



## Ensure admissibility of digital images.

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By Richard Kammen and Herbert Blitzer

Digital imaging tools, such as digital cameras, photo CD discs and image handling software, can be important assets to the police department as it gathers and presents evidence. But as with any other tools, you must have standard operating procedures (SOPs) in place to ensure that evidence you gather and present will be accepted by courts of law.

Standard operating procedures governing the use of digital imaging technology need to incorporate five key elements.

### 1. Images must be recorded in an unalterable, archival form soon after the records are created.

A digital imaging technology that supports this requirement is a writable CD. Writable CDs are CD-ROM discs using CD writers and read using standard CD-ROM computer drives.

Writable CDs are ideal for storing images or information about evidence because they are a non-erasable media. You can append data to writable CDs as long as sufficient space remains. However, it is not possible to remove or write over images that are already on the discs. Writable CD images are created by permanently altering the disc's dye layer with a laser light beam. CD writers cannot undo previous laser marks.

Some CDs have engraved serial numbers as well, which eliminates the possibility that altered discs might be substituted for originals.

Writable CDs are being used today in law enforcement to archive images and to display them in court.

### 2. The images should include information regarding their creation.

This requirement is also supported by today's digital imaging technology. For example, some digital cameras generate a uniquely written data file each time an image is captured. The file records information such as the camera's make, model and serial number, camera settings, and the date and time the image was captured. When you save the image, the data file can be stored as well.

If you write the image and data to a writable CD soon after the image capture and prior to any image enhancement, you will have created an archival reference copy.

### 3. The agency must control custody of all image records at all times.

This requirement ensures someone can testify about who had access to any images used to suport testimony as evidence.

There are a number of procedures you can put into place to satisfy this requirement. For example, determine which computer or computers will be used for medium- or long-term storage of image files. Then password-protect sensitive computer files stored on those computers. Keep the computers and any archival media, such as CDs, in secure locations.

The use of unalterable media for storage, along with a separately managed index for each unit, helps ensure the integrity of information.

You should also establish procedures for the management of any files stored temporarily on portable computers. For example, you may want to specify how frequently those files will be removed from the porables and archived.

### 4. All agency personnel who prepare exhibits for court should be trained in digital image processing and should understand which images might require a special notation to show that the changes are not prejudicial.

Certain procedures for enhancing digital imaging files are analogous to using basic darkroom techniques to enhance film images. They are applied generally to an entire image. Digital imaging software can, for example, be used to control the contrast of images or to enlarge them.

Other digital processing procedures are potentially more problematic. These are applied to certain parts of an image. For example, you can use software to "morph" an image of a person's face to show how the person would look if he or she were older or several pounds heavier. In these cases, it may be necessary for the staff to document how the changes were made.

There is also a gray area between these two types of image processing. Selective color removal or fast fourier transformation can be used to clean up the background or a latent fingerprint. Special procedures should be established to support expert witnesses as they testify concerning any of these image processing techniques.

In some cases, you can implement image processing SOPs using computer-based tools. for example, it is possible to record the keystrokes used to perform a computer operation in a file called a "macro". When a macro is replayed, it will re-execute the keystrokes in their origianl sequence. This technique could be used to document how a particular image alteration was accomplished.

### 5. The agency must establish rigorous procedures for entering work-in-progress into proper file systems.

Digital technology can help agencies document how and when images were captured, processed or stored. However, additional procedures must be used to create a complete audit trail of how the computer files have been managed. Uniquely identifiable, unalterable media can make this much easier.

Digital imaging technology has brought new tools to law enforcement. Today, digital images appear in courts with increasing frequency, and the uncertainty about how they may be used is dwindling. In fact, in some ways digital images may prove more secure than convential images.

For example, using today's technology it is relatively easy to alter an image scanned from a roll of film, create a new roll that includes the phony image, and then replace the original with the altered roll. However, if you use writable CDs which come with embedded serial numbers, and if you record an index of disc contents along with their serial numbers as part of your standard operating procedures, it would be virtually impossible to replace originals with altered discs.

The key is to select technology carefully and to put standard operating procedures into place that are derived from an understanding of operational requirements and the technology.

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