through the old part of Stade. We learned a lot about buildings from the middle age and could see excavations of an ancient monastery. The evening ended with a nice get-together where everybody received an event shirt.

Saturday

Usually, the organization team tries to find a

special location for the Workshop, as they did in 2010. Stade is a small town, but it is big enough for a few museums. One of them is the museum for technology, transportation, and agriculture. It has different small exhibits for steam machines, tractors, trains, fire trucks, old cars, planes, and much more. In 2009, Holm got in touch with Walter Mueller, a museum representative. Holm told him about our interest in cooperating with the museum for the Workshop in 2010.

The exhibition about the military airport in Stade during WWII was our main interest. A part of this exhibition is the airplane rescue kit that was used by German pilots. Except for the antenna kite, this kit was complete.

We choose this kite for the practical part of the Workshop. The only documents we had about the antenna kite were a copy of a drawing from 1940 and some pictures we took from the original antenna kite which were shown at the 2005 meeting in Lindenberg and 2009 meeting in Bad Hersfeld. First we discussed the possibility of reproducing the kite. Very soon we found out it would not be possible to prepare a large number of kits with the original method of construction, so we decided to work with a modern, self-constructed concept, which was as close as possible to the original.

From October 2009 to March 2010, we worked on the kite. We made drawings, spoke with companies that produced the metal parts for the kit, and looked for cotton fabric and sticks. Furthermore, we reproduced the drawings and text for the kite sail and gave it to a company to print it onto the cotton fabric.

In spring 2010, the prototype was almost perfect. We only had to do some changes on the main connectors. Then we could order all parts and prepare the kits.

After breakfast on Saturday, Workshop participants walked or drove from the youth hostel to the museum. We received a welcome from Walter Mueller and his team. All participants were astonished by the different machines and exhibits in the museum. After giving the kite kits to the participants, everybody was busy. Some preferred talks, some walked around the exhibitions and took photographs, and others started working on the kite.

Kite kits and manuals were prepared in a way so that the participants could finish the kite at home. So it was not necessary to work too hard on the kite. It was a relaxed day in a special location, and as far as we know, everybody enjoyed this day.

At the end of the day, the organizer of the Workshop gave the prototype kite to Walter Mueller in order to complete the rescue kit shown in the museum.

Back in the youth hostel, we had dinner and heard a lecture from Achim Kinter on how it all began. It was very interesting to hear that years before the 1st Historical Kite Workshop, other events took place in France and The Netherlands where the idea came up to start a workshop series. In summer 2000, the registration opened, although no one knew what would happen in April 2001. The event turned out to be a great success and a wonderful beginning for the Workshops.

After the lecture, everybody had to stand up and was asked if this was their first Historical Kite Workshop. If so, they had to sit down. The remaining people were asked if this was their second Workshop, and so on. In the end, only seven people were still standing. These seven people attended all ten Workshops.

Ralf Maserski and Holm Struck

ABOVE: Kite making inside of the museum. BELOW: Walter Mueller gets the antenna kite for the museum from Holm Struck, Ralf Maserski, and Werner Luehmann. An antenna kite is a box kite that lifts an antenna into the sky.

Ralf Maserski and Holm Struck

ABOVE: Achim Kinter – "How it began, the true (!) story."
BELOW: All time participants: Richard Schubert,
Frits Sauvé, Falk Hilsenbeck, Holm Struck,
Henry and Sonja Johns, and Detlef Griese.

Now the big party started with a raffle. We had more than 100 items donated by the participants and collected around 800 Euro ($1100). This money is part of the budget for the next Workshop and will help the new team get started on organization.

Sunday

After breakfast, we got the last round of lectures from Jan Westerink (kites by Matthew Sellers), Douwe Jan Joustra (kites in general), and Frits Sauvé (philosophical considerations and outlook for the next Workshop).

The last question of every Historical Kite Workshop is: “Who takes the baton?”

It went to Jan Westerink, Douwe Jan Joustra, and Frits Sauvé. They will be organizing the 11th Historical Kite Workshop which will take place in The Netherlands.

We would like to say a big thank you to Drachen Foundation, because they started this event and still support every organizing team with event shirts, donations for the raffle, or with money.

Visit the Historical Kite Workshop online:
http://www.historical-kite-workshop.de

An Interview with Carl Robertshaw

Martin Lester

Sasha Reading

Kite Related Design kites, designed by world champion kite flier Carl Robertshaw.

Editor's Note: In our last issue, we introduced the kites of Heather and Ivan Morison. Experienced kite-man Carl Robertshaw helped the Morisons produce a large-scale, tetrahedral-style kite – a "Meteor Kite" – that debuted at 2009's Bristol International Kite Festival. Read more about their collaboration in *Discourse* issue 8: http://www.drachen.org/pdf/august10-discourse.pdf

ML: How did you initially meet Heather and Ivan Morison?

CR: I was contacted by Ivan Morison in September of 2008. He also contacted Cameron Balloons. He was looking into the feasibility of flying either a hot air balloon or large kite, shaped like a meteor, that could be flown over the city for the Venice Biennale.

What struck you about their ideas that made you want to collaborate?

I'm fascinated by opposites and contradictions – an object that appeared to have great mass, yet floats in air. This has a real attraction for me. After discussing ideas, materials, and sizes, I set about getting my head around how this could be achieved. It was a puzzle and a challenge – a good place to start. If it hasn't been done before, that either means it's a stupid idea or a really good one! This was an opportunity for the studio to explore a theme that we had been talking about for a couple of years: making a kite that is not pretty and should challenge the normal perception of kites. Too many kites are "cute," garish, or cartoon-like – this meteor would oppose those

preconceptions. The facets in mineral stones are like the facets of the F117 Nighthawk stealth aircraft. The kite would have surfaces like this that confuse and disguise the symmetry of the structure.

HAS YOUR COLLABORATION LED TO ANY INSPIRATIONS IN YOUR OWN KITE MAKING?

The kites and structures we make all follow a simple concept. This concept transcends many industries, so we are able to work with many inspiring people and projects. We don't make many kites, but we stay close to the idea that everything should use the same structural language as kites and should draw closely on the experiential aspects of kites and the kite world. Kite Related Design (KRD) were commissioned for this approach and the work shows how strong the concept is.

The Meteor Kites transcend the kite world. They are exhibition pieces, sculptures in their own right, while existing as true kites that adhere to the laws of physics. This makes them very exciting pieces of work. They are not fake – in concept or physical realization – like some conceptual art.

The Meteor Kite flew at Bristol, where it had a great reaction. Someone I haven't seen in years was in Bristol that year: Corey Jensen, someone who is never afraid to speak up. We met up in the bar later that evening to catch up on old times. The first thing he said to me was, "Carl, what the fuck are you doing?" This was the perfect compliment!

Working on the Meteor Kites and overseeing their design and development has reinforced my process and practice. It has informed the studio well for subsequent works. We had a very hard time making the kites. A lot of stress, hard work, and late nights went into the two Meteor Kites. We really pushed ourselves. Like many projects, we knew the results would be worth it.

CAN YOU GIVE CREDIT TO MEMBERS OF YOUR TEAM WHO CONTRIBUTED?

At KRD we have an eclectic mix of design backgrounds – from architecture to kites and art history to fashion. There are only 3 of us full time here in the studio with an ever expanding list of freelancers who bring their own specific individual skills. At the moment there are over 20 of us working on current projects.

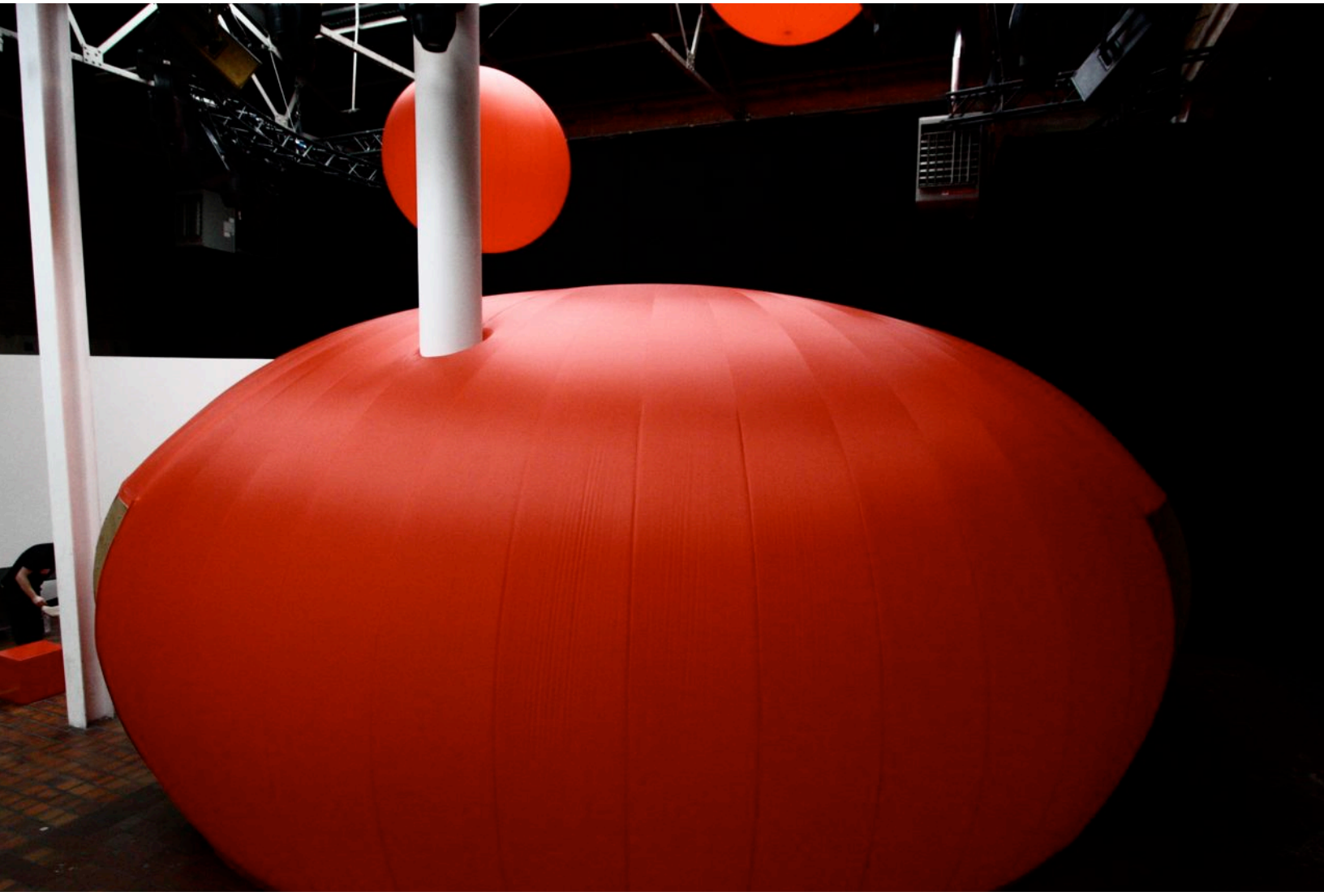
IS THERE A "PERFORMANCE" ASPECT OF ERECTING AND FLYING THESE LARGE SCALE KITES?

Of course. Anytime you put a creation on display it is the exhibitor's duty to consider the viewer. This applies to theater, music, cinema, sport, art, design, and so on.

There is a relationship between the audience and the performer. To be specific about kite events, even if you are just walking across an arena, there is the kiter, the organizer, and the audience. There should be an understanding between the different roles people are involved in – an acknowledgement, an awareness.

It is a very vulnerable place to be – in an arena, where you are open to all and every criticism and praise. The best kiters you see appreciate the mechanics at play when they display their kites.

It is the kiter's responsibility to lead the performance, no matter what it is – single line kites, small or large, sport kite routines, or power kiters. Everyone is on show at some point and may become the main focus of attention. There is a responsibility of that person or team to respect their audience and give them the best of themselves, even if it just waving to acknowledge applause.



Kite Related Design

Robertshaw was commissioned to develop this installment for the UK launch of the Nissan Cube. The concept was to reflect a meniscus or molecular curve, a droplet of water on a horizontal surface. The inflatable single-skin sphere is shown at London's Brick Lane Truman Brewery Gallery.

Kite Related Design

An inside view of the inflatable sphere.

Kite Related Design

Robertshaw created structural and translucent set pieces
for New York City music group Antony and the Johnsons.
An illuminated crystal floats in the air as a focal point.
Shown here at the 2009 Manchester International Festival.

Do you see any limits to the creative possibilities with the Morisons and kites?

We haven't reached the limit of working with kites. Kites will always be at the center of our thinking in KRD.

I've seen friends move away from the kite world, and now moving back to it. Kites have a strong, positive, and versatile identity and one that inspires. Kites are and will always be inspiring to many people. There are so many physical and conceptual plus points with kites that it is hard not to be drawn in to their positive allure.

How did you get started in kites?

As a child, parents, the usual story. It really started when I moved to London to study for a graphic design degree at St. Martins. The college was in Covent Garden then – right round the corner from the Kite Store!

The short version goes: college, kites, become obsessed, exchange course to Australia via Hawaii and High Performance, fly kites in Oz, make kites to earn some money, buy cheap ticket to the World Championships in Japan, meet more inspiring kite fliers, make friends with Top of the Line Kites (TOTL), back to London via San Diego to meet and fly with TOTL, make each design project a kite type project, help form team Airkraft, get totally obsessed, travel around the world competing, leave college with no professional direction (like many), more kites, make everything using kite materials, get small studio and work for myself.

Kites are a very natural occupation for me. I've always been fascinated with flight – planes, balloons, kites, and birds. I've always made things growing up, and we (brother James and myself) were always encouraged to draw and paint. Mum being a painter and Dad in graphic design.

What are you working on now?

We are busier than ever in the studio. We're working on two stadium shows, an architectural scheme, and a major art installation at the Hayward Gallery on the South Bank here in London. We also have the Lord Mayors Show coming up (as we have for the previous 10 years).

The Hayward Gallery sculpture will be on display at the time this is published. At the moment it is being framed in the studio. We are very excited by the installation because it is the result of our first job with Amanda Levette Architects. The second project we have undertaken with them is a series of awnings and canopies for an all carbon fiber Super Yacht. Martin Lester is sewing up the panels, so we are staying close to our kite heritage.

When this article is published, these projects will be finished. We have several other projects we are procuring for 2011 that will see us work more internationally.

We have a definite system and sequence to produce our designs. It is based on a practical step-by-step sequence that allows creative exploration. Each piece of work informs the next.

The Meteor Kites were first exhibited in Blackpool, UK. They then travelled and were exhibited at the Royal Academy in London. Looking up at the kites in the gallery became the inspiration for the Anthony and the Johnsons stage set (see page 16) for the Manchester International Festival. This has subsequently become the inspiration for several jobs.

Visit Kite Related Design online:
http://www.kiterelateddesign.com

L'Aigle – Dragon Numbers 3 and 4

Frits Sauvé

Frits Sauvé

EDITOR'S NOTE: Historical kite enthusiast Frits Sauvé has done extensive research on L'Aigle Dragon kites. In March 2007, he published a report on his study of two L'Aigle Dragons, referred to here as kites number 1 and 2. This article is an update to Sauvé's 2007 report. It documents his work on two additional L'Aigle Dragons, referred to here as numbers 3 and 4. Read the full report on all four kites on the Drachen Foundation website:

http://www.drachen.org/kite-french-bird.html

L'AIGLE DRAGON KITE NOTES

Kite number 1 is owned by Drachen Foundation from Seattle, USA.

Kite number 2 is owned by Heinz Pieper from Bückeburg, Germany.

Kite number 3 is owned by Bernhard Dingwerths from Kassel, Germany.

Kite number 4 is owned by Frits Sauvé from Diemen, The Netherlands.

In November 2009, I was included in an email that reported the discovery of a kite that was shaped like a bird. It was Mr. Bernhard Dingwerths from Kassel, Germany who sent out this email.

He asked the receivers of this email: "What should I do with it?" Bernard was directly aware of the fact that he found a unique kite, of which only a few are preserved.

The question he raised has been raised and will be raised many times by most of the (serious) kite collectors. What happens with my stuff when I am no longer here? We have not found a satisfying answer to this, and we continue speaking about it and searching for a solution to preserve kite collections in a professional way. Not only for the collectors of tomorrow but also for many years from now.

I was chosen to receive the kite for further investigation. Thank you, Bernhard. At the

same time I was asked to find out if it was wise and possible to repair the kite and bring it back to its original construction. Although I dislike the idea of repairing kites and prefer to keep them as they are found, in this case an exception on my principle was made. Because it was the owner who asked me to do some basic repairs and make it possible to have the kite displayed.

I received the kite in December 2009. It is always a pleasant moment to receive a box in the mail, knowing a kite is in it. After opening the box, I am very careful and enjoy looking, smelling, and touching the material.

The general condition was:

- Cloth: Looked good – no stains – some small holes at edges – worn out at the bottom of the wings where the kite shows it has been flown for many hours.
- Frame: Still original – one broken wing stick.
- Head: Missing.
- Tension Lines: Replaced and incorrectly mounted.
- Bridle: Missing.
- Packing: The kite came with an old green tube – not the original that came with the kite – in fact, the kite was not sold in a tube but in either a kite bag or a cardboard box. The green tube was for papers, not for kites.

I contacted Bernhard and we agreed upon repairs that would allow the kite to be able to be on display again.

Repairing

As in kite number 1 and kite number 2, the wing spars in kite number 3 are glued into the upper edge of both left and right wing. The right wing was broken, the remainder still in place. The break has also damaged the cloth and made a small opening in the front.

Since the glue was completely dried out, it took a careful job to open the glued tunnel and make the fracture of the right wing spar visible. With a surgical knife and patience, I managed to open the cloth over a distance of 10 centimeters without damaging or tearing the cloth. The broken spot was actually a good fracture: not many loose splinters and the remaining parts fit well together. I decided not to replace the stick, but repair it by means of a splint. The splint was made of very thin wood. I made two suitable pieces to be glued on both ends of the fracture. No extra bindings to re-enforce as it was not supposed to fly again.

After that, the repair was still thin enough to fold the cloth back over the stick again and fix it with special glue for textiles. The result even pleases me. If one does not know, it is hardly visible (see page 20, top left).

I still had on loan kite number 1, the Drachen Foundation kite. This is the only kite that still had its original head. With that as an example, I was able to make a new head. I decided to make three heads – one for kite number 3, the one we are working on right now; one for kite number 4, the Dutch version; and one for kite number 2.

For that, I made a digital file of the feather pattern of the cloth on the head. This pattern was then printed on a piece of cloth. The printed cloth was then glued on a piece of ecru, somewhat thicker quality cotton, including a piece of twill edge banding. This twill edge banding is needed to slide the head over the vertical middle frame piece. All this together is the best way to recreate the original head (see page 20, top right).

Digitizing and printing a cloth pattern is impossible without having differences in the

Frits Sauvé

Images of kite 3. TOP LEFT: You can see the damage in the cloth caused by the broken stick – the repair itself is hardly visible. TOP RIGHT: The new head seen from the back side – the white cloth is ecru cotton. BOTTOM LEFT: Kite with green tube – the kite does not fit in after the repairs. BOTTOM RIGHT: Kite in the new cardboard box – fits perfectly and looks good.

original color and the final result. The colors always fade away somewhat. In this project, I find that acceptable, since we do not want to give future watchers the impression that the head is original. It was added later on and should look like it was added later on.

In kites number 1, 2, and 4, the right and left upper wing spar have extra holes to fix the head with brass split pins. This kite has no such holes. I kept wondering why not. I did not dare to drill extra holes in it. I decided to fix both lower corners of the header with a piece of hemp line to both middle tension lines.

The next step was looking into the tension lines and bridle lines. I used a 1910 advertisement for the L'Aigle Dragon and kite number 1 as reference points. I am also familiar with this type of kites, which are well described in detail in older kite books and magazines.

For this kind of repair, I use old hemp line. In my collection I have old kite line winders that have good quality hemp of different thickness. The 1 millimeter looked suitable. I removed all tension lines and replaced them with the old hemp. I also put them in the right place. Now when the kite is stretched, the tension lines shape and support the kite in the right way.

The new head made it impossible to put the kite back in the green tube again without the risk of damaging it. It was very common in those days to sell a kite in a suitable bag or a cardboard box if the kite was exported. I have kites in my collection still in the original box.

I asked a box maker – my wife Inge also makes boxes – to make a box that would be strong enough and big enough to store the kite in a proper way. The box shouldn't look too new and modern.

The box was made with a lid, and finished on the outside with old-fashioned packing paper and on the inside with a special grey/white paper also used for book repairs. According my standards, the results are very good and this box completes the repairs (see page 20, bottom left and right).

The kite has exactly the same dimensions as on the enclosed drawing. No need to make a new drawing. I just added one detail, the cross section of frame and spreader.

The frame is original and is smaller and thinner than kite number 1. The dimensions of all fixed sticks are 12 millimeters wide and 3 millimeters thick. The spreader that can be taken out for transport and storage is 13 millimeters wide and 4 millimeters thick.

All wood looks like pine.

Kite Number 4

More than 5 years ago, I was walking through one of the eldest parts of Amsterdam when I noticed a shop window showing old toys. I rang the bell and shared my curiosity with the house owner. The house used to be an old toy shop, bought by the present owner, who used it as his house to live in. He kept the shop window in its original design, giving the house a nice look from the street side.

The house owner also mentioned what he found when he was cleaning the house: a kite. The owner did not want to sell it. It was supposed to be in his shop window one day. He asked an extremely high price for it. I was permitted to take pictures of it, nothing more at that time. I told him I would come back from time to time and ask him again if the kite would be for sale.

A couple of years later, I met the same man at a book market. He told me he still owned



Frits Sauvé

Images of kite 4. TOP LEFT: Front side overview – head is new. TOP RIGHT: Old wooden box and repaired kite with new head and spreader. BOTTOM LEFT: Front view of the head attached with twill tape and brass split pins. BOTTOM RIGHT: Detail of right and left claw print.

the kite and that he now focused on selling second hand books only. The kite never made it to the shop window. He did remember me well and offered me the kite for sale. For a very reasonable price this time. I told him it was too cheap, but he found the price okay to him.

That is how I came to posses the Dutch version of L'Aigle Dragon. This kite has exactly the same size, shape, construction, and frame dimensions. The only difference is the cloth and the printing pattern.

The cloth is much stiffer, compared with the three other kites. The printing is much lighter, and on the front side the word SPERWER is printed. SPERWER is the dutch name for a bird of prey called sparrow-hawk.

The kite came with an old wooden box with a metal grip and closing hooks. Not its original transport case, but very good to store the old kite. Dark and dry storage (see page 22, top right).

The kite itself had no head and, like in kite number 3, the tension lines were incorrectly fixed or missing. The spreader was also missing. The fixation of the head was still there, two brass split pins – one in each of the wing spars.

I made the same head as I made for kite number 3 and was able to fix it like the original head was once fixed, making use of the two split pins that I could open, remove, and put back again without breaking (see page 22, bottom left). Old metal usually breaks when it is bent – lucky me, I guess!

I also used the same 1 millimeter hemp line as I used for kite number 3, to bring the tension lines to their original position. For this kite, I decided not to add the bridle lines.

I cut out a new spreader, made out of bamboo, to be able to put the kite on display.

Since the kite is exactly the same, apart from the cloth and the printing on it, I assume it was made in The Netherlands with the L'Aigle Dragon as reference point. Or made by the same French company for the Dutch market. It can be roughly dated between 1913 and 1930. The printing cannot be done by an amateur kiter; a kite producing company must have been the manufacturer. Which one is for now a question mark.

Conclusions

A report is never complete, even after it is finished. More investigation and new discoveries will add information to what has been described here.

The reader is free to correct the contents and send me additional information on the subject described.

Frits Sauvé: sauve.lief@chello.nl

A Photo Intro to Kite Aerial Photography

Leland Sutton

Leland Sutton

Marine biologist Oscar Frey in action as he prepares kite aerial photography equipment.

On June 17th, I traveled from my home town of Seattle to Holbox Island, Mexico. For the next week, I was able to watch and work with marine biologist Oscar Frey and his team as they used Kite Aerial Photography (KAP) to capture the extensive wildlife which inhabits the island. Oscar is working to document the erosion which is destroying habitats on the island, as well as to perfect the methodology of KAP for research.

Holbox, Mexico is home to some of the world's most amazing wild life, including flamingos and whale sharks.* I had the opportunity to get into the water and swim with the 40 foot creatures. Being able to swim among them was nothing short of amazing.

It was truly a pleasure to experience Holbox with Oscar and his team, and I hope to return soon. Here is a selection of Oscar and his team in action, as photographed through the eyes of my camera.

*Editor's Note: Whale sharks are filter feeding sharks that feed mainly on plankton. They do not pose significant danger to humans.

Leland Sutton

Oscar works to document the erosion which is destroying habitats on Holbox Island, Mexico, as well as to perfect the methodology of KAP for research.

Applications of Kite Aerial Photography on the Yucatán Peninsula

Oscar Frey

All photos by Oscar Frey

Archeological and Methodological Applications of KAP to Stereoscopic Photography and the Influence of Ocean Processes and Environmental Condition on Local Wind Patterns on the Yucatán Peninsula, July 2010

In July 2010, Drachen Foundation and Deep Blue Conservancy supported Oscar Frey and his team to achieve new goals and results in the ongoing development of Kite Aerial Photography (KAP) applications to survey the archeological and natural resources of the Yucatán Peninsula.

Since 2006, we have done KAP surveys and workshops in the Yucatán Peninsula. We have achieved liaisons with different scientists and research institutions that are now providing new opportunities for the application of KAP in Mexico.

One of these new applications is to use KAP to obtain stereoscopic images. We tested this application over pre-Colombian Mayan ruins with the ultimate purpose to create a digital, three-dimensional reconstruction of the actual appearance of the pyramids.

We also continued to experiment with KAP at Holbox Island and its surrounding waters in order to observe the ocean processes that influence local wind patterns and to continue developing new applications of KAP in Mexico.

Objectives of the Expedition

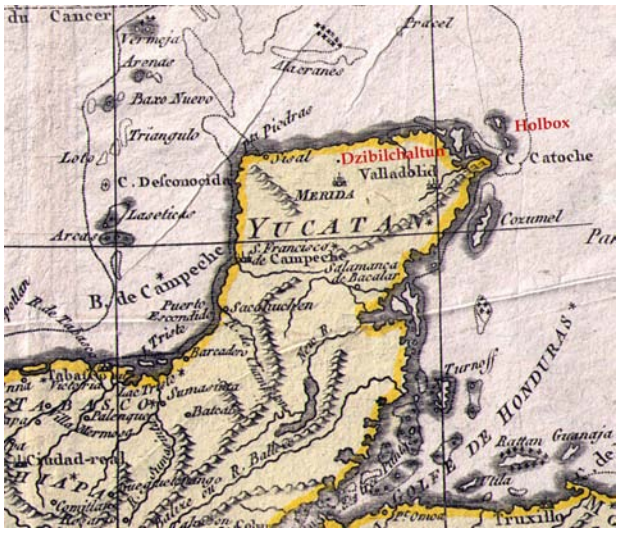
1. Survey the ancient city of Dzibilchaltun and test the application of KAP techniques to achieve stereo-photography results with the use of only one camera.

2. Obtain pairs of photographs with a high percentage of overlap in order to appreciate the elevation or third dimension of the pyramids at Dzibilchaltun with the aid of a pair of stereoscopic lenses.

3. Develop a digital, three-dimensional model of the Observatory or Pyramid of the Seven Dolls using the TNTmips and ArcGis software. This software allows us to process the topographic and geographical data obtained in the survey to build an elevation model of the pyramid. It also geo-references the aerial photographs obtained from the kite and lays them over the digital elevation model, providing the true appearance of a three-dimensional representation of the pyramid.

4. Evaluate the environmental conditions and equipment needed to do KAP in the surroundings of Holbox Island and in the whale shark (*Rincodon typus*) observation area of Yum-Balam Reserve in Quintana Roo, Mexico.

5. Evaluate the influence of the ocean processes and environmental conditions on the local wind patterns and its application to KAP activities.



Area of Study

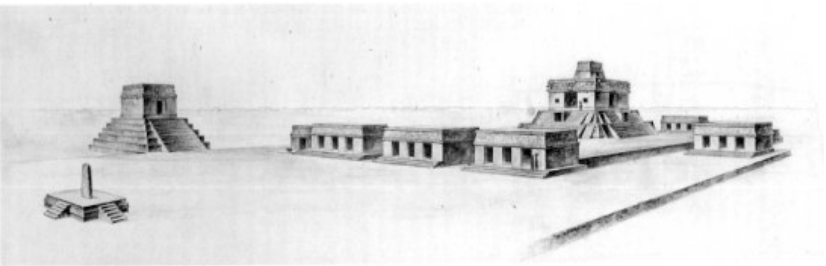
The KAP activities of this expedition were developed in two different parts of the Yucatán Peninsula: The first area of study

was the ancient city of Dzibilchaltun (occupied from 400 BC to 1600 AD), located 7 miles north of the city of Mérida in the state of Yucatán. The second area of study was Holbox Island, located in the state of Quintana Roo on the farthest eastern side of the peninsula.

MÉRIDA, YUCATÁN, MÉXICO
JULY 15 - 22ND 2010

The activities undertaken during this week were focused on the stereoscopic photography applications of KAP. The activities included four surveys at the archeological site of Dzbilchaltun and the analysis of the data in the laboratory to test the possibility of achieving stereoscopic photography with KAP by using only one camera.

The main goal was to use KAP to document the terrace of the Seven Dolls where the Observatory or Pyramid of the Seven Dolls was built. We would obtain pairs of images with plenty of overlap in order to appreciate the elevation or depth of the pyramids, first with the use of stereoscopic lenses and later by creating a digital, three-dimensional model of the Pyramid of the Seven Dolls, illustrated below.



An illustration of the Pyramid of the Seven Dolls.

METHODOLOGY

Pairs of images can be obtained by shooting 8 frames per second with only one camera. When using KAP, the slight movement of the kite allows the camera to take the photographs from a slightly different position, having a great overlap between images. The images with the same exposure and where the whole structure appears were the ones ultimately selected.

To observe the depth or elevation on photographs using a stereoscope, we follow this methodology: First select a pair of images and place them under the lenses. View through the lenses, and with your right eye select on the image at right a landmark to use as reference. Point to it with your right fingertip. Locate the same landmark on the picture at left with your left eye, and point it with your left fingertip. Now with both eyes open, move one of the pictures to overlap the marked landmark on both images and adjust it until the depth or third dimension is appreciated. Or as described by Compton: "Select a distinctive feature lying near the center of the overlap area in a pair of photographs. Place the stereoscope over the photographs so that the two images lie under the centers of the two lenses or mirrors. By looking into the stereoscope, the viewer should be able to see a three-dimensional image."

In order to create a digital, three-dimensional model of the Pyramid of the Seven Dolls, we made a topographical and geographical reference survey of the pyramid. This provided the data to create a digital elevation model with ArcGis software. Later, we laid aerial photographs over the model with the TNTmips software to reproduce the pyramid in a three-dimensional, digital format.

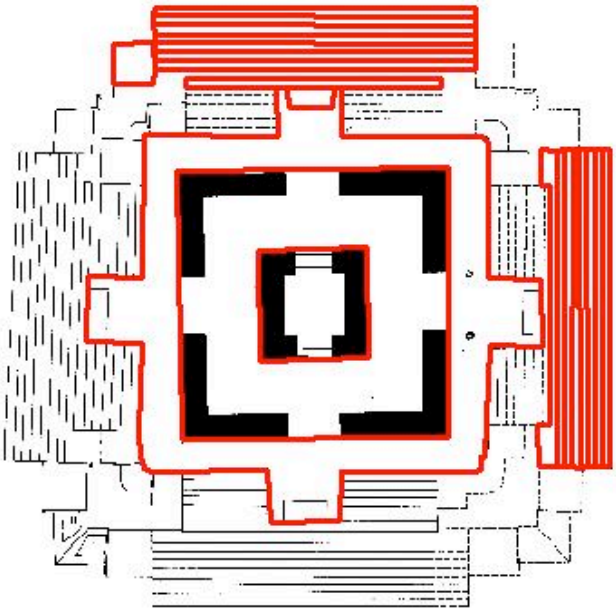
The photographs needed to create this digital model must have an equidistant scale on both sides of the frame, or in other words, no deformation. To obtain these types of images, the photographs need to be taken with a 35mm lens. This specification

Pairs of photographs from KAP surveys at Mexico's ancient city of Dzibilchaltun. The elevation or third dimension is appreciated through stereoscopic lenses.

creates the need to elevate the camera at a higher altitude than when using a fish eye lens and therefore involves a greater degree of difficulty.

Results

The weather conditions during this expedition did not allow us to fly the kite and rig above the Pyramid of the Seven Dolls and get aerial photos of this structure with the 35mm lens. The scattered rainstorms and thunderstorms in the vicinity and at the archeological site reduced the windows of opportunity to make the complete flights possible. Nevertheless, we took aerial photos of the Sun Dial and we made the topographical survey of the Pyramid of the Seven Dolls to obtain the data required to create a digital elevation model of the pyramid. Later we processed this information with ArcGis software and obtained the following preliminary model:



Digital elevation model of the Pyramid of the Seven Dolls.

We plan to go back to this archeological site during the early spring of 2011 in order to take aerial photos of the terrace of the Seven Dolls with the 35mm lens and to be able to finish the digital, three-dimensional model of the Observatory or Pyramid of the Seven Dolls at Dzibilchaltun.

To observe the third dimension with the use of a stereoscope or stereoscopic lenses, we selected pairs of photographs from the different KAP surveys done at this site. One pair was obtained from this expedition and the rest from previous years. After several experiments with different pairs of images, we noticed that the elevation or third dimension is appreciated through the stereoscopic lenses regardless of the lens used to obtain the images. (See page 29 for examples of photograph pairs.)

This proves that KAP can be used as a remote sensing surveillance technique to create high resolution 3D images in analog format and provides the evidence of its potential use in creating digital models of elevation.

Holbox, Quintana Roo, México
July 23rd - 29th 2010

The activities during this week were focused on evaluating the influence of ocean processes and environmental conditions on local wind patterns, on testing the applications of KAP to document shoreline conditions in the surroundings of Holbox Island, and on testing KAP with a digital SLR camera in the Whale Shark observation area of Yum-Balam Reserve, Quintana Roo, Mexico.

An important goal for the technical development of KAP applications was to test a new rig with a Nikon D90 and obtain geo-referenced aerial photographs. The importance of this experiment was to test potential applications of KAP with geographical information systems for the exploration of marine environments.

Methodology

Taking into consideration the previous year's experience kiting at Holbox and the Yum-Balam Reserve, we selected equipment that would have enough lifting power to lift and test a bigger rig than the ones used before. When doing KAP over the ocean for scientific applications, it is particularly important to be able to record the geographical position of the camera on every picture. We were able to achieve that by using a Nikon D90 triggered by a GPS unit. So every time the camera was triggered, the information from the GPS unit was logged on the Exif metadata file of the photographs taken.

For this experiment, we used the following equipment:

- 8′ and 7′ Rokkaku Kites designed by Mike Jones, a 16′ Sutton Flow Form, and a 30′ Sutton Flow Form modified in a Christian Becot style.
- 160 lb, 200 lb, and 300 lb Dacron lines in 500′ long lengths.
- Big Rig designed by Pieter Bults and modified by Ruben Raygosa and Oscar Frey.
- Nikon D90 digital camera, a 10.5mm Fish Eye lens, a 35mm lens, and the Nikon GP1 GPS unit.
- An AutoKAP rig designed by Brooks Leffler and built by Oscar Frey operating with an Olympus Stylus 800 digital camera.

During this week at Holbox, we experienced continuous weather changes and we had to be very aware of the environmental conditions and barometric variations before launching the kite and camera. To evaluate the weather patterns, we used a Brunton Atmospheric Data Center to monitor barometric pressure, temperature, and wind speed.

We used the methodology developed in previous years to do the KAP activities from a 27 foot outboard motor boat. We surveyed the northeastern side of the island and the whale shark observation area of the Yum-Balam Reserve north of Cabo Catoche.

Results

Due to weather conditions we could only navigate three days of our stay in Holbox from July 23rd to July 28th, and we could undertake KAP activities on only two of those days. We used these windows of opportunity to conduct KAP surveys and verified that the oceanographical conditions, particularly the tides, have a very important influence on the wind patterns of this area.

We observed that during spring tides (which happen during full and new moon phases), the wind conditions were more stable and with higher intensity than during the neap tides (first quarter and third quarter moon phases). We correlated it with the occurrence of upwelling currents. We observed this correlation during last year's summer expedition to Holbox, and in this trip we verified it again. We observed the relationship between the tides, the currents, and the wind patterns over the very shallow basin of the continental shelf that surrounds Holbox Island.

Spring tides are the tides with maximum amplitude during a moon cycle. They are the result of the combined maximum gravitational pull of the celestial bodies of the solar system over the oceans. Most of this pull comes from the gravity of the sun and the moon, the sun for being the largest celestial body in the solar system and the moon due its proximity to the earth.

This maximum gravity pull over the ocean basins also enhances vertical currents, such as the upwelling currents on certain areas of the continental shelf. In the case of Holbox, which is located on the western margin of the channel of Yucatán, the upwelling currents occur where the waters of the Caribbean meet the waters of the Gulf of Mexico. Upwelling currents bring waters from the bottom, which are rich in nutrients and cold in temperature, to the surface. During a spring tide, these colder waters penetrate farther in over the internal continental shelf, creating areas of different barometric pressure and therefore creating local wind. The effect of the local wind over the horizontal ocean currents helps to push the surface waters to shallower areas, and it allows the upwelling current to last longer. This is what apparently happens during spring tides in the basin of the Yum Balam Reserve, Quintana Roo, Mexico. To prove this correlation, it is necessary to analyze the meteorological records of this area quantitatively.

It was evident that the strongest and more stable winds always occurred in the adjacent waters and at a distance of 2 to 3 miles around the island. The weaker wind patterns occurred in the offshore waters. This is explained by the higher contrast in barometric pressure and temperature between the landmass of the island and the ocean waters that surround it.

The wind conditions in the offshore waters, where we found whale sharks feeding on the surface, were low and not strong enough to elevate any of the cameras with the kites we had. This was quite disappointing, but we could not extend our stay on the island long enough to wait for the right wind conditions in order to document the whale sharks. These low wind conditions found in offshore waters are associated with the warming of the water over the shallow continental shelf which creates low atmospheric pressure conditions.

However, in the near shore waters of Holbox Island, strong enough wind conditions were found to elevate the Nikon D90 camera. So we decided to document with KAP the coastline of the northeastern side of the island, where a strong erosion process has been observed in the last 10 years.

We did two flights in this area in order to observe the bottom conditions and the sedimentary transport: one over a transect perpendicular to the coastline and a second over a transect parallel to the coastline (shown below as yellow and blue trails).

This side of Holbox Island is a very shallow area with depths up to 9 feet. The lighthouse of Cabo Catoche is located here and provides a great landmark to compare the

ABOVE: Broad view of the strip of land that conforms Cabo Catoche. BELOW: Erosion evidence at Cabo Catoche and striated bottom patterns on the shallower areas.

photos obtained in this trip with images taken in the past by other researchers. The bathymetry in this area is very uniform and shallow. The limestone sandy bottom is covered with sea grass, algae, and a coral community distributed in patches.

We found that on the northeastern side of Holbox Island the prevailing drift current flows parallel to the coastline from north to south. A huge portion of the shoreline has been eroded. This can be quantified by comparing the photos obtained at Cabo Catoche in this survey with detailed images from the past posted on Google Earth and other publications.

We noted the presence of striated disturbance patterns with parallel orientation on the very shallow areas around Cabo Catoche that have daily navigation traffic. This is evidence that bottom conditions are affected by boat traffic in the shallower areas, creating disturbances over the sediment deposition and the sea grass and algae distribution over the bottom.

The results obtained in this survey prove that KAP is a valuable technique to document and evaluate coastal dynamic processes and expands its potential applications to scientific research as a noninvasive exploration technique of marine coastal environments.

It is very important to be aware that we need to understand the relationships between ocean processes and wind patterns over coastal areas in order to use this technique further in the study and conservation of marine environments and their natural resources.

Acknowledgements

I am very grateful to the National Institute of Anthropology and History. Special thanks to Diana Trejo, Director of the National Park of Dzibilchaltun, Yucatán, México and to the archeologist Rubén Maldonado for providing the permits and authorizations to practice KAP at Dzibilchaltun repeatedly since November 2006 and for closing the park for such purposes.

A special acknowledgement to Dr. Jorge Euán, researcher, professor, and correspondent of the Laboratory of Remote Sensing and Geographical Information Systems of the Marine Resources Research Center in Mérida, Yucatán, for his interest and support of the application of KAP on different lines of research in the Yucatán Peninsula since November 2006.

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A very personal acknowledgement to Leland Sutton for his friendship and patience during the long hot hours of navigation during the field trip to Holbox and for teaching me the importance of constant learning and endurance in life.

Thanks to Carmelo and Onny for their hospitality at Holbox and a special acknowledgement to Alejandra del Castillo and Luca Niero for their friendship, support, sincerity, and the perfume of their Mediterranean cuisine.

A very personal acknowledgement to Keith May from Deep Blue Conservancy for his friendship, advice, and constant dedication and support to the development of KAP and its applications for the exploration and conservation of marine environments.

My deepest appreciation and gratitude to the Drachen Foundation for opening their hearts and introducing me to KAP. I am especially grateful to Alison Fujino and Scott Skinner for believing in me, for their assistance, prudent advice, and personal dedication to help me develop the KAP Whales Project in Mexico since August 2003.

A very special acknowledgement to Brooks Leffler and Peter Bults for their dedication in designing and building rigs customized for my SLR cameras and needs.

And last but not least important, I want to thank Mike Jones for designing and building customized Rokkaku kites that I have been using in the Yucatán Peninsula under extreme conditions during the last four years.

2010 Airborne Wind Energy Consortium Conference

Joe Hadzicki & Dave Lang

Allen Ibara, Joby Energy

Intro to High Altitude Wind Energy
Joe Hadzicki

Let's do a quick overview of the subject of high altitude wind energy. In a nutshell, the industry is attempting to extract energy from the wind at higher altitudes than a wind turbine. Ground based wind turbines are limited to around 300 feet. As you increase altitude, the wind speed also increases. The "pie in the sky" goal would be the jet stream (30,000+ feet) since the sustained wind speed can easily exceed 100 MPH, occasionally reaching speeds in excess of 200 MPH. But this introduces several problems such as equipment, weight, safety, and not least, permission from the government, which seemingly for the near future has directed most efforts to the one to two thousand foot altitude range.

Now let's consider three main variables: lift device, generator location, and flight path. The industry combines these variables in various combinations resulting in the current designs presented at the conference.

Lift Devices

Generally speaking, three different types of lifting devices are currently being used to access higher altitudes:

1. Aerodynamic lift using kites or rigid aircraft style wings

2. Aerostatic lift using aircraft similar to blimps

3. Rotorcraft using devices not unlike helicopters

Generator Locations

Generators are used to convert the motion produced by the wind to electrical energy. These generators can be carried on board the flying device or located on the ground.

Flight Path

The flight path of the various designs differ in two ways: "reeling out/reeling in" motion, and "cross-wind" flying motion. The devices with on-board generators can be reeled out to the working altitude where they operate for extended periods, from hours to days or hopefully longer. They are then reeled in in response to weather conditions, maintenance, etc. Devices with ground based generators use a yo-yo type of motion to collect energy. As the wind pulls these devices out, the tether spins the ground based generator, which produces power. Some of this power is then used to reel the device back in. The process is repeated for the duration of the energy harvest period.

The second flight path used is called "cross-wind" flying. Cross-wind flying is a technique to increase the power output when flying. As the lifting device is flown across the wind, the apparent wind (the wind flowing over the wing) is moving faster than the ambient wind speed. Since the power generated by the wing increases as the cube of the wind speed, cross-wind flying can greatly increase the power output of the flying device. For example, using the cross-wind flying technique to double wind speed increases the power eight times!

Reflections on the Conference
Dave Lang

It is indeed exciting to be aware of, and involved in, the new potential industry we refer to as Airborne Wind Energy (AWE). It is particularly charming that it has been spawned by, and some AWE incarnations may well feature, wind harvesting that utilizes the age-old kite. However, that said, there are many other ways being proposed to accomplish AWE harvesting, and the ultimate winners are yet to emerge. More specifically, AWE transcends "soft kites," and now employs schemes that use "wings" or "lifting rotors" carrying aloft wind turbines, which themselves (being rotors) can become involved with not only electrical generation, but also in producing useful lift. Most combinations of the above are now being examined actively.

When it gets down to brass tacks, AWE is a highly technical field, because we find ourselves using aeronautical schemes, wind turbine technology, high-tech materials, meteorology, and abstruse analyses required to not only simulate flight and control dynamics of tethered lifting devices, but also to arrive at meaningful estimates of yearly power production that rigorously factors in the statistics of wind. As in other fields of intense scientific/engineering endeavor, these technical challenges of course lead folks to want to congregate and consort with one another to discuss methods and findings.

So, as all new industries are inclined to do, the periodic "gathering of the clan" (i.e. industry conference) is a ceremony of importance since it brings folks of like mind together to jovially stimulate and ridicule, encourage and criticize one another towards their mutual goal. I have now attended all three conferences in the US related to this emerging field of AWE. First, there was the 2006 Kite Sailing Symposium sponsored by the Drachen Foundation (possibly the "original" AWE conference, since many attendees were there to exchange information on traction kite technology as it might apply to wind power

harvesting). Next, the 2009 High Altitude Wind Power Conference (the first *official* high altitude wind power conference) sponsored by California State University Chico, BayTEC Alliance, and Cleantech Innovation Center of Oroville.

I have noted a significantly increasing level and diversity of attendance and interest in these conferences.

So now, the third such conference has been attended, namely, the Airborne Wind Energy Consortium (AWEC) conference held on the Stanford University campus on the 28/29th of September 2010. This was the first public event officially orchestrated by the AWEC, a consortium of AWE developers in this newly emerging field who have figuratively circled their wagons to provide a form of industry-conventional unanimity. By the way, I emphasize that the term "Airborne Wind Energy" (AWE) is used to set apart this new field from the more conventional wind-power industry that is largely (and historically) dominated by the ground based, tower-mounted, Horizontal Axis Wind Turbine (HAWT).

I attended the conference as a representative of the Drachen Foundation, since, for a number of years, I have been a Drachen board member and their point of contact/clearing-house for those approaching Drachen seeking information related to AWE. Of course, AWE schemes based on traction kites (which are commonly exhibited in the somewhat ubiquitous sport of kite surfing and kite sailing) are a stalwart component of Drachen's kiting interest and history.

The 2010 AWEC conference listed over 80 organizations attending, which correlated well with my estimate of the total attendance pushing 150 people. The conference featured a fairly conventional array of general presentations given more or less to the entire attendance in the morning sessions and regarding subjects that are common to all who are involved in AWE (regardless of engineering approach), such as safety, liability, reliability, geo-wind characterization, airspace clearance, business capitalization, etc. Mixed in with these were presentations given by the representatives of specific development groups and companies, outlining their conceptual approach to AWE, as well as their state of progress. Finally, for the second portion of the daily fare (with some concurrency with the more general presentations), there was a "dual track" presentation plan set up which featured technical presentations related to methodologies ranging from simulation analysis and detail results, to new and novel AWE schemes, to the application of generic mature technology disciplines, to the engineering design of AWE.

I observed this 2010 AWEC conference to be more nearly in line with traditional technical conferences I have attended over a period of 40 years in the "mature technical fields" (specifically, aerospace and aeronautics). That said, there was still a notable lack of the core middle-aged and older industry-experienced attendees and academics that are usually found in abundance at technical conferences related to more mature technologies. I would anticipate that this will change with the natural evolution of the AWE field. It is important to this emerging field that it exhibit on an ever more "professional persona" to attract investment and high quality experienced engineering talent. So I would say the AWEC 2010 conference moved closer to attaining such a goal.

The originators and sponsors of this event did a nice job of arranging excellent facilities and meeting venues (how could

you beat the Stanford campus as a venue?). There were about the right amount of communal meals and casual break time (with snacks and libations) to promote a nice level of networking and technical discussion. Audio/visual support was well orchestrated by the technicians, and presentation flow went smoothly.

Of particular note was the participation of representatives from the US governmental agencies, NASA, ARPA-E, NREL, and FAA. Furthermore, there was a surprising number of attendees from other nations represented: Denmark, Italy, Germany, United Kingdom, China, Korea, Belgium, Germany, Switzerland, Netherlands, and Canada. Many foreign nationals provided interesting presentations. It is apparent that AWE is attracting a lot of interest world-wide, and competent technologists are starting to take note.

There is still a conspicuous absence of successful AWE deployments in terms of harvesting significant amounts of wind power. Moreover, one of the major bugaboos in AWE is autonomous launch and retrieval, and while many claim to have solved this problem in principle, there was a notable lack of examples or data (for even prototypes) showing actual operation of deployed AWE systems for days on end through excessive wind and/or no wind conditions. This is clearly a hurdle that everyone is struggling with, and the winner(s), if their attendant configurations can produce economically viable power, will surely be in line for a healthy future.

I could not conclude these impressions without noting the presentation made by Miles Loyd, whose 1980 seminal paper about "Crosswind Kite Power" represents possibly the first analytical formalization of the phenomenon and flight-maneuver known to virtually all traction kite sportsmen. Loyd's paper is referenced by most developers in the field of AWE. It was a nice piece of closure to see Loyd addressing a conference audience, most of whom were standing high upon his shoulders from an historical standpoint.

All in all, it was a pleasant three days on the Stanford campus, meeting many with whom I have only had email correspondence, getting acquainted with our international AWE brothers and sisters, and coming away with a sense that the AWE endeavor is being furthered by a nice group of serious, dedicated developers who not only strive to perfect their technology, but also to improve the human condition through the use of airborne wind power.

Conference Presentations
Joe Hadzicki

Miles Loyd

It's fitting to start out the list of presenters with Miles Loyd. Considered by many as the father of cross-wind power. His original paper titled "Crosswind Kite Power," published in a 1980 issue of *Journal of Energy* entails the physics involved in harvesting high altitude wind energy. His 1981 US Patent #4,251,040 proposed design uses a tethered airplane with on-board, propeller-driven generators. Miles also employs the cross-wind flying technique outlined in his paper to increase power generation. The power is then transferred to the ground using a power cable/tether.

Joby Energy
http://www.jobyenergy.com

One of the Joby designs uses an aircraft style platform tethered to a tower. As with Miles Loyd's design, high speed air flow from the wind flowing over the wings

generates lift to propel the plane. The propellers are used as spinning generators, which convert the wind energy to electricity that is transmitted to the ground by the tether/power cable. The plane flies in a large circle that is a form of cross-wind flying. Joby claims a working prototype that produces power in the 5 kilowatt range. Their current focus is to attain complete autonomous flight from launch to landing. A video was presented at the conference showing autonomous launch and transition to autonomous flight control. Landings are still assisted.

Makani Power
http://www.makanipower.com

Makani Power uses a similar process of a rigid airplane wing as the lift device. On-board generators, spun by propellers, then transmit power to the ground.

Ampyx Power
http://www.ampyxpower.com

Ampyx Power, located in The Netherlands, uses its PowerPlane airplane design with a ground based generator. Ampyx employs the cross-wind flying technique to increase power generation in conjunction with the yo-yo method to collect energy.

Aeroix
http://www.aeroix.de/en/projects

swisskitepower
http://www.swisskitepower.ch

Kitenergy
http://www.kitenergy.net

Aeroix, swisskitepower, and Kitenergy uses a similar approach to Ampyx but replace the airplane device with a kite. A kite is used as a lifting device. The generator is ground based, and a cross-wind flying technique is used in conjunction with the yo-yo method to collect energy.

MagGenn
http://www.magenn.com

MagGenn uses a helium filled, blimp-like lifting design that has inflated turbine blades that spin in the wind, producing power. A stationary framework containing the spinning blimp has an on-board generator which collects the power and sends it by power cable to the ground. See a video: http://www.youtube.com/watch?v=JDJhhGJwSuA

Altaeros

Altaeros was formed by a team of students from Harvard and MIT. Based on surveillance blimp technology, their design uses a helium filled "ring wing" as the lifting device. Contained within the ring is a wind turbine. Altaeros' goal is to reduce the cost of offshore wind energy by 60% compared to standard offshore wind turbines.

SkyMill Energy
http://www.energykitesystems.net/0/SkyMillEnergy/index.html

SkyMill Energy uses an auto gyro connected by tether to a ground based generator. In high winds, the gyro spins and generates lift which pulls the tether out. As it reels out, the tether spins the ground based generator which produces power. SkyMill's design uses cross-wind flying motion to increase the available power. The SkyMill design also uses the yo-yo method to increase available power. For the reeling in portion of the yo-yo cycle, the propeller blade angles are changed, decreasing the drag. One of the big advantages of the auto gyro design is that they are very stable in gusty winds since the gusts are very small compared to the speed of the rotor.

Sky WindPower
http://www.skywindpower.com

Another company, Sky WindPower, is also using an auto gyro. In contrast to SkyMill Energy, their generators are on-board and transmit the power to the ground through a tether/power cable combination. Sky WindPower eliminates the need to continuously yo-yo the system since the generators are on board. But they add weight and complexity due to the on-board generators and the weight of the power cable.

Windlift
http://www.windlift.com

Windlift currently uses a kite surfing style kite as its lifting device, tethered to a ground based generator. They employ the yo-yo reel method along with the cross-wind flying technique to increase apparent wind, resulting in higher power output. Its system is housed in a trailer and is designed to be mobile for use in remote locations. There are several obvious advantages with this approach. They can easily trade out lifting devices as technology evolves. The kite lifting device is low cost and easily changed out. Maintainability in the field is easy and low tech. It's also relatively safe since the on-board weight is by far the lightest of all the current designs.

Although the designs and strategies are varied, one thing is for sure. This is a passionate and highly motivated group of entrepreneurs. Time will tell which approach will win out.

Images from Burning Man

Photographs by Jose Sainz

Jose Sainz

Burning Man is annual arts festival and alternative community gathering held in Nevada's Black Rock Desert. Drachen board president Scott Skinner calls the event "a great audience for kites." Read about Scott and Jose's trip, photo-documented here, on the Drachen blog: http://www.drachen.org/kite_wanderings_older.html

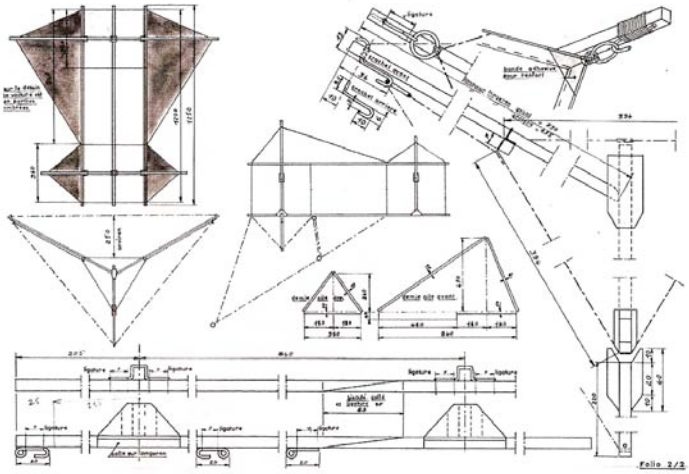
Jose Sainz

Jose Sainz

Jose Sainz

Legacy of Kites in Dieppe

Scott Skinner



Courtesy Thierry Nénot

Images of Robert Devautour and his kite plans, featured in the exhibition's catalogue.

View the full Devautour exhibition catalogue online (in French): http://www.drachen.org/pdf/DevautourCatalogue.pdf

View the catalogue's English translation: http://www.drachen.org/pdf/DevautourCatalogueTranslation.pdf

With a festival that has run for over thirty years, one that emphasizes the worldwide cultural importance of kites, it is appropriate that Dieppe, France is front-and-center as a kite festival that must be seen. But this year, at Dieppe, a more powerful legacy of kites was found six blocks from the flying site. It was the wonderful collection of Robert Devautour kites in an exhibition organized by Thierry Nénot. Here were two generations of Dieppe kite builders, fliers, and researchers, bound to each other and to the rich history of French kite making.

Robert Devautour (1921-2001) came to kites in a vacuum, it seems. In this remote town, much of his work was done before any serious correspondence or contact with other French kite makers. He was secure in trusting his childhood kite memories and in using his construction skills to make new, original kites using contemporary materials of the day (wood, plastic, double-sided tape, polyester string). With a lifetime devoted to flying objects, notably model airplanes, he began a systematic exploration of kites. He numbered his kites consecutively as he built them, so it is easy to follow his progress from simple to more complex forms. As he discovered new forms, he made variations that were, in fact, "new" kites: winged box kites, swept-wing boxes, deltas, and birds.

Devautour's construction techniques can be overlooked because of materials that we might now call "primitive." But a close examination reveals brilliant uses of the materials and an economy of usage that is second-to-none.

Ali Fujino

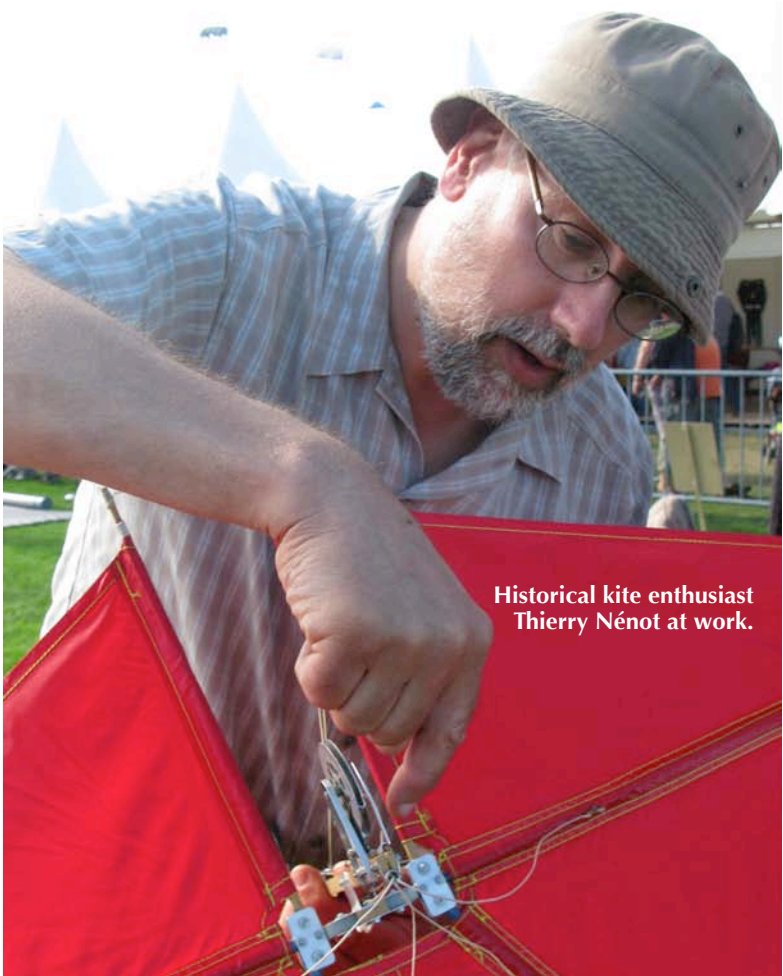
A collection of Robert Devautour kites organized by Thierry Nénot. Thierry spent hours restoring kites that had become damaged in storage or were victims of neglect.

Sticks are light, but are trussed with line for strength. Line is used to limit and control stretch of the plastic sails – as well as to change and control the lifting surfaces of wings. In one of his early ferries, he used cardboard, plastic, tin, and, it seems, every other material he had on hand to fabricate the climber. In a later aerial camera mount, we find a sophisticated leveling mechanism (two handmade pistons) and an aluminum frame. As he became more interested in kites, he studied kites of the early 20th century and made wonderful reproductions of Cody and Saconney kites. As modern kite flying and kite fliers gained momentum in France, Devautour was noticed and embraced by the community, and his detailed plan-work for a number of kites was published in French kite journals.

But this exhibition could only have taken place because of Thierry Nénot and the new generation of Dieppe kite enthusiasts. Thierry's background makes him an ideal member of the European historical kite flying community. He was instrumental in building the Musee de l'Aire's Clement Ader "Avion" airship. His knowledge of turn-of-the-century building techniques, materials, and literature make him one of a handful of experts in the field. Thierry saved the collection and has spent hours restoring kites that had become damaged in storage or were victims of neglect. In restoring the collection in the exhibition, he went so far as to fly and photograph every kite, producing a new archive of Devautour's work.

We were on the Dieppe Festival kite field when Thierry did the unimaginable – he broke a spar in one of the kites! Fear not, having restored the entire collection to flying condition, this broken spar will be easily, and accurately, replaced by Thierry.

There is little doubt that many of the kite fliers who were invited guests of the Dieppe Festival spent many hours preparing kites for flight and display. But think of the time spent by Thierry: researching Devautour's life, repairing neglected kites, flying and photographing, preparing illustrative panels for the exhibition, and, finally, actually mounting the entire exhibition (two full rooms) for the pleasure of Dieppe's kite-fanatic attendees. This was a monumental effort that makes a significant contribution toward the understanding of French kite making in the mid-20th century. Like American "old timers" Stormy Weathers, Harold Writer, and Neil Thornburn, Robert Devautour was a serious student of kites in the 1950s and 60s, when most other "adults" had better things to do. He was a bridge to the past, brought lovingly to the present by a new generation of enthusiasts. The Drachen Foundation applauds the efforts of Theirry Nénot, pictured below, a true caretaker of Dieppe's legacy of kites.

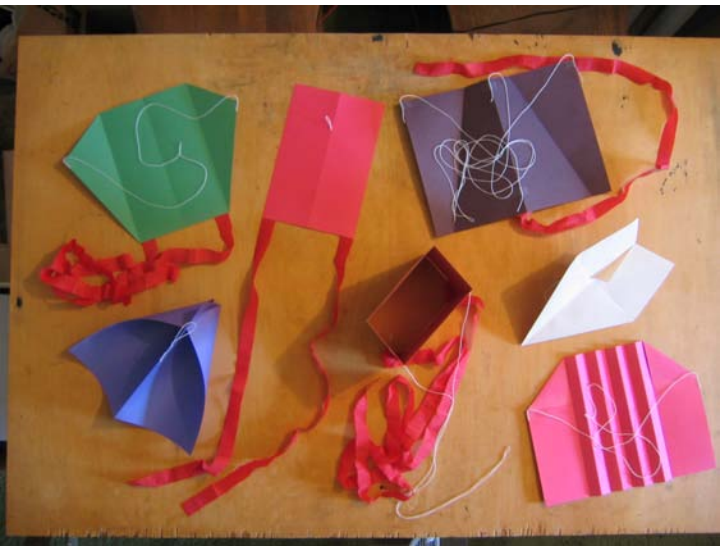


Historical kite enthusiast Thierry Nénot at work.

Ali Fujino

Simple Paper Kites

Gary Hinze



All photos by Gary Hinze

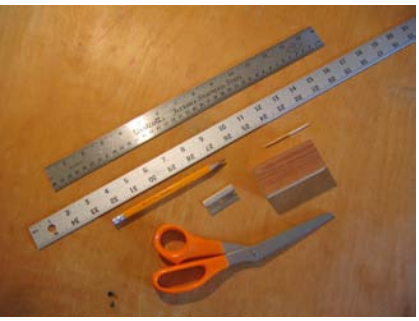
Introduction

Here are some kites that are quick and easy to build and fly, made from readily available, inexpensive materials. No sticks are used. They are stiffened by creases in the paper. These kites are good for classrooms, homeschoolers, scouts, senior crafts, church groups, or parties. I picked these three to show you from 42 kites that I made for this project.

Materials and Tools

The materials you need are 9″ x 12″ construction paper, thin cotton string, a 2″ roll of crepe paper, glue, and tape. Substitutions may be made. For example, heavy grocery bag paper will do for the construction paper. Strips of newspaper, cut along the grain and softened by crumpling, will work for the crepe paper.

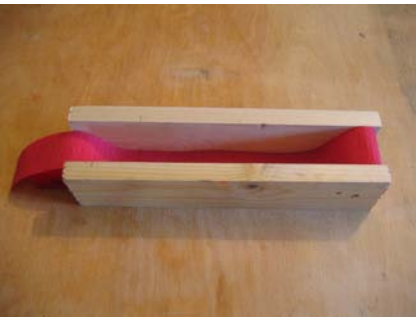
Tools required include a steel straightedge for marking and guiding cuts, a yardstick for measuring bridle string and tails, a pencil for marking positions and lines, a round toothpick for poking holes in paper, a razor blade for cutting paper, a block for pressing folds, and scissors for cutting string and paper. Again, substitutions may be made. A razor blade may be inadvisable for small children, and cuts may be made beforehand by adults or scissors may be used. I used a sailmakers needle instead of the toothpick. You will also need a suitable workplace. If you plan to cut paper with a razor blade, you will want a work board that may be scratched. The side of a cardboard box will do. Newspapers will keep glue off tabletops.



Making Tails

1. Many kites require tails. It is good to make them up in bulk and have a box of them handy. For this set of kites, you will need at least two tails.

2. Start by laying out several laps of tail material. The tails are cut to 1/2 the width of the roll and in 3′ lengths. If you are making them from newspaper, you may cut out 1″ strips along the paper grain, crumple them to make them flexible, and glue together to get the length needed.

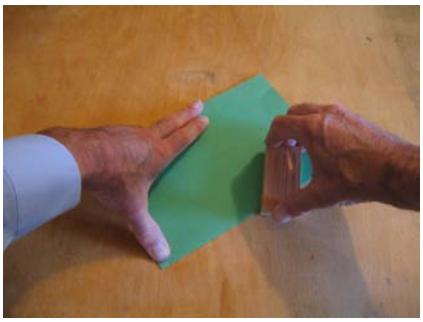


3. Align the edges by pressing between blocks of wood, yardsticks, or cardboard.

4. Measure the width, which will not be exactly 2″, center the steel straightedge on top of the stack, hold it securely, and, with a sharp new razor, cut the pack in half. You can also cut smaller bundles with scissors. Cut the 2″ strips into 3′ lengths, fold them in half three times, tap on the table to align the edges, and cut the bundle in half along the 4 1/2″ length.

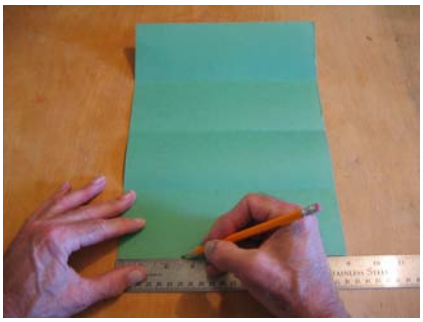
Sled Kites

1. Let's start with a simple kite that illustrates some basic construction methods and represents a whole family of kites that may be made in the same way. Put the corners together, align the 9″ edges and fold the 9″ x 12″ paper in half.



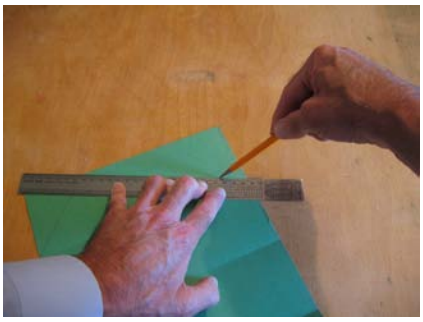
2. Make a sharp fold by flattening it with the wood block.

3. Align one edge with the center fold and fold that half in half. Do the same on the other side to divide the sheet into four equal panels.

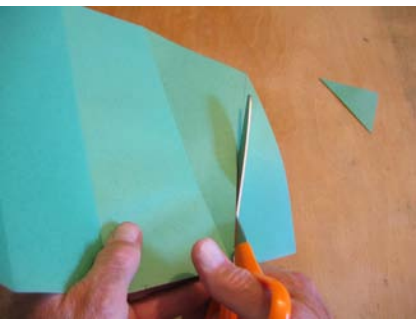


4. Mark points on each 9″ side 2 1/2″ back from one of the 12″ edges.

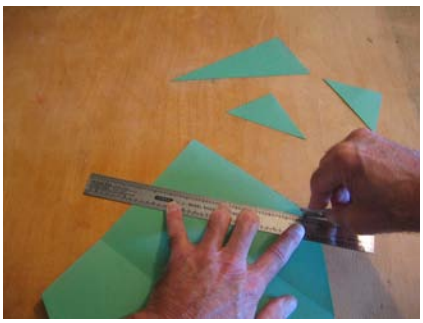
5. Draw a line from the marked point to the front end of the nearest fold line.



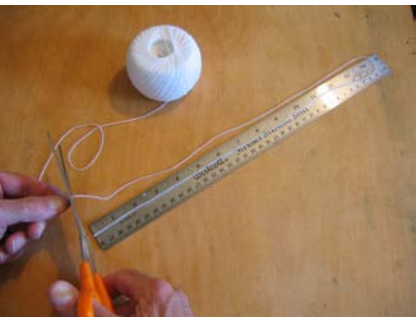
6. Draw a line from the marked point to the aft end of the nearest fold. Do the same on both sides.



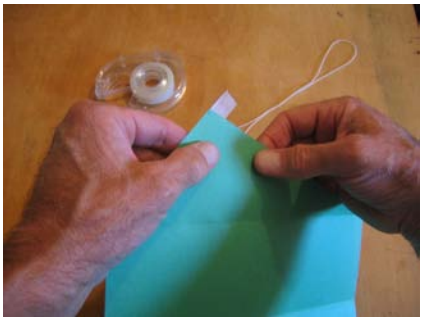
7. Cut the four triangles off the corners with scissors.



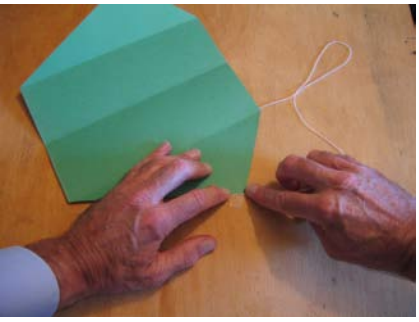
8. Builders who can safely use razor blades may cut the corners off without making pencil lines.



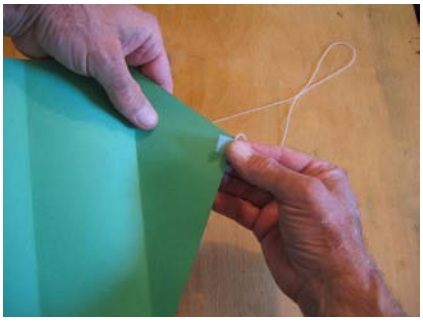
9. Double the string to make a 15″ loop and cut it off.



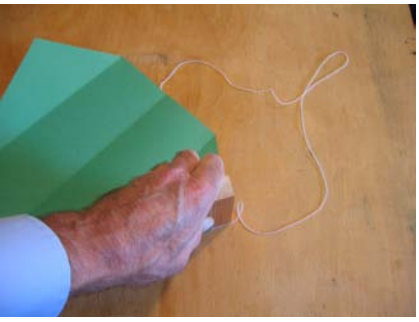
10. Apply tape to the corner of the paper.



11. Press the end of the string onto the tape along the edge of the paper.

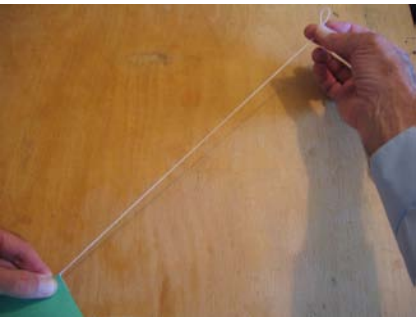


12. Fold the tape over the string.

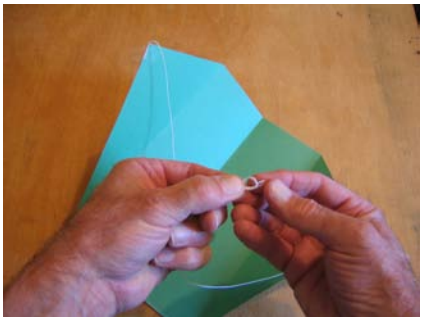


13. Press the tape down to make sure it sticks tightly to the paper and string. Attach the other end of the string to the opposite side in the same way.

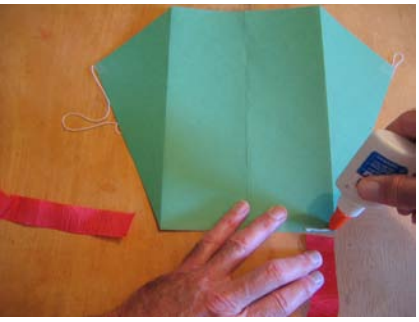
14. Carefully align the corners.



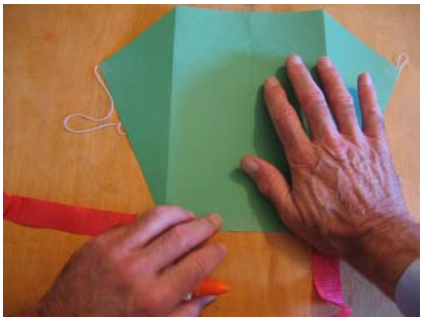
15. Draw the string out evenly from both sides.



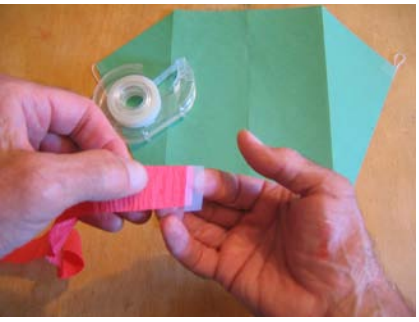
16. Tie a knot in the doubled string to form the bridle loop.



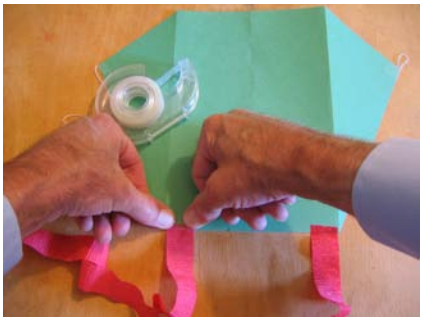
17. Apply glue to the back corner the width of the tail.



18. Press the tail into the glue to attach it to the kite.

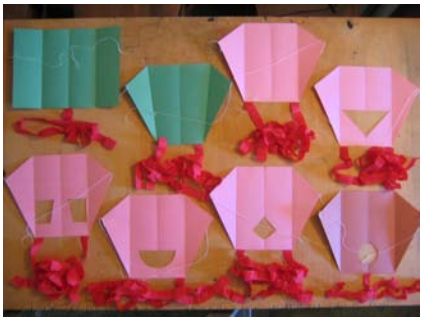


19. Or apply tape to the end of a tail.



20. Press the tape to the back corner of the kite to attach the tail. However you do it, there will be two tails on the back corners.

21. The kite is ready to fly! Tie the end of the flying line to the bridle loop.

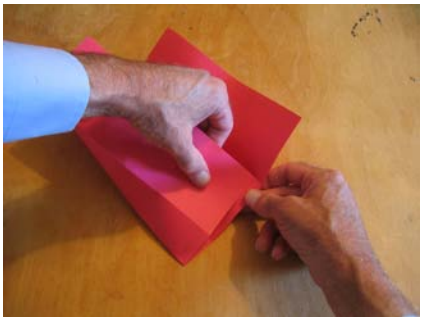


22. Here are several variations on the sled kite concept. These can be made in the same way. The one with the tapered side folds is 7″ wide at the top edge and 5″ wide at the bottom edge.

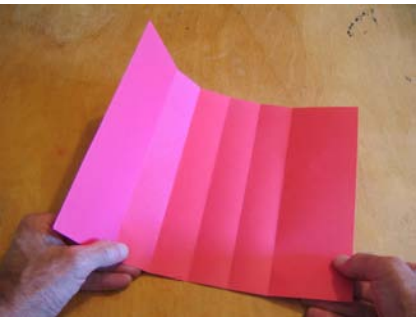
Fan Kite

1. My first fan kite was made from a paper towel about 40 years ago.

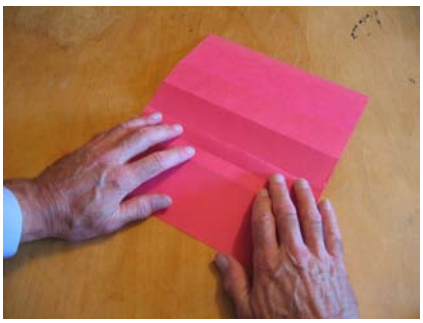
Fold the sheet into quarters, as with the sled kite.



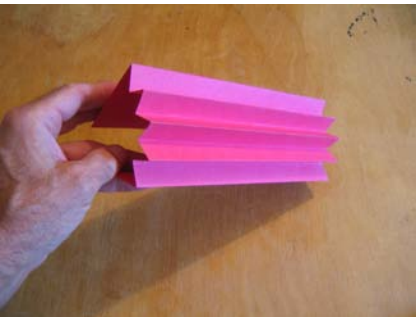
2. Bring one edge to the fold on the opposite side, align the edge with the fold, and crease the paper. Do the same on both sides.



3. There will be five folds dividing the center into four equal panels.

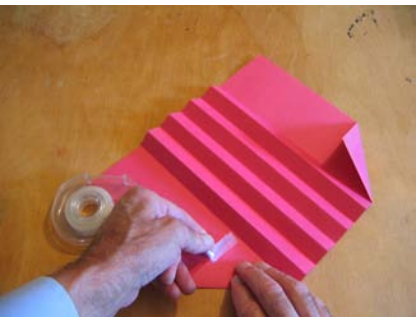


4. Turn the paper over, bring the edges of each center panel together, and crease the paper.



5. This makes a fan of 8 panels.

6. Fold the corners over, bringing the front edge against the fold.

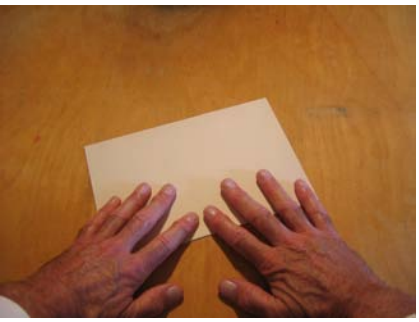


7. Tape the triangles down.

8. Or glue the edges down. Put glue on both edges opposite the fold.

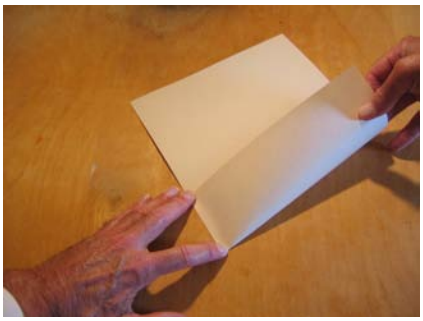
9. Measure and cut an 18" loop of string, tape the ends to the corners, align the corners, pull the string out evenly, and tie a small loop in the center, completing the kite. This kite does not need tails.

10. Take the kite out and fly it. It flies in a wide range of wind speeds.



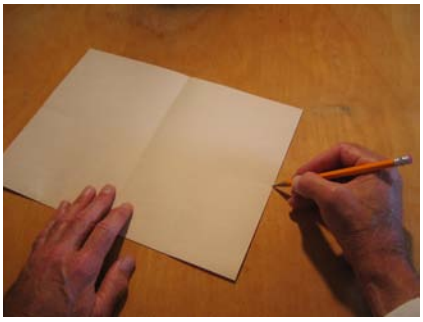
Paper Airplane Kite

1. My serious interest in kites began years ago when I tried flying paper airplanes as kites. This new design was made just for this project. It is derived from an origami glider, but uses a rectangular sheet of paper. Start by folding the 9″ x 12″ sheet in half parallel with the short sides.

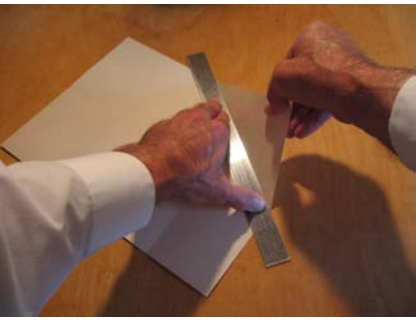


2. On one of the 12″ sides, bring the corner in to the center fold and make a crease to mark a point half way between the center and the corner. Do the same on the opposite side. This 12″ edge will become the trailing edge of the wing.

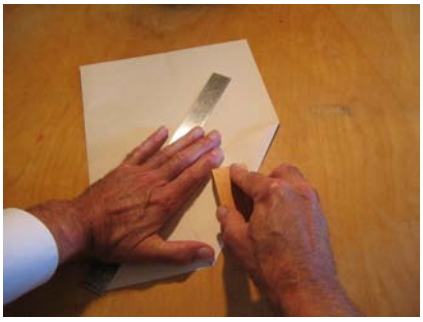
3. Make creases at the centers of each of the 9″ sides.



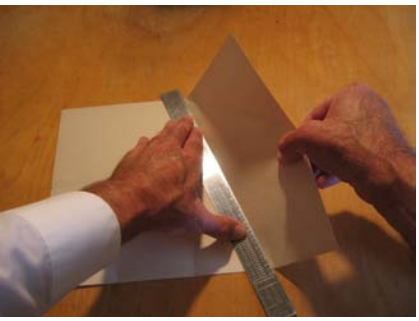
4. You may want to make the creases more visible with pencil marks. (If you are not an origami purist, you can mark then with a ruler.)



5. Place a straightedge between the center point of the unmarked 12″ edge and the center point of a 9″ edge. Pull up a corner to make a crease. Do the same to the opposite side. These fold lines will become the wing leading edges.



6. Sharpen the creases by rubbing them with a block of wood, but do not press hard enough to curl the paper.

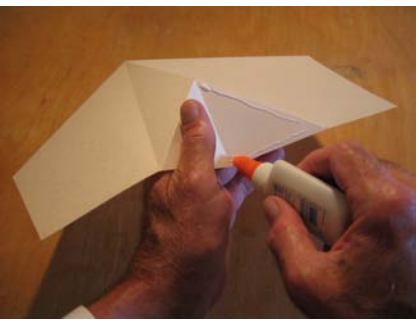


7. Put the straightedge from the center crease on the leading edge to the quarter point mark on the trailing edge and pull up the paper to make the wing root crease. Once the paper is creased, fold it back along the same line the other way. Do the same on the other side.

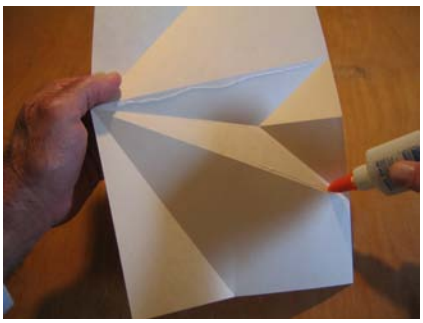
8. Mark points on the centerline 5″ and 6″ from the nose.

9. Fold the paper in half, place the straightedge between the 6″ mark on the centerline and the back end of the wing root fold and pull the corner up, forming the fin fold crease. Fold the fin crease back and forth.

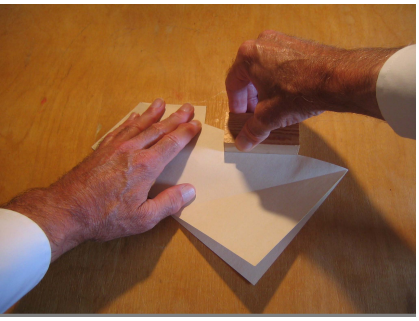
10. The fin will be folded up inside the sides of the fuselage.



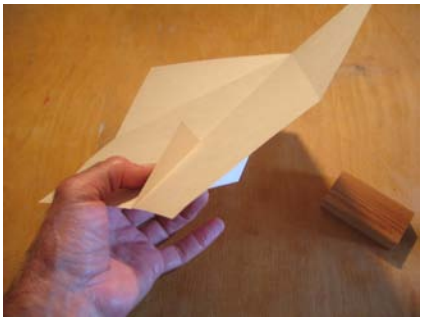
11. Apply glue to the two edges of the fin triangle opposite the center fold.



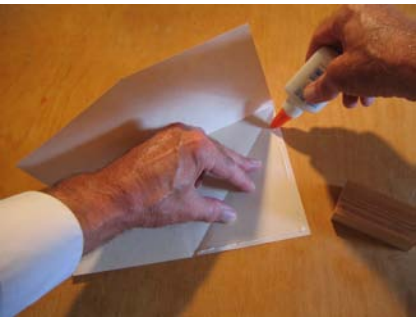
12. Apply glue to one side of the fuselage where the wing roots will come together and to the other side beside the fin.



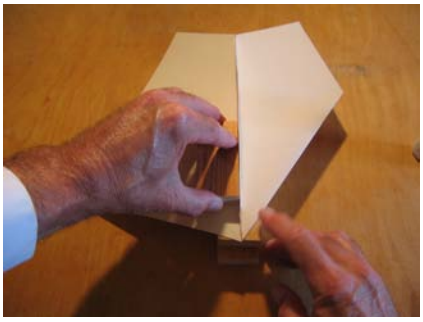
13. Bring the fin and fuselage sides together and press. Let the glue set.



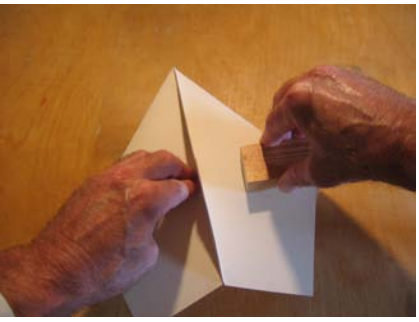
14. This shows the completed fuselage and fin gluing.



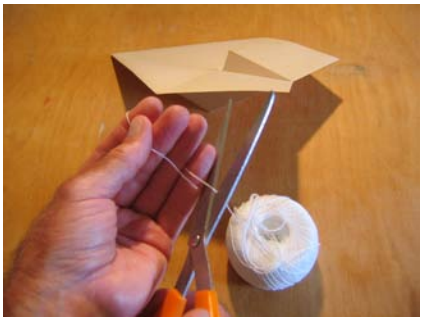
15. Apply glue to the edges of the wing leading edge panels opposite the crease, then fold it over.



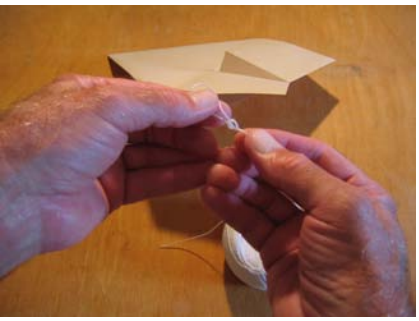
16. Put the wing up on blocks of wood to prevent the fin being bent and press the paper along the glue joints. The panel overlaps the centerline, so press on the other side of the center line as well.



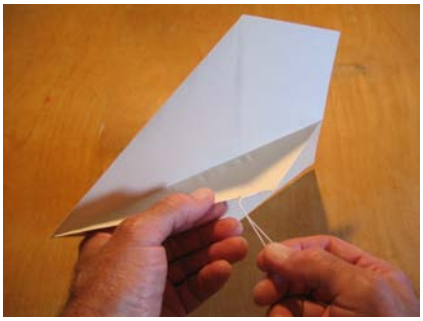
17. Do the same for the opposite wing. Let the glue dry.



18. Cut a short loop of string.



19. Tie a knot in the middle to form a bridle loop.



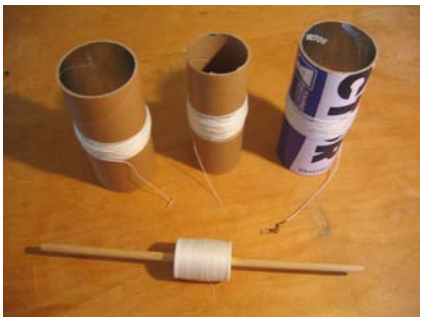
20. Tape the bridle loop to the kite with the knot at the 5″ mark.

21. Bend the wings up to form a dihedral angle.

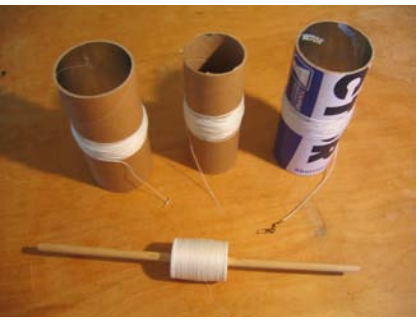
22. Take it out and fly it. Now your paper airplanes can stay up longer than you can throw them!

The Flying Line

1. These kites are small and will not pull up much line against the wind. About 100 feet of line will be enough to get your kite over the trees and into the steady wind. Those small spools make it difficult to manage your line. You need something bigger.

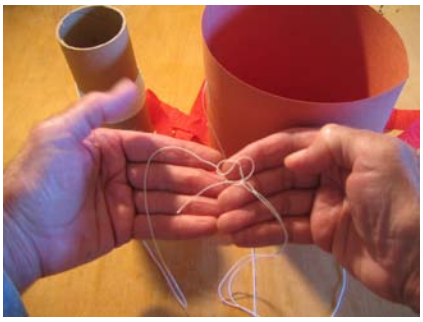


2. Spools may be cut from cardboard mailing tube, tennis ball tube, or badminton shuttlecock tube. A 4″ nut can is good, but be sure there is no sharp metal in the end. These kites will fly on thread. You can force a length of dowel into a spool of thread.

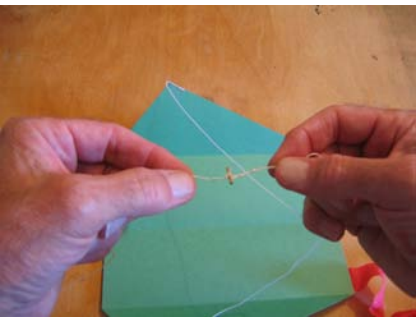


3. Paper may be wrapped around the dowel to get a tight fit. Nylon monofilament thread works well, but is difficult to make secure knots. I recommend using a fisherman's snap swivel, shown on the rightmost spool, and following the instructions for making the fisherman's knot. The leftmost spool has a toggle attachment. The toggle is a 1/2" length of round toothpick or bamboo skewer. The toggle may be used to secure your string to the spool. Poke a hole in the middle of the cardboard spool with a nail and push the toggle through the hole.

4. Cardboard tube may be cut to length by supporting a razor blade on a piece of plywood on top of a nut can and rotating the tube against the point while holding the end square to the tabletop. This must be done slowly to get an accurate cut and takes a long time. A table saw is much quicker.



5. The simplest way to attach the flying line to the bridle loop is a slipknot. Be sure to tie it so the end pulls the knot out, not the flying line.



6. This shows how the toggle is used to attach the string to the bridle loop. The loop should be shorter than the toggle, just large enough to push the toggle through endwise. The toggle is rotated square to the string and pulled back to the loop.

Wind

Most of these kites will fly at a fast walking speed. A good way to find out the speed range of a kite is to take it out in a big field when there is no wind and walk, jog, and run.

College Kites 1957

Patrick Parrish

I asked
my buddy
Matt
what he wanted to see on
MONDOBLOGO
and he said
ENOUGH
with all that Italian Design.
"Gimmie something
AMERICAN
God Dammit!"
So,
here you go Matt,
what's more
American than
Flying a kite?
At college
no
less....

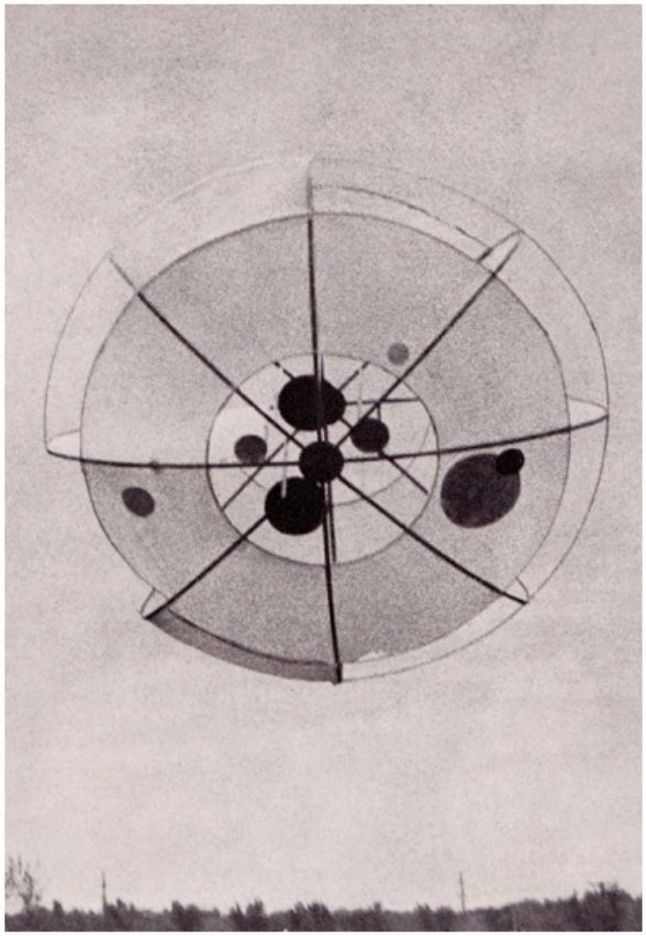
Introduction by Scott Skinner

Just about the time we think we've seen and done everything in kites, along comes a humbling nugget like this. Here are some kite designs that would make any of us proud.

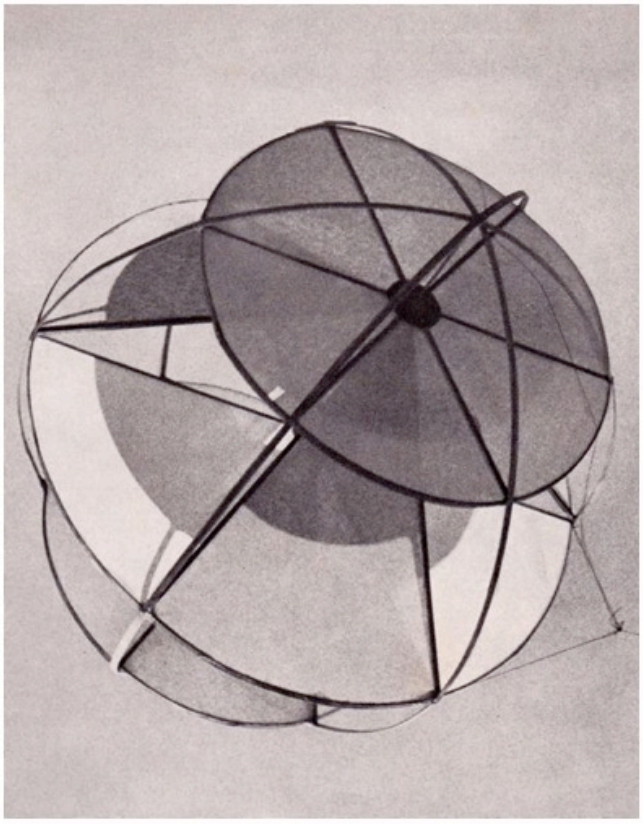
Are they practical? Can you travel with them, can you store them, can you even wedge one into your car? Probably not. But are they innovative? Do they use materials in clever ways, are they evocative of nature, do they scream originality?

Like the kites of Robert Devautour, also featured in this *Discourse*, an examination of the past may well bring us more new and innovative "original" designs in the future.

Article reprinted from MONDOBLOGO:
http://mondo-blogo.blogspot.com/2010/08/college-kites-1957.html

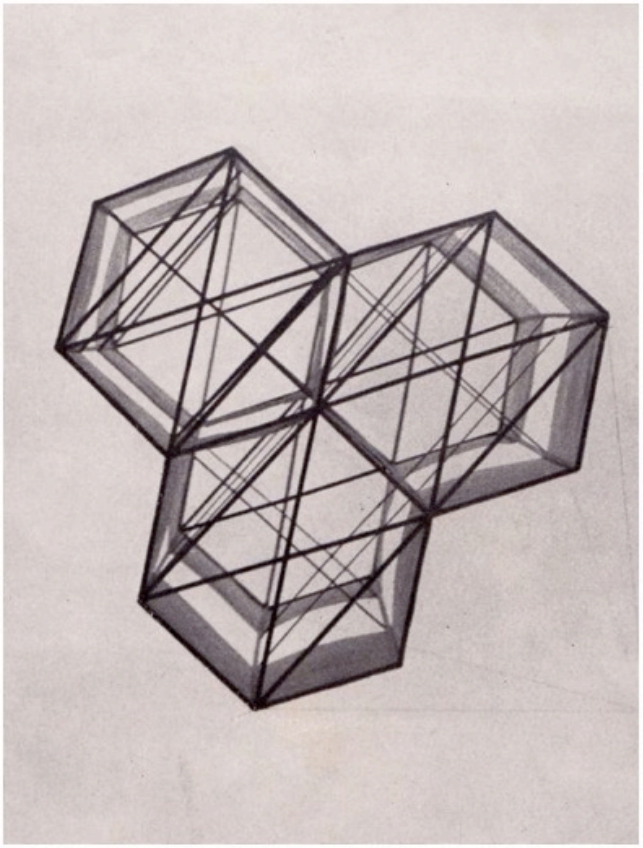


These images come from the
University of Illinois
"Kite Derby Day"
All the entrys
shown here
are from the
sophomores
in the
department of
Indusrtrial Design.

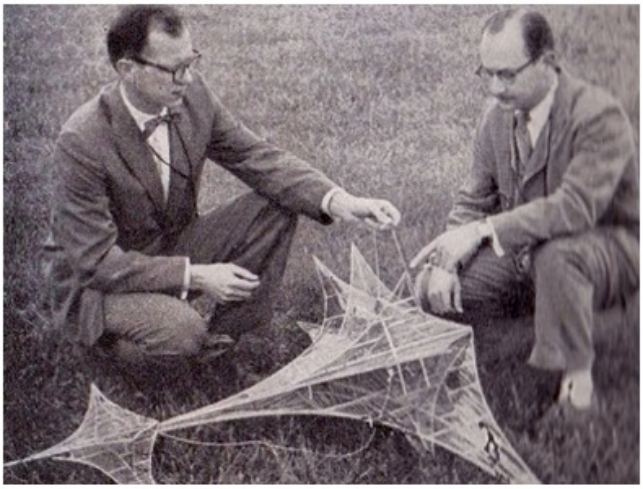


This is Henry Hosman's design.
Wonder what happened to
old
Henry?

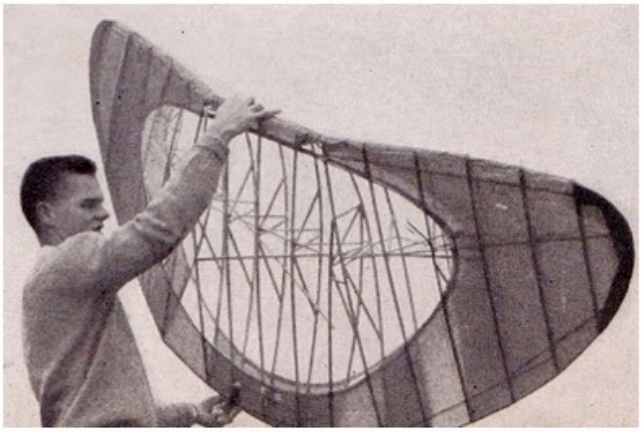
I wanna go back to school....
Wait,
no I don't.



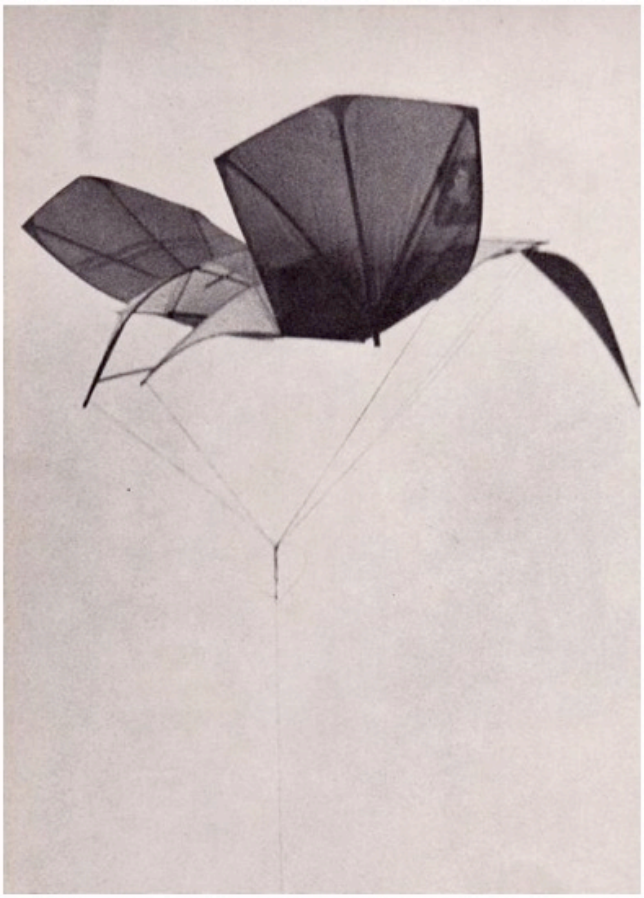
Crystalline



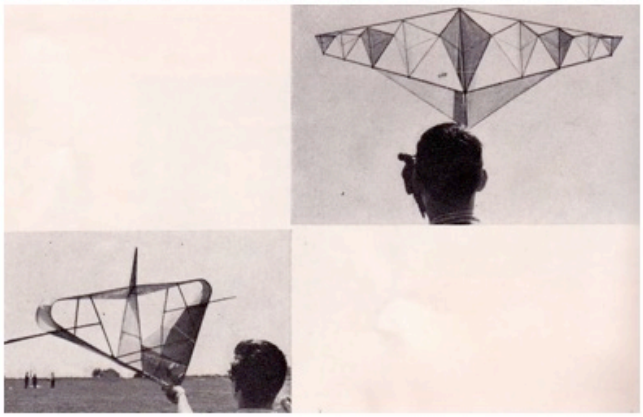
Leave it to the
Professors
to come up with something
like the
this...



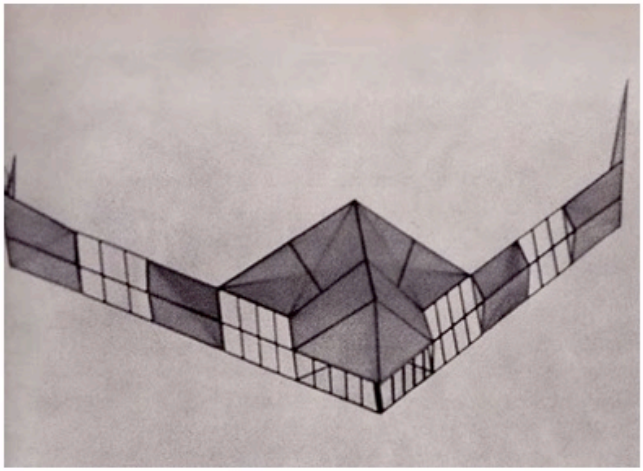
Love this entry,
but
he had to add a tail to get it to fly.
Bummer dude.



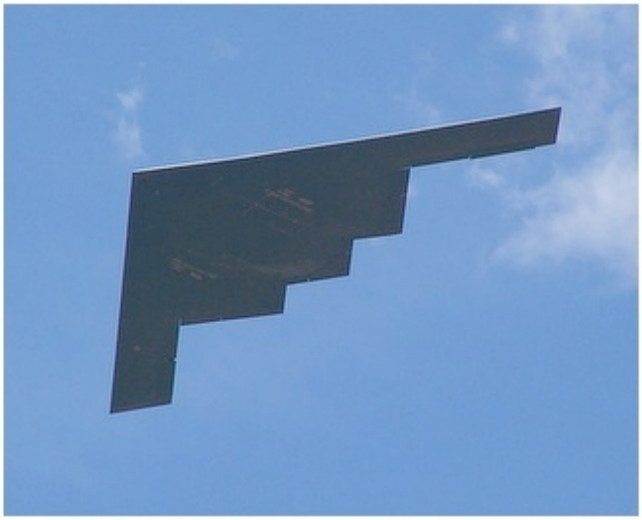
Very hummingbird-like.

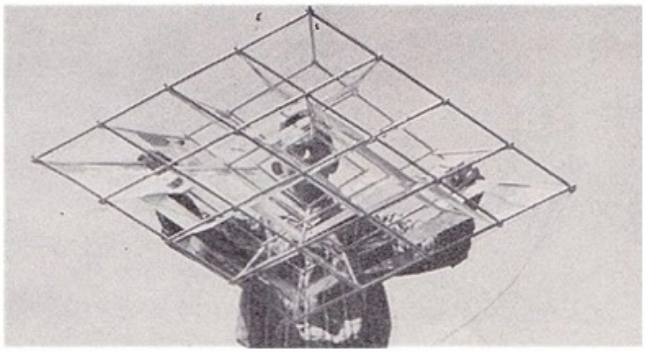


I like these...

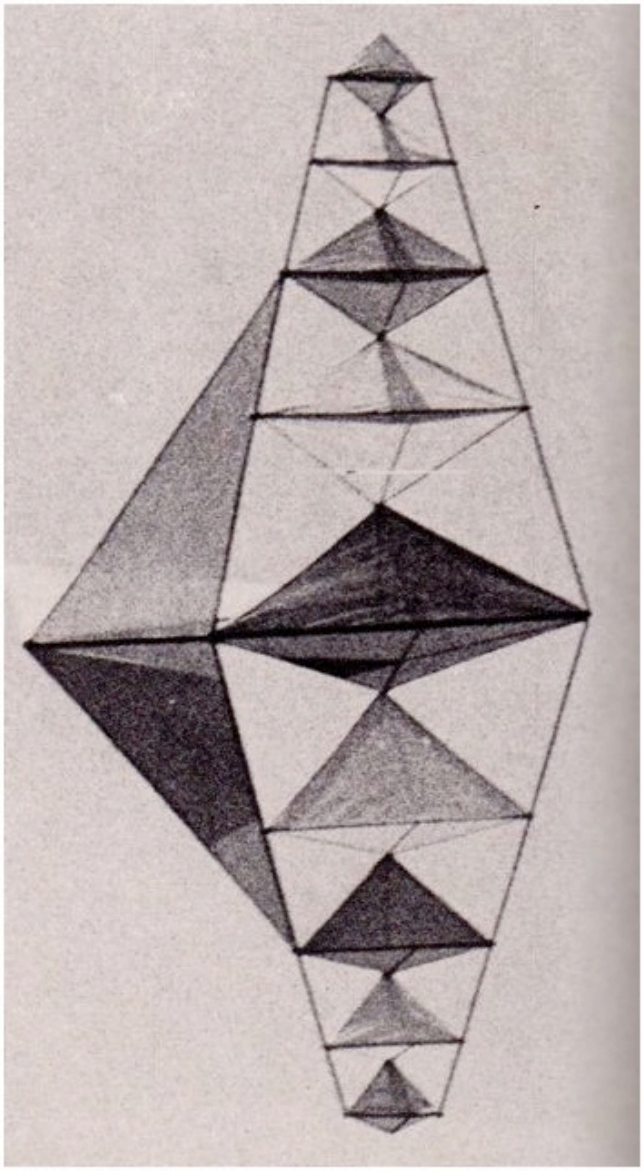


Too Stelth Bomber-like
Kenneth Newstrom.
Wait,
this predates the
Northrop Grumman B-2 Spirit
by
30 years!
Nice job Kenny!





More like it
Raymond Pittman.



Art

Don't you wish you could see this in color?

I bet it was beautiful....

Shocking!

Submit your article or photographs to *Discourse*! We thank our authors with official Drachen Foundation Sherpa Adventure Gear outdoor wear. These exclusive pullovers are not available for purchase and are reserved for authors and special friends of *Discourse*.

Send your submission or comments to:
discourse@drachen.org