Muro and the SK

For a few years now, I have been very jealous of a few guys whom I heard had been running 2C’s on their rigs, for lightweight work. Recently I’ve been running a light rig. Its great.

A project came my way, that required what I envisioned as the "lightest, perkiest" P.O.V shots. Ken Robings first told me about his prototype "SL" camera when he made it for Bob Ulland. I had also, recently seen the new “SK” Steadicam from Cinema Products. Together I had envisioned the Ultimate lightweight rig.

The CP “SK” Steadicam

The folks at CP went to great lengths to make clear to me that this equipment was for video only. And that they could not guarantee it for use with a film camera.

Let me make clear to you, the particulars of the sled. The two prototypes they had, are now gone. They were the only ones that had promise for film use. After all if your adding film accessories to the sled you need to balance it fore and aft. The Production version has a shape that truly makes no sense for film. The first two being shaped like the standard Steadicam upside down “T.”

So if anybody were persistent enough, I would either contact Ken Robings for his soon to come version of a small sled, or try to get enough parts from CP.

The arm is ok for moderately slow to fast moves, very delicate moves are not great. A lot of body movement transmits to the image. It has only one dampening section. It also has no “float point” if you can believe that! Perhaps in the future some thought and improvements that can be made here. The monitor and wiring scream “home video,” and are weak. So be wary of these things if you're interested in this device.

Jim Cameron’s comment on the rig as a whole is that it seems to be somewhere between “Pogo and Steadicam.” On True Lies we used it

SK continued on page 5
All you ever wanted to know (and more) about mixing Gyros and Steadicams

Until recently, my only tactic for coping with wind was to hide behind a portable barricade of some kind. My principle line of defense has been a lightweight, foldable, tube and cloth design measuring six feet tall and eight feet wide. It works, but I do risk the wrath of the grip department whenever I pull it out, and it has attacked members of the crew when sufficiently aggravated by the wind. I have never given up hope that a better solution might one day be available. That solution, or at least another tool in the arsenal, is now at hand.

Jost Vacano has been using a pair of Kenyon Stabilizers (gyro devices) on his handheld camera for years (remember the interior submarine sequences in “Das Boot”?), and was executing superb “Steadicam-like” shots years before Garrett graced the scene. These days, sound recording favors the Steadicam (gyros are noisy) and the Steadicam does indeed offer more versatility and finesse, but I wondered about combining these two technologies. After using Kenyon Stabilizers on my Steadicam for more than a dozen shots in my last three films, I am convinced it represents a significant advancement. A pair of Kenyons add tremendous resistance to any sudden angular changes; unexpected gusts of wind do little more than gently pan the camera, and running with the Steadicam, while maintaining a steady frame (even chewing gum at the same time) is far easier.

Garrett Brown has also used Kenyons. He mounted them on his Steadicam to help stabilize the plate shots for Return of the Jedi (the SkyCycle sequence). This was such an esoteric exercise that I did not think it much applied to the kind of work I normally do, but after a few words of advice from the maestro, I tried a single unit clamped to my center post for a tricky title shot several years ago. It was a K-4 (the smallest model) and quite light, but not very powerful, and it seemed to do more harm than good. I have since learned that two stabilizers, oriented in different axes, are much more helpful, and that larger is definitely better.

I was encouraged in my quest by Mark O’Kane, who was using a pair of K-8’s (the largest model) for boat mounts in heavy seas with great success, although he warned that there was a distinct learning curve and that proper mounting was critical. John Seitz at Seitz Technical had already been working with Bob Ulland over a period of several years with various gyro devices. I spent a day with John trying out several configurations of Kenyons on my Steadicam using a power inverter that John supplied (the Kenyons run on AC) and mounting brackets that Bob and John had devised. After going over the results of extensive tests that the two of them had done, I decided to try out John’s system with a set of K-8’s rented from Clairmont. These units are quite heavy, about 6 lb. each, so a light camera is essential. I used an Arri III. With as much anxiety as excitement, I was ready to risk my first professional outing with an “Artificially Augmented Inertial System”, or “AAIS” for those in the know.

I hard-mounted the Steadicam to the upper deck of an insert car chasing a taxicab at high speed through Times Square. The results were simply

Mounting bracket holds two gyro's at right angles to each other; mounts quickly with two bolts.
phenomenal. It looked like footage from a low flying helicopter-mounted Wescam.

In the past, when attempting to shoot straightforward, I have sometimes gone to extraordinary measures. To photograph background plates for a driving scene, for instance, I once sat inside a large box with a plexiglas shooting window, mounted to the front of an insert car. The K-8’s did just as good a job with far less trouble and infinitely more flexibility and comfort.

Flushed with this success, I wanted to buy a pair of my own stabilizers, but because of the cost, I found it hard to justify unless:

1) I could use them with the heavier cameras I normally have on the Steadicam - the Panavision Light-weight and Moviecam Compact, (2) I could use them in the normal walking or running body-mount modes in addition to vehicle-mounts, (3) they could be attached and removed quickly and easily without having to barter with the AD department for extra setup time.

Clearly the best results come from using the most powerful units (K-8’s) but their weight restricts the use of all but the lighter cameras, such as an Arri 2C or Arri III. I decided to buy a pair of K-6’s which weigh about the same as the two batteries that I normally carry onboard - the 4 lb./12 volt Steadicam battery and the 2 lb./24 volt “horseshoe battery”. I took off the batteries and mounted the Kenyons in their place with a special two piece bracket that clamps to the battery rails of my Model 3 sled. The remote batteries and a DC-AC inverter to power the gyros were then connected by 10 foot cables to the Steadicam. [FOOTNOTE #2: This configuration is just one of many possible solutions to the problem of adding gyros, and it is one that fits my needs and my model 3 sled. Mark O’Kane and Bob Ulland have each worked out their own configurations, and I am sure there are others, either already in use, or waiting to be discovered.]

My very first attempt with a body-mount system came during the opening title sequence of another film. My responsibility was to follow the main character through a parking lot and onto the shoulder of a busy interstate, ending in a static wide shot of our heroine with a mountain vista framed behind her, as traffic roars by the camera. Superimposed titles always reveal any spurious camera movements, and the prevailing winds in conjunction with gusts from the fast moving traffic combined to make the whole proposition pretty scary. Lacking in real experience with the system (but frightened enough by the circumstances to try it) I affected unconcern while assuring the somewhat sceptical Director and dubious DP that the whirling gyro sounds and rats-nest of cables looping off the sled were indeed perfectly normal! I had some trouble adjusting to the altered feel of an “IAS”, or “Inertially Augmented Steadicam”, (much more than for the vehicle-mount shots I had already done) but even so, the results were very satisfactory. Without the gyro system, I would have been quite unhappy, or “QU”.

For body-mounts, I carry the batteries and inverter in a backpack attached to my vest. (For vehicle-mount shots, block batteries can be used.) The sled needs only minor rebalancing and the extra stiffness of the gyro system makes the influence of the cables a non-issue. Once the assistants learn the system, the whole process of mounting only takes about 10 minutes, which means it is practical to add them any time you start having problems. I was having a hard time on another film shooting on a bridge over a wide river (recipe for disaster for a Steadicam operator). The combination of using a long lens to chase a running actor, with wind gusting over the sides of the bridge, framed through the all-too-revealing anamorphic format, was making it obvious that this operator was definitely using a Steadicam, and having serious disagreements with the equipment. When the DP asked Special Effects for another wetdown, that was my cue to ask the camera assistants for the gyro case. They were up and running (first the assistants, and then the gyros) before the bridge was wet, and the difference in dailies (before and after mounting the gyros) was remarkable. If I had any doubts about my investments in both time and money, they were definitely dispelled that night. From now on, I will make sure they are handy anytime I head outside, and I am starting to consider using them inside occasionally as well (when sound recording is not required).

There are some problems using gyros: 1) They do make a lot of noise; but so far I have only used them outdoors, and I have discovered that my old CP16R magazine barney fits over them perfectly! Whenever the sound department complains, I just add the barney (but then I do have to rebalance). 2) The extra load uses up the Steadicam batteries much faster, but with fairly heavy power leads, I find battery life acceptable, as long as they are in good condition and a fast charger is nearby. 3) They take nearly 10 minutes to get up to full speed.

Gyros continued on page 8
IN MEMORIAM

TED CHURCHILL
Cinematographer and Steadicam Operator
a lot for running stuff. And on Strange Days for the subjective work. The height of the sled allows you to get from a 2 foot (yoga) low position, up to a 6 foot (tiptoe) lens height.

Robings "SL" Camera

This camera was first designed on a request from Bob Ulland. It's a small "2C-esque" camera made of tough plastics and magnesium. It loads a little funny, and sounds a little like it is in serious need of some oil... but that's normal. I made it very clear to the director that soundwise, it is essentially a 2C, so get ready for some serious Post Production work. They fell for it!

The SL camera was designed pretty much, specifically, for Steadicam use. It begins with its "Mid-Rib" from an Arri medical camera. A side mounted motor and Cinematography Electronics control package keeps from raising the lens too high as well as keeping the C.G. or C.B. (center of balance) lower. It has a video only door with a built in Black Widow. Together with 200 foot long throat, magnesium mags, the package weighs in at 8 pounds! The Mags fit on any Arri, and come in 400 as well.

I also hear that an add on eye-piece is soon to come as well as throatless Mags. We ended up carrying two bodies on the show and they were marginally different in weight. A low mode bracket, that tilts and is also available. These components can be also fitted on to a regular 2C body for half the cost! And seems to be the way to go for the conventional sized Steadicam rig. My feeling is that a little more weight is better for the big rigs. My need for a lighter rig to compliment the camera is what lead me to be excited about the "SK."

A tricky button inches the camera and is a bummer to some assistants, when they forget to inch the claw out of place before removing the camera from the sled. Without the power they cannot remove the mag, because the sprocket is held in place in the gate. The full "SL" Magnesium version as opposed to the modified 2C is approximately 3 pounds lighter.

I had Lightstorm Technologies add a few connectors to the body of the camera. Those receive many groans from the technicians at Cinematography Electronics who service the thing. I thought, what harm could a little power and video connectors be.

On Strange Days, the other method of use was a handheld configuration, utilizing Mike Cameron's H.I.D. Devie for viewing. The H.I.D. is a head mounted monitoring system, that works well and possibly might be soon available through Panavision. There also have been recent sightings of similar items in the medical world as well as places like "Sharper Image." A Seitz unit was velcroed on the body, and powered from a single Belt power source. A Modulus 2000 transmitter sent the video, but the image was noisy so I went to a separate battery – a Seitz "Chocolate bar" – for the tap and monitor.

The small Steadicam is now a staple for me. Its great for fights, running and lightning fast whips. Clearly it can be said now that the lighter you go the more delicate your touch needs to be for the fine work. And all the more serious you need to be about the balance of the sled. A bubble level was all I had on this rig to work with. As a rig, on a whole, its hard to go back to the big one for running and action shots. Now my only problem is to convince the next show that they need to rent this thing.

The prototype SK with Robings SL camera and magazines

Jim Muro
The lightweight rig with NC-12 battery

The same sort of dreams that propelled Jimmy Muro to make use of the Steadicam SK affected my judgement as well. I had nightmares of my monitor dying (it hasn't happened yet) and, lying around the shop, the nagging presence of two gifts – an original EFP black and white CCD monitor and an old beat-up dovetail plate. This mix of desire, fear, and circumstance jelled into a lightweight conversion for my sled.

I figured it would be a great device for running with Arri II-C's or the Robings camera. During some down time on Before and After, I discovered it will balance out and work with a fully loaded Panavision Lightweight II with two motors, Primo lens, and mattebox, and it looks like there's plenty of room to balance even heavier cameras! And it takes about five minutes - tops - to make the conversion. So it's a complete backup unit as well.

Using the same batteries, the new sled and monitor is seven and a half pounds lighter than my regular sled. If I replace the standard Steadicam battery (NC-12) with an NP-1S via an adaptor, it's ten and a half pounds lighter. We had the opportunity to use the unit with a IIC at the SOA workshop in May. It was a lightweight dream that was especially helpful for a small-sized female operator. I used it the following weekend with an 16mm Aaton while running around a battlefield full of Civil War reenactors, and it was a true lifesaver.

Why didn't I just buy an SK? Because I wanted to have the same camera mounting platform, post, gimbal, monitor viewing position, and wiring that I'd worked so hard to get. I wanted to loose nothing but weight (and of course, some image quality), yet maintain all the features of my sled and use the same batteries, chargers, arm, cables, etc.

This device took time to make and didn't happen all at once. I had previously modified my sled to run wires up the post, made a 24 volt battery bump-up system, separated out 12 and 24 volts for the cameras, added an isolated 12 volts for the video assist camera supply, added a Donkey Box, reworked that, and created a new J-Box arrangement - among other things.

If you've got an EFP with a green screen monitor (or a PRO sled), all you need to do is get a lightweight CCD monitor, find a way to attach it to your monitor bracket, give it power and video, and you're home free. If you've got a IIA, you need to do all that and create a battery holder/wiring harness. If you've got a III, II, or I, it'll be tougher still. Regardless, it can be made quite simply or with many bells and whistles.

The first step was to gaffer tape combinations of the batteries, Seitz receiver, and a block for the electronics to play with the various shapes, weight distribution, and ease of construction. My final design reflected my preferences, the need for dynamic balance, and what I thought I could reasonably build. I underestimated how easy it was going to be.

The second step was designing and building the electronics and wiring harness. It could have been much simpler, but this was the first step I took and I didn't want any compromises. I also wanted to finish the two circuit boards so that when I built the frame, the electronics would be complete. The rig continued on p. 9
Classifieds

For Sale: Two NCQC-12 battery chargers with new spare electronics. $850 or $500 each. Scott Linguist 305 558-4814

Wanted: Heden motors/bracketry, Call 805 296-6320

For Sale: GV-U5 video 8mm adaptor/junction box, Sony cable & mounting brackets. $400 US or b/o. Michael Davies 604 251-9017

For Sale: Complete Steadicam Package. Model "IIA" heavily modified sled, type III gimbal, expandable post, fore and aft base adjustment, camera platform with side-to-side adjustment, 2 dovetail brackets, upright battery assembly, 5 batteries, 12 to 24 volt converter, external frameline generator, 52 pound articulated adjustable arm, vest, J-box with 2 Hirose video/power connectors, 2 BNC out/in, 3 Lemo lens function outputs, Seitz Model II wireless interface cable, two 12 volt XLR outputs, various cables, hardware, and cases. $21,000. Call John Moyer, 412 572-6513


For Sale: Steadicam EFP w/low-mode cage, DeRose vehicle hard mount, other accessories to numerous to list, excellent condition, never rented. Call for complete list. 419 332-6155. $15,500.

Wanted: Used EFP complete; vest, arm sled batteries. Prefer color LCD monitor. Contact John Atkinson, 407 239-4568. Leave message!

Tips & Ideas

Seitz on the fritz? The Seitz unit suddenly stops working. You replace cables, amps, etc. Nothing. But you discover everything works if you connect the transmitter to the receiver by hardwire. Hmmm. So it's either the transmitter or the receiver.

Try opening up the receiver and pushing down on the receiving crystal (a little flattened can). It sits in its holder by friction and can jigggle loose. Try adding a piece of tape to keep the crystal in place...

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Gyros continued from page 3

although they begin to provide useful help in about half that time. 4) They "do funny things". You have to learn how this new system responds to your inputs... it's yet another skill to acquire. [FOOTNOTE #2: The gyroscopic effect results from the precession of the gyro wheels inside the stabilizers as they are moved. As each gyro wheel precesses, it also slightly changes the axis that is being stabilized: panning tends to induce slight roll and pitch moments and tilting gets confused with pan and roll. I learned to counteract these anomalies after a few days, but it was very frustrating at first. Also, the gyro wheels can only precess so far before reaching their physical limits, and at that point they "cage" and suddenly stop working. This occurs at a particular pan or tilt speed. If the mounting brackets and the connecting structure of the Steadicam are not extremely rigid, this will cause a very noticeable shudder while caging or uncaging. If everything is rigid, whip pans work well, but trying to change pan rate gradually through this "caging speed" will sometimes produce a corresponding jiggle in the shot. “Artificially Augmented Inertial Moves” (“AAIM’s”) are therefore limited to less than this "caging speed". This speed is adjustable by the factory or Seitz Technical by changing the spring tension that re-erects the gyro, but the higher the "caging speed", the weaker the effect of the gyro. If you want them to be as stiff as possible, you can only make AAIM’s at very slow speeds. I find the current factory setting is a good compromise.]

5) Finally, having this new toy means yet another case to learn how this new system responds to your inputs. (You now risk the wrath of your own department.) Your dependence on both batteries and assistants expands exponentially; I now need help just attaching the battery backpack before each shot, and removing it after.

Kenyon Stabilizers are manufactured by a small company in Connecticut. Three models are currently available: K-4, K-6 and K-8. Each successive model increases in strength, weight, and cost. Power comes from a 115 volt, 400 Hz, DC-AC inverter that runs on 12 volts.

Inside, each stabilizer actually consists of two separate gyro spinning at about 20,000 rpm. The K-6 and K-8 are the same size, but the K-8 uses a heavier material for the spinning wheel. The smaller K-4 doesn’t have enough power to control the mass of a full-size Steadicam and 35mm camera which is unfortunate because it is small and lightweight.

The stabilizers come packaged in an aluminum capsule about 3 and 1/2" in diameter, and about 6" long. Each gyro works on a single axis so that one stabilizer actually affects two of the three axes you want to control. If you were to roll the stabilizer along the floor, that is the axis which is NOT stabilized, so it will resist being rotated in any direction but that one. I use two stabilizers: the first principally for pan, the second principally for tilt, with both contributing to the roll axis. This works out quite well, as I find the roll axis usually needs the most help. The first is mounted horizontally below the battery mounting rails with the long dimension sideways, and the second is mounted vertically, right above the Steadicam battery case.

Whether renting or buying, the most important consideration is how you mount them. As I mentioned before, they must be absolutely rigid, and to make it practical, they should be easy to get on and off. After that, it is just a matter of deciding where they can go so that rebalancing is still possible. When using the Arri III and the K-8, I did not need to worry about maintaining the existing balance of my rig - this was treated as a special setup for a special sequence, and time was allotted to prepare for it. I attached the vertical Stabilizer to a bracket developed by Bob and John, that clamps onto the low-mode Steadicam plate (already conveniently attached to the top of the camera."

This bracket allows for fore and aft adjustment as well as side to side. I mounted the bottom unit below the sled, directly under the post, by bolting another Steadicam plate there and using the same kind of bracketry as on top. The Steadicam battery remained onboard and the inverter was velcroed to the front of the sled. I was just able to lift this weight, but with a heavier lens, I would have remoted the battery. All this bracketry is available from Seitz Technical, but if you want to design your own, just keep in mind the need for rigidity, especially in the right angle for the vertical stabilizer, and think carefully about how the whole system will balance out.

If you have the luxury of planning ahead for specific shots that don’t require a quiet camera, this is the hot setup. Obviously the lighter...
sleds like the Pros present less of a weight restriction, but 12 pounds of gyros a lot to add to any Steadicam: you will need a strong arm. For the Lightweight or Moviecam Compact, K-6’s are a more realistic choice, at least for my model 3. I am tempted to buy a pair of K-8’s, but I would rarely use them, and extending another big outlay of cash would be difficult. Clairmont has quite a few K-8’s available to rent, but little in the way of bracketry, and no K-6’s. I have found lots of K-4’s around, mostly at still camera shops, but no one seems to rent the K-6’s. Seitz Technical is a Kenyon dealer, and they sell the stabilizers with their own 12 volt inverter that will run both gyros at once (which makes a lot of sense) and they have come up with the mounting systems which I find simple, strong and quite adjustable. John is considering the possibility of making kits available for rental, if enough interest is shown: this would be an ideal solution for many operators.

If you want to stiffen up your Steadicam so it acts like it has about 2-3 times its current apparent mass, “Artificial Inertial Augmentation” (“AIA”) is the way to go. It is not an ultra simple, easy, or cheap solution, but it works. I have used my gyro system on each of my last three jobs, and my new credo is: “DLHWT” (“Don’t Leave Home Without Them!”)

Larry McConkey

wanted to be able to use the 5 AH battery. Live and learn.

The final two dramas were solved with velcro. First was the battery holder, the second was the attachment of the two remote sensors to the Seitz receiver. At the end I learned to keep it simple.

Some small design ideas I like: Keeping the NC-12 at the bottom of the unit, where it contributes most to inertia, and using the space under the monitor/monitor bracket for the electronics, the Seitz receiver, and the GU-U5. By the way, the video has excellent noise rejection from both 12 and 24 volt camera motors and from the focus motors and Seitz transmitter.

Jerry Holway

Teddy continued from page 1
larger than life and beyond simply notorious. To judge by my own hard sense of loss, he was just irreplaceable. I wish he might have been able to read the huge outpouring of affection, respect, and admiration on the Steadicam Folder on AOL - or to hover sardonically in the shadows at his heartfelt and boisterous ‘wake’ in Los Angeles.

I have been thinking about ‘Steadicam’ as analog to the early days of flying. If I was like a fraction of the Wright brothers, Ted was our Glenn Curtis: The first professional. Flamboyant, theatrical, intense - the consummate showman; and more than that, the first great enthusiast. In fact, Teddy went way beyond Curtis. His “Manual of Style” stylishly entertained us while promoting Steadicam as a Real Job (with himself of course as prime example!).

His ads were the best in the business, and likewise helped establish us as useful and reliable artisans rather than stunt performers. He hung boldly out there with his wit and taste and intellect at the service of this strange and wonderful new device. He was our first ‘ace.’

And Teddy was wonderfully, selflessly giving of his time and his knowledge. He probably taught half of the operators in our Association. After I wrote a paragraph about him, on AOL, I kept thinking of additional instances where he had helped me and my friends. He flew to L.A. and donated his time to appear in the instructional video for the Steadicam JR, and he came to Philadelphia to help Jerry plan and shoot the “EFP Instruction Tape” that has formed a part of our workshops ever since.

In our little business, warts and all, he was a hero and he was a good man. He was an inspiration, a staunch friend and ally and a brilliant colleague. As long as the noble instrument performs its magic, he will be spoken of and mythologized and missed.

Farewell Teddy,

Garrett
Pictures from Greece

Hmmmmm... There's a girl, the sea, a Model III, sand...

We were sent these pictures without explanation or captions. You figure it out...

Let's see. There's a girl, a couple of boats, an SK, sand...

And I thought it was tough to carry a rain deflector. Wow.
Now there’s a girl and a guy, more sand, another boat, a Model III, the sea...

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After years of frustration, particularly with the Seitz motor clamps which won't clamp down hard on all half-inch rods nor always allow one to aim the motor/idler gear combo at the lens. I had what might be called a flash of insight if it wasn't so small or late in my career. The whole damn clamping system just doesn't do the job. Brilliant, huh?

My response to that flash resulted in two new toys. The first is a motor bracket that will clamp down really hard on any half-inch or 15mm rod and aim the motor/idler gear combo right at the lens. The second is a sweet little bracket which rides on two half-inch rods from the standard dovetail plate and makes the new motor bracket really useful.

In combination, the new motor bracket pivots on one of the rods but doesn't clamp tightly to it. The crosspiece creates a solid point in space from which to push the motor bracket into the lens with micrometer control, and easily release it as well.

Once the initial setup is accomplished, no tools are needed to position the motor or back it off for lens changes or gate checks. The motor is rigid and cannot back away from the lens. No more curses, no more stripped socket head screws. The combo set sells for $200 or $220 with a universal riser/adaptor.

For more details, contact Jerry Holway, 610 524-5979, 524-5946 fax.