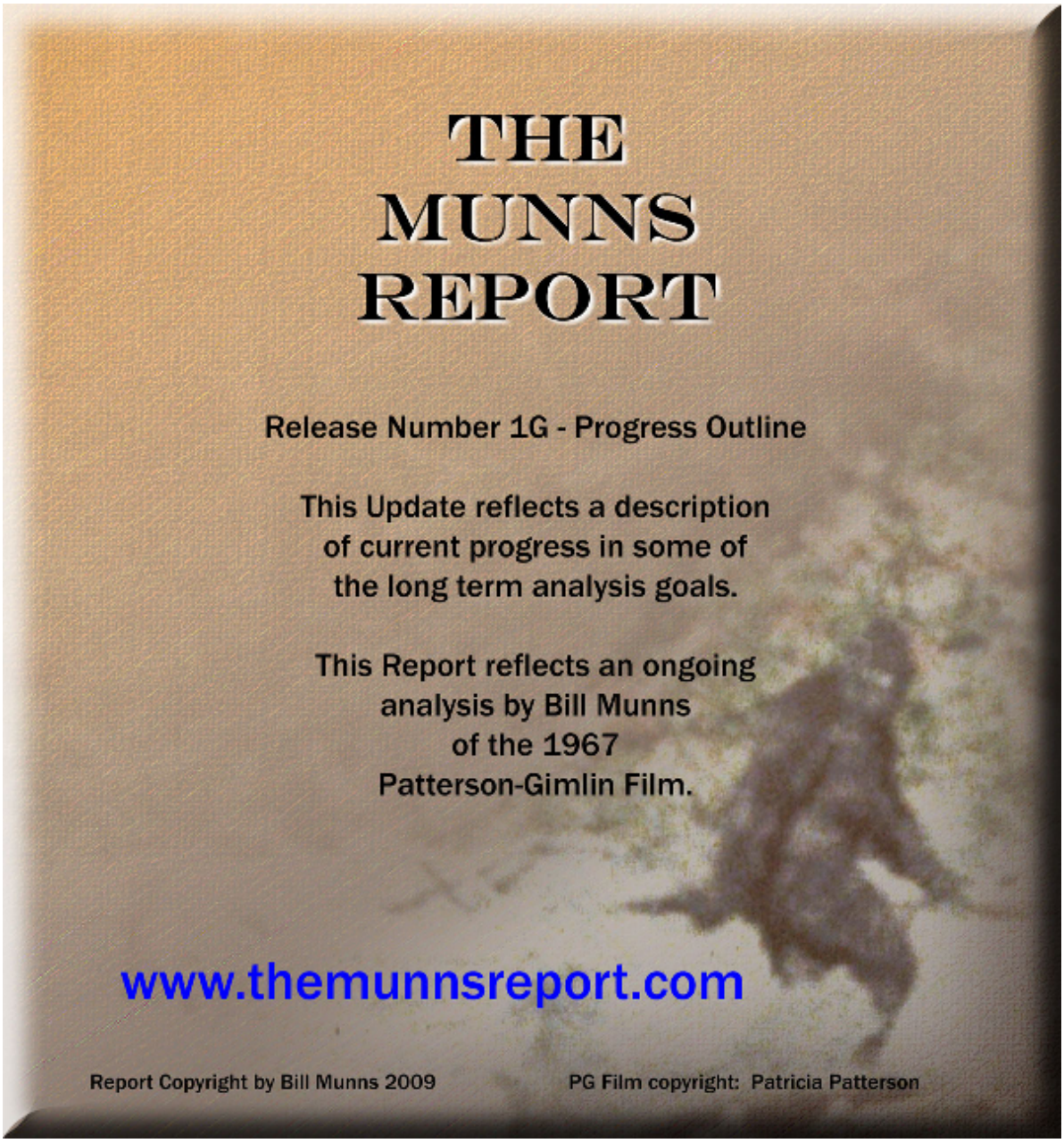


Progress Report - Released Sept. 25, 2009

Introduction

Given that this Report endeavor has taken on many somewhat unconventional attributes, including being debated in various internet forums as the work continues, and a fair amount of interest has been demonstrated in the discussions (As of Sept 24, 2009, on the BFF forum, three threads on the report have a combined statistics of 1574 posts and 57,882 views, and on the JREF, the report discussion thread shows 3238 posts and 74,015 views), it may be fair to say there is some interest and awareness of this report's continuing development.

This particular Report Update is offering a description of efforts currently underway, moreso than conclusions, because I have observed over the past 21 months that observers and people commenting about the report seem to appraise the extent of activity (or lack of apparent activity) as a pertenant fact to inject into the discussions.

On the plus side, others have made some valued contributions of ideas and research references because they were aware of the work in progress. So disclosing progress has potential for better results and in that spirit, I offer this latest update.

The topics in this material are:

Update on the Site Model/Lens Analysis project

Introduction to the new comparative anatomy analysis

Introduction to the walk cycle and path analysis project.

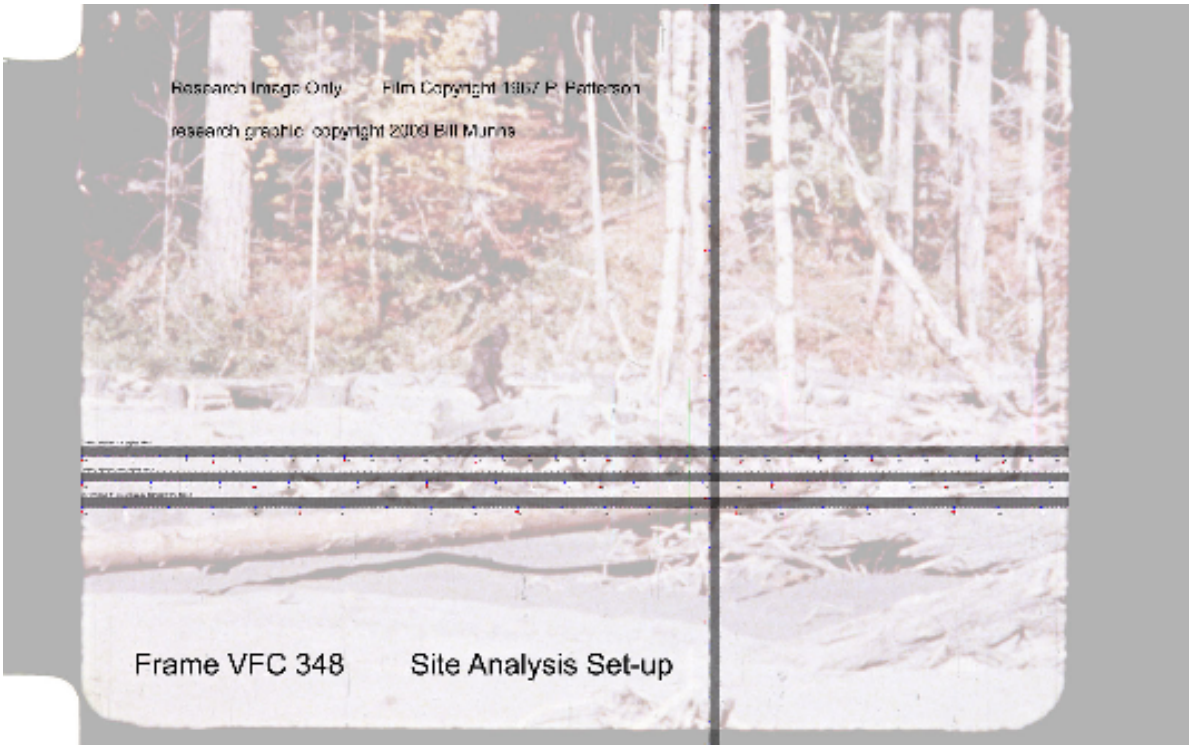
Also included in a listing of some events I will be speaking at or being interviewed

The Site Analysis, Photogrammetry Analysis, and Lens Debate

In the matter of the lens analysis issue (and related Photogrammetry site analysis effort) which was featured in the initial report release, and has been the subject of considerable controversy, I've chosen to "go back to square one" and re-open consideration of all lens options and review methods of performing a photogrammetry analysis, with more extensive documentation of methodology and process.

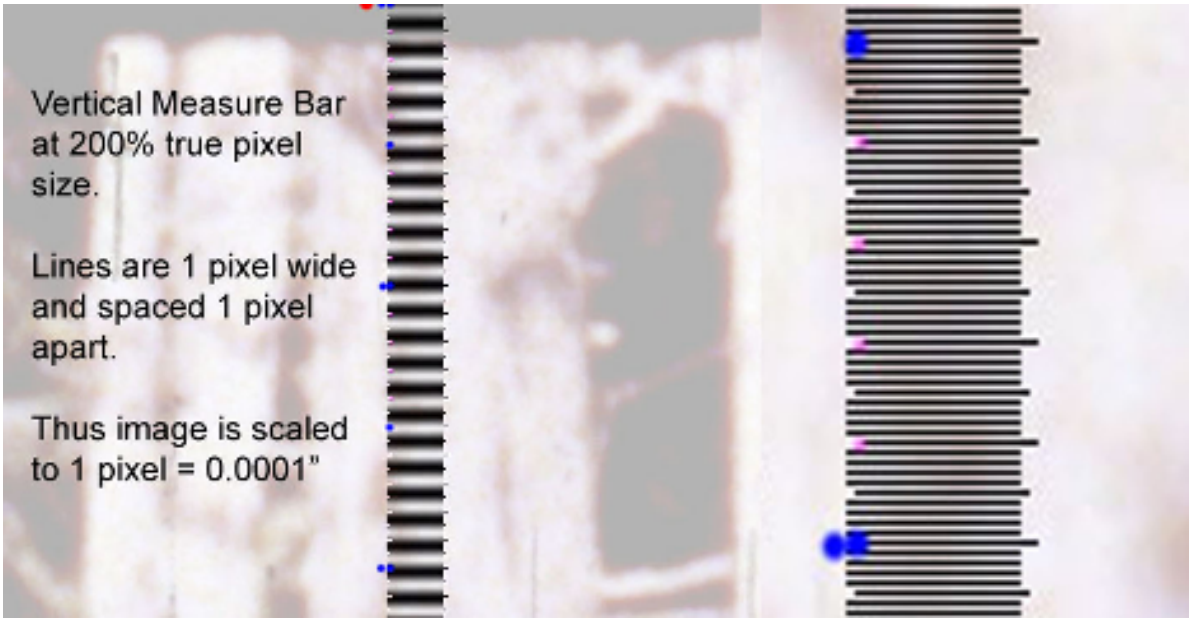
The foundation work explained in Report Update 1C particularly establishes a full frame specification I can now consider definitively reliable and so the new frames to be used for the site model and photogrammetry analysis are being set up to that specification, with true full frame scans being scaled to 3000 pixels high and cropped to precise frame pulldown so one image pixel equals 0.0001". Then a visual measure bar, with lines 1 pixel wide, and spaced 1 pixel apart, allows a true pixel measurement of any vertical or horizontal measure in the image.

A sample is shown as follows:

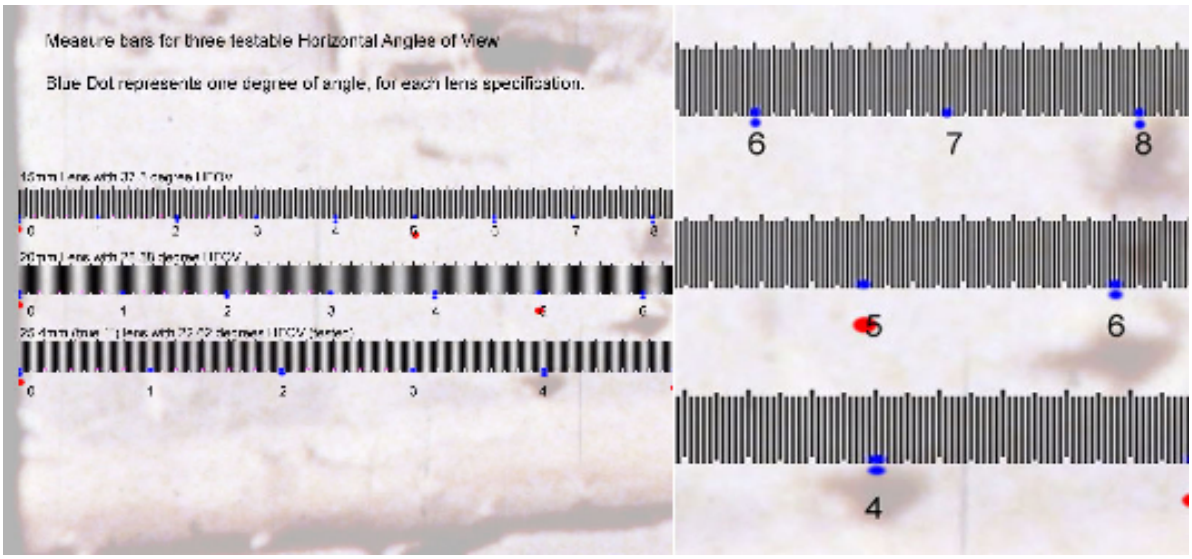


Note: the film frame is normally full color intensity, but was reduced in intensity here to highlight the construction features, measure bars, etc.

The Vertical measure bar which is scaled, pixels to decimal fractions of an inch, is shown below, enlarged 200% over actual pixel size. (note the PDF formatting may not display it as clearly as the true image frame)

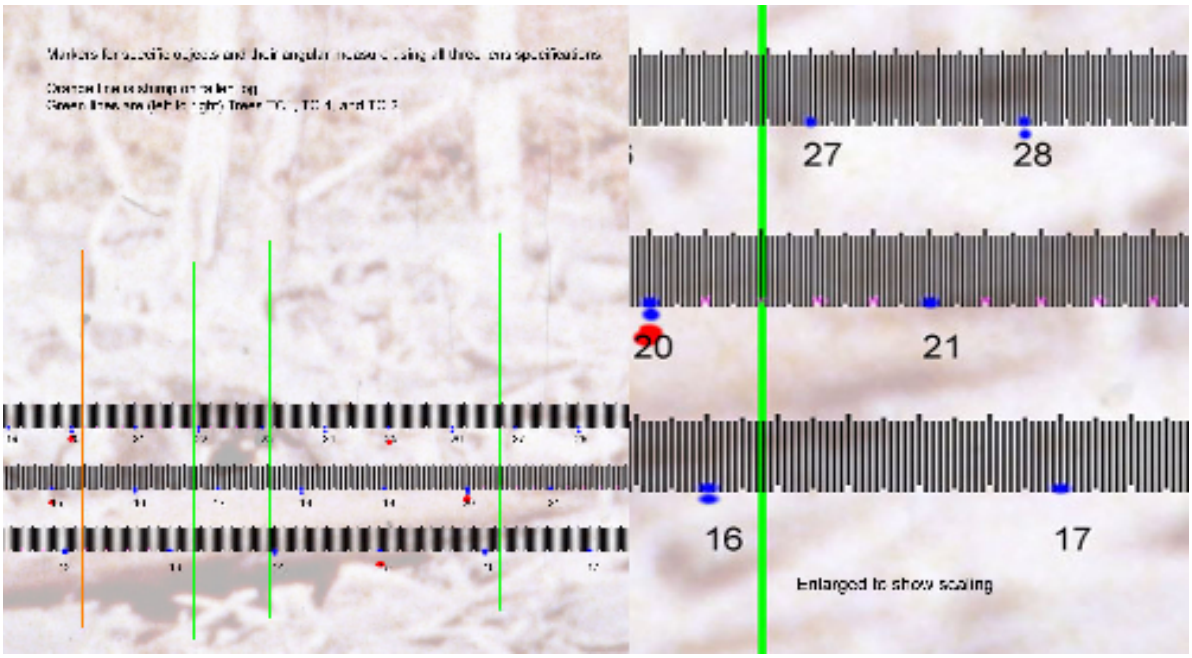


A second set of measure bars have also been developed, for angular measure across a horizontal field of view. This angular measure has three measure bars, one each for a 25mm lens, a 20mm lens, and a 15mm lens (using 22.62 degrees for the 25mm lens, based on lens tests, a 28.58 degree angle for the 20mm lens, based on calculation, and a 37.5 degree angle of view for the 15mm lens, based on calculation).



So using this set of three bars allows the tree or object elements in each test frame to be measured in angular position across the horizontal field of view, for the three test angles which will be first used in the preliminary analysis.

The following image shows how objects are located and angles measured, for the three starting lens options.



Upper scale line is angle for 15mm lens.

Middle scale line is for a 20mm lens

Lower scale line is for a 25mm lens

Those angular calculations, for the center trees, are shown as follows (using F 348 as an example):

Frame VFC - 348

15mm 37.5 degrees

TC1	21.92	degrees
TC2	26.78	
TC3	36.20	
TC4	23.00	
TC5	34.10	
stump	20.18	

20mm 28.58 degrees

TC1	16.72	degrees
TC2	20.40	
TC3	27.61	
TC4	17.62	
TC5	26.00	
stump	15.38	

25mm True 1" 22.68 degrees

TC1	13.24	degrees
TC2	16.15	
TC3	21.88	
TC4	13.95	
TC5	20.59	
stump	12.17	

A similar calculation will be done for each frame selected for site model analysis.

The Current inventory of frames being set up for usage are: VFC 003, VFC 006, VFC 012, VFC 175, VFC 184, VFC 194, VFC 200, VFC 207, VFC 211, VFC 266, VFC 275, VFC 290, VFC 301, VFC 348, VFC 397, VFC 455, VFC 672, VFC 706, VFC 717, VFC 723, VFC 745, VFC 778m VFC 793, VFC 864

This effort thus far is merely the setup and documentation, establishing the foundation for subsequent analysis. But it provides a systematic and reliable method for measuring dimensions and angles, easily documented and visually preserved for subsequent review and analysis by others after release of the material. But it has been time consuming and the goal is to do it well rather than in haste.

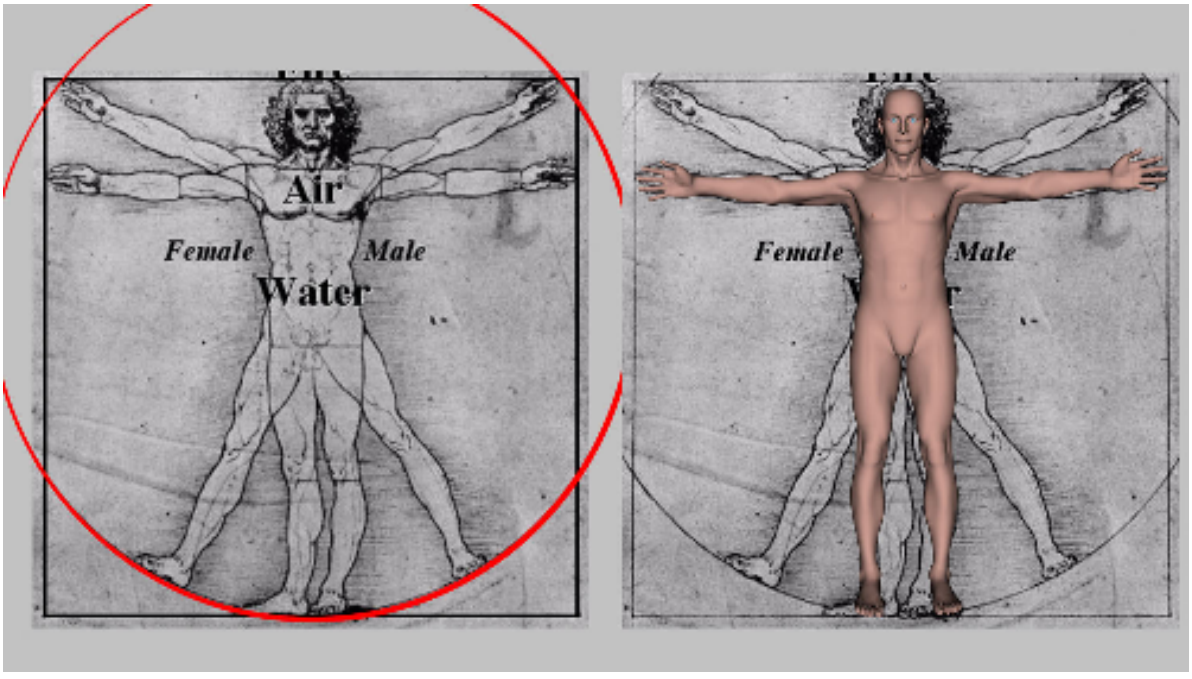
Issues of lens distortion, and correction for same, are currently under consideration as well. Plans for bench testing the distortion of several samples of lenses in the 25mm and 15mm focal length are under way, to establish both a distortion character and a profile of how high a degree of continuity there is among several lenses, so a reliable lens distortion correction can be applied to the film frames. The financial and logistical issues for successfully running these tests are being evaluated currently, and hopefully will be resolved soon to allow for progress to the next analysis step.

So while this effort is taking longer than anticipated before, the work is progressing in a systematic manner and the documentation of method and effort is being accumulated.

Comparative Anatomy

The Comparative Anatomy of the film's subject has been expanded and in the process of doing so, a direct connection between this and the walk cycle and path was determined, so the effort now tends to support both channels of analysis.

The human body, as a generalization, is one specified average form and dimension, but of course, humans come in all shapes and sizes. So any comparative anatomy analysis requires a baseline assumption of human form. For this, I have chosen a classical study of human anatomy by Leonardo DiVinci, to represent the "normal" human proportion.

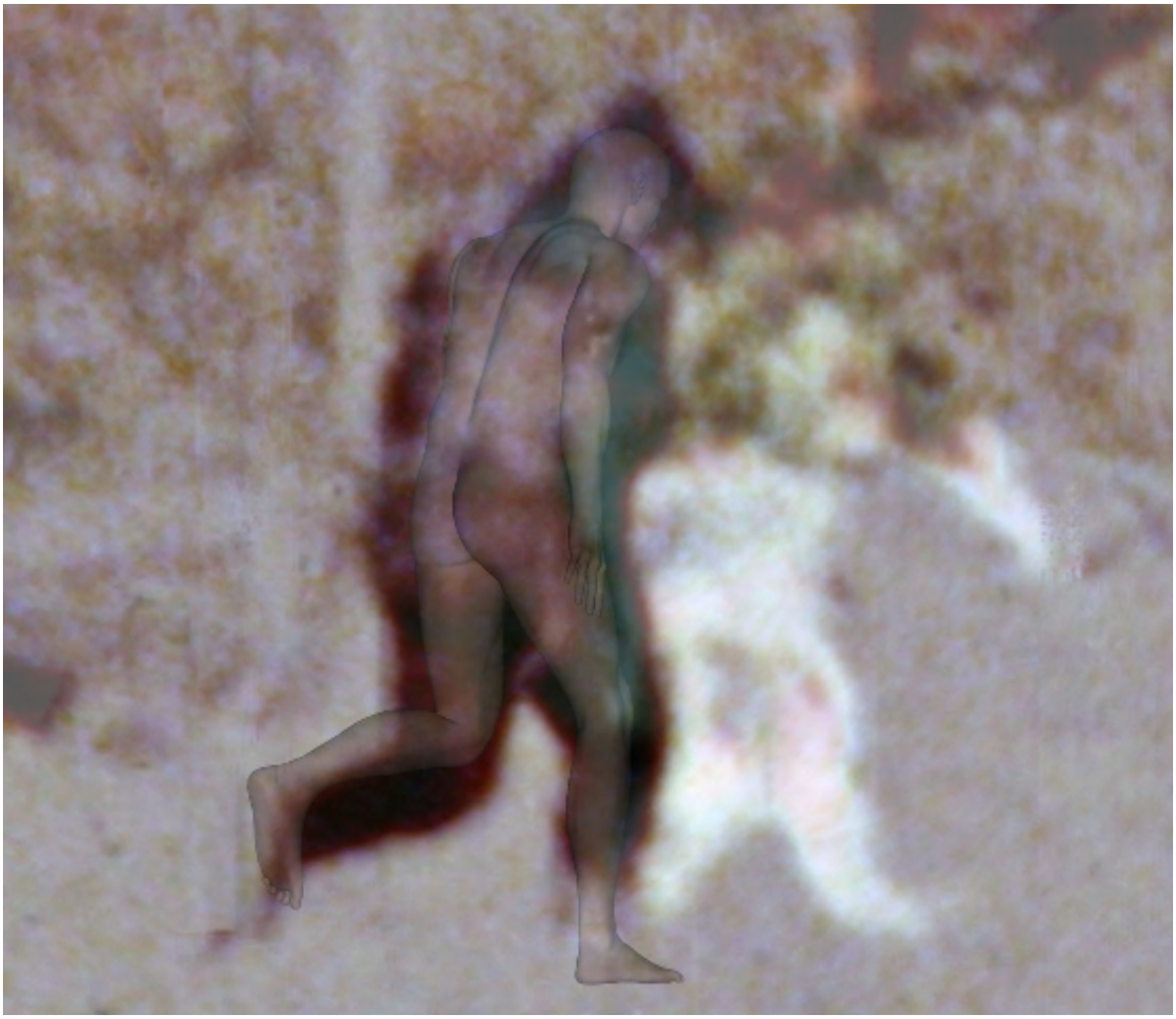


To transpose this standard man proportion into a film frame, locating the foot was a necessary part of the alignment, so the digital figure can be superimposed over the film figure, with head and foot aligned.

Since the foot supporting the body is so often slightly obscured from view, a method was used to superimpose two frames of distinct different sequence positions, but the same foot securely planted on the ground for both, to provide two separate shin bone (lower leg) vectors for pointing to the foot position. One frame was inverted in color and set to 50% transparency, and overlaid on the prior frame, to produce the following composite image.

If you do not understand this process, the two images have essentially the same background (varying primarily in film grain patterns). So by inverting the colors of the top layer, and setting transparency at 50%, and then positioning the top image so the landscapes align, the correct alignment of landscapes renders out as a neutral grey tone, and only that which is different about the two frames shows in any intense coloration. In this case, the two different body positions are the different frame elements, so this method essentially eliminates almost all the landscape and allows us to give our full attention to the body anatomy, and especially what the differences are between the body at differing points in time.

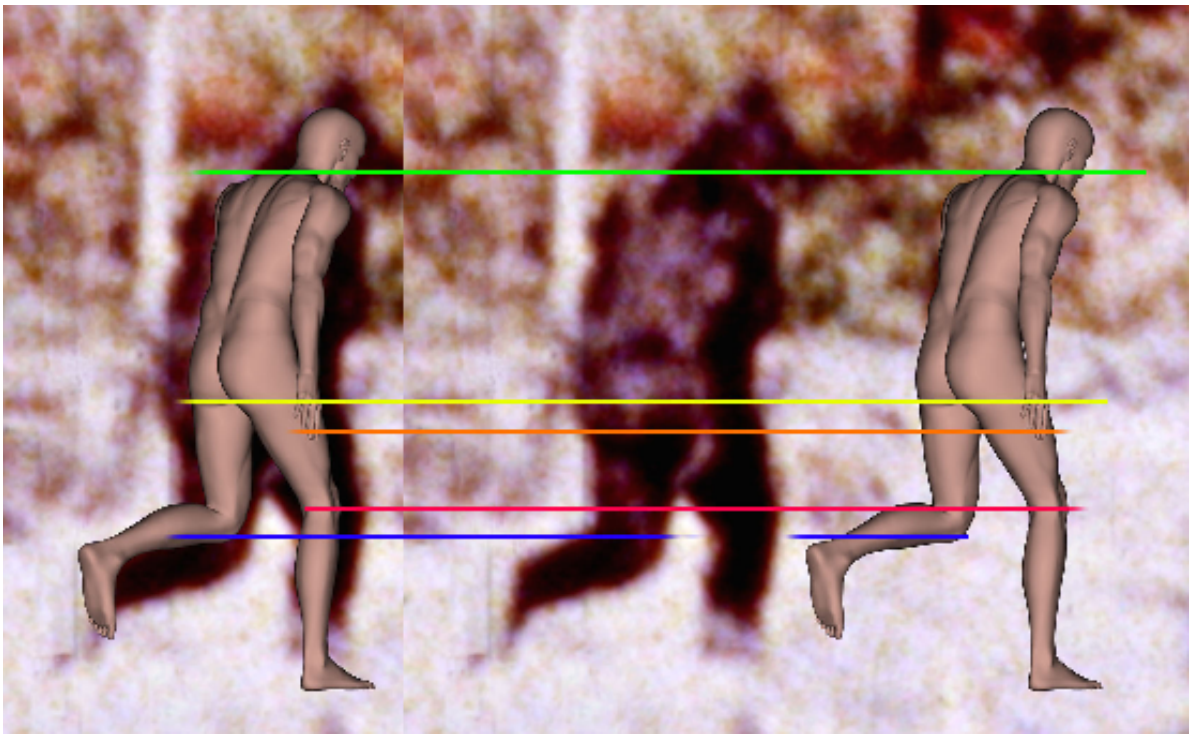
Then this is referenced to the digital figure as posed to match the frame above, as seen in this next image.



The foot, in this position, can bend at the ankle and lean into the whitish posture, and thus is a reasonable estimation of the foot location in this part of the film frame sequence.

Using this positioning, the digital model, as posed to match the general posture of the black figure, (which is the earlier frame of this two frame compare), we can now see the general discrepancies between a standard man body and the film subject's proportions.

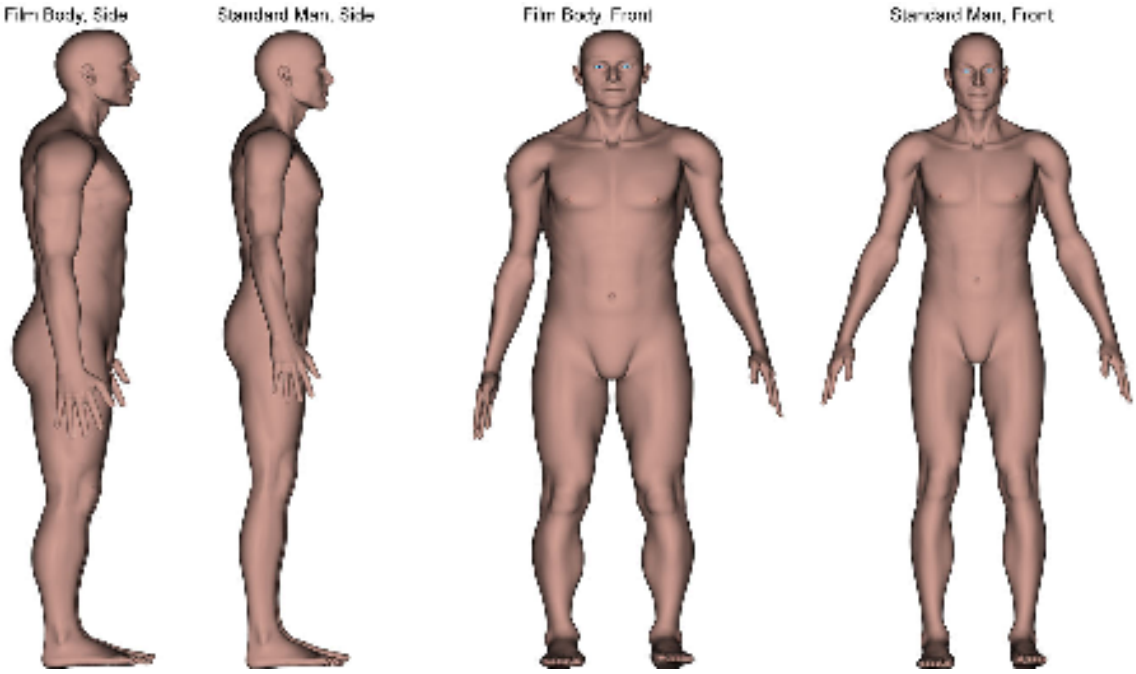
The comparison of standard body and film subject body is thus:



The green line is the shoulder reference, where the figures align.
The yellow line is the base of the buttocks, and the film subject body needs a longer torso and lower buttocks.
The orange line is the finger tips, and the arm, overall, needs to be longer.
The red line is the right knee, with the bend of the knee in back clearly misaligned.
The purple/blue line is the left knee, at the bottom of the bend, and it too is clearly misaligned to the film subject knee. These knee mis-alignments must be corrected by a slightly shorter upper leg, resting on the longer torso with lowered bottom, and a much shorter lower leg in relation to the upper leg, to keep the final foot position correct.

So the adjustments are, longer torso, slightly longer arms, slightly shorter upper leg, and very shortened lower leg. The overall body width is also too skinny, so a wider body is necessary. And in the process of comparative studies with this new body specification, it was found that drooping the right shoulder also facilitated a better match.

So below is a comparison of the standard man to the revised body morph found to have a high degree of anatomical matching to the film subject's body.



The Film Body, as shown above, is currently the primary testing body for subsequent analysis. In the full comparative anatomy report segment, when complete, this body's full specifications will be included.

As noted in the beginning of this section, the comparison of this body to the film subject body is given a higher degree of reliability as more frames are compared, and comparing multiple frames gave clues to a walk cycle determination. So the comparative anatomy work has been done as a concurrent and corroborative element to the walk, path, and foot size analysis. Highlights of the work in progress are shown below.

I would like to point out that I have only recently become aware of the analysis of other researchers about the short lower leg, in particular, and it has been observed and studied by others for several years now. But the curious nature of the forum environment, where good threads with fine research information tend to be taken over by people intent merely on arguing a petty concern to death and derailing a thread in the process, actually makes it all the harder to use the forum data, voluminous as it is, for good research.

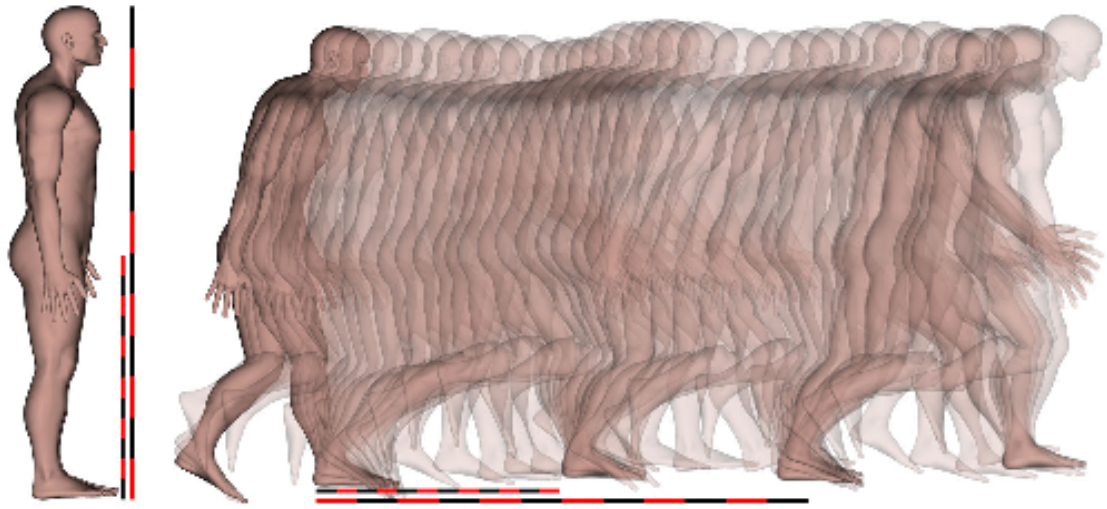
Thus we may sometimes "re-invent the wheel" so to speak, discovering what others before us had previously discovered, because we were unaware of the effort by others, and the ratio of wasteful argumentative posts (compared to real data of merit) impeding our efforts to properly research the efforts of others before us.

On the plus side, people who arrive at similar conclusions by independent means, and not influenced by the prior work of others, do provide a good substantiation of the facts, because they reflect independent conclusions arrived at, converging on one result. So to one and all of you who observed the short lower leg before me, I would be pleased to acknowledge your prior efforts if you wouldn't mind e-mailing me the links to your prior analysis presentations and discussions.

Walk Cycle Analysis and Path

The walk cycle is developed by taking consecutive frames of the film, and posing the body to that frame, and then rendering out a true orthographic side view of each pose, and then superimposing each render frame with alignment of a foot which is stationary for that phase of the walk.

In doing so, a step length, as a proportional measure to body height, can be determined. The individual poses for each film frame can be compared to the motion pattern of multiple frames, because the physics of a walk cycle tend to reinforce smooth changes of position (rate of change) as a simple biological matter of efficiency. The chart below simply illustrates the work now in progress, a composite of about 40 sequential frames.



Interestingly, it identifies a step distance for the first full step at 50% of body height (using the standing body at far left as the height measure reference), so a 6' tall figure is making a 36" step. For a body of the same height, the second full step is about 32".

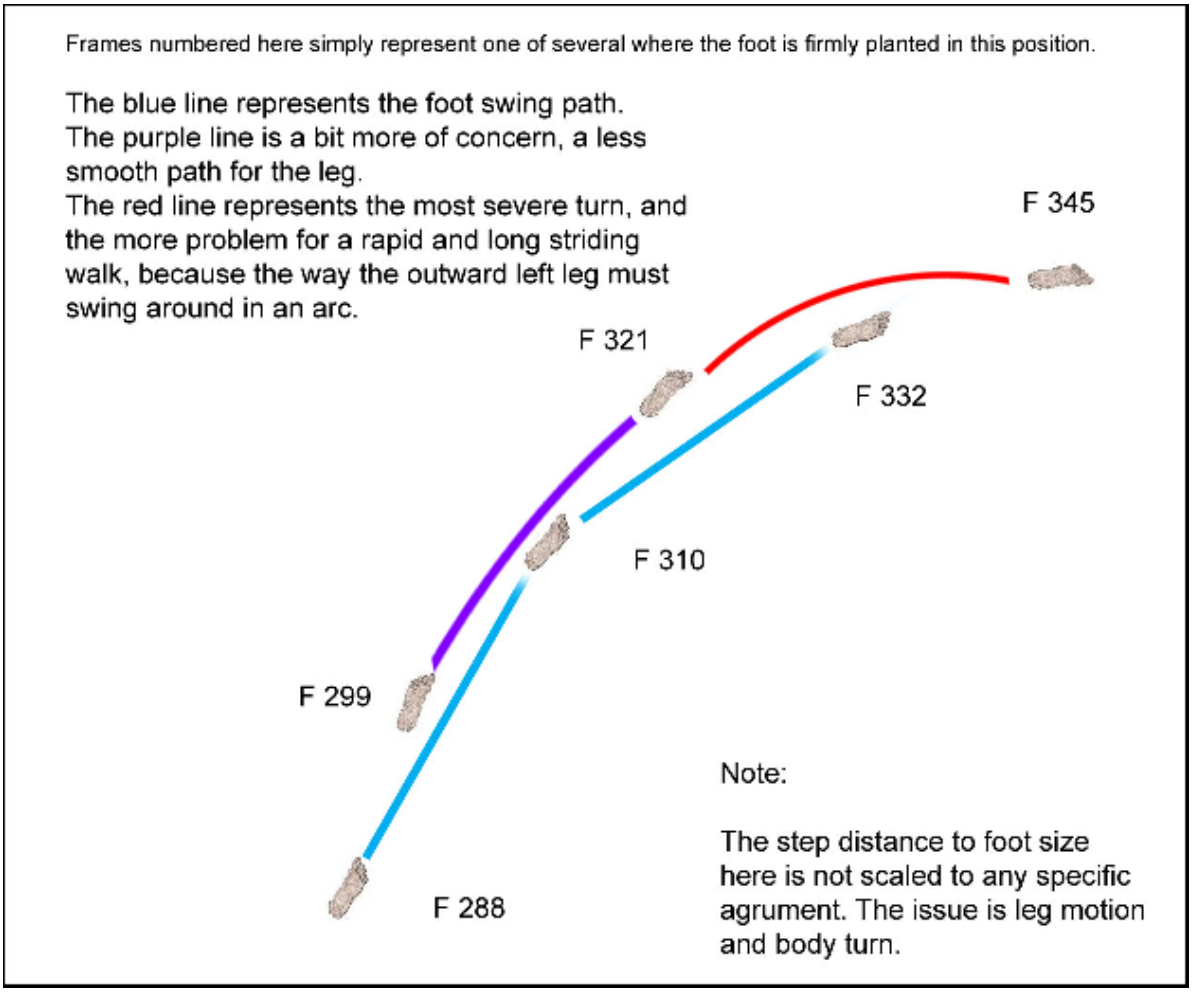
The value of this analysis is that it may help us fix the final body path angle from camera, the step and stride length (in proportion to any specified body height), and help fix the rotational degree for each step as the body approaches the look back sequence.

This step path rotation has the possibility of helping us further refine the walking speed and stride, because a faster speed and longer stride reduce the turning agility of a subject, and may set limits on stride and walk speed, which could ultimately impact on filming speed analysis.

For example, the step taken in and around frame 330 is the last step going into the full profile sequence for the lookback, and the body turns about 20 degrees or more through that step cycle. But the body is turning to the right, and it is the right foot which is planted, the left foot being lifted into its forward swing. But this means the left foot cannot travel a straight path to its next step location, because the path (in true straight line) is literally through the right foot. So the left foot must swing around the right foot, and the body must torque at the ankle of the right foot to make the turn.

I can see where a fast pace walk can turn abruptly, if the planted foot is on the outside of the turn, and the planted foot pushes on an angle, and the swinging forward leg angles forward and away from the body to its destination position to step. So the outside leg pushes the body into the turn. But in this film, that last turn of the body is being made by the inside leg, so it would seem to pose more problems making a fast turn with a long stride under the circumstances. I have no conclusion on this yet, merely the concern that it requires more study and perhaps some walking tests, to see if such a turn on the inside leg may limit speed and step distance.

The following illustration shows the specific step of most concern, with a red path for the leg swing.



The current walk cycle analysis may allow for more information on this specific walk sequence from the film to be more fully modeled in a digital motion analysis, and may help clear up some of the questions regarding stride and walk speed, based on how full a stride and how fast a walk can be accomplished in this step pattern, and these step path angles.

So this walk cycle analysis is very comprehensive, and time consuming to set up, and evaluate, but once done, has excellent potential for helping solve many of the issues regarding path, step and stride length, walking speed (and thus camera speed) and even foot size to body height. Once the walk cycle is finalized, it will set limits on how large a foot (in relation to body height) can complete the walk cycle without tripping over the toes. So it may factor into the "foot as ruler" analysis done by so many researchers.

Under consideration is how to format the documentation of the walk cycle analysis, because of the sheer volume of rendered images needed to do it, when each frame pose is rendered out alone at true side, alone at true camera view angle, compared to the frame of film, etc. and then composites of multiple frame poses overlaid to graph the motion cycles of various body parts. So this is an issue still being considered, as documentation is accumulated.

Upcoming Events

Several events are currently scheduled where I may be interviewed or may be speaking to a gathering in person. So this list is offered for anyone interested in these events.

Interview Sept. 29, 2009 Bigfoot Busters Radio Tim Stover, host

Bigfoot Discovery Days event Speaking Oct. 17, 2009
Fenton, CA.
Bigfoot Discovery Museum

Interview Oct. 21, 2009 Campfire Shadows with Vic Cundif

Possible speaking event, November 2009 in Florida.

TV Documentary (Late fall, 2009) to be announced