

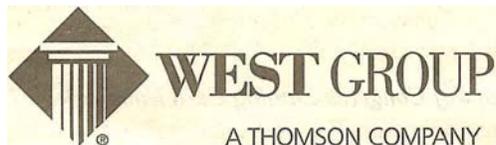
Electronic EVIDENCE

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**Cumulative Supplement
by The Publisher's Editorial Staff**

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Issued August 2001



At this point it is possible to make a few general comments with respect to forensic video, especially in contrast to forensic audio. First, making high quality, possibly undetectable, falsifications or fabrications of video evidence is much more difficult than it is with respect to audio recordings. The video signal for even ordinary NTSC video is enormously more complicated than the corresponding audio signal, with a bandwidth one hundred to one thousand times as wide.

Second, forensic video analysis can be much more costly than forensic audio analysis. The equipment, expertise, and time necessary to examine even a five second video event might cost many times what it would cost to examine an hour-long audio recording. Given the complexity of the video signal, far more aspects of it can be examined with specialized equipment, including waveform monitors, vectorscopes, and oscilloscopes, for technical inconsistencies and tell-tale signs of manipulation. Given the possibility that an alteration might have been made in any of the thirty frames (or sixty fields) that comprises a second of video, each of those fields might have to be examined.

Third, video is unlike audio, in which there is a relatively continuous curve between crude falsifications using widely available equipment and high quality, potentially undetectable falsifications using the most advanced digital audio workstations. As a function of the complexity of video—at least given the current state of technology—manipulations tend to be either crude and obvious, or difficult to detect. In other words, it is usually possible to make a determination that a crude video falsification has or has not occurred for a few thousand dollars. If it is a sophisticated video manipulation, however, and a quantitative, instrument-based, analysis is desired, an analysis can easily cost tens of thousands of dollars for a few seconds of footage. Fortunately (again given the current state of technology), the ability to perform sophisticated video falsifications and fabrications is currently limited and would, in itself, be extremely expensive, i.e., generally many times more expensive than it would be to analyze the same material.

Fourth, the basic forensic video analysis is likely to parallel the forensic audio process. The first stage will be the equivalent

of the forensic audio expert's "critical listening" stage, but in the case of a video recording it will be a "critical looking and listening" stage. Thus, it is important to consider the audio and video components together, since the synchronized audio and video components supply an indicia of reliability that can serve as an important reference point. A strong clue that a video recording may have been altered is the presence of discrepancies in synchronization between the picture and the sound, as when a speaker's words do not exactly match the movement of his or her lips. As to the video component itself, "smears," "glitches," "rolling," unexplained lines, unexplained distortions, and any other type of picture "breakup" may indicate editing, alteration, or falsification. Sudden jumps in action or cuts from one scene to another should also be noted. With respect to the sound component, sudden changes in noise levels, strange or inexplicable sounds, conveniently disembodied voices, or important statements made while a person's back is turned, may also be significant.

Subsequent to this initial noninstrumental phase a forensic video expert can apply various measuring devices and instruments, especially waveform monitors, oscilloscopes, and vectorscopes, to analyze a video recording for inconsistencies between segments and unusual changes between frames. Ultimately, the detection of alteration boils down to a combination of common sense and technical expertise, and the willingness of a party to spend the time and money necessary to thoroughly review the video recording in question. Of course, certain falsifications may simply not be detectable, regardless of the effort expended and the level of expertise of the forensic video expert retained.

Fifth, the location of a properly qualified forensic video expert is an important task that should be carefully undertaken. There are currently few experts who are solely in business as forensic video experts. If counsel is unable to locate a properly qualified forensic video expert, either through word of mouth or through local bar association contacts, inquiries made to local video service providers may prove fruitful. Given the many different levels of expertise that can be found, and given the rapid expansion of the electronic imaging and legal video services fields, it is important for counsel to carefully check the credentials and references of all potential experts. Previous successful experience as a forensic video expert is, of course, the best possible credential.