the aerial eye

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of the American Kitefliers Association
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St. Malo, France by Patrick Morin

SMART & SAFE KAP

the aerial eye

This newsletter is produced by the Aerial Photography Committee of the American Kitefliers Association. It is our goal to publish quarterly, in August, November, February, and May.

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suitcases or safety?

Steve Eisenhauer's call in the last issue for more attention to the hazards of KAP stimulated Cris Benton to write several well-researched pages on the subject for his website, which he has kindly shared with us as well. As it happens, the announced features for this issue, like the last, have brought forth little or nothing in the way of articles or pictures. Hence, instead of transmitters, receivers, and carrying cases, this issue's feature is safety.

Don't let the announced feature stop you from writing!

Text via Email or on 3.5" (9cm) high-density disk (Mac or IBM in ASCII text format) is preferred, but typed text or handwritten letters are welcome too. Likewise, diagrams in PICT, GIF, or TIFF formats are best, but pen drawings, preferably on white paper, will work as well.

Photos may be sent as negatives, prints or slides, on disk or CD, or by email attachments in JPEG, TIFF, or GIF formats. Please scan your pictures at 200 - 300 dpi. We'll keep the prints unless you direct otherwise, but return all negatives, disks, CDs, and slides—eventually.

Send everything to Brooks Leffler at the address below.

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a fork in the road

by CRAIG WILSON

Steve Eisenhauer mentioned to me over a year ago that he thought it was my turn to take over as the chair of the AKA aerial photography committee.

Steve had performed that function since the start and did a superb job at it. I knew that in all fairness it would be someone else's turn sooner or later, but I let it go as long as I could. Finally in the wake of Brooks seeking a replacement, Steve let me know that it was time.

So I have now officially tucked my feet into those shoes and they feel plenty roomy. I don't plan any major changes and I don't have any big fancy ideas about how to control or direct the future of this enterprise.

I sense a very deep passion about what we do from most who contribute stories and photos to **æ** and I think there is a real community spirit among our subscribers. I feel we are all friends and I like that very much. The **æ** has evolved into a platform where any of us can share what we are doing with our kites and our cameras.

More importantly, I like how the **æ** has become a place where we all can and do profit from each other's creativity and cleverness. Many of us are separated from other KAPers by hundreds or even thousands of miles. The **æ** has become for many the only thing that keeps us tethered together.

Recently, with Brooks Leffler's resignation as Editor, **æ** came to a fork in the road.

One direction meant that **æ** would park, have its wheels and engine removed, and end with the next issue. The other fork led forward.

On this path, the surface may be unpaved; it may have steep winding turns with no guard rails. We may encounter uncontrolled cross traffic and stubborn farm animals refusing to yield right of way.

Even though I fear that I am driving with no headlights down this dark road, I feel that it is important that we keep this masterpiece alive by choosing the path that leads forward.

Beginning with the Winter issue, Chuck Henderson of Philadelphia has volunteered his expertise as the new Publisher to do the nuts and bolts of putting together the

Continued on page 16

about the cover

St. Malo, France, by Patrick Morin

St. Malo is very important to my family, as most of my ancestors were born there and I was born not far away.

The city—but not the wall— was destroyed during World War II. I have a photo taken from a plane in 1933 and of course many pictures from right after the war. I took this one in the summer of 1996 to compare what the city looks like now to the earlier photos. There's not much that's the same.

I used a 4-meter [13 ft] delta to lift my Nikon 301 [2000 in the US] fitted with a 28 mm lens.

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kites vs. aircraft

by CRIS BENTON, Berkeley, California

In my mind, aircraft-related safety is the most difficult of KAP safety issues.

In the last issue of **the aerial eye**, Steve Eisenhauer took the bull by the horns and discussed his uneasiness about the potential for conflict between kites and occupied aircraft (e.g., airplanes, helicopters, ultralights, hang gliders, and paragliders.) While it would at first seem unlikely that an aircraft would tangle with your kite, the more hours you fly the more exposure you have.

Also at issue is the size of kite and kiteline. Early in my kite-flying career I generally flew small kites on 75-pound kiteline. Those seem innocuous compared to the Sutton Flowform 60 and 250 pound kiteline I often fly these days.

As I write this article I have accumulated around 600 hours flying kites. During this time I have had three anxious moments, two compliments of low-flying helicopters.

In one case a helicopter flew over the UC Berkeley campus while I was photographing the Campanile. I'd estimate its altitude as 400 to 500 feet—too low for me to be comfortable—and heading generally toward my kite. The helicopter changed course long before nearing the kite but left with me questions about who should be doing what to prevent interaction.

In the second case I was flying from an El Cerrito waterfront park when a police helicopter arrived and loitered at 150 feet or so for 20 minutes. The Bell Jet Ranger's pilot seemed quite aware of my kite and stayed clear (actually circling the kite) as I quickly brought the kite down from around 300 feet. That helicopter eventually landed to participate in an arrest.

On occasion I have had fixed wing aircraft in the vicinity of my kite. On all but one occasion they have had sufficient altitude to ease any worries.

The one that concerned me was a low-flying Bonanza hugging San Francisco's Pacific shoreline near the ruins of Sutro Baths. I would estimate its altitude at 300 feet. Unlike the many planes that fly parallel to the coast, this Bonanza was flying over the shore, not over the water. It banked seaward before reaching my flying site in what I believe was an evasive reaction to the kite.

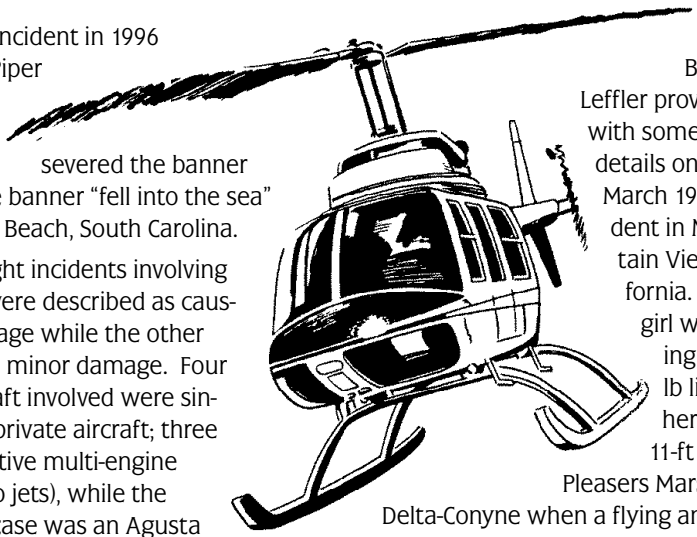
WHAT'S ON THE RECORD

My curiosity fueled by these incidents, I searched the National Transportation Safety Board Aviation Accident/Incident Database for references to aircraft "accidents" involving kites. There are none apparent in the 45,015 aviation accidents recorded by NTSB since 1983.

I also searched the 114,817 record database of aircraft-related "incidents" reported since 1981. Here I found eight incidents involving kites.

None resulted in accident or injury, though a kiteflier was charged with malicious mischief for deliberately flying a kite in front of a Pitts Special on landing approach. The Pitts landed without damage.

Another incident in 1996 involved a Piper PA-18 towing a banner. A kite severed the banner line and the banner "fell into the sea" near Myrtle Beach, South Carolina.



Of the eight incidents involving kites four were described as causing no damage while the other four caused minor damage. Four of the aircraft involved were single-engine private aircraft; three were executive multi-engine aircraft (two jets), while the remaining case was an Agusta A109 commercial helicopter.

Five of the incidents occurred during an aircraft's final runway approach and one immediately after takeoff so there appears to be a causal and intuitive relationship with proximity to airports.

The remaining two incidents occurred during low level cruise: the commercial helicopter ferrying passengers from New York City to the airport and the banner-towing airplane.

Only two reports mentioned kiteline strength. The narrative describing the helicopter incident said that "...during cruise aircraft contacted 100 pound test nylon kite cord. Cord entangled in rotors. Safe landing." The helicopter was not damaged.

The other kiteline citation mentioned 20-pound fishing line. The FAA described a third incident as "Pilot struck a kite that was being flown by a 9 year old girl in his flight path on final approach."

Brooks Leffler provided me with some more details on this March 1988 incident in Mountain View, California. "A little girl was holding the 170-lb line to her dad's 11-ft Cloud Pleasers Marshall Delta-Conyne when a flying ambulance came in too low on a seldom-used approach to nearby Palo Alto airport and snagged the line in the prop. The girl was lifted about ten feet and let go when she saw a grove of trees approaching. No damage or injuries, but lotsa adrenaline pumped."

KAP safety related to aircraft is a serious issue due to its life safety dimension. It deserves our full attention.

I am interested in learning more about kite / aircraft protocols. If you know more about the issue, have had experiences with low-flying aircraft, or just have some thoughts then please drop me a line.

cris@ced.berkeley.edu

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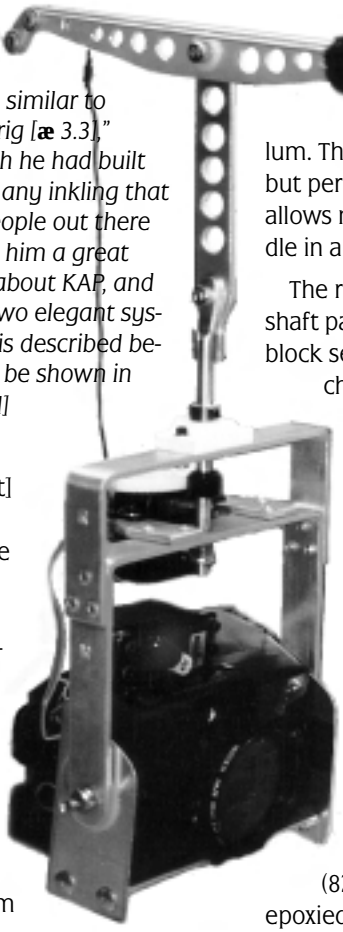
aluminum elegance

by JON W. TRAER, MD, Townsend, Georgia

*[Jon Traer had been experimenting with KAP for some time when he came upon an article by Steve Eisenhauer and wrote to him. "He was using a wooden cradle very similar to Rodney Thomsen's rig [**æ** 3.3]," Steve reports, "which he had built on his own without any inkling that there were other people out there KAPing." Steve sent him a great pile of information about KAP, and Jon has since built two elegant systems, one of which is described below. His SLR rig will be shown in the next issue. —bgl]*



My [point & shoot] cradle is aluminum, with the basic frame held together by Pop™ rivets. The spine, upper pendulum, and upper parts of the cradle are 1/8" X 3/4" flat stock, while the camera shell and battery/receiver housing at the rear are formed from .020" sheet stock.

The lower part of the pendulum is 1/4" round tempered aluminum, flattened on its upper end, and threaded on the lower 1/2". The flattened end of the round stock is thru-bolted to the lower end of the flat upper pendulum.

Note that the very lowest part of the flat upper pendulum has been bent in a curve that will nest with the round pendulum. This joint is quite rigid when bolted, but permits quick disassembly, which allows me to store the camera and cradle in a small bag for transport.

The round portion of the pendulum shaft passes through a white Teflon® block secured to the upper frame by machine screws. This block stabilizes the shaft against any wobble, and serves as a friction surface for a 1/4" collar on top of that block.

The adjustable friction created when the collar is drawn against the block by tightening the lock nut at the bottom end of the round shaft seems to provide really smooth panning motion, minimizing fly wheel action and ensuring stable and precise meshing of the pan gears.

The pan servo gear is nylon (87 teeth) and the composite spur epoxied to the shaft is 22 teeth, both r/c model car gears.

The whole rig weighs 24.9 oz, but could be lightened if I changed over to AAA batteries, and drilled additional

holes in portions of the frame. I haven't found its weight to be any problem, even in 6-7 mph winds, using a single 8' Delta-Conyne, or an additional 8' D-C if I want more altitude on a short line.

I'm beginning to think that a reasonable amount of camera and cradle weight is desirable and may even add to stability in variable winds. I'm further becoming convinced that keeping the cradle mass as compact as practical, and reasonably streamlined, helps stability. I've also found that the balance of this rig is good, and in stable wind, allows level horizon pictures regardless of pan (or tilt) position.

The quick connect/disconnect spine [from which the pendulum hangs] is 8" long and has the "Eisenhauer Pivot" [**æ** 1.4] but with nylon instead of Teflon washers.

Those little knobs that the kite line threads around are Pop™ rivets... actually double pop rivets. I first took the stem out of four 3/4" X 3/16" aluminum pop rivets, ran a 1/8" drill bit through their head and hollow stem, then shortened the rivets to about 1/8". These shortened 3/16" rivets were then secured to the ends of the spine with 1/8" pop rivets of appropriate length.

There's probably a simpler way to construct these small knobs, but I used what I had on hand. Even with a very taut line the spine is easily installed (and removed) and will not slide down a line that is relatively slack. I've seen no evidence that the kite line is damaged by this method of attachment, and thus far the rivets remain completely tight and unbent, even after multiple flights.

I've made a photocopy template of the spine in the picture... I'll be glad to share it with anyone who might be interested.

The 35 mm camera is a "one-touch" inexpensive ($60) Yashica Impressions Plus. A 46 mm UV/haze filter is secured with velcro and will serve as a threaded base for other 46 mm filters that I'll be experimenting with soon.

The .020" aluminum camera shell fits the camera like a glove, and I've found that using only the camera's tripod screw provides adequate retention security. When I get a little more experience with the mechanics of KAP, I'm going to modify the cradle pictured (or build a very similar one) for a better camera with interchangeable lenses.

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accurate stereoKAP

by CHRISTIAN BECOT, Tourlaville, France

In an article in **æ** *4.1, I described a rig I built for John Carlson to use in his studies of penguins in Antarctica. In that rig I arbitrarily separated the cameras about 57 inches (137mm). Christian responded with several lengthy papers which brought his scientific discipline to bear on the subject. This article combines those papers. —bgl*

Here is a digest of some of the basic formulas and principles.

• The normal stereo effect is considered with lenses at the same distance apart as eyes, which is 65 mm average for most people. This is called the "base" (B).

• Cameras should be set so that they frame exactly the same subject. This means that they have to be strictly leveled and parallel.

• Range limit of stereoscopy depends on keenness (K) of sight. Our eye cannot differentiate between two points which are located at less than one minute angle from each other. This is keenness = 0.0003 but a practical value is often 0.0004 and some are basing calculations on 0.0005 . This explains different results given by authors.

• In stereoscopy, two zones are important [see diagram below]:

– the ineffective zone (G), which is the distance from background where there is no stereoscopic effect;

– the effective zone (D), which extends from the observer to the farthest point where stereoscopy can be perceived.

• With a normal base of 65mm, the effective portion extends:

- up to 130m with K=0.0005
- up to 162m with K=0.0004
- up to 217m with K=0.0003

So with normal eyes let us say that stereo effect extends for 200 meters (656 ft).

• When lens separation (B) is increased, the effective zone (D) is increased proportionally. Doubling the base to 130mm will give effective distance up to 400m.

• Hyperstereoscopic effect is reached by moving apart the lenses further than normal spacing with subject within effective zone.

• Exaggerating this distance further will lead to excessive stereo, which makes the correct adjustment in the viewer difficult or impossible.

• I would rather say that for KAP, the base to consider is from 100 to 150mm and possibly 200mm on some occasions, because we mostly shoot subjects l00m to 300m away with background in the far distance.

• Above figures are correct only when background is at infinity.

INEFFECTIVE ZONE G D IN METERS

BASE B IN MILLIMETERS

	3	5	10	20	30	50	100	200	300	400	500	D_{min}	D_{max}
70		0.15	0.60	2.6	6.2	20	133	∞	∞	∞	∞	3.5	175
100		0.10	0.41	1.7	4.1	12.5	66	800	∞	∞	∞	5	250
150			0.27	1.1	2.6	7.7	36	228	1200	∞	∞	7.5	375
200			0.20	0.8	1.9	5.5	25	133	450	1600	∞	10	500
300				0.54	1.25	0.33	15	72	200	457	1000	15	750
500					0.7	2	8.7	38	95	188	333	25	1250

STEREOSCOPIC RATIO (SR)

	EXCESSIVE		HYPER		NORMAL		WEAK OR NUL				
70	57	34	16.3	7.7	4.8	2.5	0.75	0			
100	82	49	24	11.5	7.3	4	1.5	0.25	0		
150	124	74	36.5	17.7	11.5	6.5	2.7	0.8	0.25	0	
200	165	99	49	24	15.7	9	4	1.5	0.67	0.25	0
300	249	149	74	36.5	24	14	6.5	2.75	1.5	0.8	0.5
500		249	124	61.5	40	24	11.5	5.2	3.1	2.1	1.5

SR > 50 = EXCESSIVE
15 to 50 = HYPER
3 to 15 = NORMAL
SR < 3 = WEAK

For example, photographing downward on a beach from an altitude of 30m (100 ft) the umbrellas are within the ineffective zone, about 5m (15 ft); they will not be seen with stereoscopic effect. Hyperstereo is necessary.

• In order to achieve good stereoscopic effect in all photographic situations, one must know and apply formulas or tables.

FORMULAS

Minimum distance for stereo achievement: $D_{min} = 50B$

Maximum distance for stereo effectiveness: $D_{max} = 2500B$

Ineffective zone with the subject at distance D:

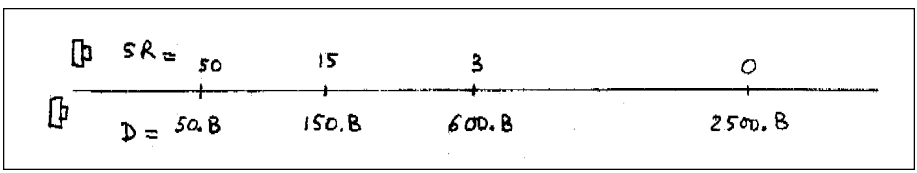
$$G = \frac{KD2}{B - KD} \qquad \text{with } K = 0.0004$$

Stereoscopic Ratio

When objects are closer, we feel greater stereo effect than when they are far. I use this effectiveness ratio:

$$SR = \frac{D}{G} = \frac{B - KD}{KD}$$

Continued on page 18



towards safer KAPing

by CRIS BENTON, Berkeley, California

Here are some things we can do to better insure safe KAPing.

Be aware of your country's regulations. In the United States, if you fly kites that weigh less than 5 pounds then there is a single section of the Federal Aviation Regulations (FAR) that applies to your activity. [see box, below.]

Assuming that your kite is under the five pound limit then Section 101.7 states that you should not create a hazard. I read this as meaning you should *be proactively prudent in deferring to aircraft*.

For their part, aircraft are generally supposed to stay at least 500 feet high except in "sparsely populated" areas. The notable exceptions to this are flight paths related to airports and helicopters. The FAR regulation establishing general minimum safe altitudes is reproduced on the opposite page.

PART 101—MOORED BALLOONS, KITES, UNMANNED ROCKETS AND UNMANNED FREE BALLOONS

Sec. 101.7 Hazardous operations.

(a) No person may operate any moored balloon, kite, unmanned rocket, or unmanned free balloon in a manner that creates a hazard to other persons, or their property.

(b) No person operating any moored balloon, kite, unmanned rocket, or unmanned free balloon may allow an object to be dropped therefrom, if such action creates a hazard to other persons or their property.

If everyone followed these rules we would be in pretty good shape. However, I've noticed aircraft sometimes fly lower than the specified limit and kitefliers sometimes exceed it.

Aircraft seem particularly prone to low altitude flight along scenic and "sparsely populated" shorelines. And then there is the issue of helicopters which are allowed by paragraph (d) of Section 91.119 to fly below 500 feet.

Be aware of airport locations. The FAA restricts kites weighing more than 5 pounds from flying within a radius of 5 miles of an airport. While lighter kites are exempt from this requirement it is prudent to know the location of nearby airports and to avoid flying in areas that align with their runways.

This information is readily available on a map; look it up before you fly. I have flown my kites at small airports before but only after receiving permission, and a 200-foot altitude limit, from the airport manager.

This leads to the next suggestion. *Note that airplanes often neatly align with the runway as they approach to land but that their departures follow varied directions.*

Listen for aircraft and locate the ones you hear. I now have the routine habit of listening for aircraft, even, it seems, when I am not flying a kite. When I hear a low aircraft I immediate try to locate it, gauge its altitude, and determine whether there is a chance of it intersecting the kite or kiteline.

Develop a sense of aircraft scale. I find it difficult to gauge the distance of airborne objects as there is little up there to compare things to. Your kite, however, provides a known frame of reference. I find it useful to have a sense of the relative sizes of your kite and typical aircraft.

My Sutton Flowform 60 is about 7 feet wide. A Cessna 172 Skyhawk is 27 feet long and has a wingspan of 36 feet, a Bell JetRanger 6 feet wide and 39 feet long.

As a nearby aircraft approaches I try to estimate whether it will ever get close enough to appear as large as my kite in angular width. If it looks like this will happen then the aircraft should have plenty of clearance. If the aircraft has a chance of appearing as large or larger than your kite then pay close attention.

Fly low. The larger kites (greater than 5 pounds) are restricted from flying above 500 feet of altitude. I have adopted that limit for all of my kite flying and do not keep more than 700 feet of line on my reels. In fact, I try to keep the kite below 300 feet if possible.

PART 91—GENERAL OPERATING AND FLIGHT RULES

Sec. 91.119 Minimum safe altitudes: General.

Except when necessary for takeoff or landing, no person may operate an aircraft below the following altitudes:

(a) Anywhere. An altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.

(b) Over congested areas. Over any congested area of a city, town, or settlement, or over any open air assembly of persons, an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.

(c) Over other than congested areas. An altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.

(d) Helicopters. Helicopters may be operated at less than the minimums prescribed in paragraph (b) or (c) of this section if the operation is conducted without hazard to persons or property on the surface. In addition, each person operating a helicopter shall comply with any routes or altitudes specifically prescribed for helicopters by the Administrator.

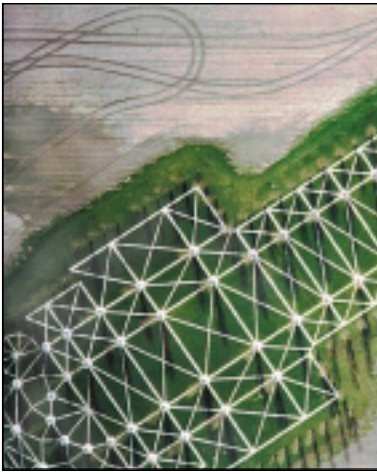
At some point in time we all want to send a camera high. After the novelty of this wore off I found that KAP images taken above 500 feet start to look like they were taken from an airplane anyway; it is the low stuff that is the most fun.

Use a wide-angle lens. One reason it is easy for me to fly low is that two years ago I started using relatively wide-angle lenses. The principal motivation for this is the advantage of keeping the KAP rig close to the earth. I also like the three-point-perspective effect of these lenses, a feature that differentiates the images from those taken with a long lens at height (e.g., from an airplane).

My "normal" lens on the Canon rig is a 24-mm wide angle and sometimes I use an extremely wide angle 15-mm fisheye. You do not have to achieve great altitude with these lenses to provide an impression of height.

Design light KAP rigs to allow a smaller kite and lighter line. Intuitively, 100-pound kiteline will be less problematic in an encounter than 250-pound kiteline. This approach has

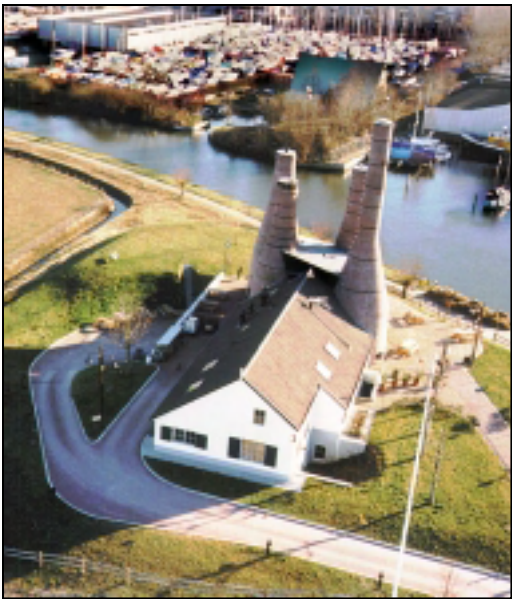
Continued on page 21



Images gathered at the first meeting of the
[above left] ***Senior Housing, Groning***
[above] ***Green Cathedral*** *by*
[right] ***Windmill at Vorden*** *by L*
[below right] ***De Kalkovens*** *by*
[below] ***Quiet Road, Holthees***
[left] ***Cruising Up the IJssel*** *by*

aerial gallery

e Dutch **eye-fliers**, *April '98:*
en *by Henk Breedland*
Peter van Erkel
eo van Zandvoort
y Paul Breddels
s *by Peter Bults*
y Brooks Leffler



monopost™ III

by BROOKS LEFFLER

Last summer I started a chain of events that has led to my current KAP system. Often, in KAP as in life, the minute you solve one problem, another one pops up to replace it, and when you get done, sometimes the finished product ends up in the trash can. This time, I learned a lot, and ended up with a rig I'm delighted with, the third iteration of which is pictured here.

Looking through a photo magazine, I discovered the Olympus Stylus Epic (see **æ** 3.4), which seemed to have great promise. So I bought one.

For some time, I had been thinking about making another ultralight rig with just a backbone, rather than the usual inverted-U frame. Now, with one of the newest, tiniest, fastest 35mm cameras in my hands, and three sizes of aluminum channel at my local hardware store, I decided to give it a go.

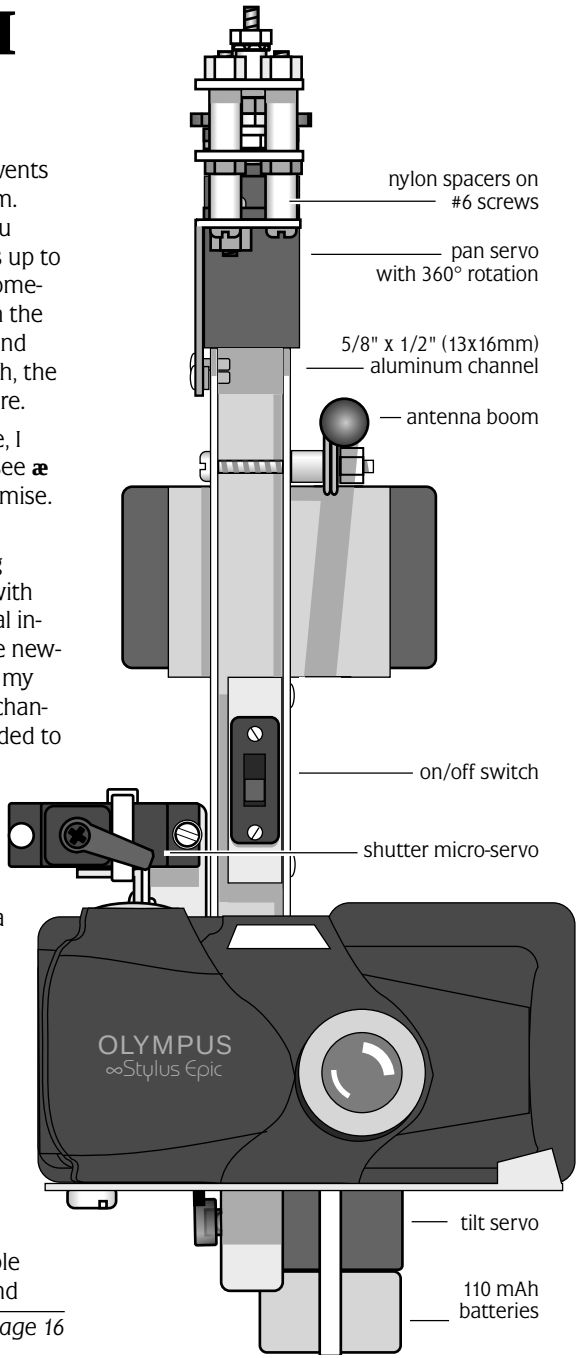
Below a spine which carries the pan servo, receiver, and antenna, the camera is mounted at one end of a short boom. The camera's 5-oz (140g) weight is counterbalanced by a set of 110mAh batteries and the tilt servo, which operates through a pushrod rather than the direct drive that is now commonplace.

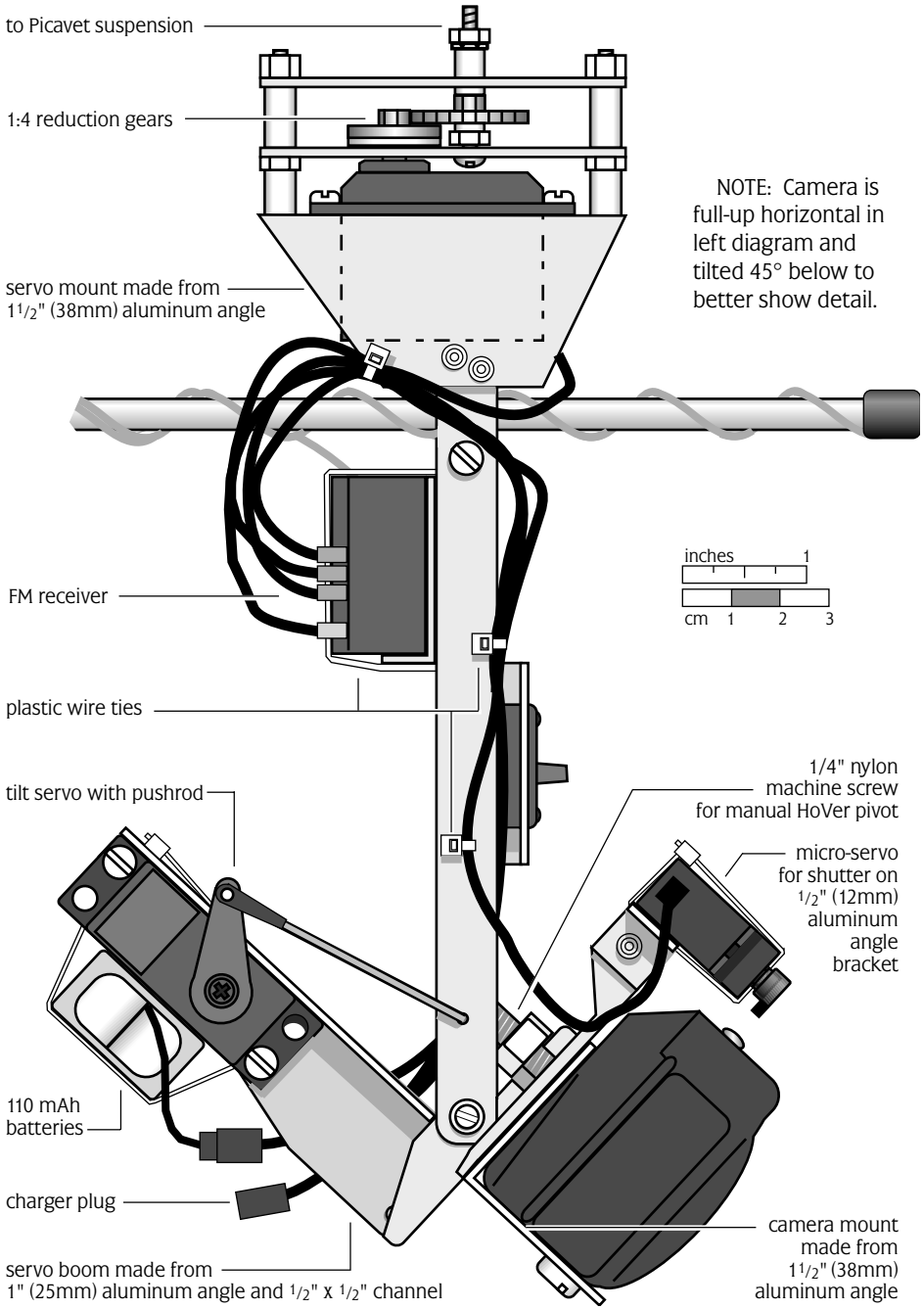
Here's how one thing led to another:

1. The backbone rig, with little to support a camera, required a very light one such as the Epic.

2. Counterbalancing the camera required that I use the lightest possible microservo for the shutter release, and

Continued on page 16




to Picavet suspension
1:4 reduction gears
servo mount made from 1 1/2" (38mm) aluminum angle
NOTE: Camera is full-up horizontal in left diagram and tilted 45° below to better show detail.
inches 1
cm 1 2 3
FM receiver
plastic wire ties
tilt servo with pushrod
1/4" nylon machine screw for manual HoVer pivot
micro-servo for shutter on 1/2" (12mm) aluminum angle bracket
110 mAh batteries
charger plug
servo boom made from 1" (25mm) aluminum angle and 1/2" x 1/2" channel
camera mount made from 1 1/2" (38mm) aluminum angle

Continued from page 14

abandon a micro for tilt for a heavier standard servo on the other end, along with my favorite lightweight 110 mAh batteries.

3. The tiny cross-section of the backbone made it awkward to use my usual 4:1 gearing with an offset microservo to rotate the rig. The most efficient solution would require use of a servo modified for 360° endless rotation.

4. Endless rotation, I found, would be impossible using a microservo, which I prefer due to my fixation on lightness. The several brands available to me all had only partial gears in the final drive, which will not rotate more than 180 degrees.

5. The first standard servo I took apart was a Tower Series 2000, in which the final output shaft depends on the shaft of the internal potentiometer for positioning. But pots don't turn more than about 270°, so I had to modify it by removing the guts and making it rotate endlessly, placing a replacement trimmer pot on the outside of the servo case.

6. Direct drive with a 360 servo is not as fast as 1:4 gearing on a normal servo, but it's too quick for easy control, so it seemed that reduction gearing was in order. I used a train of surplus gears which reduced it to 4:1, much better.

7. With the gear train on top, my rig wouldn't fit in my old case along with my standard transmitter. That meant I either had to carry a second case, or repackage the transmitter. I chose the latter. But that's another story, which I'll go into next issue.

My drawings should give you enough detail to build a backbone rig of your own, except for converting a servo to 360-degree endless rotation, which was covered in detail in the last issue of **æ**.

•æ

Continued from page 3

æ, and I have taken on the role of Editor, reviewing and polishing the submissions.

The **aerial eye** has proven to be the only real tie that keeps us KAPers connected to one another. It came out of an idea that Brooks and Steve came to independently, to openly share information and opportunity relating to kites and KAP. They had seen a void and it was mostly Brooks' effort, his leadership and talent, that made the **æ** a reality.

Now he is stepping away and trusting his creation to Chuck and me. Believe me when I tell you that I am very nervous about how this will go.

I began my KAP experience in 1987. At that time there was a group called KAPWA (Kite Aerial Photography Worldwide Association). It was a Belgium-based club that produced a quarterly journal reproducing submissions but never released any information about any of its members.

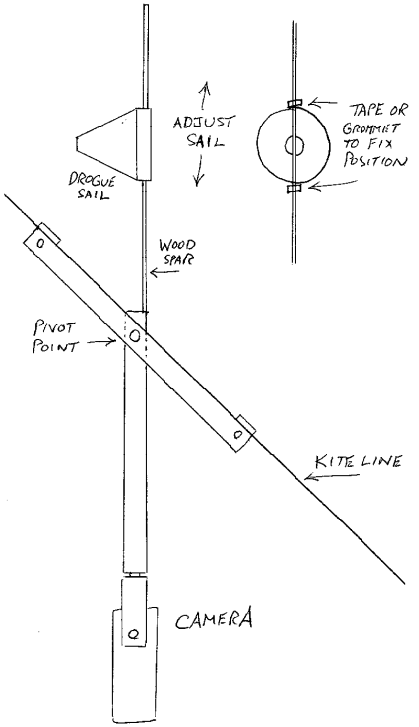
When the organization disbanded in 1991, I still felt that I was the only person I knew that did KAP. I had read about others but I had never seen or met anyone who did it. Doing KAP in Wisconsin, I felt like a thousand miles or more separated me from the next nearest KAPer.

In 1994 Brooks called to ask me to join him at the AKA convention to present KAP to the kite community. So in October 1994 we met in Wildwood. His rig was the only other rig I had ever seen. He was the first person I had ever met face-to-face that did what I loved. We were friends after one minute.

Brooks, thank you for what you have given to all of us; I hope that we can continue the spirit in a way that makes you proud.

•æ

two more swingers



In our very first issue, Steve Eisenhauer described his double-drogue rig, which was designed to dampen pendulum swing, a method he's since abandoned. Obviously, the idea still seems workable. Here are two new variations. —bgl

FROM RICHARD AMIRAULT
MALDEN, MASSACHUSETTS

The article in the Fall 97 issue by Christian Becot about compensating a pendulum rig for the effects of wind got me thinking.

Christian's method is to change the center of balance so that the pendulum hangs straight down with a specific speed wind blowing. The problem is that (1) you have to pre-set the center of balance offset on the ground and (2) you will have problems if the wind gusts or changes speed.

All that should be necessary is to extend the pendulum above the pivot point and attach some sort of sail to compensate for the drag of the camera below *[left]*. You do not need to extend an equal length above the pivot point as below. All you need to do is make the drag sail larger to compensate. A simple conical drogue with a plastic hoop sewn into the opening should work out just fine.

If you make the sail adjustable vertically you can "fine tune" it. Once you have found the correct size of the drag sail and distance from the pivot, mark and/or fix the position on the vertical extension.

This (in theory) should automatically compensate for pendulum offset from vertical no matter what the wind speed is.

FROM MARVIN NAUMAN
GIG HARBOR, WASHINGTON

The use of a wind counterbalance will help provide level horizontal horizons. Mine is made from a darning ring from a sewing store with cloth over it. You have to play with the right combination of distance of the disk from the pivot point, size of disk, and weight of the rig. I cannot overstress the use of Teflon™ washers under tension at the pivot point to reduce or eliminate swinging.

Since using this system, I have been able to eliminate most if not all swinging motion caused by wind gusts, something very important when shooting video. •æ

Continued from page 9

From this ratio we can also *calculate distance:*

$$D = \frac{B}{K(SR+1)}$$

Formulas to *calculate the base:*

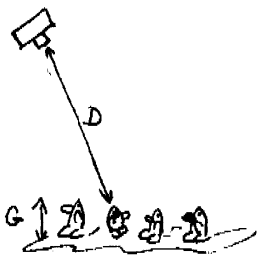
$$B = \frac{KD(D+G)}{G} \quad \text{or } B = KD(SR+1) \quad \text{or } B = K(SR)(D+G)$$

APPLYING THE FORMULAS

In Brooks' article, he wrote that the base for John Carlson's stereo rig was 1.37m. I would assume that Carlson is observing penguins at 100-200 meters distance [325-600 ft], which gives an ineffective portion of 3-12m [10-40 ft] and a stereoscopic ratio of 33 to 16. If correct, this is an hyperstereo ratio, but it is well workable if the background is not too far.

Here are two examples of formula application:

1. Knowing the penguins are 0.4m high, let's calculate what base is necessary to view them in relief against the ground when taking pictures with a hovering camera.



SR = D/G B = DK (SR + 1)

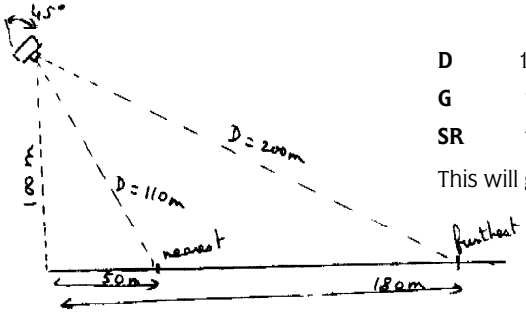
D and B in meters

D	20	30	40	50
SR	50	75	100	125
B	0.4	0.9	1.6	2.5

This is a case where excessive stereo is necessary.

2. Knowing that with camera inclined at 45° and located at 100 meters elevation, the scenery is geometrically well-defined as follows. We can estimate which base is necessary for a stereoscopic ratio of 5 at the furthest point, and verify stereoscopic data at nearest distances.

B = DK (SR+1) = 200 x 0.0004 x (5+l) = 0.48m



D	110	150	200
G	11	21	40
SR	10	7	5

This will give a "natural" stereoscopic effect.

As you can see, the stereoscopic ratio is a very interesting piece of data to consider, as we can compare the three-dimensional sensation in different circumstances and rationalize it.

•æ

the ultimate rig

by SIMON HARBORD, Alford, Aberdeenshire, Scotland

I have designed the perfect rig, I know,

I fly it, it uses a unique control system that lets me compose shots totally according to my creative needs.

When shooting documentary verticals for surveys and maps, the system is precise in control; I know exactly where it's pointing. A simple feedback control interface linked to the onboard electronics tells me as much or as little as I need to know about camera direction, height, battery status etc.

I can switch to the video viewfinder module for precise aiming, or rely on my own instincts for the perfect picture.

My rig is so convenient, so elegant, so portable, it is totally suited to my KAP needs. The control interface allows me to switch over to auto and let the system take a programmed set of photos without further intervention, or at the flick of a switch, I can take over full control of all cradle and camera functions.

My kite is so stable, so steady, in itself it is a work of art, form and function fused in a thing of beauty. It is so trusted that there is nowhere I cannot—or dare not—take photographs. This kite, which I spent so many hours lovingly crafting to perfection to my own design, is so forgiving that it will fly stable in almost any wind conditions from a breath to a gale.

Fastening the rig on and off the line is simple and second nature, the kite lifts flawlessly, adjusting itself to the wind speed through the autostable bridle, maintaining a constant line tension down to my hands, which, tuned like a sixth sense, allow me to feel every move the kite and rig make.

The cradle is a thing of beauty too, perfectly crafted, its electronics housed neatly, almost organically faired into the supporting carbon fibre arms of the cradle. No wires intrude on the elegant functional form of my rig. The lightening holes in the struts form a lace-like tracery. The tiny powerful geared motors spin the camera silently and effortlessly to any point of the compass within fractions of a second on micro ballraced pivots. The micro video and avionics module clip on smoothly if required, without affecting the overall balance, the onboard electronics compensating and adjusting for their presence.

The camera is a tiny lightweight miracle of technology, shining in its sophisticated cradle, its programme and manual modes switchable from the ground. It has a marvellous zoom lens that I can change from wide through standard to telephoto from the ground, the deliverer of all my best KAP images. So few blurred images, such pin-sharp perfection.

The suspension system is a tangle free derivation of the wonderful Picavet. It performs flawlessly, the jewelled bearings of the precision microblocks providing perfect stability, always keeping the cradle level in all conditions.

Soon I'll be giving up work and taking up KAP full time, the world's leading authority, the first KAP artist to exhibit in the world's major galleries.

Continued on page 20

Continued from page 19

RRRIING !!!!!!!!

Seven o'clock.

Time to get up.

What did I dream of last night...?

Perhaps the wind will be right for some KAP today, must make sure I pack the right kite. The parafoil got in a tangle last week and I haven't sorted it out yet. I snapped the spar on the DC and forgot to replace it.

The Rok? It was a bit skittish last time I flew it. I need to work on the bridling. I'll take the parafoil and sort out the tangles on the field.

Which rig should I use?

The ultra light? Yes - but the camera on that rig has a shutter that only goes up to 1/125th, so I get more blurred shots. Besides, the battery's flat and I forgot to charge it.

The big rig with the video viewfinder? Yes - but the control system isn't fully debugged, and I haven't got round to all the transmitter mods so it's not a very intuitive system to use, besides that would mean using the kite train, and I was planning on some simple KAP. Besides, it uses legions of batteries.

The normal rig, - old faithful? Yes I guess so, I'll have to find something to replace the tilt swivel, the pivot bolt fell out the other day. At least the batteries are fine. The wiring is still a mess and needs something to hold it out the way, and the tilt servo seems a little tired, but everything should work. The last mod improved the servo angle no end.

A PARK—LATER

Four hours later during a stolen lunch hour from work, our hero struggles onto the field festooned with an odd assortment of equipment, to the inquisitive looks of passers-by.

After 10 minutes sitting with a screwdriver and various tools, he stands up, muttering and shaking his head and walks over to a nearby litter bin. He pulls out a discarded aluminium Coke can and carries it back to his strange pile of gear.

A few more minutes of feverish cutting and struggling pass, and our hero then starts wrestling with a giant tangle of brightly coloured fabric and string.

After a few minutes the tangle turns into a slightly scruffy parafoil kite which, after diving into the ground three or four times, finally climbs up into the clearer air above the trees.

A few minutes later the man attaches a contraption to the kite line. A contraption of wire, aluminium strip, string, gears, pulleys and black boxes festooned with tie-wraps, cellotape and strips of aluminium - clearly from an old Coke can.

As our man pays out the line playing the kite up into clearer air, a loop falls to the ground and wraps itself, unseen, round his foot. The wind gusts briefly and for a few seconds he can be seen hopping down the field on one leg pulled by the kite, before flopping backwards onto the ground with a look of embarrassed anguish on his face.

He stands up carefully, extracting the telescopic aerial from his left nostril and brushes himself down. The onlookers turn away, bemused. A small child is shrieking, rolling on the ground in paroxysms of mirth, and is shooed away by her mother.

Our man has been here before many times.

Somehow though, a transformation is occurring, the kite is now a bright speck in the blue sky and the camera system is

soaring over a building hundreds of feet below.

Up there, in its element, the cradle responds unerringly to the signals coming to it from the ground below. It spins and tilts this way and that, the camera taking shots precisely to order.

Our KAPer, tribulations forgotten, starts to walk around the field moving the controls on his battered transmitter, almost without looking, with a light touch and familiarity borne of experience. He knows intuitively where the tired old Yashica is pointing.

A look of supreme serenity comes over his face, the dream and the reality have fused for a few minutes. The rig and kite, his old faithfuls—his favourites, have become that dream system he knows that one day he will build.

What he hasn't yet realised is that there is no perfect system of kite, rig and controls, but the tatty idiosyncratic system he has developed over the years is itself a piece of evolved perfection when the conditions are right, on days such as this when the sky is blue and the winds are soft on his cheek.

A system that works perfectly under all conditions would not be perfection, it would be bland, it would be boring.

All KAPers strive for perfection, the perfect system, but few of us realise that now and again we have already achieved it.

KAP, by taking our hearts and minds into the sky, has a high chance of providing those moments of mystical perfection when everything is just right. KAP is a marvellous metaphor for everything we strive for in our lives.

The next time you have a perfect KAP flight, know that you're close.

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Continued from page 11

the bonuses of making the kite easier to handhold, easier to launch, and easier to pack into a gear bag.

Be prepared for an incident, however unlikely. If it appears that an aircraft will intersect your gear aloft, you should try to take evasive action by moving laterally. You might also spool out kiteline to try to lower the kite's altitude.

You should also *be prepared to let go of your kite* should the kiteline get caught on an aircraft. I am speculating here but I think hanging on would be to the disadvantage of you and the aircraft. If you tie your kite off to an anchor be prepared to cut the line.

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in the fall issue:

DIGITAL KAP

AND/OR

TRANSMITTER TWEAKS

Share your ideas on either or both.

DEADLINE: August 1, 1998

aerialetters

360 EVEN-EASIER DEGREES

Having recently converted my pan gear to 360 degree rotation with 1:4 gearing, I was interested to see your approach in "360 easy degrees" [**æ** 4.2]. For some servos, the process can be even simpler! In my rig I used a Futaba FP-S148 servo [*right*]. Where my approach differed, was that no trimmer was required and the pot didn't even have to be removed or modified. The steps I took were as follows:

1. Before dismantling the servo, power it up, center and adjust the trim on the radio to stop it (a self-centering transmitter control helps), and remove the upper case.

2. In the following steps, be careful not to turn the pot. Cut/file the two stops on the final gear (part 14).

3. Remove the potentiometer drive plate (part 7)

4. Reassemble, and you're done!

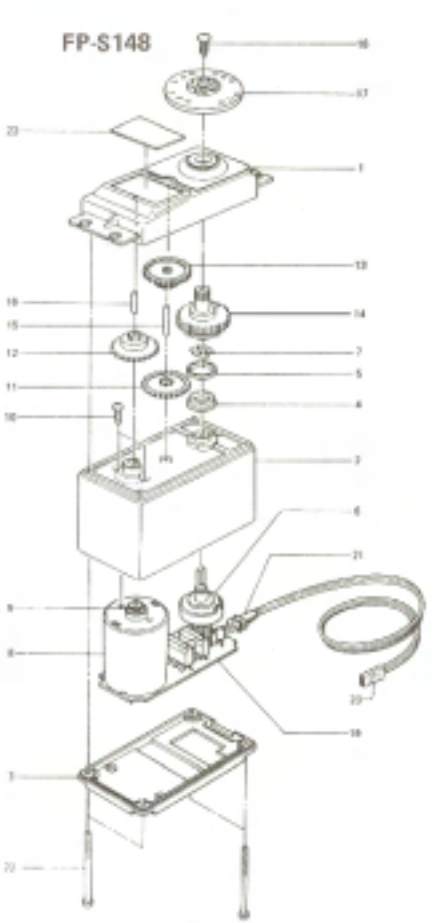
By simply removing the pot drive plate, the gears can spin endlessly in either direction and the pot doesn't turn. My only worry was that the pot might slip beyond what could be corrected with the trim adjustments on the transmitter, but the center trim position hasn't moved a bit, so this appears not to be a problem.

Bob Pebly
Boca Raton, Florida

Thank you, thank you...and what timing! I have been putting off rigging the electronics for about 2 weeks because I didn't have a complete picture of a modified servo. Guess what came in the mail today?

I just about have a 4 x 5 camera ready to go, ... When I get some pix I will forward to you.

Anthony Howell
Silver City, NM



German	IEC	USA	Capacity
Monozelle	KR35/62	D	1.2V, 4Ah
Babyzelle	KR27/50	C	1.2V, 2Ah
Mignonzelle	KR15/51	AA	1.2V, 0.5Ah
Microzelle	KR10/44	AAA	1.2V, 0.18Ah
Ladyzelle	KR12/30	N	1.2V, 0.15Ah
9V Pack		9-volt	9V, 0.11Ah

MIGNONS & MICROS

I saw you couldn´t do anything with the word "Mignon" in the text of Ralf Beutnagel [**æ** 4.2]. Here I have some information about battery sizes. [*above*]

Harald Prinzler
Schlangen, Germany

FLARE'S MISSING DIMENSION

The **aerial eye** Spring 98 edition is great! It's full of good information and well detailed. I plan on converting my pan servo to a 360.

There is a missing dimension though on the Flare kite plans (page 9). What is the width of the kite at the lower (horizontal) spreader?

Kevin O'Leary
Rochester, NY

The missing dimension, according to Pelham, is 100 cm (39 inches). —bgl

PHOTOGRAPHER PHOUND!

I confess that "yacht.jpg" [*the unidentified photo of a sailboat on the back cover of* **æ** *4.2*] belongs to me. A subtle hint as to origin [is] on the sail: "SA." A yachtie would have given you country of origin. MTN [*the boat's sponsor whose logo is also on the sail]* is a large cell-phone service provider in South Africa.

Glen Thomas
Cape Town, South Africa

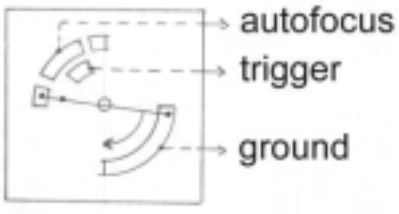
Congratulations, apologies, and thanks for identifying yourself, Glen. As an ex-yachtie, I'm chagrined to say that I didn't check the sail number. —bgl.

OVERZEALOUS EDITOR STRIKES AGAIN

The drawing in my article in **æ** 4.2 (p. 25) shows [only] the pushbutton you need after the mju-modification for normal triggering. If you want to trigger the Slim Rig camera you need a contact (finger) that moves over two circuit fields [*below left*]. Or you activate a 3-finger-switch by the gearbox. The photo [*below*] shows a 3-finger-switch that is activated by a microservo.

Ulrich Monsees
Stade, Germany

•**æ**




two-step servo switch

[above] **Zilvermeer, Groningen, 10:30 pm** by Henk Breedland
[below] **Gone to Seed** by Cris Benton