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with Tim Dees

Why digital video is better than analog

Unlike analog recordings, digital recordings usually contain information called metadata — "data about data" — that further describes the nature of the primary record

When in-car or "dashcam" video was first introduced to the law enforcement market more than 20 years ago, VHS cassettes were the most logical choice of recording medium. Virtually every courtroom and training classroom had a VHS recorder/player, the cassettes were cheap and plentiful, and the quality was about as good as you could hope for, given the equipment. Many agencies are still using VHS cassettes, or are recording analog video onto some other media, because the equipment is still in place and functional, and managers don't see much of a reason to change. The fact of life is that there are plenty of reasons to upgrade.

Not everyone understands the difference between analog and digital recording. Analog is a continuous waveform (or record) whereas a digital recording is composed of discrete bits of data, usually represented as ones and zeroes.

Important Differences

An analog signal written to a magnetic tape will fade with time, with portions of the waveform eroding away. If you have ever viewed a VHS recording that has been copied repeatedly, with one copy being made from another, you have seen how the signal degrades with each copy generation. A copy of a digital recording is as clear as the original, no matter how many generations of copies have been made, because the ones and zeroes of each copy are identical. It's an all-or-nothing proposition. This capacity to make an infinite number of copies with no degradation is alone enough to justify a move from analog to digital recording methods. Yet, there are still more reasons to make the move to digital.

Maintaining an archive of analog recordings means keeping shelf after shelf full of VHS cassettes (or whatever other recording medium you use), all of which look alike. Paper labels attached to the cassettes can identify the contents — as long as your tape librarian is meticulous in their methods — and no one removes or alters a label. A single tape can hold as much as eight hours of video, and more often than not, only a few minutes of that tape are of evidentiary value. Every time that segment of the tape is viewed, the tape is eroded slightly — especially if the recording is stopped or viewed in slow motion. Those viewing the tape will have to fast-forward and rewind the recording to get to the portion they want to see, and that wears the mechanism more. Finally, if someone exposes the cassette to a magnetic field accidentally or intentionally, the entire recording can be lost.

Analog recordings can be transferred onto CDs or DVDs, which preserves the recording in digital form. The quality of the recording at the time of transfer will not degrade, but by that time the quality has often deteriorated from the time it was made. The transfer process usually takes place in real time, so the transfer of a two-hour recording will take around two hours.

Video recordings that start life in digital form forego most of these problems. If you know the portion of interest in a continuous video recording occurs at and hour and twenty minutes into the recording, you can go directly to that segment without having to view or skip over everything in between. Copies can be produced rapidly, often requiring only a few seconds to "burn" a good-as-the-original copy onto an inexpensive CD. Instead of filling up a closet or storeroom with tape cassettes, thousands of hours of video can be maintained on inexpensive, large capacity hard drives, ready to be called up at any time.

The Digital Advantage

Unlike analog recordings, digital recordings usually contain information called metadata. Metadata is "data about data," information that further describes the nature of the primary record. In the case of digital in-car video, metadata channels often contain the name(s) of the officer(s) who made the recording, the time and date of each segment, the status of vehicle equipment such as brakes, emergency lights, siren, doors, etc., and GPS coordinates where that segment of the recording was made. This same information is sometimes available on an analog recording, but it's encoded on the text overlay of the video image, and the viewer has to scroll through the video to get to the portion of interest. With a digital recording, a reviewer can search for, say, all recordings made within 100 meters of a set of GPS coordinates, and see only those segments listed for review.

One agency I know of uses a digital video system where officers check out a removable hard drive at the start of each watch. The hard drive fits into a recess in the patrol car console, and captures the output of the car's video and audio recorders. At end of watch, the officer removes the drive and returns it to the rack where he got it. The archiving system automatically downloads the new video onto a server consisting of many large-capacity hard drives and deletes the recording from the portable drive. The same system updates the portable drive with mug shots, local warrant information, and other local data the officer may need during the next shift, so the data is always fresh when the watch begins. The officer accesses this information from their car computer, which also serves as the interface of the video system.

Recordings on the server can be viewed and downloaded from any workstation in the department, so long as the user has the appropriate security privileges. This capability has drastically reduced both the number of

complaints against officers and cases going to trial. When a citizen comes into the station to make a complaint about an officer, the supervisor interviewing the complainant brings up the video from the incident while the citizen is present. Far more often than not, the video shows the citizen causing the problem, and the officer is vindicated. No matter what the video shows, the supervisor offers to make a copy of the recording the citizen can take with them. A similar service is provided to defense attorneys and prosecutors. The recordings are viewable on any computer or DVD player. The cost to the agency is about a quarter per CD, but the transparency of their community cooperation is priceless.

Of course, the effectiveness of maintaining a digital video archive is dependent on the "back office" software that indexes and tracks the stored recordings. There are many vendors for this critical service, and it's paramount that you choose one that is compatible with the way you do business.

About the author

Tim Dees is a writer, editor, trainer, and former law enforcement officer. After 15 years as a police officer with the Reno Police Department and elsewhere in Northern Nevada, Tim taught criminal justice as a full-time professor and instructor at colleges in Wisconsin, West Virginia, Georgia, and Oregon. He was also a regional training coordinator for the Oregon Dept. of Public Safety Standards & Training, providing in-service training to 65 criminal justice agencies in central and eastern Oregon.

Tim has written more than 300 articles for nearly every national law enforcement publication in the United States. In 2005, Tim became the first editor-in-chief for Officer.com, moving to the same position for LawOfficer.com at the beginning of 2008. He now writes on applications of technology in law enforcement from his home in SE Washington state.

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