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An Assessment of Videotape in the Criminal Courts†

*Ernest H. Short, B. Thomas Florence, and Mary Alice Marsh**

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The authors are associates of Ernest H. Short & Associates, the entity primarily responsible for conducting the studies reported in this article. The videotape studies conducted by Ernest H. Short & Associates are part of a larger project in progress at McGeorge School of Law, University of the Pacific.

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I. INTRODUCTION

A. A Brief History of Television and Videotape in the Justice System

Several jurisdictions have attempted to use and others have used video technology at various points in the judicial process. However, the rate of transfer of this technology¹ into the courts has been slow, probably because of uncertainties surrounding the potential impacts of the technology and because of early problems with television coverage of trial and pretrial proceedings. The cases of *Estes v. Texas*² and *Rideau v. Louisiana*³ illustrate the abuses which led to laws or rules of court strictly prohibiting the use of cameras in the courtroom.⁴ In *Estes*, at least 12 cameramen representing the newspaper and television media were present in the courtroom during pretrial hearings which were carried live by both radio and television. The defendant's motion to prohibit television coverage was denied. By the time the trial began, a booth had been constructed within the courtroom to house the media cameramen. Although the trial court's order prohibited live telecasting during most of the trial, it permitted videotaping of the entire proceeding without sound. The United States Supreme Court reversed the conviction of the defendant, finding that the presence of television during the pretrial and trial proceedings was inherently prejudicial to the defendant's right to a fair trial.

In *Rideau*, the defendant had been jailed on suspicion of robbery, kidnapping, and murder. A motion picture film with soundtrack was made of the "interview" wherein the defendant was interrogated by the sheriff and confessed to having perpetrated the crimes. The "interview" was then broadcast on the local television station. The defendant's motion for change of venue was denied, and he was convicted in the local trial court. The Supreme Court reversed, holding that it was a denial of due process of law to refuse the request for a change of venue after the people in the locality had been exposed

¹"Technology transfer" is taken here to mean the utilization of an existing technique in an instance where it has not previously been used — either the acceptance by a user of a practice common elsewhere (adoption) or an application of a given technique in a new way (innovation).

Video recording is proposed to be one technological tool which has the potential to help reduce court delay and improve the adjudicative process. However, the benefits of this technology to the judicial system must depend on its ability to be utilized with minimal side effects. There are both obvious and subtle impacts which videotape could have upon the criminal justice process and individual rights. The California Council on Criminal Justice initiated this research program to assess the potential impacts of this technology on California's judicial system in order to provide for informed implementation of the technology.

²381 U.S. 532 (1965).

³373 U.S. 723 (1963).

⁴For a general history of judicial restrictions on courtroom use of television and camera equipment, see Burnett, *The Utah Federal Court's Ban on Sketching of Courtroom Scenes*, 1975 B.Y.U.L. Rev. 21, 24 n.13.

to the spectacle of the defendant personally confessing in detail to the crimes with which he was later charged.

Some courts have distinguished between the use of cameras by the news media and their use internally and have begun to use video technology. Several jurisdictions have adopted specific provisions allowing the use of video technology.⁵ Others are interpreting existing rules in such a way as to permit the use of videotape in the litigation process. Many court systems, however, still severely restrict the use of videotape.⁶

Actual use of the technology within the justice system has been concentrated in three areas: the investigative process, the preservation of testimony, and the recording of the trial itself. Within the investigative phase, courts have accepted in evidence videotapes of crimes being committed,⁷ crime scenes,⁸ lineups,⁹ interrogations and confessions,¹⁰ and driver performance and condition where the defendant is charged with driving under the influence of alcohol.¹¹ Videotape has also been used to preserve testimony of witnesses, particularly expert witnesses, who will be unavailable for trial. While the majority of cases involving this kind of use are civil,¹² there is authority for similar use in criminal cases.¹³ In addition, out-of-court reenactments of actions or events have been video recorded and later played for the jury.¹⁴ The third area of use has been to record the actual trial for the official record, as an adjunct to the official record, or for later presentation to the jury.¹⁵

⁵See, e.g., FED. R. CIV. P. 30(b)(4) (videotape record of depositions permitted); MICH. CT. R. 315; OHIO SUPER. R. 15 (videotape record of trial permitted).

⁶For a summary of statutes and court rules affecting use of video recording in the courts, see NATIONAL BUREAU OF STANDARDS, POTENTIAL USES OF COURT RELATED VIDEO RECORDING app. B (1972) (available from NATIONAL BUREAU OF STANDARDS, Washington, D.C., 20234) [hereinafter cited as POTENTIAL USES].

⁷State v. Johnson, 18 N.C. App. 606, 197 S.E.2d 392 (1973).

⁸People v. Mines, 132 Ill. App. 2d 628, 270 N.E.2d 265 (1971); State v. Thurman, 84 N.M. 5, 498 P.2d 697 (Ct. App. 1972).

⁹People v. Heading, 39 Mich. App. 126, 197 N.W.2d 325 (1972); State v. Newman, 4 Wash. App. 588, 484 P.2d 473 (1971).

¹⁰Hendricks v. Swenson, 456 F.2d 503 (8th Cir. 1972); Paramore v. State, 229 So. 2d 855 (Fla. 1969); State v. Crothers, 278 So. 2d 12 (La. 1973); State v. Hall, 253 La. 424, 218 So. 2d 320 (1969); State v. Lindsey, 507 S.W.2d 1 (Mo. 1974); State v. Rist, 456 S.W.2d 13 (Mo. 1972); State v. Lusk, 452 S.W.2d 219 (Mo. 1970).

¹¹People v. Fenelon, 14 Ill. App. 3d 622, 303 N.E.2d 38 (1973); People v. Ardella, 49 Ill. 2d 517, 276 N.E.2d 302 (1971); State v. Zimmerman, 501 P.2d 1304 (Ore. App. 1972); See also 1 WEST. ST. L. REV. 104 (1972).

¹²Carson v. Burlington Northern Inc., 52 F.R.D. 492 (D. Neb. 1971); Rubino v. G. D. Searle & Co., 340 N.Y.S.2d 574 (Sup. Ct. 1973).

¹³People v. Moran, 39 Cal. App. 3d 398, 114 Cal. Rptr. 413 (1974); State v. Hutchings, 286 So. 2d 244 (Fla. Ct. App. 1973).

¹⁴Zollman v. Symington Wayne Corp., 438 F.2d 28 (7th Cir. 1971).

¹⁵See Comment, *Videotape Trials: Legal and Practical Implications* 9 COLUM. J.L. & SOC. PROB. 363 (1973).

B. Recent Studies of Videotape Technology in the Justice System

Several studies investigating the potential for video technology to improve the adjudicative process have been conducted. The National Bureau of Standards has reported two studies of court-related uses of videotape. The first report discussed the potential for video recording trial proceedings for the record;¹⁶ the second documented the then current state-of-the-art of video technology and its relationship to the criminal justice system.¹⁷ The National Center for State Courts recently completed an extensive study involving the collection and analysis of information from work conducted in eight different states. The principal objectives of that project were (1) to analyze the technical feasibility of video technology in the criminal process, and (2) to clarify legal and procedural issues affecting the implementation of video technology.¹⁸ Using videotape, Michigan State University has studied the effects of stricken testimony on jurors' verdicts and jurors' perceptions of the credibility of contesting attorneys, and the effects of videotaped legal proceedings on the amount and type of information retained by witnesses and jurors.¹⁹ Similar issues were addressed in a study conducted by the Brigham Young University Law School.²⁰

Another group of studies, conducted for the most part by courts themselves, has also explored various aspects of the use of video technology. In 1968, the Illinois Supreme Court authorized the use of videotape for the experimental recording of complete jury trials to determine if videotape could be used in courtrooms as a substitute for stenographic court reporting.²¹ The Federal Judicial Center has made videotape equipment available to several federal courts to experiment with the recording of depositions of expert witnesses who are unable to appear at trial.²² In Michigan, the State Bar Association and the courts experimented with videotape depositions of expert witnesses for later use as evidence if the expert was not

¹⁶NATIONAL BUREAU OF STANDARDS, 1 A STUDY OF COURT REPORTING SYSTEMS: DECISION FACTORS (1972) (available from National Bureau of Standards, Washington, D.C., 20234).

¹⁷POTENTIAL USES, *supra* note 6.

¹⁸NATIONAL CENTER FOR STATE COURTS, VIDEO SUPPORT IN THE CRIMINAL COURTS (1974) [hereinafter cited as VIDEO SUPPORT].

¹⁹Miller *et al.*, *Effects of Videotape Testimony in Jury Trials: Studies on Juror Decision Making, Information Retention, and Emotional Arousal*, *supra* this issue.

²⁰Williams *et al.*, *Juror Perceptions of Trial Testimony as a Function of the Method of Presentation: A Comparison of Live, Color Video, Black-and-White Video, Audio, and Transcript Presentations*, *supra* this issue.

²¹See ADMINISTRATIVE OFFICE OF THE ILLINOIS COURTS, INTERIM REPORT TO THE SUPREME COURT OF ILLINOIS, EXPERIMENTAL VIDEO-TAPING OF COURTROOM PROCEEDINGS (1968) [hereinafter cited as INTERIM REPORT]; Madden, *Illinois Pioneers Videotaping of Trials*, 55 A.B.A.J. 457 (1969); Sullivan, *Court Record by Videotape Experiment—A Success*, CHI. B. REC. 336 (1969).

²²POTENTIAL USES, *supra* note 6.

available at trial and with videotape trials to determine if videotape would serve as a reliable record. As a result of these efforts, the Supreme Court of Michigan authorized a project to videotape an entire docket as a means of investigating the advantages and problems inherent in docket management of cases where the ultimate means of communication to the jury was by prerecorded evidence.²³

These efforts have done much to counteract negative attitudes toward judicial use of video technology and to further the intelligent transfer of this technology into the justice system. Nevertheless, there are still unanswered questions about the impacts of videotape on the *criminal* justice system. There has been little inquiry into the technical problems of using videotape in the courtroom, and research on the behavioral impact of video technology on trial participants is only in the initial stages. In addition, few research efforts to date have examined the cost effectiveness of video technology in the litigation process.

C. Overview of the Goals and Methodology of the Present Study

Believing that videotape is a highly sophisticated technology which may have profound effects and which should be adopted only after careful study and analysis,²⁴ and recognizing the incomplete status of prior research, the California Council on Criminal Justice organized and funded the project reported in this article. The stated purpose of the project, entitled *Videotape Examination of Witnesses for Trial: Impacts and Costs*, was to: (1) define videotape applications and develop equipment configurations and operational procedures; (2) evaluate the impact of videotape technology on court operations and participant behavior; and (3) develop cost analyses for videotape applications.

To accomplish the stated project goals, the project staff defined three functions to be accomplished which would determine data

²³See Brennan, *Videotape — The Michigan Experience*, 24 *HAST. L.J.* 1 (1972).

²⁴The National Bureau of Standards cautioned that:

Technological innovations in the criminal courts must insure that there will be a minimal disruption of the administration of justice while providing maximal opportunity to reduce systems delays and improve court procedures.

POTENTIAL USES, *supra* note 6, at 98.

The Bureau's report called for a study to:

(1) establish an integrated, operational tape recording system in one or more specified criminal court jurisdictions; (2) operate that system over an extended period of time; (3) conduct thorough research to clarify relevant legal issues and to protect the rights of all parties to criminal proceedings.

Id.

Reporting on its study, the National Center for State Courts recommended that further studies evaluate among other things:

(1) Cost effectiveness of video recording for each video application, and (2) Influence of video recording on attitudes and behavior of participants (judge, counsel, witnesses, defendants, and jurors) and related uses (appellate courts, district attorney and public defender agencies.)

VIDEO SUPPORT, *supra* note 18, at 7.

collection efforts. All potential applications of video technology within the criminal justice system would have to be explored and narrowed to a particular subset of applications in which videotape offered the greatest potential utility. The legal, technical, and behavioral issues involved in this subset of activities would have to be identified. Based on these issues, data would have to be collected to allow comparison of videotape and nonvideotape situations in order to assess the effects of the videotape medium.

Individuals from state and national criminal justice communities were selected, organized into a committee, and set to the task of identifying the possible applications of videotape and the legal, technical, and behavioral issues involved in those applications. At the outset, the committee formulated both "in-court"²⁵ and "out-of-court" applications.²⁶ Preliminary surveys were conducted during initial recording activities to expose the technical and behavioral issues involved.

After analysis of the preliminary surveys and discussions with the committee, the legal, technical, and behavioral issues involved in each of the videotape applications were identified and the necessary data to allow comparison of videotape and nonvideotape situations were defined. Questionnaires and survey forms were designed and data collection performed.

The discussion of the project research will be divided into four

²⁵An "in-court" application is taken to mean a proceeding taking place in the physical confines of a courtroom.

The term "application," as used in the text, means those situations, circumstances, and proceedings which may properly be the subject of videotape recording.

²⁶The project studied the following applications:

Out-of-court —

- 3 line ups at police station
- 1 line up at hospital
- 9 depositions of unavailable experts
- 1 confession
- 3 field sobriety tests
- 1 polygraph examination

In-court —

- 3 trial conference hearings
- 2 motions to suppress
- 35 preliminary hearings
- 12 misdemeanor arraignments
- 2 conditional examinations — criminalist
- 1 misdemeanor trial

73 applications total

Out-of-court applications of videotape were immediately pursued. However, rule 980 of the California Rules of Court, which prohibits cameras in the courtroom delayed the in-court applications. Consultations with the California Judicial Council were conducted to obtain a temporary exemption to rule 980 for the purposes of this project. On July 1, 1974, the California Judicial Council promulgated rule 981.1 of the California Rules of Court which allowed the provisions of rule 980 to be made inoperative upon approval by the Judicial Council of any study designed to improve the administration of justice in the courts through the use of modern technology. On July 12, 1974, the Judicial Council issued a Memorandum of Approval for this project's in-court video applications.

parts. The first addresses the videotape system—equipment systems and configurations, the recording environment, and production techniques—and is reported in section II of the article. The second part assesses the psychological and behavioral impacts of videotape on judges, witnesses, and attorneys. This part is reported in section III below. Part three, reported in section IV, presents the nonbehavioral impacts of videotape, such as the financial, procedural, constitutional, and administrative issues raised by implementation of the technology. Part four summarizes project conclusions, discusses long-range impact, and presents recommendations for future studies. This last part comprises section V of the article.

II. THE VIDEOTAPE SYSTEM

Use of videotape technology by the courts could potentially reduce many of the inefficiencies and inconveniences currently found in the judicial system. However, the realization of these benefits is dependent upon the ability of videotape to *accurately record, both aurally and visually, all relevant action within a specified environment.*

There are three aspects of the videotape system which will ultimately determine the quality of any court-related application: (1) the recording environment, (2) the production techniques used, and (3) the equipment components employed.²⁷ To assist in understanding these three factors and their relation to specific legal applications, this section identifies and defines relevant equipment components, environmental factors, and production techniques and their interrelationships. Further, in this section we assess the suitability of alternative equipment combinations to provide accurate court-related recordings, analyze the requirements of specific court-related videotape applications, and make recommendations concerning the most appropriate videotape system for each application.

A. The Recording Environment

The five major environmental factors affecting component selection and production quality are: (1) lighting, (2) spatial arrangement, (3) participant mobility, (4) acoustics, and (5) electrical power. This section analyzes each of these factors and notes its influence on equipment and production techniques selection. These five environmental factors are relevant to all recording applications. They will affect the quality of the final product and will determine the equipment and production techniques used.

1. Lighting

The lighting levels in the recording environment must be high enough to produce an acceptable picture. Light intensity, although

²⁷These three aspects are highly interrelated, and this interrelationship directly

the most important aspect, does not completely determine lighting quality. The light must also be evenly distributed throughout the recording area if an acceptable picture is to be produced.

Most industrial-type television cameras are designed to operate in brightly lighted rooms or studios.²⁸ When they are forced to operate in lighting conditions that are below their minimum light intensity requirements, picture quality diminishes. Overall picture brightness is reduced and video interference (noise) is increased.

Extremes in lighting distribution also adversely affect picture quality. When an usually bright light source enters a generally dark scene, most industrial-type video cameras automatically compensate for the change in light levels. This results in dark areas of the picture becoming even darker thus decreasing the general quality of the picture.

Increasing light intensity in the recording environment can often be accomplished by placing higher intensity lamps in existing fixtures. Alternatively, environments can usually be designed or re-designed around video camera lighting requirements without turning the environment into a television studio. While auxiliary lighting can be placed in the existing environment, caution must be used to avoid a studio effect.

Constantly changing lighting conditions present special problems when recording outdoors. Sunlight on a scene may become too intense resulting in a problem of contrast between light and dark objects. Fluctuating sun and cloud positions create lighting instability requiring the use of artificial lighting to stabilize lighting intensity and distribution.

When preparing for videotape recording, it is recommended that as much light as is practical be added to the recording environment and that cameras then be chosen that are capable of performing satisfactorily in those lighting conditions. Low light level cameras do exist, and though expensive, they represent an alternative to re-designing or modifying existing lighting systems. Finally, it must be noted that the project staff continually recorded in environments that had light levels below the minimum specified for the cameras used; although picture quality was somewhat less than ideal, the recordings were generally acceptable.

2. *Spatial arrangement*

The audio source (the microphone) and the video source (the camera) must be carefully positioned in the environment to insure quality recordings. This positioning is affected by the size and

affects the quality of any video recording. The equipment components selected for a recording system are directly determined by the environment in which they are to be used and type of production desired.

For a detailed discussion of videotape components and their interrelationship, see C. BENSINGER, PETERSEN'S GUIDE TO VIDEOTAPE RECORDING (1973).

²⁸Fifty- to 100-foot candles.

physical arrangement of objects in the environment. Generally, the microphones should be placed from 3 to 6 feet from a participant who must be recorded. Microphone sensitivity and pickup patterns will be determined by this distance requirement and the participant's mobility.

Three spatial factors affect the video source. The first is the distance between the cameras and the action to be covered; this distance will determine the lens selection. The closer a camera is to the action, the shorter the focal length of the lens required. Second, to achieve realism, cameras should be positioned at a height which will provide an image comparable to an eye-level view of the scene. However, when a camera is located at eye level there is a greater likelihood that the camera's view will occasionally be obstructed. In courtroom applications, attorneys are particularly prone to step in front of a camera while approaching the bench or the witness. Third, because of spatial constraints, the "best" camera positioning may be impossible. Experimentation will be required within a particular recording environment to ascertain camera angles which come closest to the desired eye-level perspective.

3. Participant mobility

The number of cameras and microphones used and the selection of lenses will be determined by the participants, their location, and their potential mobility. A large area of action with very mobile participants may necessitate multiple cameras and microphones and an increased use of more sophisticated production techniques to adequately record the proceedings. Conversely, in a limited area of action with stationary participants, a single camera and microphone may adequately cover the relevant action.

4. Acoustics

The inherent sound characteristics of a recording environment are extremely important to quality videotape recording. The acoustics of an environment can range from "brilliant" (surfaces in the environment are reflective and high frequencies dominate) to "deadened" (surfaces are absorbent of high frequencies). The "deadened" environment normally contains such sound-absorbent materials as carpeting, drapes, and acoustical ceilings; this environment is preferred for videotape recording. The acoustical characteristics of the environment must be determined prior to recording and will dictate the type, number, and positioning of microphones used.

5. Electrical power

Industrial-type television equipment operates on a 120V, 60 Hz power source. This equipment is wired with three-prong, three-wire grounding-type plugs and receptacles. Such a wiring scheme reduces shock hazards, the possibility of noise, and interference.

The number of equipment components comprising a court-related

videotape recording system will usually vary between 5 and 15 units. The power consumption of the components will range between 3 and 100+ watts. Most court environments have the capacity to provide the power requirements of a 15-unit video system. During project applications, no power consumption problems were encountered.

These five environmental factors are relevant to all recording applications. They will affect the quality of the final product and will determine the equipment and production techniques used.

B. Production Techniques

Production techniques comprise the second of the interdependent subsystems which affects the capacity to adequately videotape court-related applications. The production techniques suggested in this subsection were used in this study for two reasons: (1) they reduced the potential for operator-introduced bias,²⁹ and (2) they resulted in a more natural representation of the application.³⁰

Of the large number of production techniques currently available, three types are particularly important for court-related videotaping: (1) video source location, (2) audio source location, and (3) picture composition. This section will define these techniques and discuss their interrelationship with the recording environment and equipment components.

1. Video source location

Video source location is the point in the environment at which the camera is placed. In attempting to achieve an objective recording, every effort should be made to position the camera to capture a natural point of view: a relevant participant's eye-level perspective of the proceeding. Since most recordings are made to serve as evidence, the accuracy of the tape is enhanced if it is recorded from the viewing angle at which the trier of fact would have seen the proceeding.

Additionally, camera placement considerations must include the need to keep the equipment as unobtrusive as possible. Placements recommended in subsequent analyses are predicated on their potential to provide a natural point of view while minimizing obtrusiveness.

2. Audio source location

The audio source location is the placement of microphones in the environment. Microphones should be located where they can provide

²⁹The use of more sophisticated production techniques increases the likelihood of operator-introduced bias thereby negatively affecting the objectivity of a recording. Efforts should be made to restrict production techniques to those which minimize the potential for bias.

³⁰A natural representation is a recording which provides a video and audio perspective of the proceeding from a relevant participant's point of view. Because most court-related applications have an evidentiary purpose, this point of view is usually that of the trier of fact.

a clear representation of vocal events to be recorded. Microphone placement should be determined by factors such as who must be recorded, the acoustical characteristics of the environment, and the potential for acoustical interference. Again, obtrusiveness of the placement should be avoided.

3. *Picture composition*

During recording, particular production techniques can be used to vary picture composition. These techniques are: (1) zooms, (2) varying video sources, and (3) special effects.

a. *Zooms.* A zoom is a technique used to vary the scope of the picture while maintaining the position of the camera. For example, by manipulating the lens, a close-up view of a witness may be changed to a total view of the courtroom without altering camera position. Zooms can be performed by manual adjustment of the lens or by using remote control lenses to allow operation from a location removed from the camera. The latter method eliminates any distraction resulting from the presence of the cameraman.

The use of zoom techniques will be determined by the requirements of the application. Because of the low light levels in most court-related environments, close-up shots are often required to insure an accurate video identification of participants. Wide-angle shots tend to reduce image clarity and should be used only for establishing the environment and the number of participants in it or for recording a number of mobile participants within a wide area of the courtroom.

Two precautions should be taken when using zooms. Zooming from a close-up to a wide-angle view should only be done when the need arises to cover another participant or event in the proceeding. Also, zooming should be done slowly and steadily. Quick or frequent zooms can be distracting to the viewer. If participants and exhibits are stationary and at a constant distance from the video source, zooming is not required. However, an increase in participant mobility leads to an increased need for zoom techniques.

b. *Varying video sources.* The alteration of the recording perspective while maintaining camera position, made possible by the use of multiple cameras and a camera switcher or special effects generator, is a valuable production technique. However, because frequent changes may reduce the viewer's ability to integrate the audio information being heard with the video image being seen, the number of perspective changes should be minimized and switches should be made at points which coincide with natural shifts in viewer attention.

Perspective changes should be determined by the need to follow the natural flow of action in a proceeding. In general, this translates into a need to record, both aurally and visually, the person who is speaking. However, in courtroom recordings, the interaction between an attorney and witness is often too fast to capture each participant as he speaks without a great number of distracting scene changes.

This problem can be solved by the use of a special effect.

c. Special effects. Two special effects techniques are available for overcoming problems of frequent camera switching: split-screen and corner-insert. Split-screen technique combines the image from two video sources into one picture. It permits the recording of the interaction between two participants who could not be captured with one camera source on one picture screen. This technique eliminates the need for frequent perspective changes when two physically separated participants are involved in verbal interaction such as the typical exchanges between a witness and an attorney. Additionally, it enables the viewer to see more of the courtroom action at one time and thereby enhances his capacity to observe participant demeanor.

Corner-insert technique is a variation of split-screen technique. Where split-screen technique normally allocates equal picture area to both video sources, corner-insert technique allocates picture space differentially. This technique provides benefits similar to split-screen technique and should be used in special situations when spatial arrangement or participant mobility rule out the use of split-screen technique. Although special effects have the potential to improve the quality of a recording, like other production techniques, they should be used with caution to prevent distraction and operator bias.

Based on this general discussion of the elements of the video system, the remainder of this section will analyze alternative equipment systems and assess their ability to meet the requirements of specific legal applications.

C. Alternative Equipment Combinations³¹

Based on recordings conducted during this project, there are four general equipment combinations with varying technical capacities

FIGURE 1

System	Components								
	Microphones	Camera(s)	Videotape recorder	Time-date generator	Monitor	Switcher	Special effects generator	Remote pan-and-tilt unit	Remote zoom lens
System 1	X	X	X	X	X				
System 2	X	X	X	X	X			X	X
System 3	X	X(2)	X	X	X	X			
System 4	X	X(2)	X	X	X	X	X	X	X

³¹Equipment systems analysis is limited to industrial-type television equipment because it is capable of providing quality recordings at costs which would not preclude widespread use.

which can be used to record the majority of court-related applications (see Figure 1). Each combination differs primarily in either the number of video sources within the system or in the auxiliary components used.

Two alternative audio systems can be used with any of the four equipment combinations identified in Figure 1. Each audio system provides different capabilities and is suitable in different situations. A single microphone system uses one microphone to feed sound directly to the videotape recorder. The single microphone must be capable of capturing all desired sound; hence, this audio system is applicable only in those situations where all speakers remain within the pickup range of the microphone. Multiple microphone systems are useful in recording environments with large areas of action and physically separate, mobile participants. The number and type of microphones required will be determined by the number of potential speakers and the area of action in which sound should be recorded. This system requires an audio mixer to convert the incoming signals into a single signal for processing.

This section will discuss the four videotape equipment combinations in terms of their technical capabilities and the environmental factors which determine the use of each.

1. System 1: the single camera

This single camera system provides the capability to capture an area of action from one video source. If the operator can be located near the camera, relevant action can be followed by manual camera movement. If this is not possible, the camera must be positioned so that all relevant action can be captured without camera movement. System 1 is most suitable for recording applications conducted in a limited area of action with minimal participant mobility and a high degree of physical proximity among participants. An example would be a confession.

2. System 2: the single camera with auxiliary components

This system is also limited to an area of action which can be covered with a single camera. However, the addition of auxiliary components allows the use of production techniques. In System 2, the primary auxiliary components are a remote pan-and-tilt unit and a remote zoom lens. These features eliminate the need for the operator and console to be located near the camera.

System 2 permits camera movement and lens zooming regardless of spatial limitations. In addition to the System 1 applications, System 2 is suited for applications where operator presence is undesirable or some participant mobility exists. An example of the latter situation is a lineup.

3. System 3: multiple cameras

This multiple camera system incorporates multiple video sources

and a switcher to select the desired camera perspective. If space allows and obtrusiveness is not objectionable, the operator and console can be physically positioned to allow manual operation of one camera.

This system has the capacity to cover a wide area of action which includes mobile participants physically separate from one another such as are found in a trial. However, because the operator must remain in close physical proximity to the console and one of the cameras, problems of obtrusiveness and spatial constraints may limit the applicability of this system.

4. System 4: multiple cameras with auxiliary components

This multicamera system with special effects generator, remote pan-and-tilt unit, and remote zoom lens provides maximum recording flexibility. The addition of these components provides zoom, split-screen, and corner-insert capabilities while allowing the operator and console to be placed in a remote location. In other words, System 4 realizes all the advantages of a multiple camera system while offering additional production flexibility and unobtrusiveness.

D. Recommended Uses of the Various Videotape Systems

This section analyzes the requirements of specific court-related videotape applications and recommends the most appropriate videotape system for each. All recommendations are based on project experience and are compatible with existing norms of behavior in each application. Suggested equipment systems and production techniques are designed to provide the highest possible quality at the lowest cost.

1. In-court applications

Although the nature of the proceeding may differ, all in-court videotape applications occur within the same environment and serve the same function, which is to create an evidentiary record of the proceeding. Hence, for this analysis, all in-court applications are considered as a group.

While courtroom design varies, certain common features can be identified. The judge's bench and the witness stand face the attorneys' tables, with the jury box to one side. While judges, witnesses, jurors, and defendants are relatively stationary, attorneys have a high degree of mobility. Overhead lighting is prevalent; typical light intensity levels fall below minimum requirements for video cameras, and there is an unequal distribution of light throughout the courtroom. Extraneous noises often exist which further complicate problems of poor acoustics. Most courtrooms have adequate power capacity, but outlets are rarely positioned within easy reach of equipment.

The equipment combinations suggested for use in the courtroom

are System 3 (the multiple camera system) and System 4 (the multiple camera system with auxiliary components). Multiple microphones should be used with either. Only a multiple camera-multiple microphone system insures adequate coverage of the large recording area with mobile participants. By providing zoom and split-screen capability, System 4 increases ease of operation while equipment and operators remain relatively unobtrusive.

With a multiple camera system, one camera, covering the judge and witness, should be located behind and to the jury box side of the attorneys' tables. The other camera, covering attorney action, should be located at the bench end of the jury box. This camera configuration insures a natural point of view from the juror's perspective and, when split-screen techniques are used, results in a video image with the witness and the attorney facing each other. Unidirectional microphones should be placed 3 to 6 feet from each participant with one additional microphone near the bench facing the attorneys' tables. Additionally, if jury trials are to be recorded, it is suggested that a unidirectional microphone be placed close to the jury area in order to record remarks of attorneys directed to the jury and made while the attorney is standing near the jury box.

2. *Out-of-court applications*

The recording environment of out-of-court applications varies; hence, each application will be analyzed individually. The applications to be analyzed are lineups, confessions, sobriety tests, and out-of-court conditional examinations.

a. Lineups. The use of video technology in lineups may serve two purposes. It can be used to preserve a lineup for later viewing by witnesses. Additionally, it can serve as an evidentiary record of the identification process to which the court can resort to resolve challenges to the validity of a lineup.

The physical lineup environment is usually a large room with a brightly lighted staging area on which the suspects stand and a dimly lit area from which witnesses observe the procedure. These areas may be separated by a one-way mirror or screen for witness security. Suspects may be required to move through the staging area while witnesses are usually stationary. The administering officer moves within the witness area.

The acoustics are usually poor. Power capacity is usually adequate, although outlet locations may require extension cords.

The purpose for the videotape recording will dictate which equipment system is appropriate. If the purpose of the recording is to preserve the lineup for later viewing by witnesses, System 1 is recommended. When the recording is to be used as an evidentiary record of the identification process, it is necessary to record the witness making the out-of-court identification as well as the suspect. In this

instance, System 4 is recommended. A lavalier microphone³² should be worn by the administering officer. If aural identification is required, unidirectional microphones should be available to witnesses.

Regardless of whether System 1 or System 4 is used, one camera should be placed behind the witnesses to provide a full face view of each suspect. When the suspect moves across the stage, the operator should zoom back to capture the suspect's entire body and movement. If System 4 is used, the second camera should be positioned to afford a full face view of each witness. Using corner-insert techniques, the identifying witness should be framed in the upper corner of the picture.

b. Confessions. Videotaped confessions provide an evidentiary record of the procedures used by police and prosecutor while preserving the suspect's statement and demeanor.

Confessions are usually recorded in a relatively small room with overhead lighting and poor acoustical characteristics. Participant movement is usually minimal, with the suspect and the officer seated in close proximity. Power capacity is generally sufficient for equipment needs. System 1 with one microphone is recommended for this application.

Either a unidirectional or omnidirectional microphone should be placed between the officer and the suspect. The camera should be placed in a position which minimizes suspect distraction. If the camera is required to operate from behind one-way glass, additional lighting or equipment is needed. Zoom techniques can be used to provide a close-up of the suspect as the statement is given; however, additional production techniques are not recommended.

c. Sobriety tests. Videotaped sobriety tests provide an evidentiary record of the suspect's physical condition as well as the fairness of the test procedures. Sobriety tests conducted at the police station involve a recording environment similar to lineups; brightly lit, acoustically brilliant areas are prevalent. Participant mobility is normally confined to a marked area. System 1 with a single microphone is recommended to record this limited area of action. A unidirectional or omnidirectional microphone should be placed in the middle of the test course. Production techniques should be limited to manual zoom and pan as necessary to cover both administering officer and the entire body of the suspect in the performance of the test.

Roadside sobriety tests require a self-contained "port-a-pak" videotape unit. Because of severe environmental constraints, nighttime roadside sobriety tests are not amenable to videotape recording unless extremely specialized equipment is used such as infrared cameras and "night scopes."

d. Out-of-court witness testimony. This application involves the

³²A lavalier microphone is one that can be fastened to the speaker by a cord around the neck.

out-of-court examination of a witness by stipulation of the parties. Environmental factors vary widely for this application. When the recording environment is similar to the courtroom, System 3 or 4 is recommended and should be used as described in the section describing in-court applications.

A more common environment for the recording of out-of-court witness testimony is one in which all participants are seated at one table in a panel arrangement. With this spatial configuration, System 1 should be used. The camera should be placed in front of the participants and unidirectional microphones should be placed on desk stands 4 to 6 feet in front of each participant. Production techniques should be limited to the use of zooms and pans. If equipped with a manual zoom lens, the camera can be positioned to capture both the questioning attorney and the witness. If an objection is raised, the lens may be zoomed out to include the objecting attorney.

E. Special Considerations

Two special considerations are of general import regardless of the specific application: (1) the handling and storage of tapes after the recording, and (2) the relation of videotape to human perception.

1. Handling and storage

A suitable storage system for videotapes must serve two needs. It must provide security against unauthorized access and preclude any damage to the recordings. Temperature, cleanliness, space, and freedom from magnetic interference are primary determinants of a suitable storage area which will prevent damage. The temperature of the storage area should be kept at approximately $70^{\circ} \pm 5^{\circ}$ and a humidity of $40\% \pm 10\%$. The tape should always be stored in its original plastic container to keep it free from dust. Long-term storage may necessitate that the tapes be sealed in a plastic bag to prevent dust buildup. Magnetic interference can distort or even erase the material on the tape; hence, the storage area should never be in the immediate vicinity of a strong magnetic field. In general, the normal office environment offers suitable storage conditions, assuming that adequate internal security procedures are maintained.

To insure the efficient use of a stored tape, an index and retrieval system should be established. Every retrieval system should include legal and technical information, a log, and a cross-reference indicator to case files. The legal information should include the case number, name, and dates as well as the reel number(s) and should be placed on the outside protective cover and on the reel hub.

Technical information, including tape format data such as width of the tape, black-and-white or color, and length of recording, should be noted on the protective cover and reel hub. Also, a log of impor-

tant events indexed to the internal tape timing device should be maintained to provide a convenient reference source. Copies of this log should be kept inside the tape cover and in the case file. The case file should include an indication that videotape was used. This indicator should be cross-referenced to the retrieval system.

Extensive use of video recording may necessitate shipment of videotape to various courts. To insure tape safety during shipping, the tape should be sealed in a plastic container to protect it from dirt and dampness. In addition, tapes should be allowed to return to room temperature before being played.

2. *Video v. human perception*

The user should be cautioned that in spite of the capability of videotape to accurately reproduce an image, a one-to-one relationship between human perception and videotape reproduction does not exist. For example, the human eye has a greater sensitivity to light and a greater field of view than most video cameras. In addition, sensitivity to sound varies between the human ear and microphones. In light of these facts, user expectations of video recordings for legal purposes should be limited to an accurate representation of an application. The legal user should exercise extreme caution in attempting to use videotape as a simulation of human perception.

III. PSYCHOLOGICAL AND BEHAVIORAL IMPACTS OF VIDEOTAPE

Despite the fact that the usefulness of video technology to the courts hinges upon its ability to promote the administration of justice without impairing individual rights, there is a paucity of empirical research dealing with the impact of videotape on the behavior of participants in the judicial process. While the literature repeatedly advances unsupported speculations and prescriptive statements,³³ data supporting these claims concerning videotape's advantages and the ways it may affect the dynamics of courtroom interaction were, until recently, nonexistent. The lack of empirical evidence regarding the impacts of a particular technology becomes an extremely important issue when considered within the context of the legal system. Since conclusions regarding the impacts of video technology on the courts may directly affect the administration of justice and individual rights, the problem of insufficient empirical research cannot be overemphasized.

Three potential psychological and behavioral effects of videotape on the legal system were initially identified for investigation: (1) the impacts of videotape recording on witness behavior and witness testimony; (2) the impacts of videotape recording on the behavior of judges and attorneys and on courtroom decorum; (3) the impacts of

³³See, e.g., Morrill, *Enter — The Videotape Trial*, 3 JOHN MARSHALL J. PRAC. & PROC. 237 (1970).

videotape recording and playback of testimony and evidence on juror attitudes and behavior. Because time constraints limited the opportunities for playback of prerecorded testimony and evidence for jurors, the project concentrated its research on areas (1) and (2).³⁴

A. Study Design and Methodology

Every effort was made during the design of the study to insure a proper balance between scientific control and realism. This balance is difficult to obtain in any behavioral research environment; it is extremely difficult to obtain in a research environment as heterogeneous as a court system. With these factors in mind, the following procedures were used during this project.

1. Data collection

Four issues were of utmost concern in the design of measurement instruments to be used in assessing the behavioral impacts of videotape: (1) Data collection was designed to take advantage of existing data and records wherever possible. (2) All data collection efforts were designed to minimize intrusion into normal court operations. (3) Variability in literacy levels of witnesses and lay participants in criminal proceedings was taken into consideration. (4) All data collection efforts were designed to maximize reliability to insure the validity of conclusions drawn from the data base. ✓

Attempts were made to use existing court records where possible. However, the use of archival data from existing court records was generally deemed inefficient and unreliable because of the type and quality of data available. For this reason, a program was instituted whereby videotape and nonvideotape data were collected concurrently. For example, while data were being collected in courtrooms equipped with videotape, comparable information was being gathered in courtrooms not so equipped. Although this method significantly increased the time and resources required for data collection, it did provide data sufficient for a comparison of videotaped and nonvideotaped cases and thus the information necessary for assessing the differential impacts of video technology.

To minimize intrusion into normal court proceedings, any data collection requiring the active participation of witnesses, attorneys, and judges was conducted during noncourt time and, if possible, outside the courtroom environment. Data collection requiring witness participation was designed so that witnesses could be questioned immediately after being released by the court.

Because of the variance in literacy levels among the witnesses sampled, questionnaire items were worded in simple, commonly understood language. Where it was necessary to use terms or phrases that might exceed the literacy level of witnesses, interviewers were

³⁴Although some data were collected on videotape playback effects on jurors, the quantity of data was insufficient for statistical analysis.

provided to interpret questions.

Three basic data collection methods were used to collect behavioral impact data that would meet the above stated constraints and still provide reliable information on which to base valid conclusions: (1) self-report interview/questionnaires, (2) trained observers,³⁵ and (3) participant evaluations.³⁶

The self-report technique consisted of questionnaires and interviews administered to witnesses, judges, and attorneys requiring them to provide information regarding their personal attitudes and behavior. Observational techniques were used in the form of trained research personnel placed in the courtroom to make specific evaluations and observations relating to courtroom activities and participant behavior. In addition to these two techniques, questionnaires were used to allow attorneys and judges to evaluate the behavior exhibited by participants other than themselves during the proceedings.³⁷

By using multiple measuring techniques, data collected using one

³⁵Law students with experience in courtroom proceedings were used as observers during this project. Each observer participated in a 2-week training session involving classroom and practical training. Formal classroom instruction focused on: (1) the problems of observational measures of behavior; (2) the types of error and bias that are common in observational techniques; and (3) the observational forms and their use. Each observer received a glossary containing descriptions and behavioral summaries for each rating scale used in the project. These descriptions were designed to insure that all observers utilized a common set of evaluative criteria. After formal training and prior to collecting final project data, all observers were placed in a courtroom and required to evaluate proceedings and complete the observation forms. To insure interrater reliability, at the end of each proceeding the observers compared evaluations and discussed instances where discrepancies had occurred in observer ratings.

In conjunction with this training program, an additional safeguard was used to insure the reliability of observational measures. During the data collection phase of the project, observers were alternately assigned to videotape equipped and non-videotape equipped courtrooms on a daily basis. This technique was used to counterbalance any potential systematic biases in observer evaluations.

³⁶For a detailed discussion of the three techniques, see F. KERLINGER, *FOUNDATIONS OF BEHAVIORAL RESEARCH* (2d ed. 1973); C. SELTZ, M. JAHODA, M. DEUTSCH & S. COOK, *RESEARCH METHODS IN SOCIAL RELATIONS* (rev. ed. 1959).

³⁷The data collection techniques used can be summarized in part by use of the following chart.

Measurement technique	When Administered		
	During proceeding	After proceeding	After series of proceedings
Self-report:			
Witness		X	
Judge			X
Attorney			X
Observer evaluation	X		
Participant evaluation:			
Judge		X	X
Attorney			X

particular technique could be cross-checked for reliability with data collected by one or more of the other techniques.³⁸

2. *Sampling*

The project's video recording activities focused on actual court or investigative proceedings to insure results which would be valid and capable of generalization. The preliminary hearing was chosen as the primary vehicle for assessing the behavioral effects of videotape recording on in-court proceedings. The large number of separate preliminary hearings which could be recorded would allow the collection of data in quantities sufficient to facilitate statistical testing. The testimony recorded at preliminary hearings also presented the potential for playback at trial. Although differences in participant behavior were assumed to occur between preliminary hearings and other in-court proceedings, it was assumed that the *measurable behavior impacts of videotape recording did not differ* between preliminary hearings and other in-court proceedings. While participants may behave differently during preliminary hearings than during trials, this difference is a function of the proceedings themselves and not a function of the presence or absence of videotape recording. Hence, the results of the analysis of preliminary hearings may be generalized to the majority of courtroom proceedings.

Since the project had no control over scheduling or docketing rules, there was an inherent potential of systematic sampling biases which could lead to spurious conclusions regarding the effect of videotape. Three procedures were used to minimize the likelihood of these potential biases:

1. Data were collected in jurisdictions where case scheduling was based on court availability rather than case-court matching, thus approaching a random assignment of cases to both videotape and nonvideotape conditions.
2. Research personnel and trained observers were alternately assigned to videotape and nonvideotape conditions to counterbalance any inherent observer biases.
3. Statistical tests were conducted after the completion of data collection to determine whether cases and witnesses in videotape and nonvideotape courts were comparable.³⁹

3. *Survey procedures*

Using the measurement and sampling techniques outlined above, behavioral and attitudinal impact data were collected in three northern California counties: Fresno, Alameda, and Sacramento. With the

³⁸Data which yielded inconsistent results across multiple measures were deemed unreliable and therefore unsuitable for analysis in this project.

³⁹Statistical tests indicated no significant differences between videotape and nonvideotape courtrooms in terms of such factors as type of case, demographic characteristics of witnesses, and average length of proceeding.

cooperation of the local municipal court judges, two municipal courtrooms in each county were selected as survey sites. The specific courtrooms were selected to maximize the volume of preliminary hearings conducted in each courtroom during the survey period. Videotape equipment and personnel were installed in one of the two courtrooms for the purpose of videotaping all preliminary hearings that occurred during the study period. Trained observers were placed in both video and nonvideo courtrooms to keep detailed records regarding all proceedings as they occurred.

During the survey period, all preliminary hearings in the courtroom equipped with videotape were recorded using various equipment systems. For each preliminary hearing that was conducted in either a video or a nonvideo courtroom, trained observers completed detailed observation and evaluation forms. Upon completion of his testimony, each witness responded to a questionnaire concerning his participation in the proceedings. At the end of each preliminary hearing, the judges completed short forms evaluating witness and attorney demeanor. At the end of the survey period in each county, detailed questionnaires were mailed to all judges and attorneys who had participated in the videotape applications.

These procedures permitted the collection of behavioral impact data on 100 witnesses, 44 attorneys, and 14 judges in approximately 75 different cases. Although a larger sample size would decrease the likelihood of statistical error, it was felt that the combined use of the procedures outlined above provided a data base of adequate size and reliability to allow statistical inference.

4. *Data analysis*

The majority of analyses used in this study were based on variance tests that compared effects across videotape and nonvideotape conditions.⁴⁰ By comparing data obtained in videotaped cases with that obtained in nonvideotaped cases, conclusions can be drawn concerning the behavioral and psychological changes explicitly resulting from the use of videotape.

B. Results of the Psychological and Behavioral Impact Studies

1. The effects of videotape on witnesses

In 1965, the United States Supreme Court reversed a conviction in *Estes v. Texas*⁴¹ because the original trial had been televised. Concerning the potential impacts of television trial proceedings, the Supreme Court stated:

The quality of testimony in criminal trials will often be impaired. The impact upon a witness of the knowledge that he is being viewed by a

⁴⁰For a detailed discussion of these techniques, see Q. McNEMAR, *PSYCHOLOGICAL STATISTICS* (4th ed. 1969); Cohen, *Multiple Regression as a General Data-Analytic System*, 70 *PSYCH. BULL.* 426 (1968).

⁴¹381 U.S. 532 (1965).

⁴²*Id.* at 547.

vast audience is simply incalculable. Some may be demoralized, frightened, cocky and given to overstatements; memories may falter, as with anyone speaking publicly, and accuracy of statement may be severely undermined.⁴²

Although none of the proposed legal uses of videotape involve viewing by the general public,⁴³ the similarities between television transmission and videotape recording have caused many individuals within the legal system to raise questions regarding potential effects of videotape similar to those noted by the Court in *Estes*.

There are at least two reasons for expecting videotape recording to have a behavioral or psychological effect on witnesses and their testimony. First, it can be argued that videotaping could impair or inhibit witness testimony because the witness is unsure of the audience to whom he is speaking. To a large degree, a person's actions are dependent upon his awareness and perceptions of his audience.⁴⁴ But since videotape testimony may be viewed by a number of people not actually present during the taping, the witness may be unsure of the specific audience to whom he is speaking and therefore uncertain regarding the "appropriate" way to behave.⁴⁵ If this argument is correct, one can expect the witness to be overly self-conscious or guarded in his responses.

A second reason for expecting videotape to have an effect on witness testimony derives from the fact that videotaping is a unique or novel experience that violates certain expectations regarding courtroom procedures. Whenever a witness enters a courtroom, he does so with a set of expectations about the surroundings and the behavior of others. Whether these expectations are based on actual experience in serving as a witness or merely on television renditions of courtroom activities, the expectations do exist. Since people are generally unfamiliar with the application of videotape in the courtroom, videotape would not likely be part of the set of expectations of courtroom environment and procedures. Therefore, the presence of videotaping equipment and personnel could constitute a violation of witness expectation which might affect witness behavior.⁴⁶

Regardless of which of the preceding hypotheses seems most feasible, both raise certain questions regarding the potential impact of videotape recording on witness testimony. Two are noted here:

1. Comparing witnesses whose testimony is videotaped with witnesses whose testimony is not, are witnesses more nervous or do they experience greater stress when their testimony is videotaped?⁴⁷

⁴³See, e.g., Hicks, *Video Recording in Police Identification*, 59 J. CRIM. L.C. & P.S., No. 2, at 295 (1968); Kane, *Videotape Recording*, 50 JUDICATURE 272 (1967).

⁴⁴See E. GOFFMAN, *THE PRESENTATION OF SELF IN EVERYDAY LIFE* (1959); G. A. MILLER, E. GALANTER & K. PRIBRAM, *PLANS AND THE STRUCTURE OF BEHAVIOR* (1960).

⁴⁵See Henchy & Glass, *Evaluation Apprehension and the Social Facilitation of Dominant and Subordinate Responses*, 10 J. PERSON. & SOC. PSYCH. 446 (1968).

⁴⁶See generally P. McHUGH, *DEFINING THE SITUATION* (1968).

⁴⁷For a detailed discussion of how stress affects testimony, see Driver, *Confessions and*

2. When comparing witnesses whose testimony is videotaped with witnesses whose testimony is not videotaped, are witnesses less decisive in their responses when their testimony is videotaped?

In addition to these questions concerning the potential effects of videotaping on witnesses, certain other hypotheses are suggested if videotape recording is shown to increase witness stress. Prior research indicates that persons experiencing stress are likely to develop negative attitudes regarding the situation that produced the stress.⁴⁸ If videotaping, therefore, increases witness stress, witnesses whose testimony was videotaped may have a more negative attitude toward the proceedings than witnesses whose testimony was not videotaped. Additionally, since their participation as a witness resulted in personal discomfort (stress), witnesses participating in videotape applications would probably be less willing to serve as witnesses in the future.

The research bearing on each of these questions and possibilities will be discussed individually.

a. *Witness discomfort and stress.* Based on the data collected during this project, there was no evidence that witnesses were more nervous or experienced greater stress when their testimony was videotaped when compared to witnesses whose testimony was not videotaped. No statistically significant differences were found on self-report or trained observer measures of witness stress between the videotape and nonvideotape conditions.⁴⁹ When judges and attorneys participating in videotape applications were asked to evaluate witness behavior during videotaping, over half of those sampled *disagreed* with the statement, "Witnesses are more nervous when being videotaped." In addition, 86 percent of the judges sampled and 73 percent of the attorneys sampled *agreed* with the statement, "Witnesses behave the same whether they are being videotaped or not."⁵⁰

b. *Witness decisiveness.* No differences were found in the responsiveness or decisiveness of witnesses being videotaped when compared to those not videotaped. Statistical tests performed on the self-report and observational measures indicated that videotape recording had no measurable impact upon the decisiveness or responsiveness of witnesses giving testimony. In addition, the majority of attorneys and judges sampled support this conclusion.⁵¹

c. *Witness attitudes and willingness to serve as a witness in the future.* Based on self-report measures obtained from the participating witnesses, no differences were found in witness attitude toward the

the Social Psychology of Coercion, 82 HARV. L. REV. 42, 46-47 (1968); Foster, *Confessions and the Station House Syndrome*, 18 DE PAUL L. REV. 683, 684-93 (1969).

⁴⁸See L. Festinger, *A THEORY OF COGNITIVE DISSONANCE* (1957).

⁴⁹For all statistical tests used herein, the .05 level of significance was employed.

⁵⁰Although stress was not affected by the videotape process, factors such as the sex of the witness and the number of times the witness had testified before were found to be strongly related to witness stress.

⁵¹The results of the judge and attorney questionnaire on this issue can be summarized as follows:

proceedings between those witnesses whose testimony was videotaped and those witnesses whose testimony was not videotaped.

In responding to the question, "If you could serve as a witness in a similar case in the future, how willing would you be to serve?" witnesses whose testimony had been videotaped did not differ significantly in their responses when compared to witnesses whose testimony had not been videotaped.⁵²

It should be noted that these findings do not imply that videotape has no effect on psychological stress of witnesses or on witness demeanor. It is entirely possible that videotape recording produces stresses that are either so small as to be undetectable or so short-lived as to be unmeasurable. Informal interviews with witnesses, judges, and attorneys indicated that witnesses might have been aware of the presence of videotape apparatus. However, this awareness was of little consequence when compared with the pressures and demands made upon witnesses as part of the normal testimonial process. Although specific data were not collected to test this conclusion, the research revealed some indications of its validity. For example, although no witnesses indicated that videotape made them nervous or distracted them in any way,⁵³ they did indicate that factors such as the intensity of attorney questioning, the presence of the defendant/suspect, and the sensitivity of their testimony were stress producing and made them nervous.

2. *The effects of videotape on legal participants and courtroom decorum*

In addition to hypothesized effects upon witness attitudes and behavior resulting from videotape recording, questions have been

Questions	Responses	
	Percent of judges responding	Percent of attorneys responding
1. Witnesses are inhibited in their answers when being videotaped.		
Strongly Agree	0%	10%
Agree	14%	27%
Disagree	57%	45%
Strongly Disagree	29%	18%
2. Witnesses are unresponsive to questioning when being videotaped.		
Strongly Agree	0%	0%
Agree	0%	9%
Disagree	71%	73%
Strongly Disagree	29%	18%

⁵²Although videotape recording had no effect upon the willingness of witnesses to testify at some future time, the data indicated an extremely strong relationship ($r = .43$) between the degree of stress experienced by the witness and the witness' willingness to serve as a witness again.

⁵³Such statements were supported by judge and attorney evaluations; 58 percent of the judges sampled and 73 percent of the attorneys sampled *disagreed* with the statement, "Witnesses are distracted by the presence of videotape recording equipment."

raised about the potential effects of videotape on legal personnel and on general courtroom decorum. Relying primarily on experience gained from cases such as *Estes v. Texas*,⁵⁴ opponents of the use of videotape have suggested that:

Being on camera will prompt judge, jury, lawyers and witnesses to perform for the camera rather than address themselves to the sober business of justice.⁵⁵

[U]sing television recording equipment in the courtroom will disrupt the sober, deliberate atmosphere in which courts should function.⁵⁶

Counsel on TV would over-object. He would be foolish not to, knowing he can bleep it out at the editing session.⁵⁷

On the other hand, proponents of videotape have argued that if the participants in a trial know that the proceedings are being videotaped, they may be more aware of their own demeanor, appearance, and gestures, which might ultimately improve the general courtroom atmosphere.

These competing predictions, although stated in rather general terms, suggest four questions amenable to empirical investigation: (1) Is the style of attorney presentation different when that presentation is being videotaped? (2) Do attorneys tend to enter more objections when being videotaped? (3) Are attorneys better prepared when being videotaped? (4) Does videotape recording affect the overall structure or formality of courtroom interaction? The research bearing on each of these questions will be discussed individually.

a. The style of attorney presentation. Based on observational measures and responses from attorneys and judges surveyed, there is no evidence to indicate that the style of attorney presentation is affected by videotape recording. Of the judges surveyed, over 80 percent indicated that the style of attorney presentation as well as overall courtroom behavior was unaffected by the videotape recording process.

b. Frequency of attorney objections. Detailed data on the number of prosecution and defense objections entered in both videotaped and nonvideotaped preliminary hearings were analyzed. These analyses indicated that attorneys being videotaped were no more likely to enter an objection than attorneys not being videotaped.

c. Attorney preparation. Observations made by research personnel indicated no significant difference in the degree of attorney preparation in videotaped and nonvideotaped proceedings. When asked to

⁵⁴381 U.S. 532 (1965).

⁵⁵INTERIM REPORT, *supra* note 21, at 10.

⁵⁶Kennelly, *The Practical Uses of Trialvision and Depovision*, 1972 TRIAL LAWYERS GUIDE 183, 196.

⁵⁷Panel discussion, *Modernizing Trial Techniques and Management: Audio-Visual Testimony*, 58 F.R.D. 219, 254 (1972) (remarks of L. Fincum).

evaluate the quality of attorney case preparation, 71 percent of the judges indicated attorney preparation was totally independent of whether or not the attorney was being videotaped. As could probably be expected, 73 percent of the attorneys concurred with this evaluation.

d. Structure and formality of courtroom interaction. Neither judges, attorneys, nor trained research observers were able to detect any significant differences in the structure or formality of courtroom interaction in videotape versus nonvideotape courtrooms. Although no *persistent* changes in courtroom formality were noted in videotape courts, informal interviews with court clerks, bailiffs, and judges tended to indicate an initial change in courtroom formality resulting from increased awareness in judges of their own demeanor. Nevertheless, the personnel interviewed indicated that these changes tended to be transitory and short-lived. When judges and attorneys who had participated in videotape recording applications were questioned regarding their awareness of the videotape recording process and its effect on them, the majority of the responses were of the following type:

"I was aware for a brief moment."

"I felt only a momentary effect (nervousness); then the job took precedence."

"I was distracted at first, but I soon ignored it."

These responses, combined with data collected via other methods, indicate that after an initial period of increased awareness and sensitivity to the unfamiliar surroundings, attention shifts to the job at hand and behavior adapts accordingly.

C. Discussion and General Observations

To facilitate accurate interpretation of the above-stated findings, two important issues should be discussed: (1) the relationship between videotape recording methods and behavioral impacts, and (2) the relation of statistical conclusions to social conclusions.

Research experience, as well as common sense, indicates that conclusions resulting from this study are to a large degree dependent upon the methods by which videotape recordings were made. Given the videotaping methods used during this study, no persistent attitudinal or behavioral changes were noted. However, this does not imply that effects resulting from videotape recording are independent of the obtrusiveness of the recording techniques. It is theoretically possible to create a recording situation sufficiently obtrusive and encroaching to yield significant behavioral and attitudinal effects. For example, auxiliary lighting was not used in videotaping preliminary hearings in which behavioral impact data were collected. However, in those instances where auxiliary lighting was used for technical experimentation, numerous comments and objections were raised regarding the distracting effects of the lighting and the result-

ing detrimental impact on courtroom decorum. For these reasons, the results and conclusions reported in this section should be considered within the context of the recording procedures used during the collection of behavioral impact data.⁵⁸

In summary, one must bear in mind that conclusions regarding differences between videotaped and nonvideotaped situations are derived from measures of statistical difference. Results reported in this section are based on data collected and aggregated to permit scientific analysis. These analyses were designed to identify the factors that, beyond a specified level of reasonable doubt, influence the judicial system. Although these results should not be interpreted as a guarantee that videotape recording will never have an effect on a particular witness, judge, or attorney at a particular point in time, they do suggest that the behavioral and attitudinal impact of videotape recording is insignificant in relation to other factors in the courtroom environment.

To more fully assess the efficacy of videotape as an adjudicative tool, the following section will consider the economic and administrative impacts of videotape across a variety of legal proceedings.

IV. PROCEDURAL, ADMINISTRATIVE, CONSTITUTIONAL, AND FINANCIAL CONSIDERATIONS OF VIDEOTAPE IN THE JUDICIAL SYSTEM

Experience has demonstrated that technology transfer is a process that develops over time. The introduction of video technology into the criminal courts is no exception. The initial stages of technology transfer necessarily involve adaptation and familiarization periods in which the technology is integrated into the system and use patterns stabilize. Since the level of videotape usage determines its cost to the courts, valid comparisons between standard and video-equipped courts can only be made when videotape usage patterns have stabilized. At that point, sufficient data may be generated by the operation of comparable systems to provide reliable information for direct cost analyses.

Since videotape usage during this project was, by necessity, short-term and experimental, a direct comparison of costs for video and nonvideo-equipped courts would be of questionable accuracy. In addition, project experience indicates that many nonmonetary consequences may flow from the use of videotape which are not amenable to assessment in strictly monetary terms. Those considering the use of videotape in the criminal justice system should not only measure monetary costs of the technology but also balance nonmonetary impacts (positive and negative), such as the effects of videotape on the accused's constitutional rights and the effects of a videotape record on the scope of appellate review. The remainder of

⁵⁸During the data collection phase of this research, there were never more than two videotape technicians visible to the people in the courtroom. All equipment used was industrial-type videotape equipment.

this section analyzes many of these monetary and nonmonetary considerations that must be weighed in deciding whether to implement videotape technology into the criminal justice system.⁵⁹

A. Procedural Considerations

Most procedural impacts of video technology in the criminal justice system center on the fact that a *visual record* of the actual event is made available for continual review. This addition to normal recording methods has both positive and negative implications.

Visual records of investigative procedures may serve to alleviate law enforcement reporting tasks while providing more accessible methods of judicial review. For example, confessions recorded on videotape could be viewed to determine whether *Miranda* warnings⁶⁰ were properly given or whether waivers of any rights were voluntary or coerced. Lineups preserved on videotape could be visually examined in the event of challenges of suggestiveness or improprieties in witness identification procedures. Out-of-court identification could be tested in court by playback of the videotape. Sobriety tests performed on videotape could support or refute charges of intoxication. Judges confronted with challenges to such procedures and charges could more efficiently arrive at rulings by reference to the video record. Thus, by providing an alternative reporting method, an arresting officer's report could be supplemented and, at the same time, verified. Further, attorneys with access to both the written report and the supplemental video record could more readily identify viable issues for trial and reject defenses clearly not available from the video record.

The typewritten transcript of a judicial proceeding is frequently criticized as sterile and subject to inaccuracies in interpretation. As one court has stated:

The cold record cannot give the look or manner of the witnesses; their hesitations, their doubts, their variations of language, their precipitancy, their calmness or consideration. A witness may convince all who hear him testify that he is disingenuous and untruthful, and yet his testimony, when read, may convey a most favorable impression.⁶¹

In the event a witness examined at a preliminary hearing or examined conditionally before trial becomes unavailable at trial, his testimony could be presented via videotape. Videotape preserves not only verbal testimony but also the aural and visual indicants of demeanor and credibility, and thus provides the trier of fact with a more repre-

⁵⁹The constitutional, procedural, and administrative impacts expected to flow from videotape use must be weighed against the potential for negative participant reaction. Section III contains a detailed discussion of this study's investigation into potential adverse consequences of videotape on participant behavior.

⁶⁰See *Miranda v. Arizona*, 384 U.S. 436 (1966).

⁶¹*Maslow v. Maslow*, 117 Cal. App. 2d 237, 243, 255 P.2d 65, 69 (1953).

sentative information base from which to judge. Similarly, a video record permits the trier of fact to examine exhibits, visual aids, and demonstrations and thus frees him from reliance on written descriptions of these facets of the case.

At the appellate level, use of a videotape record may engender problems. In addition to providing a record of what was said, videotape provides a record of contextual factors such as voice intonation, voice inflection, and nonverbal behavior. The objection has been raised that a necessary concomitant of providing such a complete record is the expansion of the scope of appellate review. Appellate review is in theory limited to issues of law. Factfinding is viewed as the exclusive province of the trier of fact. That province is not to be invaded by the appellate courts unless the findings of the trier of fact are wholly insupportable in reason from the evidence presented. Some fear that the videotape record would improperly invite an appellate court to second-guess the trier of fact by giving to the appellate court an otherwise unavailable opportunity to evaluate the participants' demeanor and nonverbal communication. This fear may materialize; the resolution of the problem awaits the actual controversy.

B. Administrative Considerations

The major administrative impact of videotape results from its use as a tool to increase *scheduling flexibility* for all phases of the criminal justice process.

Investigative procedures may be expedited by the use of videotape. Under present methods, the physical lineup is performed when the necessary witnesses are present and when the requisite physical similarity among suspects is achieved. The availability of a videotaped lineup would relax scheduling constraints imposed by the necessity of having all known witnesses view the same lineup at the same time, or alternatively having to assemble a second set of suspects for identification by previously unavailable or unknown witnesses. Videotape could be used to record lineups when the requisite physical similarity of suspects can be achieved; the videotape record could then be replayed to witnesses when convenient.

Because of the difficulty of achieving a comparable set of suspects at a time when all known witnesses are available, many jurisdictions are presently using photographic lineups as an alternative to physical lineups. Videotaped lineups could maintain the scheduling flexibility offered by the photographic lineup procedure while preserving the identifying characteristics of suspect movement and speech available in physical lineups.

Constraints imposed upon scheduling witness appearances at trial can be reduced by well-planned use of videotape recording. A witness may be unavailable at some time during the trial, yet his testimony may be prerecorded and presented at the appropriate point during

the trial. A frequently called prosecution witness whose personal appearance at trial is not crucial, such as a police chemist who examines confiscated drugs, may be examined in advance of trial. This capability permits counsel to schedule case preparation tasks more efficiently and permits the presentation of evidence to the trier of fact in a more logical sequence. Congested courts may benefit from fewer continuances occasioned by witness unavailability.

The preparation of the record of proceedings is a major cause of court delay.⁶² Videotape can provide an immediate record of a variety of proceedings. For example, the videotape record of a felony preliminary examination may be used at the hearing on the motion to dismiss the information, or the videotape record of a hearing on the admissibility of allegedly illegally obtained evidence may be used to review the trial court's ruling on the motion to suppress. Either instance would result in accelerated case disposition since the delay in preparation of the written transcript would be eliminated. The appellate process could be hastened if counsel and the court had an instantaneous video record rather than a written transcript long delayed in preparation. However, the amount of time required at the appellate level to view the playback of a trial, or a portion thereof, may be significantly greater than the time required to read a written transcript. Increased costs or scheduling constraints could be introduced by the need either to provide playback equipment and duplicate tapes for each member of the appellate panel or to assemble all members at a given time to view the taped record.

Counsel for appellant and respondent may find that appellate brief preparation from the video record is difficult and time consuming as citation to page and line must be translated to hour and second, requiring repeated replay of the tape. Rapid scanning techniques and precise logging procedures would be of considerable value in facilitating both review of videotaped records on appeal and preparation of appellate briefs.

C. Constitutional Considerations

The stated objectives of this study project did not encompass a detailed investigation into the constitutional issues affecting the official use of video technology in the criminal courts. It is not the intent of this section to provide an exhaustive analysis of the constitutional issues surrounding use of videotape in the courts; such a statement would suffer because of the hypothetical nature of the issues. However, those constitutional issues which are likely to become the most salient are briefly discussed in this section. The legal considerations discussed below are of general import across all study applications.

⁶²Moran, *Technology and the Court*, 12 JUDGES' J. 98 (1973).

1. *Right to confrontation*

The question has been raised whether the use of prerecorded witness testimony at trial in lieu of the personal appearance of the witness would result in a denial of the accused's right to confrontation. That question was addressed in *People v. Moran*.⁶³ A chief prosecution witness to a murder was dying of throat cancer. He was not expected to live to testify at trial and in fact died during the initial stages of the trial. His 8-hour preliminary hearing testimony had been videotaped and was admitted into evidence at trial over defendant's objection and after a careful preview by the trial court and counsel in pretrial proceedings. The appellate court found no merit to the defendant's contention that the use of the videotape deprived him of his sixth amendment rights. With the knowledge that the preliminary hearing testimony would likely be used at trial, defense counsel had pursued an unusually extensive cross-examination at the preliminary hearing. Citing *California v. Green*,⁶⁴ the court held that, "The requirements of the confrontation clause are satisfied if at the prior hearing the accused was afforded a complete and adequate opportunity to cross-examine."⁶⁵

2. *Right to effective assistance of counsel*

This aspect of the sixth amendment guarantee has been raised by some commentators who suggest that prerecorded testimony may prejudicially impair counsel's opportunity to prepare an adequate defense. It has been noted that questions arising between the videotaping of the testimony and its presentation at trial may be foreclosed due to an inability to reopen examination of the witness. This issue has not yet been addressed by the courts.

3. *Right to counsel*

The right to counsel at investigative, pretrial, trial, and posttrial stages of criminal justice would not necessarily be affected by the use of videotape. It is noteworthy in this respect that in the recent case of *United States v. Ash*,⁶⁶ the United States Supreme Court held that there was no right to counsel at a postindictment photographic lineup. The rationale advanced for the decision was that defense counsel had adequate opportunity at trial to cure any alleged defects in the photographic display by confrontation and cross-examination of the identifying witness. It remains to be decided whether the same rule will be applied to videotaped lineups as was applied to this conventional photographic procedure.

4. *Privilege against self-incrimination*

In the case of *Hendricks v. Swenson*,⁶⁷ the Eighth Circuit Court of

⁶³39 Cal. App. 3d 398, 114 Cal. Rptr. 413 (1974).

⁶⁴399 U.S. 149 (1970).

⁶⁵39 Cal. App. 3d at 406, 114 Cal. Rptr. at 417.

⁶⁶413 U.S. 300 (1973).

⁶⁷456 F.2d 503 (8th Cir. 1972).

Appeals held that, upon a proper foundation of voluntariness and accuracy of depiction, the use of a videotaped confession in a murder trial did not impinge a defendant's fifth amendment rights. Indeed, the court suggested that a videotape is protection for the accused:

If he is hesitant, uncertain, or faltering, such facts will appear. If he has been worn out by interrogation, physically abused, or in other respects is acting involuntarily, the tape will corroborate him in ways a type-written statement would not. Instead of denying a defendant his rights, we believe it is a modern technique to protect a defendant's rights.⁶⁸

The court also stated that it did not think the use of videotape was any more violative of a defendant's privilege against self-incrimination than the constitutionally permissible use of still photographs or blood or urine samples.⁶⁹

5. *Due process*

a. Production techniques. It was contended by the defendant in *People v. Moran*⁷⁰ that the videotape medium distorted the demeanor of the witness and that this asserted failure to accurately transmit the testimony constituted a violation of his right to due process of law. Disagreeing with the defendant, the court stated:

[T]he advantages and disadvantages of the "filtering" effect of the medium falls equally on both sides. Therefore, its use is 'fair' and there is no inherent unfairness. Conceding that testimony through a television set differs from live testimony, the process did not significantly affect the flow of information to the jury. Videotape is sufficiently similar to live testimony to permit the jury to properly perform its function.⁷¹

It is theoretically possible for prejudicial production techniques to be used, thereby violating the requirements of due process. Strict production standards must be developed for each application so that any unfairness is exogenous to the use of videotape. To the extent that videotape provides an impartial and accurate record of in-court and out-of-court proceedings, the due process guarantee is not likely to be interposed as a bar to its use.

b. Notice to the defendant. The Memorandum of Approval from the California Judicial Council for this project permitted, upon certain conditions, in-court videotaping for the purpose of this study.⁷² One condition was that the taping be done by specific order of the court. Accordingly, the participating judges read into the record at the commencement of each proceeding an order permitting the videotaping. The order provided the defendant with notice that the

⁶⁸*Id.* at 506.

⁶⁹*Id.* at 506-07.

⁷⁰39 Cal. App. 3d 398, 114 Cal. Rptr. 413 (1974). See text accompanying notes 63-65 *supra*.

⁷¹39 Cal. App. 3d at 410, 114 Cal. Rptr. at 420 (citations omitted).

⁷²See note 26 *supra*.

proceeding was to be recorded for study purposes only.

The Memorandum of Approval also provided that the judge presiding could impose such additional limitations on the videotaping as he deemed necessary for the protection of the rights of the parties. It was the practice of the presiding municipal court judge in one series of applications to allow the defendant an opportunity to refuse the video recording of his hearing. In another series of applications, however, the presiding judge issued the order and merely noted for the record any defendant's objections to the taping. It was the opinion of this judge that the study recordings would in no manner prejudice the defendant's rights; therefore, the defendant needed no opportunity to refuse.

Were the use of videotape in certain judicial and extrajudicial proceedings to become standard procedure, the issue would have to be settled at the outset whether such use compromises the defendant's rights, and if so, whether a waiver or objection must be entered prior to the commencement of the proceeding.

D. Financial Considerations and Recording Costs

In any decision whether to use videotape recording, the prospective user must necessarily weigh the advantages or disadvantages discussed in the previous sections against the associated costs. This section presents and comparatively analyzes two primary methods of obtaining videotape services: (1) by commercial contract on an as-needed basis, or (2) by establishing an in-house videotape system. There are, of course, other alternatives available, including combinations of the two presented, and potential users should determine the method which best satisfies their needs.

1. Videotape services by commercial contract

Project staff conducted a survey of five California firms⁷³ currently providing videotape recording services to determine commercial cost ranges for videotape recording with single-camera and multi-camera systems. The survey is summarized in Figure 2. It should be noted that most of the firms sampled are of recent organization and that the prices quoted are for the services of a new industry. In fact, some of the prices quoted exceeded the ranges presented in Figure 2. The project staff selected the ranges given as most realistic. These prices may possibly settle over time as the use of video technology in the judicial system increases.

⁷³Color Depovision, Oakland; Mobile Video, Sacramento; Television Associates, Mountain View; Video/Audio Recording Systems of Sacramento, Sacramento; Video Depositions, Glendale.

FIGURE 2

Service	System		
	Black-and-white single-camera	Black-and-white multicamera	Color single-camera
Recording:			
First hour	\$110 - \$150	\$170 - \$200	\$170 - \$250
Add'l ½ hour . .	\$ 50 - \$ 75	\$ 80 - \$100	\$ 80 - \$110
Playback	\$40 - \$75 per hour or \$100 - \$125 per day		
Editing	\$50 - \$70 per hour		
Duplication	\$20 - \$70 per hour		
Tape	\$30 - \$45 per hour		

The rates quoted in Figure 2 include operator costs and are for "on location" services, that is, services rendered in court or at police facilities. Some firms charge additionally for time required to set up and break down the equipment. Average time consumed by these tasks is approximately one-half hour for single-camera systems and one hour for multicamera systems. Also, most firms charge additionally for tape. The most frequently quoted cost was \$35 per hour. From the cost ranges presented in Figure 2, the average commercial cost per recording hour may be stated as follows:

1. Single-camera, single-microphone system: \$130
2. Multicamera, multimicrophone system: \$185

The equipment system to be used and the recording time determine the commercial recording costs per application. Figure 3 depicts examples of average commercial recording costs for each of the project applications. These costs are based on project experience with the typical duration of each application and on recommended equipment systems. It should be noted that the duration of each application may vary significantly and affect costs accordingly.

FIGURE 3

Application	Equipment system	Average duration	Avg. cost*
Preliminary hearings, motions	Multicamera	1 hour	\$220
Lineups, confessions, sobriety tests	Single-camera	30 min.	\$165
Conditional examinations, depositions	Multicamera	3 hours	\$650

*This includes the average cost of videotape.

2. *In-house videotape system*

Those contemplating an in-house videotape system should be cautioned that this approach requires the creation of an operating entity and entails consideration of many factors other than cost such as personnel administration and training, facilities development, administrative procedures for logging, and storage and maintenance. Although the costs presented hereafter anticipate direct purchase, other financing arrangements are available such as leasing, rental, or combinations of these alternatives.

To assess in-house recording costs in terms comparable to commercial rates, total in-house recording costs must be translated to recording cost per hour. To make this translation, total cost per year would be divided by frequency of use. However, there is no currently available data from which to project the frequency of videotape use *on a per application basis*. Because this information is unavailable and because frequency of use would vary between agencies in any event, in-house recording costs are computed on *total* cost and frequency of use per year.

To arrive at in-house recording cost per hour, the following factors were assumed:

1. The purchased equipment would be used for at least 5 years and the purchase cost would be allocated equally over this period.
2. The theoretical maximum recording hours per year is 1,750, a product of 250 working days at 7 hours per day. The probable yearly maximum, however, was assumed to be 5 hours per day for 250 days, or 1,250 hours.
3. Tape costs would accrue at \$25 per recording hour.
4. The salary for a full-time videotape operator would be \$10,000 per annum.
5. The purchase cost per recording hour would be exclusive of overhead and employee benefit burdens.
6. Maintenance costs were not included, as it was the experience of the project that these costs were nominal in relation to total costs.

These cost computations were made for both single and multiple camera recording systems.

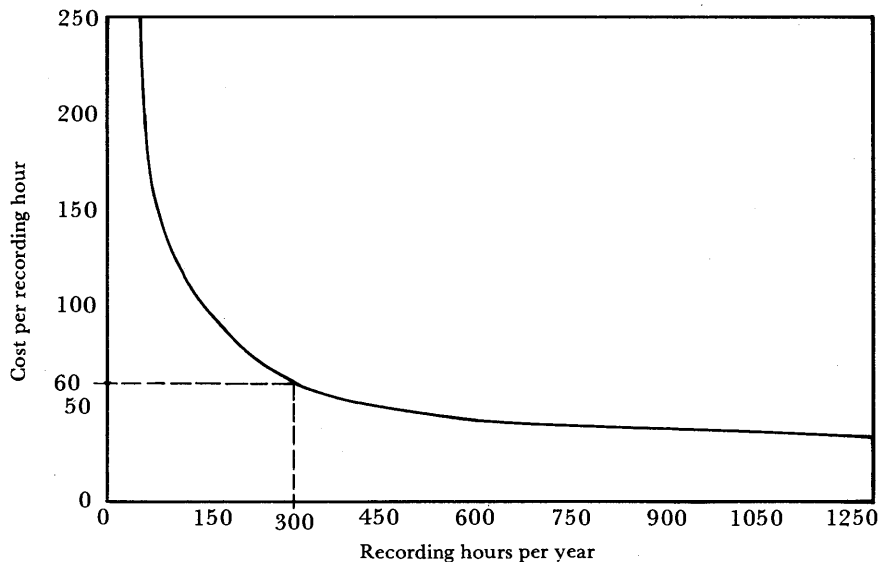
a. Costs of an in-house single-camera system. Based on total equipment purchase cost of \$3,300 allocated over a 5-year period (\$660 per year), Figure 4 presents the in-house cost per recording hour for a single-camera, single-microphone system as a function of annual use. This system is comparable to the single-camera system referred to in the commercial rates quoted in Figure 2.⁷⁴ By estimat-

⁷⁴The following equipment with cost per item constitutes the single camera system referred to.

1. Camera (1), \$377.00
2. Camera viewfinder (1), \$200.00
3. Microphone, omnidirectional (1), \$79.00
4. Videotape recorder, 1/2" reel-to-reel (1), \$1,105.00
5. Monitor, 11" black-and-white (1), \$244.00

ing the number of recording hours per year, the cost per hour for in-house videotape recording may be approximated. For example, if the estimated recording hours per year is 300, the cost per recording hour is approximately \$60.

FIGURE 4



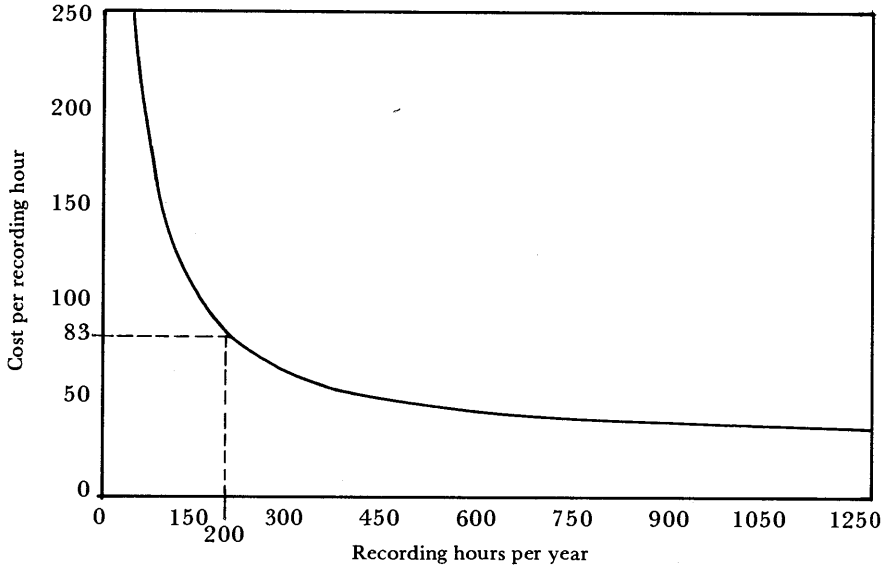
b. Costs of an in-house multicamera system. Based on total equipment purchase cost of \$8,300 allocated over a 5-year period (\$1,660 per year), Figure 5 presents the in-house cost per recording hour for a multicamera, multimicrophone system as a function of annual use. This system is comparable to the multicamera system referred to in Figure 2.⁷⁵ By estimating the number of recording hours per year, the cost per hour for in-house videotape recording may be approximated. For example, if the estimated recording hours per year is 200, the cost per recording hour is approximately \$83.

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6. Auxiliary equipment: a. time-date generator (1), \$670.00; b. zoom lens (1), \$244.00
 7. Miscellaneous equipment: a. tripod (1), \$288.00; b. microphone stand (1), \$21.00; c. audio earplug (1), \$2.00; d. connecting cable, \$70.00

⁷⁵The following equipment with cost per item constitutes the multiple camera system referred to.

1. Camera with viewfinder (2), \$1,078.00
2. Microphones, unidirectional (4), \$396.00
3. Videotape recorder, 1/2" reel-to-reel (1), \$1,105.00
4. Monitor, 11" black-and-white (1), \$244.00; monitors, 9" black-and-white (3), \$675.00
5. Auxiliary equipment: a. special effects generator (1), \$1,045.00; b. microphone mixer (1), \$190.00; c. time-date generator (1), \$845.00; d. remote camera controls: (i) automatic zoom, (ii) pan-and-tilt unit, (iii) control unit (1), \$1,500.00; e. zoom lens (1), \$244.00
6. Miscellaneous equipment: a. tripod dolly assembly (2), \$690.00; b. microphone stands (4), \$84.00; c. audio headset (1), \$25.00; d. connecting cable, \$180.00

FIGURE 5

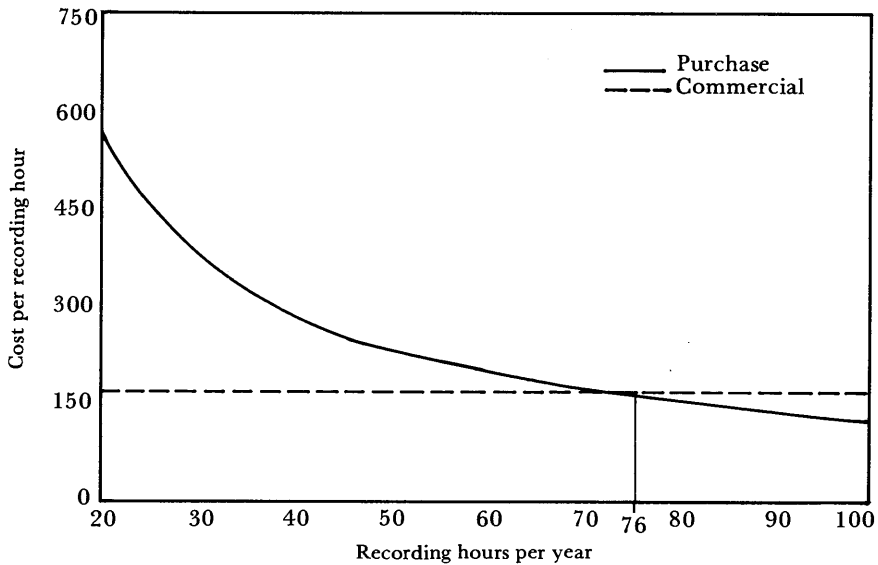


3. Commercial v. in-house costs

Since the cost per hour for in-house recording decreases as the amount of use increases, there is a point at which the hourly rates for in-house and commercial recording are equivalent. Comparisons of commercial and in-house recording rates for both single-camera and multicamera systems are presented in Figures 6 and 7 respectively.

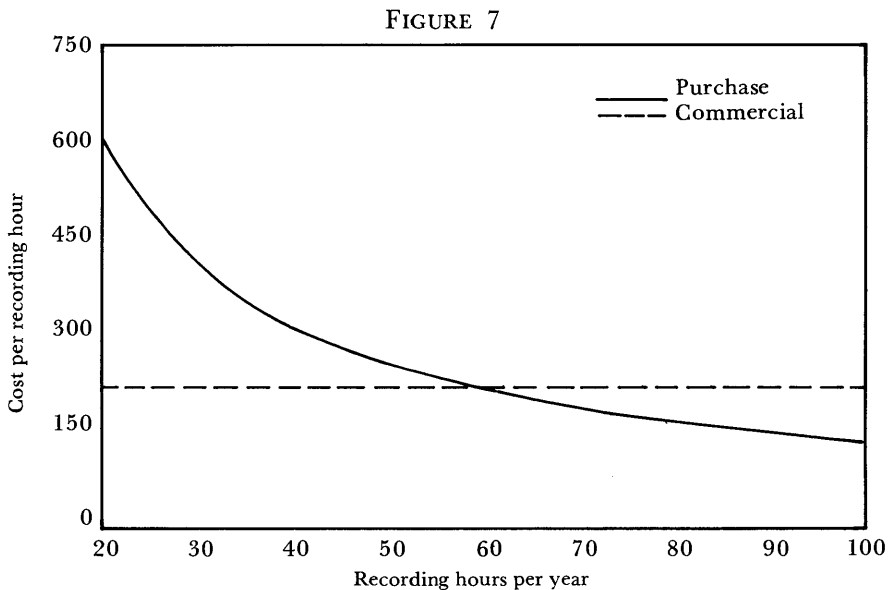
Based on a single-camera recording system, Figure 6 provides a comparison of in-house and commercial costs per recording hour as a

FIGURE 6



function of annual recording hours. The commercial cost stated in this figure, \$165 per recording hour, includes the average recording cost given in Figure 2 (\$130 per hour) and tape charges (\$35 per hour). As shown in Figure 6, recording costs become equivalent when annual in-house recording volume is approximately 76 hours. Beyond this point, equipment purchase becomes *cost* advantageous.

Based on a multicamera recording system, Figure 7 provides a comparison of in-house and commercial costs per recording hour as a function of annual recording hours. The commercial cost stated in this figure, \$220 per recording hour, includes the average recording cost given in Figure 2 (\$185 per hour) and tape charges (\$35 per hour). As shown in Figure 7, recording costs become equivalent when annual in-house recording volume is approximately 60 hours.



The costs for in-house recording used in these comparisons include only the major direct cost items such as equipment purchase and operator and tape expenses. Such costs are presented to illustrate a method for comparing two alternatives and should not be taken as estimates of total operating expenses. Also, commercial recording rates vary widely. Those anticipating the use of video recording technology should conduct specific cost computations and comparisons based on local conditions.

V. RECOMMENDATIONS AND CONCLUSIONS

In assessing the consequences of any technological change, two issues are of utmost importance. First, what are the immediate, first-order effects of introducing the technology? And second, what are

the derivative effects that may emerge as dominant, long-term consequences? Although this project focused primarily on the first-order effects of videotape use, certain long-term effects may be extrapolated from project data.

A. Projected Long-Range Effects of Videotape in the Justice System

Observations made during this project indicate that as the user becomes familiar with videotape and its capabilities, new applications are developed. During this project, new and innovative uses for videotape were suggested by individuals who were initially hesitant to use videotape at all. For this reason, an increase in user familiarity can be expected to result in an increase in the number and frequency of court-related videotape applications.

There is currently a rapid rate of advancement in the field of telecommunication technology. While many of the equipment improvements are designed for nonlegal users, product changes should become more responsive to the problems of court-related recording as manufacturers become aware of the market potential within the legal community. These advances in technology, coupled with an increased level of user expertise resulting from extended use, should lead to improvements in the overall quality and efficiency of court-related videotape recording.

As illustrated previously, the hourly cost of videotape recording with an in-house system decreases as the volume of recording increases. Furthermore, as the demand for videotape services increases, greater competition in the commercial realm should decrease the costs of commercial recording. Therefore, given production efficiencies and increased use of videotape in the justice system, the long-term user could reasonably expect a decrease in videotape recording costs for both commercial and in-house services.

Although some changes in behavior on the part of judges, attorneys, and witnesses may be expected with the introduction of videotape, these effects will dissipate rapidly. Hence, minimal behavioral effects on judges, witnesses, and attorneys can be expected from extended videotape recording.

B. Recommendations

Research as well as experience has shown that the severity and frequency of problems arising from the use of videotape are totally contingent upon the anticipation and solution of the problems at each stage of the development process. Aside from the fact that some specific legal authority must provide for the use of videotape in the court, videotape can develop into a cost-effective adjudicative tool only if three important potential problems are solved: (1) Potential users must be adequately informed to avoid the formation of unrealistic expectations. (2) Standards and procedures must be developed to prevent the introduction of distortion and bias. (3) The

absence of detrimental effects on a long-term basis on individual rights must be demonstrated.

The adoption or nonadoption of videotape technology in any particular situation will, to a large degree, be a decision which rests with legislators, judges, attorneys, and court administrators. If a decision is made to adopt videotape, its successful and efficient use is contingent upon the user's *realistic* expectations regarding videotape's capabilities. Previous studies suggest that if a user's expectations are unrealistically high, adoption may produce unwarranted disappointment and could in fact preclude the successful use of videotape in other areas. To insure an informed decision regarding videotape adoption and use, programs should be instituted to inform the potential user of the general availability of the technology, the range of potential applications, and the positive and negative aspects of videotape use across legal, administrative, and behavioral dimensions.

As noted earlier, the value of videotape within the community is ultimately dependent upon its ability to accurately record, both aurally and visually, all relevant action within a specified environment. Videotape, like other methods of recording, may be tainted by the introduction of distortion or bias. Regardless of whether this bias is knowingly or unknowingly introduced, it remains a potential problem. If videotape is to be used as an objective medium for the preservation of legal information, safeguards must be developed to preclude misuse. At a minimum, detailed standards and guidelines should be developed which define appropriate procedures for videotape production, videotape operator certification, and access to recorded videotapes.

Much of the research on technological assessment commits the error of myopia. The research focuses on short-term, often transitory, effects emanating from the introduction of the technology, but ignores the more subtle effects that only emerge during continuous use over a long period. It is important to avoid committing this error in assessing the impacts of videotape on the legal system. For example, although some research has been completed on juror attention to and retention of videotaped trial information, these studies do not address *long-term* videotape use and its effects on juror behavior. In determining the viability of videotape use, it must be shown that jurors do not lend differential credence to videotaped evidence; that long-term use of videotape does not foster negative attitudes toward the judicial process; that use of videotape in trials does not result in an emotional detachment which may affect the jury's verdict; and that extended use does not impair juror attentiveness to videotaped evidence. Scientific methods and the adversary system should be combined to evaluate the effects of videotape playback on jurors, judges, and attorneys, and to examine the administrative and behavioral effects of stable, long-term videotape usage.

C. Conclusions

The findings of this project generally support the usefulness of videotape as a tool in the criminal justice system. Specific behavioral, technical, and administrative conclusions are presented throughout this report. In summary, these conclusions may be generalized as follows.

Analyses conducted during this project indicate that, within existing procedural and legal constraints, four videotape recording systems are applicable. The ultimate choice of the system to be used is determined by the environment in which recording is to take place and by the end use intended for the videotape. Recording in environments with participant mobility confined to a relatively small area can be adequately done with a single-camera system. In an environment with numerous, mobile participants active in a relatively large area, a multiple-camera system should be used for quality recording. Regardless of which videotape recording system is used, equipment should be positioned and operated in a manner that insures a natural representation of events from the point of view of the trier of fact and minimizes the potential for operator-introduced bias.

In this study there were no measurable changes detected in judge, attorney, or witness behavior as a result of videotape recording. Legal participants exposed to the videotaping process were initially aware of the introduction of the technology into the environment; however, this awareness was short-lived. Although witnesses were aware of the presence of videotape recording equipment, this awareness was of little consequence when compared with the pressures and demands made upon witnesses by the normal examination process.

Those anticipating the adoption of videotape recording technology should conduct specific cost computations and comparisons based on local conditions and weigh these costs against potential positive and negative effects of videotape use. Many of these effects are non-monetary in nature and may only be evaluated within the context of specific user needs. The volume of use will dictate the appropriate method of obtaining videotape recording services. Because videotape recording technology is constantly changing, the potential user should seek assistance to insure that his recording requirements can be met given the existing technology.

There is no research on the potential effects resulting from extended use of video technology in the criminal justice system. Standards governing production, operator training, and security and storage should be developed in conjunction with the adoption of the technology as an integral part of the criminal justice system.