

# Presenting Photographic Evidence

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One upon a time, when knapping flint arrowheads was still a useful skill, photographic evidence was presented in the form of projected slides or photographic enlargements ranging in size from 4 x 6 to 24 x 36 inches, depending on the jurisdiction, the budget and the available facilities.

**Caveat:** Digital photographs store information in the form of pixels. A modern camera such as the Nikon D7200 will capture twenty-four million pixels. Three hundred pixels per inch is generally considered to be true photo quality. A 24 MP JPEG printed at 300 PPI gives you a 13.3 x 20 inch print, which of course requires a wide carriage printer such as the Epson 4900.

When you down-size the camera-original to make a 4 x 6 print or to include it in a Word document or project it on a multi-media AV system, you'll typically end up with a two megapixel image file. In other words, you are discarding most of the original pixels and perhaps some of the information contained in the original file. *Make sure that important evidentiary information is preserved in whatever method you use to present your photographs to the judge and jury.*

Color slides and color slide projectors have gone the way of the great auk. Digital has all but killed conventional photographic prints in many, but by no means all, courtrooms.

Crime scene investigator Christopher Duncan, author of *Advanced Crime Scene Photography*, tells me that photographic prints are still the preferred method of presenting photographic evidence to juries in Houston's felony courtrooms. Houston, my home for many years, can have more homicides on an off-day than my current home in Woodland Park has had in ten years.

Today, many courtrooms have modern audio-visual systems on a par with those found in college lecture halls. Just as there are e-classrooms wired for electronic multimedia presentations, there are e-courtrooms wired for electronic multimedia presentations.

**The key word is modern.** Not all courtrooms have modern, state of the art audio-visual systems. The Teller County courtroom in Cripple Creek, Colorado, has a CRT monitor and a VHS player on a rollaway cart. It is in no way different from the VHS systems found in Houston courtrooms in the late Seventies and for all I know they're still there to this day.

When I retired in 2006, retail security personnel were still copying shoplifting surveillance footage from hi-tech hard drives to lo-tech VHS tapes for playback in courtrooms in the small and not-so-small towns throughout Texas, Louisiana, Oklahoma, Colorado, New Mexico and Arizona, those states falling within my area of responsibility.

Digital changed all that but the changes did not take place in a standardized manner. Google "courtroom audio-visual systems" and "courtroom presentation software" for an overview.

- Some courtrooms do not have AV systems. Prosecutors and defense attorneys can ask the judge for permission to install their own portable AV equipment, owned or rented.
- Some courtroom systems are based on proprietary technology. Bring your own DVD or flash drive and hope it works.
- Some proprietary systems are controlled by touchscreen monitors while others can be controlled by a smart phone with the proper control application installed.
- Some courtroom systems are generic. Plug in your laptop and you're good to go as long as your material is in a standard format such as PowerPoint, PDF, JPEG, MOV or MPEG.
- You'll want a laptop with several USB ports (3.0 preferred) an Ethernet connection, a 15 pin VGA connector (AKA fifteen pin Sub-D) or an HDMI port with an HDMI to VGA adapter.
- Budget permitting, opt for a Windows laptop with a 64-bit operating system, a multi-core Intel Pentium processor, at least 8 MB of RAM and a fast solid state drive (SSD).
- I'm using a \$350.00 laptop found on clearance at Walmart but my primary system is a desktop workstation. The laptop is strictly a convenience while traveling.

- The faster your laptop, the faster your applications, photos and videos will load and display.
- Some courts have AV specialists on the payroll that will teach you to use their system before the trial is scheduled to start.
- Other courts are strictly hands off.
- Some systems use a multitude of small monitors in the fifteen to nineteen inch range while others use a few large monitors in the forty to eighty inch range.
- Some court houses have a single courtroom while others are home to a dozen or more felony, misdemeanor, civil, bankruptcy, traffic, domestic violence and appellate courts, with differing systems in each depending on the nature of the evidence commonly presented.
- Some courts do not have a system in every courtroom. Portable systems are moved between courtrooms first come first served.

In a jury trial, the jury is the trier of fact while the judge is the referee deciding how the law should be applied and how trials will be conducted.

Whether you're using large exhibit prints mounted on 24 x 36 inch foam core or an electronic display, common sense dictates that the judge and jury must have a clear view of the evidence being presented.

Some early electronic courtrooms provided six small monitors in a twelve seat jury box, one monitor for every two jurors, plus additional monitors at the prosecution and defense tables and the judge's bench. This had the unfortunate side effect of focusing attention on the monitors rather than on the witness.

One Internet article suggests that attorneys presenting digital evidence should use one large display, four by six feet or larger, positioned fifteen feet from the jury box and stand beside the display, pointing out items of interest with a finger just like a weathercaster explaining tomorrow's forecast. This requires a wireless remote, such as a smart phone with the appropriate app.

Obviously, there are significant differences in how e- courtrooms are configured, based on the preference of administrators, the expertise of the designer and the limitations of the then-available budget and technology.

In a criminal trial, within limits established for the court in question, the prosecutor determines how he or she will present a given case.

This has consequences for a police photographer. When you process a scene, you have no way of knowing when, where, how or even if your photos will be presented to the jury. It might be presented one way in the trial court and yet another way in an appellate court. Thus:

- You need to take pictures good enough and have the editing skills required to make 24 x 36 prints if that's what the prosecutor wants.
- You need to be prepared to make as many sets of 4 x 6 or 8.5 x 11 full frame prints as the prosecutor might ask for.
- You need to be prepared to submit photographic evidence in the form of a PowerPoint, a slide show or a series of JPEGs, either as shot camera originals complete with EXIF data or edited masters in which brightness, sharpness, color and contrast have been adjusted to yield prints of professional quality.
- You need to take enough pictures to ensure that the smallest detail can be effectively presented on a low resolution display such as 768 x 1024 projector or a 720 x 1080 monitor.

If you're shooting with a DSLR, you can safely assume a 2:3 aspect ratio. If you're shooting with a pocket, video or mirrorless camera, you may have to contend with a 2:3, 3:4, 4:5 or 9:16 aspect ratio.

This can cause a problem if you have a fingerprint photo shot with a DSLR with a 2:3 aspect ratio and your display system is set up for a 3:4 pocket camera or a 9:16 video camera. The fingerprint will be distorted and the distortion will be apparent to even the least sophisticated juror.

Some systems will let you display whatever you've got. It is still a potential problem unless you verify that your photos will be displayed properly in advance of the trial. If in doubt, be prepared to submit prints even if they might not be needed.

Video opens another can of worms. There are a number of video recording formats, called codecs. Codec is short for **coder-decoder**. Not all cameras can record every codec. Not all systems can display every codec. It pays to shoot vid-

eo using a generic codec that does not require conversion to a standard format to be displayed on a courtroom AV system.

AV systems can be based on projection or flat screen television technology, or some combination thereof. Projectors and TV-style monitors are defined by their resolution in pixels, which determines how much detail you'll be able to see. Common resolutions include:

Projectors	Monitors	Laptops
768 x 1024	720 x 1080	768 x 1024
1080 x 1920	1080 x 1920	900 x 1440
1200 x 1920	1200 x 1920	900 x 1600
1080 x 2048	1440 x 2560	1152 x 1684
2160 x 3840	2160 x 3840	1080 x 1920
	4320 x 7680	1200 x 1600
		1800 x 2800
		1800 x 3200

Obviously, prices go up when you opt for a high resolution display which requires a faster processor, a faster hard drive, additional memory and so forth. By way of comparison, a low end Dell laptop (\$350.00 on clearance at Walmart) has a 768 x 1024 display versus \$2,000.00 or more for a Macbook Pro Retina (1800 x 2800) or a Dell M3200 (1800 x 3200).

A 768 x 1024 laptop, a 768 x 1024 projector or a 720 x 1080 monitor displays less than one megapixel of visual information. At 1080 x 1920, the resolution of HDTV, you're seeing 2.1 megapixels of visual information. At 2160 x 3840, Sony's 4K motion picture resolution and the resolution of the new ultra-high definition 4K-UHDTV format, you're seeing 8.3 megapixels of visual information.

When I take a photo with my Nikon D7000 and print it at 300 DPI, I'm looking at a 10.9 x 16.4 print with 16 megapixels of information. If I take my original 16 MP JPEG and resample to make a 20 x 30 inch print at 300 DPI, I'm looking at the equivalent of 54 megapixels.

A well-made print can potentially reveal more detail than you can see in an electronic display. I'd be leery of displaying a picture or a video with important detail on a display with less than HDTV resolution (1080 x 1920).

The 2160 x 3840 format (4K at your local cinema or 4K-UHDTV on your television) is so new that the equipment is expensive and content is hard to come by. At this writing, the Panasonic GH4 mirrorless camera, about \$2,500 with a general purpose lens, is the least expensive camera capable of shooting 4K video as well as sixteen megapixel still photos.

While 4K costs will eventually come down, court administrators and police photographers are tied to the systems already in place, some of which are getting a little long in the tooth.

At this writing, the 4320 x 7680 pixel 8K-UHDTV format is still a work in progress and it will probably show up in event venues long before it shows up in your living room. Nevertheless, Wikipedia reports that 8K television broadcasts will commence in Japan in 2016.

You can't always replace an older projector with a newer model. The existing wiring may not have enough conductors, shielding and bandwidth to support today's high resolution display and control systems.

Television-type monitors are easy. What you see is what you get, and they're all bright enough to be viewed in room light.

Projection systems require a projector with sufficient light output, perhaps something upwards of 4,000 lumens depending on the size of the room and the distance from the projector to the screen, to be viewed in full room light. You also need a suitable screen, preferably a screen that can easily be seen from off-axis viewing angles.

**Caveat:** Don't go overboard on resolution. 1080 x 1920 is a good target to shoot for whether you're buying a monitor, a projector, a laptop or a video-capable camera. You may see a drop in picture quality if you try to run a 1080 x 1920 projector or monitor with your 768 x 1024 laptop. Your picture is only as good as the weakest link in the chain.

Photographs are demonstrative evidence. Demonstrative evidence is evidence submitted for the purpose of helping the jury understand other evidence, such as the testimony of a witness present at the time describing what he or she saw while the scene was still fresh.

While PowerPoint, part of Microsoft Office and accounting for a reported 95% of the visual presentation software market, is something of a de facto standard, I'm not a PowerPoint fan. I've sat through too many boring PowerPoint presentations, including my own.

If called upon to present photographic evidence in a courtroom or a classroom with laptop support, I'd be inclined to create a Faststone Slide Show Demo if only because it's faster and easier than creating an equivalent PowerPoint.

Redundancy is your friend. I've replaced two hard drives and a CPU cooling fan in the last three months without losing a single byte of data. I subscribe to the 3-2-1 backup strategy endorsed by dpBestflow.org even when I'm on the road.

Some years ago, I was working out of town when my laptop died. I bought a new laptop and went through several pots of room service coffee configuring the new laptop but I was good to go in the morning.

I normally work on a desktop so there are rarely any files worth mentioning on my laptop. However, I'd very likely transfer any files not related to the case at hand to an external hard drive and go into the courtroom with only relevant files on the laptop. Those files would very likely be password-protected and encrypted should my laptop be lost or stolen.

FastStone slide shows compile to an executable with an EXE extension which may or may not play on a proprietary system. FastStone will also let me build an image strip (similar to a slide show) that that can be saved as a PDF, which should play on virtually any system, generic or proprietary.

Should commentary be required, caption information can be stored in the Comment section of a FastStone EXIF table. This is faster and more convenient than building a PowerPoint.

See <http://www.forensic-photography.com/EXIF-Metadata.pdf> for a detailed discussion of using EXIF metadata to validate photographic evidence. Irfanview gives you the ability to print a more detailed EXIF file than you'll find elsewhere.



**File and Attributes**

File Name: D7K\_0086.JPG [ 8 / 42 ]

Location: C:\Documents and Settings\Bob McMicken\My Documents\My Pictures\trains\  
 Type: JPEG Bitmap (JPG) YCbCr

Size: 8.20 MB

Date Time: 2014-01-21 12:28:36

Attributes: 4928 x 3264 (16.08 MP) 24bit

Print Size: 16.43 x 10.88 inches , DPI: 300 x 300

EXIF Histogram JPEG Comment

EXIF Metadata

Make	NIKON CORPORATION
Model	NIKON D7000
Software	Ver.1.04
Date/Time	2014-01-21 11:28:35
Exposure Time	1/160 sec
Exposure Program	Normal
Exposure Bias	0 EV
F Number	F 8
Max Aperture	F 3.48
ISO Speed ratings	ISO 100
Flash	Flash did not fire [off]
Focal Length	18 mm
35mm Equivalent	27 mm
Metering Mode	Multi-segment
GPS	

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EXIF Histogram JPEG Comment

JPEG Comment (Press T or Double Click to edit)

CB&Q 4-8-4 Engine 5629 built in 1940 at the Chicago, Burlington and Quincy shop, now on static display at the Colorado Railroad Museum. A 16 MP JPEG as shot with a Nikon D7000. A copy of this photo was adjusted for levels and contrast and up-sampled to 20 x 30 at 300 DPI. In a ten dollar Costco print, the power lines on the butte in the background are clearly visible, along with the signage on the Denver and Rio Grande rail cars.



Walmart can make 8 x 10 prints while you wait. Costco can make standard sizes from 4 x 6 to 20 x 30 while you wait. Even if you're stuck in an out of town motel, the ability to conjure up prints on short notice is always an option if you have a nearby minilab with competent operators.

Absent a nearby Walmart or Costco, you might find one of the larger Xerox or Konica-Minolta color printer/copiers commonly found in the larger government and business offices, plus Office Depot and your friendly neighborhood UPS store.

I routinely have brochures and manuals with color content printed on the Konica-Minolta machines at our local UPS store here in Woodland Park. At ten cents a page for B&W and forty cents a page for color, the quality is good when the operator uses premium glossy brochure paper.

**Caveat:** The aspect ratio of a DSLR is 2:3. The aspect ratio of pocket and mirrorless cameras is 3:4. The aspect ratio of 8 x 10 photo paper is 4:5. I'm told by photo lab operators at local Walmart and Walgreens stores that they can give you full frame prints of any size up to 8.5 x 11 while you wait, but this is not necessarily true of all minilab operations.

If you can't find a minilab that can give you full frame prints, you can always buy an inexpensive inkjet and glossy photo-quality inkjet paper and make your own full frame prints in a motel room or a borrowed office.

Even if your laptop isn't compatible with the electronic image display system in a given courtroom, most courtrooms have a document camera, commonly known as an Elmo after one of the early manufacturers.

Letter-size prints made on an inkjet printer or a color copier can be displayed on a document camera in all but the most rudimentary courtroom setups. If all else fails, Costco can make 20 x 30 prints for ten bucks while you wait. You can buy a portable easel, sheets of 3/8" foam core and mounting adhesive at the nearest Hobby Lobby.

This isn't rocket science. This is how everyone did it back in the cave days. This is still a viable option if you find yourself in a courtroom with an obsolete or nonexistent AV setup.

In a perfect world, a police officer will know what kind of facilities are available in local courtrooms. Potential issues can be discussed with the prosecu-

tor during the pretrial conference. In the real world, a judge can grant a change of venue or a long-forgotten case can resurface in an out of town appellate court.

Within reason, a competent photographer should be able to deliver photographic evidence in any form requested by the prosecutor or dictated by the available courtroom facilities. The following sites may be of interest:

- <https://public.resource.org/scribd/8763731.pdf>
- <http://www.powerpointforcourt.com>
- <http://www.projectorpeople.com>
- <http://www.projectorcentral.com>
- <http://www.da-lite.com>

## **Reality Check**

Print your most important camera-original JPEG full frame at 300 DPI on premium glossy photo paper using a photo-quality inkjet. Do not downsize to fit the paper. If your printer isn't large enough to make a print at camera-original resolution, make the customary adjustments for exposure, sharpness, contrast and color balance and take a copy of the print-ready JPEG to Costco.

Ask for a full frame print at the camera-original resolution, neither up-sized nor down-sized. If the operator can't give you a full frame print at the camera original resolution, ask for a full frame print at the next larger standard size letting the printer drive make the necessary adjustments.

This is your benchmark print. Take it when you have a pretrial conference with the prosecutor. If the AV system in the court in question can't display the photo with important detail that is clearly visible in the benchmark print, the prosecutor may elect to go with display prints on an easel.

If you find that you're consistently taking pictures that can't be properly displayed on the existing AV systems in local courtrooms, you may need to take more and better closeups to preserve detail that can be displayed electronically.



This is an overall view of the Royal Gorge RR maintenance siding adjacent to an abandoned brick plant in Cañon City, Colorado, reduced from sixteen megapixels to one megapixel. At this low resolution, you can't read the engine number on the locomotive outlined in red.



Crop from a 20 x 30 print enlarged from sixteen to fifty-four megapixels. Nikon D7000 using a 18 x 70 mm lens. All edits performed in FastStone. You don't need Photoshop for basic editing.

## The "Correct" Viewing Distance



This is a full frame view of the cropped photo reproduced on page 11. It was taken with a Nikon D7000 using an 18 - 70 mm lens at 18 mm, the equivalent of a 28 mm wide angle on a full frame camera.

**An attorney, well-coached by a paid consultant** who might have read *Photographic Evidence* by Charles Scott (1935), *Police Photography* by Larry Miller (2006) and *Crime Scene Photography* by Edward Robinson (2007), might ask why I failed to use a "normal" lens, thus ensuring a perspective approximating that supposedly seen by the human eye.

The short answer is that I was standing in the doorway of a business across the street from the brick yard and the rail siding. I couldn't have backed up far enough to use a 35 mm lens (supposedly "normal" on an APS-C camera) even if I wanted to.

I carry a 35 mm prime should a situation arise where it might be needed. But, truth be told, I normally use it in low light situations because it has a fast maximum aperture, a hard infinity stop, a depth of field scale and an infrared focusing mark, all features missing on modern zooms.