Rebuttal of Ace Baker's "Chopper 5 Composite" Analysis
**29 July 2007**
by Eric Salter

Many times in the past several years we've heard dramatic announcements of definitive proof of no-plane and video fakery claims. These previous false-alarms have proved to be mistakes and Ace Baker's analysis of the Fox 5 footage is no exception to this pattern.

Baker claims that the lower variability in the measurements of the plane's speed in his control cases prove that the motion of the plane in the Fox 5 footage is unnatural. This claim is in error. The control cases are not equivalent to the Fox 5 footage and do not shed light on the expected margin of error in the Fox 5 analysis. In fact, his control footage is sharper and lacks the noise and distortion (visible in the wavy, rippled edge of the WTC towers) of the VHS source for the Fox footage. The most important factor in stabilizing or tracking motion is the clarity of detail of the tracked object and the consistency of that detail from frame to frame and not so much on the number of pixels that object occupies. It's not surprising that he achieved a lower error rate with his control footage analysis.

The increase in variability in Baker's post-stabilization measurements of the Fox 5 footage is not suprising either: stabilization of that footage would not change the variations in speed, except for some jitter caused by the software stabilization process, which would generate errors due to the low quality of the footage. The helicopter already had a mechanically stabilized camera system to remove shakes and vibration, leaving only a steady drift to the left, probably caused by the helicopter's movement. Stabilizing this footage removes the same amount of movement from each frame, leaving the before and after measured motion variations the same, except for the positioning jitter, which can be seen in the higher variability in Baker's stabilized velocity graph.

So the only question remaining is: do these variations exceed what would be the expected margin of error in measurement of the Fox 5 footage? For this an attempt to calculate that error must be made.

The subjective placement of the wireframe over the plane image is definitely going to create some error. The following diagram shows 3 possible placements (at 800% magnification) of the wireframe over the image, one in a center position and two other positions moved to the left and right .5 pixel. The size of the pixels can be easily seen.

+.5 pixel   -.5 pixel
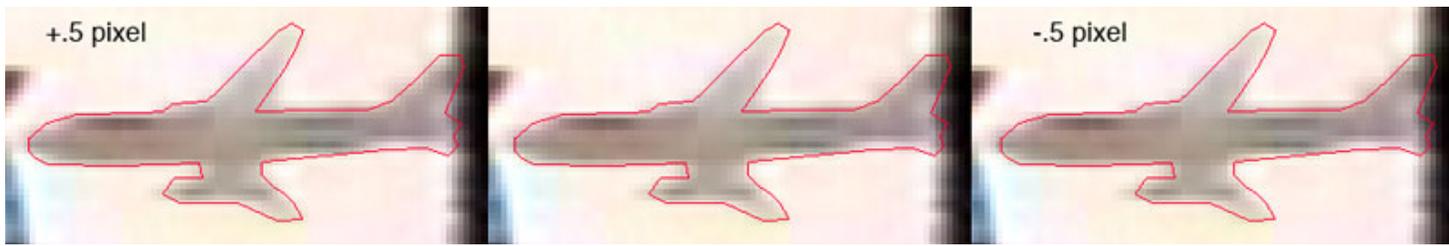
The center and left positioning are virtually indistinguishable, and the right adjustment only barely looks out of alignment. So the exercise of visual placement alone introduces a minimum margin of error of just less than 1 pixel.

And there are more factors which would add to the margin of error:
•Distortion of the shape of the profile of the plane from frame to frame due to poor quality vhs footage.
•Stabilization usually calculates stabilization at a sub-pixel resolution. I've seen jumps of a large fraction of a pixel when stabilizing high quality footage, yet the Fox 5 footage is noisy, poor quality VHS footage (in fact, I had to make adjustments to the stabilized Fox 5 footage by hand because of some errors in the stabilizing process, and that manual process also certainly has a margin of error). I don't know exactly what this additional error would be–only someone with more experience in this subject can know this value with some confidence– but a good sized fraction of a pixel seems like a bare minimum conservative estimate.

Given the error in visual placement plus these other two factors, the margin of error should be at least 1 pixel and could possibly be higher. A velocity measurement uses two position measurements, therefore the minimum margin of error in the velocity measurement would be 2 pixels or higher.

The following shows the stabilized Fox 5 footage with a wireframe overlay placed over the plane and a timeline showing the change in position and speed of that overlay:

http://www.questionsquestions.net/WTC/fox5velocity.html

Frames 12 and 13 were excluded from the velocity calculations because the plane behind the graphic. The data for frames 1, 11, 14 and 22 might be less reliable than the other measurement because only a small portion of the plane was visible, but I included them anyway.

Now, if the plane is real and moving smoothly, the difference between two velocity measurements should not exceed 2 pixels. This is exactly what is the case, as shown in this graph of the velocity of the wireframe:
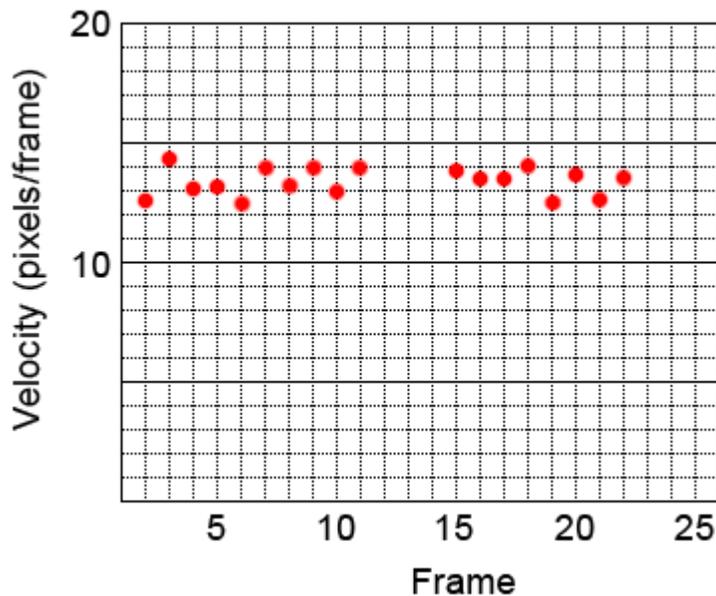
The largest change in speed between any consecutive frames is between frames 2 and 3, 6 and 7, and 18 and 19: a 1.6 pixels/frame change, which is less than the 2 pixels/frame minimum margin of error (corresponding to a .8 pixel error in position, which could be accounted for solely by the subjective error in positioning the wireframe overlay). Thus, the motion of the plane in the Fox 5 footage clearly matches the motion expected of a real plane.

Baker's measurements of larger errors are simply not representative of the Fox5 footage, and are a result of less accurate placement and stabilization (by the way, Baker apparently doubled the image size of the 640x480 footage before measurement, resulting in motion of 20-25 pixels per second instead of around 11-12. His values must be multiplied by .56 to be equivalent to the values in my graph above, which come from the 720x480 footage at normal scale).

One might argue that Baker couldn't have come up with such similar graphs of velocity for the stabilized and non-stabilized versions of the Fox footage unless those variations were authentic, but this would not be necessarily true: he could

have simply made the same subjective errors in positioning the wireframe both times, resulting in similar graphs.

In regard to the exit of the plane, the alleged "nose cone" emerging from the building is not the shape of the nose of the plane: it is very clearly [thinner than the nose of the airplane](#) when it first exits the building, then grows in size to approximate the shape of the nose, then *continues* to widen and starts to move down a bit, which is exactly the behavior one would expect from a smaller piece (or pieces) of debris pulling an expanding cloud of dust or smoke behind it. It simply *can't* be part of a keyed plane image or CGI model. Because the shape is changing Baker's motion tracking data of its velocity is pretty much meaningless, and furthermore that data has generally the same amount of variability as Baker's measurements of the plane, which means it's probably not indicative of any abnormal motion for the same reasons the plane data is not.

So in summary:

•Baker's control cases are not equivalent to the Fox 5 footage and don't contribute anything to the calculation of a margin of error.
•A conservative estimate of the margin of error in positioning the overlay on the Fox 5 footage must be around 1 pixel (or more).
•The motion of the plane in the footage is well within this margin of error, therefore the motion is natural and there is no evidence for video fakery.

There's really no need to read further but I have some more observations for those who want to explore more. In addition to technical mistakes Baker's article is filled with biased and illogical thinking.

His arguments show that he doesn't understand how keying and compositing is achieved on a professional level. His idea that footage of a real plane was chroma keyed live is absolutely silly. It would never be used when photo-realistic [CGI](#) would better accomplish the task (unless the perps deliberately wanted to emulate 1950's quality special effects and expose themselves). Not only could CGI be perfectly synced to the motion of the background footage, it could be cleanly overlaid, eliminating the problems with edge details that go along with chroma keying. Keyed real footage would only be used when both pieces of footage are shot using the same motion control camera movement, which would match the motion of each perfectly and eliminate motion anomalies of the type he says can be observed (and which aren't there anyway). And if they did use live footage, it would not be keyed live but be prepared ahead of time with keying and/or [rotoscoping](#) to create an image

digitally formatted with an [alpha channel](#) for a clean overlay (and they could have easily fixed any variations in movement during that process). Besides, in broadcast video, the "Sportsvision" technology he cites in his article is used with CGI images, not chroma keyed footage.

The pink-colored artifacts he mislabels "digital paint" are artifacts resulting from noise, poor quality VHS recording or compression.

Like all the other no-plane arguments, there are fatal logical flaws to the scenario Baker argues. If an overlay was used, the Fox 5 footage shows that the overlay was *perfectly synced with the WTC towers*: jets of dust come out of building exactly where and when the plane hits (propelled by last second operation of jet engines, as seen in the [Fairbanks footage](#)). This tells us that the overlay of the plane would have been placed exactly where the alleged planted explosives would have been in the building, confirmed again by the flames coming out directly opposite on the other side of the building a split second later. So the timing and positioning of overlay would have been precisely coordinated with the camera movement. Therefore (since they would have used CGI and nothing else) it doesn't make sense that there would be any irregular movement of the overlay as Baker suggests. And it also follows that it doesn't make any sense at all to suggest that the conspirators would mess up the exit of the model from the building when the entry was absolutely perfect, AND furthermore to suggest that they remembered to slow down the overlay during it's penetration of the building (as seen in Baker's velocity graphs) yet forgot to have it actually stop within the building. It seems that some no-planers simply can't think logically.

Baker suggests that clear weather was essential to the conspirators plan (because of their rather unprofessional plan to use chroma key). And just how did they ensure clear weather for a date planned months in advance? Was God in on the plot? Amazingly, this is even more ridiculous than the previous no-planer assumption that the conspirators could have controlled all the cameras in New York on 9/11.

In addition to his own claims, Baker cites a series of no-plane arguments (such as that the plane in the Naudet footage is smaller than a 767) which not only [have already been thoroughly debunked](#) (and a long time ago too) but which were debunked with analyses much simpler than the kind he himself attempts in his article. Because of this, one is forced to assume he possesses a zealous bias towards the no-plane scenario totally in contradiction to the scholarly tone of his article.

Once again, I felt obliged to revisit this issue and conduct this analysis, since this analysis is outside the expertise of other 9/11 researchers I know who are working in this area. Unfortunately it was a royal waste of time, delivering totally predictable results. The lack of a logical scenario for the no-plane theory should be enough to invalidate it, but many people don't think logically and, sadly, propaganda like this still has to be rebutted, as the [unwary will be fooled][1] by it's veneer of authenticity.

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[1] [Mounting Evidence of 9/11 Video Fakery](#) by James Fetzer