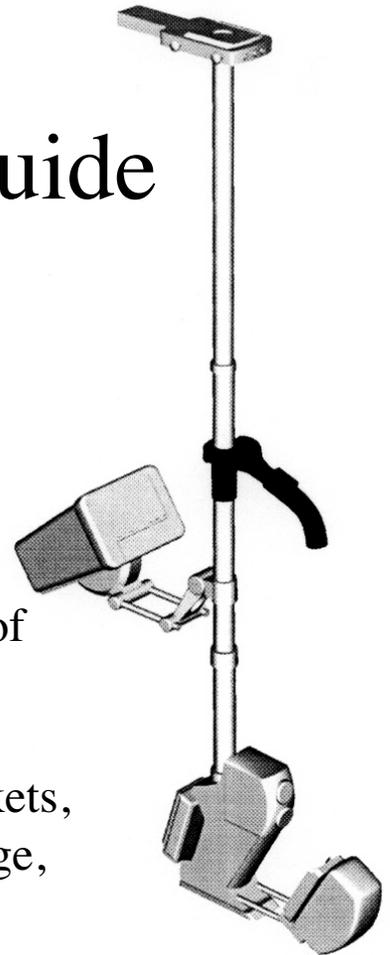


Steadicam[®] Ultra[™]

An Operator's Guide

by Jerry Holway

How to maximize the use of
the tilt head,
the telescoping posts,
the monitor and battery brackets,
the improved motorized stage,
the stiffening system,
and
the dynamic balance computer.



The new features of the Ultra work in conjunction with the arm and vest to allow the operator to quickly configure the Steadicam to the best possible advantage for each shot.

The **integral tilt head** - a key component of the Ultra - maximizes the use of the telescoping post, preserves dynamic balance in both regular and long modes, helps with clearance, reach, or viewing problems, and enables whip pans with the lens angled as much as twenty degrees up or down.

The four section **carbon fiber telescoping post** can quickly extend the sled from 28 to 72 inches. Extending the post increases the lens to gimbal distance, dramatically increases tilt and roll inertia, and alters the clearance of the sled to objects in the set.

The monitor's and battery's **dual carbon fiber rod and bracket systems** are extremely rigid and provide a greater range of extension than ever before. The operator has a much greater control of the sled's inertia and dynamic balance, as well as increased flexibility in viewing the image.

The Ultra's **high capacity and lightweight 28.8 volt NiCad battery** was carefully selected for your real-world needs. The Ultra's 3 AH battery easily drives an Arri 435ES at 150 fps, even near the end of its charge. Charge time is about 45 minutes. Competitor's NiMH batteries quickly suffer loss of capacity under high loads and need up to two hours to charge.

The Ultra is the only Steadicam to sport an innovative **stiffening system**. It creates extra rigidity whenever violent moves, a rough ride, or a very long post configuration requires some help. This lightweight, unobtrusive system can be installed on the sled in under a minute.

An entirely **new transmitter and receiver** upgrades the Master Series' motorized stage. Operators or their assistants can trim the sled on the fly, increasing the precision of every shot.

The Ultra's **Palm Pilot® computer** contains a customized dynamic balance program that is specifically tuned to the sled. This computer - and the design of the Ultra - work together to make finding and preserving dynamic balance easy.

Of course, all adjustments on the Ultra's sled, arm, and vest are **tool-free**. No hassles, no fumbling, and fast. **The way it should be.**

No additional accessories or duplicate parts are required for any configuration. The features are integral to the design, ready to be used when you need them.

And the Ultra is **three pounds lighter** than the Master Series Film system!

Quite simply, the Ultra is the most versatile and user-friendly Steadicam ever made.

The following pages discuss in some detail how the new features can be used - both individually and in combination - to make conventional operating easier and more precise, and to create entirely new shot possibilities. At the end of the guide is a list of additional benefits of the new design.

Note: The maximum lens height you can achieve with the Ultra depends a lot on the camera weight. The lighter the camera, the higher it can get. **See pages 5 - 8 for details.**

October 2001 News flash!
New and exclusive Ultra features!
8.4 inch color LCD monitor, works in full sun!
Innovative vest mods for increased control and comfort, less fatigue
Ergonomic slanted F-bracket

This guide was written and updated by Jerry Holway (with the help of Garrett Brown and others).

The opinions, conclusions, advice, specifications, errors, etc. are Jerry's, and not necessarily those of anyone else or of The Tiffen Company.

The integral, low profile tilt head will really change the way you operate.

Not only does the tilt head make long mode operating practical, it makes all operating easier and more precise. Nominally, it tilts plus or minus 20 degrees from horizontal. With a small wrench and an extra minute, it can be made to tilt about thirty three degrees downwards.

Using the Tilt Head to preserve a vertical post and dynamic balance

We all know that the Steadicam behaves better when in dynamic balance and that dynamic balance can exist *only* when the post is vertical.

With other Steadicams® and Steadicam-like stabilizing devices, much of the benefit of getting the rig into dynamic balance is wasted when one alters the trim of the rig as much as a few degrees - for example, as one normally does when trimming for headroom.*

Based on the shot requirements, the operator determines the proper length of sled, optimal monitor viewing position, inertia, and lens height - then adjusts the pre-tilt angle with the head.

The operator sets this tilt angle by releasing two clamps and manually repositioning the camera. The post remains vertical and the rig stays in dynamic balance.

One important aspect of the tilt head's design is that the center of rotation is close to the c.g. of most cameras, which minimizes static and dynamic rebalancing when altering the degree of tilt.

Using the tilt head is clearly important in long mode configurations, when the nominal tilt might be in the order of 15 degrees downwards. Normal Steadicam operating - with the post compressed -also benefits greatly from tilting with the head.

Using the tilt head for general operating

Even if the Steadicam is somewhat out of dynamic balance, it's a whole lot easier to hold the post vertical than at any other angle, especially when panning and accelerating - which we tend to do a lot with a Steadicam. The Ultra's tilt head keeps the post vertical in many situations, making it easier to operate and keep things level.

Another benefit of the design - a whole new class of whip pans

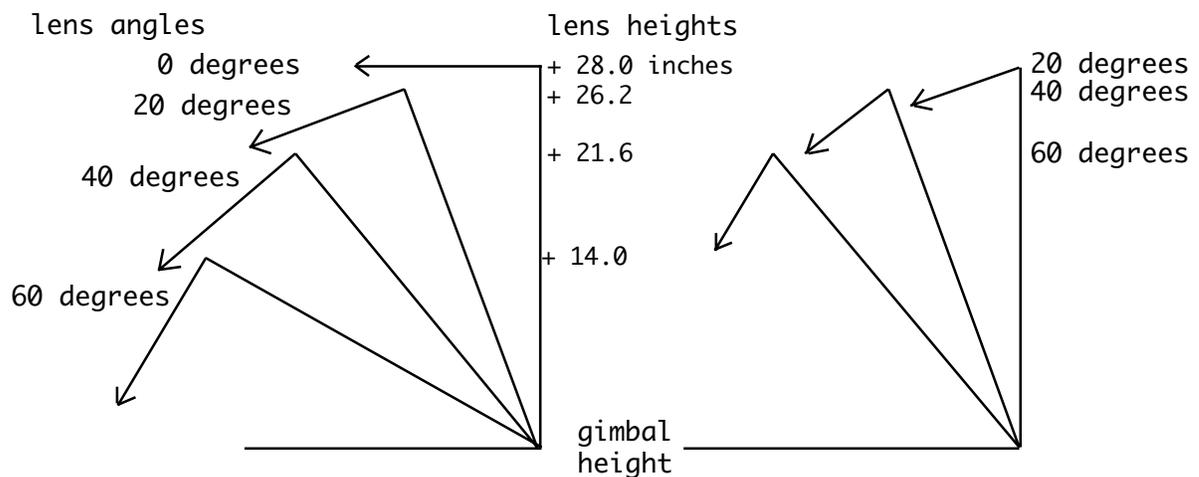
Previous whip pans had to be done in dynamic balance with the post vertical and the lens horizontal. Now the lens can be angled up or down as much as twenty degrees and the operator can still make extremely precise fast pans. The precision of slow pans with a lens angled up or down is also increased dramatically.

Long mode pans (fast or slow) with the lens looking down - say at a crowd - used to be exceedingly difficult or impossible, due to the large spatial translations of the battery, monitor, and camera. But the Ultra's tilt head eliminates this spatial translation, and makes these pans routine. Low mode and very low mode pans are also much easier and more precise.

* If you don't believe this proposition, I suggest you try spin balancing a sled into dynamic balance as perfectly as you can, and then alter the trim a few degrees. Spin it again, and you will know exactly how important the tilt head is for precise operating. And once you try it....

Using the Tilt Head to maintain lens height

As the operator tilts the Steadicam, the lens height gained with an extended telescoping post disappears. The more one tilts, the more rapidly the lens height is lost.



The drawing on the left represents a long mode rig without the tilt head. Here, a 20 degree tilt would lose 1.8 inches, and a 40 degree tilt would lose 6.5 inches, and a 60 degree tilt would lose 14 inches.

With the tilt head (the drawing on the right), we can maintain full lens height with 20 degrees of tilt in the lens, lose 1.8 inches with 40 degrees of tilt, and lose only 6.5 inches with 60 degrees of tilt.

In low mode, the same pre-tilting not only preserves the minimum height of the lens, but it also keeps the monitor in front of you where you can see it.

Without the tilt head in low mode, the monitor tilts back behind your shoulder, and as you struggle to see the image, you lose form, dignity, confidence, etc.

This pre-tilting is useful looking both up and down in both high and low modes.

Using the Tilt Head for clearance

One of the more unusual applications of the tilt head is to angle the sled and its components relative to the desired position of the lens. Moving the sled relative to the lens might avoid casting shadows into the shot, seeing one's own feet, or prevent the sled from hitting something on the set.

A couple of examples:

A man sits at a desk, and the lens needs to be over part of the desk to get his close-up. Without the tilt head, the monitor hits the desk and restricts the travel of the lens.

Angle the sled to the rear (tilt the camera up), and push the lens over the desk. Use the tilt head in this manner, and combine it with the telescoping post and/or a long post in the arm, and a whole new range of lens positions is possible.

The same angling in super long low mode could place the lens underneath the center in a football game, inches from his hands, looking down and forward across the ball.

Another unusual application for the tilt head

Making switches is a common maneuver in Steadicam operation. It requires that the post be more or less vertical when the switch is made. The tilt head allows a switch to be made at a different and perhaps more convenient time during a shot. Unusual, but possible and easy to configure.

Lens height and the telescoping post - Just how high or low a lens height can you get?

As a rough estimate, in high mode you should be able to get a lens height of about 7.5 feet. If you are tall or using a light camera, a lens height of 8.5 to 9.5 feet is not impossible.

To be more precise takes a bit of work - see below.

In low mode, your camera can always reach the floor. Always. See page 8 for the trick.

To get the maximum possible lens height with any camera, extend the bottom two sections - (#'s 3 and 4) - and fully lower the monitor all the way down on its section. Position the gimbal at the top of its section (#2). This arrangement of components creates the maximum distance between the counterweights (battery, electronics, and monitor) and the gimbal (the pivot or balance point).

Raise the camera from the gimbal by extending the upper section (#1) until the rig is in static balance. The lighter the camera, the more you can extend it from the gimbal and raise the lens.

To gain additional height, use one of the provided long arm posts in the arm and position the socket block as high as you can on your vest. This can be done quickly, without tools.

If you can carry additional weight, add it to the bottom of the sled via the integral dovetail. Then raise and re-balance the camera. Antlers™ work well in this application, and they are tool-free.

But how high can one get the lens??

Alas, the answer isn't easy. The exact lens height you can achieve with the Ultra depends on your height, the camera weight, and how much additional weight you are willing to carry.

To get a better sense of the possibilities for lens heights in the Ultra (or any other Steadicam), you must first measure the maximum and minimum height at which **you can position your gimbal** with your arm.

This "primary gimbal height range" is the same regardless of how short or long your rig is, or the specific camera you might be using. As an example, I'm 71" tall in my operating shoes and my primary gimbal height range is about 38 to 65.5 inches.

To generate your own primary range of gimbal heights, measure the top and bottom gimbal position from the floor when in high mode. Do this with the arm attached to the socket block at its lowest practical point on the vest, and with the shortest possible arm post. This will generate your primary range of gimbal heights.

Several additional ranges for the gimbal should be calculated for

- using a 12 inch arm post (adds 8.5 inches to the primary range),
- the additional height that can be made by raising the height of the socket block on the vest (+3 inches).
- low high mode using a J-bracket with a six inch arm post (*minus* 4.5 inches)
- low mode using an F-bracket and minimum length arm post (*minus* ten inches)

Another range to note is **the comfortable reach of your operating hand** to the c.g. This is important because not all possible gimbal positions can be reached via the operating hand. Measure this range while in the vest and carrying a rig. The comfort level is up to you.

My operating hand range is about 33 to 75 inches. I can reach further, but the comfort level goes down along with my form.

Next, statically balance your sled, camera, and accessories in the minimum and maximum configurations. Do this one time only, and do it on the stand. Make note of the **gimbal to lens distances**, and then add these numbers to the various gimbal ranges to generate lens height ranges.

Now as a shot is described, you can measure the given lens heights (as a dolly grip might do) and choose the best or fastest configuration for the shot. You will know the real limits of any configuration ahead of time, and where you can and cannot reach.

Jerry's gimbal and lens height chart with a Panavision LW II, 30mm C series anamorphic lens, 2 lens motors (30 lbs!), with a Seitz receiver and amp, and 8mm GV-U5 VCR on the sled.

gimbal range	High mode w/ telescoping post fully compressed	lens height range
38 - 65.5	+ 9.5 inches to lens	47.5 - 75
46.5 - 74	+ 12 inch arm post (+8.5)	56 - 83.5
49.5 - 77*	+ 12 inch arm post + raising socket block (+11.5)	59 - 86.5
	Note that a longer arm post would exceed the upper reach of my operating hand	
33.5* - 61	Low high mode w/ J-bracket & 6 inch arm post (-4.5)	43 - 70.5
	Note that a longer arm post would exceed the lower reach of my operating hand	

gimbal range	High mode w/ telescoping post fully expanded	lens height range
38 - 65.5	+ 20.5 inches to lens	58.5 - 86
46.5 - 74	+ 12 inch arm post (+8.5)	67 - 94.5
49.5 - 77	+ 12 inch arm post + raising socket block (+11.5)	70 - 97.5

gimbal range	High mode w/ telescoping post expanded + 5 lbs*	lens height range
38 - 65.5	+ 28.5 inches to lens	66.5 - 95
46.5 - 74	+ 12 inch arm post (+8.5)	75 - 102.5
49.5 - 77	+ 12 inch arm post + raising socket block (+11.5)	78 - 105.5
	Note: the 5 pounds were added to the base via Antlers on a zero riser	

Using different arm posts - high mode

From the charts, it should be clear that **the quickest way to gain gimbal and lens height** is to use a longer post in the arm and to raise the socket block on the vest.

This increase in gimbal height - up to eleven and a half inches - also puts the c.g. about as high as one can comfortably reach with the operating hand. A longer arm post could be used (only with extreme care - it puts a lot of torque on the arm bearings!!) but one can't reach the c.g. and do the most precise work.

Changing arm posts with the Ultra is almost effortless - no tools - about 10 seconds - and it does not alter the static or dynamic balance or the feel of the rig, or the general sense of clearances.

When used alone, a long arm post alters the height of all the components equally, which may make viewing the monitor more difficult or annoying - or not, depending on the shot.

Using different arm posts - low mode

In normal low mode, eleven inches at the bottom of the boom range of the arm is wasted. Your first recourse is to raise the socket block on your vest. This restores three inches of the arm's range.

Use a longer arm post with a collar about two inches from the top to further raise the F-bracket and the gimbal height. The length of this post is limited by the clearance requirements with the camera.

As the F-bracket is raised relative to the arm, the arm goes down relative to the gimbal and camera. When the telescoping post is expanded, use a twelve inch arm post to restore the full useful range of the arm. This is a good idea with any Steadicam. See the chart for details.

Be aware that using very long arm posts can exert enormous torque on the arm. The heavier the camera is, the shorter the arm post you should use. Again, if you want a very high or low lens height, get a light camera!!

Please note that I didn't exaggerate the possible lens heights in the charts with a potentially dangerous long arm post - or with a gimbal height that can't be reached.

A useful trick: The lens height in any low mode range easily can be lowered by making the rig more bottom heavy. With this trick - and the unique design of the Ultra's telescoping post - even a very heavy camera can kiss the ground.

In fact, if one didn't care at all about bottom heaviness, the *top* of the camera could be almost four feet below the gimbal - which might be great for a trench or grave shot or working off scaffolding. Pretty hard to dock the rig, though.

FYI: I carry my F-bracket and four additional arm posts in a bag on the docking stand at all times. The shortest possible post is usually in the arm.

In the bag is a 5 inch, a 6.5 inch, a 9 inch, and a 12 inch post. The 6.5 inch post is generally used with the F-bracket - making it a J-bracket for low high mode work - and I drilled a hole through it and the F-bracket to accommodate a no-tools safety pin.

I attached a removable collar to the 12 inch post about two inches below the top. It is used for high low mode when the telescoping post is greatly expanded (see the chart above). Somewhere in my kit is the no longer supplied but infamous 18 inch arm post - rarely used, but available.

Working with long post configurations

Most of us are used to working with relatively short sleds. As the length of the telescoping post increases, new factors must be taken into consideration. Viewing, inertia, clearances, static balance, dynamic balance, and flexing are key issues.

Increasing the lens height by extending the telescoping post may be the only way to get the height you need (see your charts!), or it may service an additional need, such as better viewing of the monitor or adding increased inertia in tilt and roll.

If the range of lens heights desired is less than the maximum possible, the operator has choices in configuring the Ultra's components. In the high mode, maximum extended post example above, raising the monitor from the bottom to the top its section - for better viewing - would only lower the overall range by about 2.5 inches.

Extending the telescoping post and re-balancing should take well under a minute with a trained crew, and a minute and a half at most. Adding the stiffening system adds another half minute (see page 11). Adjusting the tilt head - a few more seconds.

Any change of configuration can be done in under two minutes, without tools. This is important because one may discover that some aspect of a shot or production may demand an alternative configuration, and it's comforting to know that it is relatively quick and painless to get there.

Static balancing with long post configurations

The drop test we typically use to determine bottom heaviness should be altered, and a much longer drop time will provide your normal feel. Instead of a strict drop time comparison, tilt the Steadicam with your operating hand and note how much force is required to tilt the sled. Compare this force to your normal length sled's feel. Accelerate the rig and note the pendular action. Adjust the bottom heaviness accordingly, depending on the requirements of the shot.

Dynamic balancing with long post configurations

All the same rules apply as with short sleds. However, because there are so many possible configurations with the Ultra, spin balancing for each one would be time consuming and unproductive. Fortunately, the Ultra comes with a dynamic balance computer to expedite and simplify the process. See page 12 for details.

Clearance issues with long post configurations

A long post configuration adds a lot of extra inches to the bottom of the sled. We tend to pay attention to the lens, and we may be surprised when that other part of the sled hits something. The longer the sled, the sooner some part of it (usually the battery) will mysteriously collide with the ground or the stairs or something behind you.

Remember, one function of the Ultra's tilt head is to keep the rig more vertical when shooting, which can greatly reduce clearance problems.

In the most expanded high mode, the bottom of the sled can be as much as 46 inches from the gimbal. You can use your gimbal and lens height charts to find when your minimum gimbal height is lower than 46 inches and the rig will drag on the floor.

Inertial increases with long post configurations

Inertia increases with the square of the distance from the point of rotation (in our case, the gimbal). As we increase the length of the sled, the tilt and roll inertia increase dramatically.

This can be useful in many situations where the camera should behave slowly. But it also makes it hard to quickly correct any tilt or roll, or to have a very active camera in these axes. During a shot, it is much easier to adjust for headroom by booming with the arm.

Inertial imbalances with long post configurations

The tremendous inertial increase in tilt and roll with long sleds is not matched via any increase in pan inertia. As a consequence, the rig may feel unnaturally quick in the pan axis.

One solution is to extend the monitor fully (and correspondingly, the battery for dynamic and static balance). This increases the pan inertia and brings it more in line with the tilt and roll inertia, and is great for working in windy conditions.

Using the long battery and monitor rods can delay the need to use auxiliary stabilization, such as gyros or Antlers, without adding additional weight or making a time-consuming reconfiguration.

Using the monitor and battery extensions

Both the monitor and battery are solidly supported by dual .620 diameter carbon fiber rods that are locked into position by special cams.

The standard five and an half inch long monitor rods enable the monitor to be extended three inches from minimum, nearly doubling the monitor's inertial effect in pan.

The monitor uses two sets of cam locks on the extension rods. This design enables the use of longer rods, but it creates two minor clearance issues when the monitor is fully compressed.

The rods must clear the telescoping post when flipping to low mode. Also, when tilting the monitor vertically, be very careful that these dual rods remain clear of the bottom of the monitor.

The standard ten inch long battery rods enable the battery to be positioned properly for dynamic balance and/or to increase the battery's inertial effect in pan by over a factor of three.

To absolutely minimize pan inertia, remove the monitor and rods. Drop the bottom post slightly. Now you can rotate the monitor bracket 180 degrees to the rear. Re-attach the rods and monitor to the bracket. The monitor must be tilted up - and the c.g. is as close as possible to the post.

With the supplied rods, sled inertia in the pan axis can be as low as 360 pound inch² to as much as 1,750 pound inch².

For even greater inertia, longer rods are available, or one can substitute Panavision iris rods, but be sure the electrical cables aren't over-stretched.

It is also extremely easy to substitute another monitor - such as a 6 inch LCD monitor. Depending on the mount, one could reduce pan inertia to 130 pound inch².

Monitor tilt and flip

The monitor tilts and flips on its c.g. - without affecting the static or dynamic balance of the rig. The new arcs and clamps make it easy to reposition the monitor and to positively lock it in place.

The monitor face can be angled almost 90 degrees - from nearly vertical to horizontal - making viewing easy in any configuration.

Tip: When in a long post, low mode configuration, the monitor does not even need to be flipped. The viewing is better if one uses the switches on the monitor to correct the image orientation.

The Stiffening System

Any long post Steadicam sled, whether single or multi-section, suffers from increased flexing. The longer a post, the more it flexes - unfortunately by the cube law. Doubling the post length makes the rig eight times more flexible.

The Ultra's carbon fiber telescoping post is very stiff, but it will need extra rigidity under certain situations. The heavier the camera or the more violent the moves, the more help is required.

The patent-pending stiffening system consists of a spreader that attaches to the monitor arcs (without tools, of course); attachment points on the battery mount, the bottom of the sled, and just underneath the tilt head; and a length of lightweight Vectran™ line. Vectran is a polymer cable that is as strong as steel, but it has one-fifth the weight and is much more flexible.

To use the system, the monitor and/or battery is moved inboard an inch or so from its final position, and the Vectran™ line is laced from one side of the battery mount down around a pin at the base of the sled, up around the spreader on the monitor, further up to a hook just under the tilting head, and down the other side via the spreader, around the pin at the bottom of the sled, and back up to the battery where the line is tensioned and secured under a special washer.

The whole operation takes less time than reading that sentence.

The Vectran line is further tensioned by extending the monitor and/or battery out to its final position, and/or tilting the sled horizontal with the monitor down and re-tightening the line.

The system works best when the monitor is highest on its section (#3). The system is also very useful with normal length rigs whenever violent moves or stresses are anticipated, such as a vehicle shot on rough roads.

It is also possible to attach the Vectran line to some solid part of the camera to further stiffen the rig. Often the camera to Steadicam mounting isn't perfect, and the stage exhibits some flexing as well. Once you have balanced your rig and tensioned the Vectran, be careful that the camera doesn't move very far on the stage.

New transmitter and receiver for the motorized camera stage

The size, shape, and use of the transmitter remains the same as in the Masters Series. Four buttons still direct the action of the stage, but the electronics have been completely changed.

The receiver has a removable antenna outside the shielded, forward section of the stage. The new transmitter and highly tuned receiver and antenna makes the system reliable under most conditions and at a greater distance than ever before (30 feet or more under ideal conditions).

The Palm Pilot® Dynamic Balance Computer

We've said it before: Because there are so many possible configurations with the Ultra, spin balancing for dynamic balance could be time consuming and unproductive. However, the Ultra's dynamic balance computer makes finding and maintaining dynamic balance easy.

A few measurements are required prior to using the dynamic balance computer. You need to know the weight and position of components you carry on the sled, such as your focus motor receiver and amp, VCR, and transmitter. Motors and other accessories you carry on the camera - and the camera's weight - can be ignored.

Enter this information in the appropriate data fields to set up your basic package. Multiple set-ups can be stored in memory to simplify this process.

On set, whenever you change the height and/or extension of the monitor and/or the length of the sled (to best configure the Steadicam for the shot), you take one to three measurements, enter them into the appropriate data fields, and the computer tells you where to place the battery.

You complete the process by static balancing the rig with the camera. The program also computes the camera position if you know the exact weight of the camera, lens, mag, film mattebox, filters, etc., but this is not necessary. Just static balance the rig with the camera.

The three measurements you need to make for each new configuration are

- 1) the vertical distance from the camera c.g. to the battery c.g.
- 2) the vertical distance from the camera c.g. to the monitor c.g.
- 3) the horizontal distance from the monitor c.g. to the centerline of the telescoping post.

“Dot” decals on the monitor and battery indicate the c.g. of these components. The camera c.g. can be determined by a simple balancing test.

Remember, the monitor tilts and pivots on its c.g., so changing the angle of the monitor will not affect dynamic balance. The tilting head nearly preserves the camera c.g, and tilting the camera has little effect on dynamic balance (in many cases, practically none).

Some other features and benefits of the Steadicam® Ultra™

Ease and speed of use

In the old days of the Model IIIA and earlier, trimming for headroom involved releasing a lock, making an adjustment, re-locking and re-testing the trim. It was too much work (and looked too fussy to everyone else on the set), and therefore the most precise balancing was often ignored.

Now we can trim our balance with the touch of a button, and no one even knows it is happening, let alone that it can happen during a shot.

Because *all* adjustments are quick and tool free with the Ultra, all the configuring and tweaking of the Steadicam (sled, vest, and arm) can actually be done under real-life conditions, shot after shot, and you can get the most out of your machine.

Ease of (dis) assembly

The design of the sled facilitates assembly, servicing, and repairs, as well as future advancements, upgrades, and user customization.

The monitor can be pulled off the rods, and the power and video cable has Hirose connectors on each end, making replacing the monitor a snap.

Fashion a simple bracket for an LCD screen, and you have a lightweight rig for special running or fast action situations. Alternative (longer) rods can also be used.

The entire sled disassembles and assembles easily for service or cleaning. There are three quick release electrical connectors at the base of the sled, two for video and one for power. Undo these connectors and each section of the telescoping post can slide free of the one above it.

The bottommost section (# 4) holds the electronics and the battery mounts. The battery holder also can be removed; another quick release electrical connector is provided for this purpose. Substitute a special lightweight battery and create a running rig.

Section number three holds the monitor bracket, which can slide off the bottom if necessary.

Section two holds the gimbal, which also can slide off.

Section one is attached to the tilt head and motorized stage, both of which easily can be removed.

All of the Ultra's tool-free clamps and locking cams are user adjustable. A small wrench is required to adjust the cam's nyloc nuts, and a hex key is needed for the main post and gimbal clamps.

Be very careful not to over tighten any clamp, and especially the ones that lock on any carbon fiber rod.

Slim Sled Design

The slim and clean design of the Master Series sled has been improved.

Perhaps the most obvious change is the elimination of the "hump." The Ultra's electronics have been moved four inches down and one inch in - well out of the way of the arm - and the converter is tucked inside the front cover.

The control panels now wrap seamlessly around the bottommost section of the telescoping post, and the connectors and controls are clearly visible and accessible.

In addition, the electronic level adjustment can now be done by hand while watching the monitor.

Power and video cables in the telescoping post

Hidden in the telescoping post is another of the Ultra's patent-pending features: the novel and lightweight curly cord that automatically expands and retracts. It consists of three super flexible fourteen gauge wires (a must for high current requirements) and two shielded video cables.

Unlike molded curly cords, this cable is small in diameter, lightweight, and easily customizable for future applications. The cable also provides a friendly, springy suspension when you are adjusting sections 3 and 4 of the telescoping post.

12 and 24 volts (Ultra Cine version)

The Ultra's 3 AH @ 24 volt NiMH battery powers the new 24 volt monitor and handles the most power hungry cameras, such as the Arri 435ES at high speed with no problems. The high capacity and high discharge rate battery also maintains its capacity under high loads.

Other NiMH batteries - such as those used in competing systems - lose their capacity under the high current draws of many film cameras.

An efficient and electrically quiet switcher circuit (nested under the front cover) provides up to 7.6 amps continuously at 13.2 volts for 12 volt cameras and accessories.

Integral dovetail base

A special version of the standard dovetail forms the bottom of the sled. This integral dovetail bolts directly to the main clamp at the base of the telescoping post.

This solid structural arrangement facilitates the fast and extremely rigid mounting of accessories such as gyros, Antlers™, or special batteries.

Weight

The first two Ultra Cine prototype units are already a pound and a half lighter than a Master Series Film Steadicam.

Production units will be even lighter; with the new 24 volt batteries and monitor, the weight will drop another two pounds.

Upgrade options for owners of Master Series Steadicams

It was always my plan that owners of Master Series Steadicams could upgrade their sleds.

The "basic" upgrade adds the four section, carbon fiber telescoping post, the +/- 20 degree integral tilt head, the monitor and battery brackets and rods, the base, the stiffening system, the dynamic balance computer, the new transmitter and receiver for your motorized stage (if applicable or desired), and the new wiring harness.

This upgrade path preserves your current monitor, gimbal, (motorized) stage, 14.4 volt batteries and charger, electronics, and 24 volt converter. Your converter will be re-configured to permanently fit under the front cover.

This upgrade path is how the first three prototype Ultras were made.

The "full" upgrade path includes all the above plus the new NiMH 24 volt batteries, and an upgrade to your charger, if possible, or a new charger. Your monitor will be modified to 24 volts, and the new 13.2 volt switcher will be installed.

Contact Frank Rush at Tiffen for specifics on all the upgrade possibilities for your Master Series.

Cell phone: 205 527-0117

Email: frush@tiffen.com

Field tested

The transition from the Master Series to the Ultra has taken a couple of years. The first prototype in this process, the XP, was in hard service for over a year on many different movies and commercials.

The XP tested the basic concept of the telescoping post, the stiffening system, and the curly cord wiring up the post. It also illustrated where the XP design needed improvements or could be made more user friendly.

Use of the XP made it clear that a tilt head was needed; the first head was an immediate success, and in the last nine months improvements have been made and the tilt range increased.

The idea for a dynamic balance computer has been kicking around for some time. The basic dynamic balance program has been in use for over ten years.

But because the tilt head made dynamic balancing for many shots a reality, and because the Ultra can be configured in so many ways, the need for a portable and user-friendly dynamic balance computer and customized program increased dramatically.

Much of the electrical and mechanical technology - such as the carbon fiber telescoping post and its tool-free clamps - are "old hat," long a solid part of the Master Series line of Steadicams.

My Ultra Cine prototype was assembled for the NAB show in Las Vegas on April 19, 1999.

Immediately after NAB, I returned to Santa Fe to continue working on a feature film - *All the Pretty Horses* - under trying conditions. Wind, dust, sand, heat, cold, rain, bad roads, *horses*, - the Ultra survived all that, and my assistants, bless them, quickly learned another Steadicam system.

The rig performed flawlessly through the day we wrapped and I left to demonstrate the Ultra at Show Biz West on June 24th.

I can hardly begin to explain what a treat it was to have all the Ultra's features at my fingertips!

In August and September 1999, I used my Ultra on a low budget feature in Milwaukee - where I was also the DP and operator - and 70 percent or more of the movie was Steadicam.

The Ultra was so incredibly easy to use, re-configure, and balance. I knew I could get the lens anywhere from the floor to the ceiling without a hassle or a time-consuming delay.

So many times we would drag the camera along the floor in extreme low mode then quickly flip to high mode. Or configure it strangely just to get some special shot. My assistant, Will Eichler, is also a Steadicam operator and he loved the rig. He's the one who figured out how to get the tilt head to tilt to 30 degrees.

Using the Ultra was all so easy and effortless, all done without fussing or worries or looking for tools. It's clear that I couldn't have made the movie without the Ultra; it simply saved me and the production so much time and energy.

This spring (2000) I worked on *Jericho*, a western shot in Brackettville, Texas. Again, I was the DP and operator, and we used my Ultra prototype to great advantage.

Horses love the Ultra, as do the wranglers. No worries, no tools, no sweat. Okay, it was 100 degrees in the shade and I sweated a bit.

Garrett's Ultra Cine prototype also works like a charm, and on one movie he achieved a nine foot lens height with a Moviecam SL - he claims without a long post in the arm!!

In late August and September, 2000, I was A camera and Steadicam operator on a MOW for Hallmark (*The Runaway*). The director didn't much care for Steadicam, I was told. We used it 20 out of 24 days; again the mechanics of configuring and adjusting the device were so subdued that I could stay in touch with the director and DP and give them what they wanted - and a few shots they hadn't dreamed of.

Questions or comments?

Please email me at Jholway@maccom regarding the information in this guide or my experience using the Ultra.

Future versions of the guide will have photos and diagrams, as well as other Ultra operating tips.

For instance: A new, ergonomic F-bracket for low mode has been designed and tested for the Ultra. It's based on a 1993 design by Jacob Bonfils of Copenhagen, Denmark. It's going into production in October, 2001, as is the amazing 8.4 inch LCD monitor and the modified vest.