

Industry Trends in Mobile Video



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Introductory Remarks

- 34 years of Law Enforcement Experience
- Last ten years in the LASD were spent in charge of overseeing the development, implementation, expansion, and day to day management of the Sheriff's Data Network.
- That included installation of over 5,000 desktops, implementation of an department wide email system, backbone network that connected to every law enforcement agency in LA County and remote access to the network in addition to the implementation of a Department wide WEB sight.
- I also served as the LA County CLETS coordinator and was on the California State CLETS Strategic Planning Committee.
- 31/2 Years as a consultant, sales manager, and now Business Development Manager for Panasonic Computer Solutions Company.
- Current position Project Manager for development of a mobile video solution for public safety.

Video – What it is and what it is not

- Video is evidence
- It is representative of events that took place relative to the restrictions of the technology used to capture the event
- It is intended as an investigative aid and not the definitive tool for establishing identity
- Video does not carry the same weight as DNA or fingerprints in terms of evidentiary value
- Quality is relative to the camera and codec used, lighting and environmental conditions
- Video, put in it's simplest terms, is what it is.

Benefits for Law Enforcement

- Investigative tool
- Tactical tool
- Officer safety tool
- Risk mitigation tool
- Increases officer awareness of conduct
- Training tool
- Overall - Arbitration tool for resolving conflicts
– provides easier understanding of any situation.

Brief History - Analog Systems

- Analog systems – those which transmit or encode information that is continuously variable. The analog value in visual terms make up an effectively infinite number of colors and detail.
- Recording video in a police car began in early 1980's with portable cassette recorders
- These 'borrowed' technologies from other industries did not survive the harsh and physically demanding environments of the mobile police car
- The mid 1990's saw a move to integrated VCR and camcorders but they too had their problems which include tape removal, storage, search, archival and backup functions.
- Technology is now moving from Analog to Digital systems in both stationary and mobile video

Analog vs Digital

The Advantages of a Digital System

- More hardware reliability – less moving parts
- Higher capacity and more compact storage media
- Ability to record additional data such as GPS, speed, meta data.
- Pre and Post event recording
- Better authentication and security capability
- Vastly better search, storage, and security
- Ease of sharing files
- Wireless transfer capability

Who Builds the Perfect System?

- Nobody does – all systems are built via a series of technical tradeoffs to accommodate market price & user requirements
- Could a perfect system be built?
- Almost, but current costs of technologies used when maximized for best results are cost prohibitive - Wireless transmission constraints are the biggest impediment to perfection
- Goal – produce the very best system given current technology and costs

Digital Video Systems

Process

Video Capture

Media Transfer

Management

Storage

Technologies

Analog: record to tape
Digital: Digital File encoding to storage media

Analog: removal of tape
Digital: wireless or removable storage device

Analog: manual tape catalog
Digital: automated, PC-based retrieval system

Analog: manual filing
Digital: automated archiving, indexing and expiration

Recommended Digital Solution

Network Video System

- Wireless
- Removable Digital File

Scalable, Distributed Over IP Networks

Storage Area Networks and Tape Library Systems

System Components

- Video Camera
- Codec or Compression / Decompression Device
- Storage Device
- Wireless & Wired Microphones
- Software – Front End
- Device Triggers
- File Transfer
- Back end / Storage / Archiving / Retrieval / Backup System

Critical Factors

- The Camera
- The Capture Device – CODEC
- The Storage Device
- The Method of Transfer

The Camera

- The camera housing
- The lens
- Low level light
- Features
- Controls

The CODEC

- What is a CODEC?
- It is a software or hardware technology that compresses and decompresses data
- Why do we need a CODEC?
Video files are huge if a compression algorithm is not used. A live video can contain 24 to 30 frames per second. A single TV quality frame contains 921,000 bytes which equates to 27 megabytes per second.
- How big is that?
- A 650 megabyte CD would only hold 24 seconds of video
- The most common types of CODECS used in Mobile video technology are MPEG2 and MPEG4.
- **The question now which must be considered is how do you get the recorded file from the vehicle to the back end server?**

CODEC CHOICES

- MPEG (Motion Picture Experts Group)
- MPEG2 is capable of producing greater quality than current MPEG4 codec's - currently used in DVD's ,Satellite, and Cable authoring.
- MPEG4 offers substantially better video compression and picks up where MPEG2 left off – defines methods of encoding, storing, transporting, and decoding. The Cable TV industry has announced it is moving from MPEG2 to MPEG4 .

What Does Compression Have to do With Quality

- Digital video is made up of a series of '*pels*' which is equivalent to a 'pixel'
- The more '*pels*' per single frame and the more frames per second results in a better picture up to a limit.
- The greater the '*pels*' & '*frames*' the larger the file which results in much greater transfer rate times.
- Generally speaking, it takes 4 to 5 times as long to wirelessly transfer an MPEG2 file as an MPEG4 file.

File Transfer Options

- Sneaker net – hand remove from the vehicle by a supervisor
- Ethernet – from a strategic location
- **Wireless Transmission - by far the preferred solution**