

COURT REPORTING TECHNOLOGIES

**A COST-BENEFIT ANALYSIS AND
QUALITATIVE ASSESSMENT**

**JUSTICE RESEARCH INSTITUTE
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The Justice Research Institute

The Institute is nonpartisan and is incorporated under the nonprofit corporation law of 1988 in the Commonwealth of Pennsylvania. Its purposes include research, management consultancy, and education for improving the administration of justice in state, federal and foreign justice systems.

Its principals have provided research and consultancies to numerous justice system entities including the National Commission on Judicial Discipline and Removal, and to the National State-Federal Judicial Council. The Institute has also contributed to the work of the Carnegie Commission on Science and Technology in Judicial and Regulatory Decision Making. Recently, the Institute was consulted on a major report on civil justice reform developed by the Office of the Solicitor General on behalf of the Council on Competitiveness chaired by the Vice President of the United States.

The Justice Research Institute is presently assisting the senior staff officers of the Supreme Court of the United States in developing that institution's first-ever mission statement and strategic plan for operations.

Staffed by MBAs as well as attorneys and former court executives, the primary consulting focus of the Institute is the introduction of sound business practices into justice system infrastructures. The applied experience and expertise of its principals in state and federal court management combine to make the Justice Research Institute the only organization of its kind in the United States with researchers who also have had successful hands-on experience in court systems.

The Institute is headed by William K. Slate, II, who has over 20 years of policy, management and research experience in both state and federal courts. An attorney with an M. B. A. from the Wharton School of the University of Pennsylvania, Mr. Slate served as director of the congressionally chartered Federal Courts Study Committee, which undertook the first comprehensive study of the federal court system and its relationship to state courts in the history of the nation. Among that report's 100 recommendations was the consideration of technology and court reporting.

Executive Summary

This report is based on a study of the four methodologies for making a trial court record: audio, video, computer-aided transcription (CAT) and computer-integrated courtrooms (CIC). The specific focus is on the development of a cost-benefit analysis model which examines direct costs for start-up, year one costs and a net present value calculation for a five-year time span.

After describing the salient features of each method, the report evaluates the quantitative and qualitative arguments and facts.

Principal among the report's findings and conclusions are the following:

- The introduction of limited vision technologies for making a trial court record which are not computer based is not cost efficient and delays the ultimate computerization of court record making. It also stunts opportunities for court system technology compatibility with other branches of government and the private sector.
- Shifting and hidden costs associated with audio and video technologies are substantial and should be identified and quantified in assessing these methodologies for making a trial court record. Illustrative of a shifting cost is the governmental cost of video equipment for a nine judge intermediate court which is \$31,950. A significant hidden cost of any equipment is the replacement cost of major components in four to five years.
- System participants (judges and lawyers) utilizing either audiotapes or videotapes on appeal report the time required to review a record increases by a factor of three to four over the use of a hard copy transcript.
- The success of any method chosen for making a record is dependent upon the competence of the individual monitor or reporter and the effective administration of the process employed. In evaluating the system for making a trial court record, attention must be given to due process safeguards based on accuracy and accountability.
- In one respect the future is known. The microcomputer is now and will be the cornerstone of all foreseeable technologies.

I. Introduction and Acknowledgments

Introduction

The National Court Reporters Foundation of the National Court Reporters Association engaged the Justice Research Institute to conduct a cost-benefit analysis of all relevant costs in a court system setting of the use of audio, video and court reporters' systems. This is a first-of-its-kind undertaking precipitated by increasing demands from the courts for cost data relative to making the official record of trial proceedings. A study of this magnitude necessarily contemplated qualitative considerations for each of the methods of recording trial proceedings: audiotape, videotape, computer-aided transcription (CAT), and computer-integrated courtrooms (CIC).

It was requested by the Foundation and required by the Institute that the study, evaluations, and conclusions should be free of influence and unfettered throughout in order that an intellectually honest inquiry might be made. This study, then, in a very real sense is one of first impression. It has not been driven towards a particular result or preordained conclusions. In contrast, the presence of bias, or an excess of enthusiasm for a given result leading to inaccurate or incomplete conclusions, has been patently obvious in most "studies" which we have read.¹ We note here that to our understanding and belief we have reviewed all the extant literature in the field for the decade leading up to the present time, September 1992.

Acknowledgments

We wish to acknowledge our debt to the many individuals and organizations who contributed to our work. A complete list of individuals and organizations consulted is found in Appendix A. However, particular mention, in thanks, is made here to the clerk and staff of the United States District Court for the Eastern District of Pennsylvania where all four methods of making a trial record exist (audio, video, CAT, and CIC). Their cooperation in meeting with representatives of the Institute on multiple occasions and giving generously of their time and information enabled us to "field test" the Institute's survey instruments before going to the eight data sites. That experience benefited our efforts immeasurably.

Special appreciation is also noted for the professional and congenial assistance and advice provided by B.J. Shorak of the National Court Reporters Foundation, while conscientiously maintaining fidelity

¹ Typically, one method of making a trial court record has been encouraged or "sold" in almost every study reviewed. Notable exceptions are recent reports published in Minnesota and Washington State.

to the integrity of the project.

Lastly, it should be said that this report is the proprietary product of the Foundation and, thus, the Foundation is at liberty to retain it internally for its own use, or to make it more broadly available.

II. Cost-Benefit Analysis Process and Methodology of the Study

1. Cost-Benefit Analysis Process

There is rightly a desire today to bring public spending under closer scrutiny. The effort involved in a cost-benefit study addresses that desire because it concentrates attention on basic issues. Briefly, the usual method for testing the "soundness" of proposed activities requires a calculation of the value of the resources to be employed in them (the cost) which is compared with the value of the goods or services to be produced (the benefits).

The basic notion is very simple. If we have to decide rather to do A or not, the rule is: Do A if the benefits exceed those of the next best alternative course of action, and not otherwise. If we apply this rule to all possible choices, we shall generate the largest possible benefits, given the constraints within which we live. Going on a step, it seems quite natural to refer to the benefits of the next best alternative to A as the cost of A, for if A is done, those alternative benefits are lost. So the rule becomes: Do A if its benefits exceed its costs, and not otherwise. Said another way, measure the total value of benefits against the total costs.

In their quest for rational decisions, policymakers are frequently faced with a variety of problems. Often, the single overwhelming concern is the amount and type of information needed in order to determine appropriate policy options. Moreover, too often the producer of the information needed is enamored with the technique and does not focus on the results. One aim of this distanced and freestanding cost-benefit analysis is to help facilitate and rationalize government decision-making.

2. Methodology of the Study

As noted earlier, the effort involved in a cost-benefit study concentrates attention on basic issues. Necessarily then the approach is detailed and methodical.

This study involved the following approach to the information, the collection of data, the construction of a cost-benefit model and, ultimately, the analysis and conclusions emanating therefrom:

(a) The study commenced in January 1992, with an exhaustive literature search and review of all relevant and available materials, published and unpublished, for the last decade. A complete listing of materials reviewed is in the bibliography to this report.

(b) Institute staff engaged in prestudy discussions with a wide range of experts in the field, including representatives of state and federal courts, the National Center for State Courts, the Administrative Office of United States Courts, academics, technology experts, and vendors.

Subsequently, one member of the project team attended the Third National Conference on Court Technology in Dallas, Texas, March 1992, to interview individuals and gather information pertinent to the study. A complete list of all persons consulted during the study is in Appendix A to this report.

(c) It was determined that the wealth of knowledge available in the abundant secondary sources should be updated with information collected through a survey instrument and interviews from contemporary data sites. Initial design of the survey instrument was commenced and field tested in discussions and through actual data collection in the United States District Court for the Eastern District of Pennsylvania. The data collection instrument was then refined and prepared for distribution.

(d) The criteria for data collection sites were then developed and locations were identified based upon:

- (1) Geographic diversity.
- (2) Access to data.
- (3) The availability of a recent study or report.
- (4) The presence of cooperative contact persons in the jurisdiction.
- (5) The inclusion of both state and federal jurisdictions, but a preference for a preponderance of state courts given the plurality of state courts nationally.

(e) A representative sampling of the four methods under study was undertaken with two jurisdictions in each category to be identified.

Based upon those criteria,² the following data sites were selected:

Audio

Sacramento, California

Farmington, Aztec and Gallup, New Mexico

Video

Louisville and Frankfort, Kentucky

Moorehead, Minnesota

CAT

Toledo, Ohio

Binghamton, New York

CIC

Phoenix, Arizona

Los Angeles, California

²Additionally, because Kentucky has a long history of utilizing video and has been a leader among video courts, and because New Mexico had been a largely court reporter state, then an audio state which has substantially returned to court reporters, both Kentucky and New Mexico were deemed important states to include.

Seven of the data sites are state courts. The one federal court is the CIC court in the United States District Court in Phoenix, Arizona.

(f) Telephonic discussions and presurvey interviews were then held with data site participants.

(g) Survey instruments (Appendix C) and explanatory cover letters (Appendix B) were then distributed to the eight data sites.

(h) Upon receipt of the survey instruments, Institute staff reviewed them for completeness and, where necessary, made follow-up calls.

(i) On-site visits for additional data collection, interviews, and site investigation were accomplished in three states: in Kentucky, with interviews and on-site visits in Louisville and Frankfort; in Moorehead, Minnesota; and in Albuquerque, Aztec and Santa Fe, New Mexico.

(j) Data site information was then consolidated with all other knowledge, including consultant's observations, on-site investigations and interviews, along with secondary research sources permitting the development of a cost-benefit analysis model and final analysis and conclusions.

III. Description of the Technology of Making a Record

1. Audio

Audio electronic recording is used in many courts throughout the country for making the record. A typical audio recording setup will consist of a recording unit, capable of multitrack recording and eight microphones placed strategically throughout the courtroom. A monitor is generally employed to verify that the recording equipment is working properly. This monitor may also be utilized to manually log the court proceedings. In some jurisdictions the court clerk, or even the judge, may act as the monitor of the audio recording device; however, as will be discussed later, the latter option is not recommended.

Upon conclusion of the proceedings, the audiotape is either marked and filed in a storage facility or sent to transcribers to produce a typed transcript of the record. Interested parties may also request a duplicate copy of the tape.

Supporters of audio recording claim that the complete record is captured on tape rather than by having to rely on a court reporter's version of the proceedings. Additionally, proponents claim that cost savings will result. These savings, the argument goes, should be realized because monitors and transcribers are generally lower-cost personnel than official court reporters (OCRs). Also, in those states where the audiotape itself (without a transcript) is the official record on appeal, it is argued that appellate review is more affordable to the average citizen.

Detractors of audio recording claim that the equipment is generally unreliable. The equipment will at times completely fail without detection by the monitors. Also, at times, monitors are out of the courtroom performing other duties. Further, transcribers often will find many areas of the tape unintelligible due to multiple parties talking simultaneously or people not talking into the microphone. Since the transcriber is generally not present during the court proceedings, it is imperative for an accurate transcript that the speaking parties identify themselves before speaking. This often does not occur.

In contrast, there are times when the audiotapes record too much. Off-the-record discussions or arguments at the bench regarding impermissible evidence can be captured by an audio recording. If the jury requests a playback, those proceedings not normally read back by a court reporter will be reintroduced to the jury. Side-bar conferences remain a problem.

The problem of quick turnaround time for transcripts is not alleviated by audio recording. In fact, due to the multiple parties involved in the transcription process, the turnaround time to produce an accurate transcription may actually take longer. Attorneys and judges have tried to make use of copies

of the tape to speed the turnaround process. However, the inability to "skim" tapes, as is done with typed transcripts or computer diskettes, makes using tape duplicates very time consuming. Finally, detractors claim that audio recording is, in fact, more expensive than OCRs if all costs associated with the process are taken into account, and that it is not at all cost effective for government in the long run because of the limitations of relying on a noncomputer-based information technology.

2. Video

Video cameras are also used in some trial courts to make the record. Courts using video technology are fewer in number than those using either OCRs or audio.

A typical video setup may include five cameras placed in fixed positions. An audio recording will be tied into the video setup. As with an audio recording, a monitor will generally be employed to assure that the electronic video equipment is working properly and to monitor its use and develop a log of proceedings.

Supporters of video recording use the same arguments put forth by the proponents of audio: that the video is more reliable and accurate in capturing the record; that attorneys have instant access to the proceedings with video; and that video is less expensive. Additionally, supporters believe that the problem of speakers not being properly identified in an audio recording should be improved by using the video technology.

Detractors of video recording invoke most of the same arguments put forth by the detractors of audio recording and enumerated in the audio description. Additionally, the integrity of using a video transcript of a trial has been questioned when the case has been appealed. Because the trial judge is the trier of facts and has responsibility for the evaluation of witness credibility, it is argued that video tapes on appeal invite inappropriate appellate court incursion into the legally established province of the trial court. It is also argued that video is not cost effective for government in the long run because of the limitations of installing a noncomputer-based information technology system.

3. Official Court Reporters - Computer-Aided Transcription (CAT)

Official court reporters (OCRs) are utilized to make the record in the majority of trial courts of record today. In the past, a reporter would attend the court session and record the proceedings by capturing testimony on a stenotype machine that imprinted phonetic shorthand symbols onto a paper tape. The presence of a human enabled the proceedings to be interrupted only when an immediate point of clarification was necessary. Historically, the human presence has been deemed an asset of the traditional system.

After the court proceedings were complete, the court reporter would take the paper shorthand

output and convert this output to an English language transcript. However, turnaround time from the conclusion of the court proceedings to the production of a transcript was frequently slower than desired.

Today, most court reporters have invested their own resources in the computerization of their stenograph machines. The technology known as computer-aided transcription (CAT) has enabled court reporters to turn out instantaneous unedited hard copy or edited hard copy transcripts shortly after the conclusion of the court proceedings.

Computer-aided transcription is a tool by which official court reporters may be relieved of most, if not all, of the time-consuming job of translating stenotype shorthand outlines into English transcripts. The computerized stenotype machine in use today creates both a steno paper record and records the electronic equivalent of the steno strokes on a computer-compatible medium. If a transcript is not needed immediately, the data may be stored on a disk or tape media. When a transcript is required, the computer is instructed to translate the strokes by using a computerized dictionary that each reporter has created based on his or her own shorthand strokes.

Once translated, the "raw" transcript is edited on the same computer system, using modified word processing software. This editing phase, which can be done by the reporter or a technician (called a "scopist" or "scope operator"), perfects the transcript by correcting shorthand that did not translate, resolving homonym conflicts, and correcting punctuation and page format. The perfected transcript is ready for delivery to an attorney or a judge.

Supporters of CAT (other than court reporters) note correctly that the accuracy level of a record produced by a professional certified court reporter using CAT is the standard to which all other systems compare themselves. Gaps in transcripts simply do not occur as is possible in developing an audio- or videotape. OCRs are also trained to interrupt inaudible speakers and request that they repeat themselves; audio and video monitors are not. Additionally, CAT proponents point to the immediate availability of a transcript (something not possible in the use of either audio or video since they each require an extra transcribing process). Supporters also point to the universally acknowledged ease of use of transcripts on appeal by both attorneys and appellate judges. We found that public defenders and others involved in budgetary crises underscored the operational savings of the use of transcripts in contrast to the time consumed in reviewing audio and videotapes.

Detractors of CAT no longer have the traditional arguments of delays in transcript production which were frequently valid before the introduction of computer-aided transcription equipment. Small jurisdictions in sparsely settled areas sometimes maintain that trained and certified reporters are unavailable. The principal argument advanced by CAT detractors today is that audio and, perhaps, video costs are lower than the cost of OCRs using CAT. However, that argument, as will be pointed out later, is subject to valid criticism for its failure to take into account all systemic costs.

4. Computer-Integrated Courtroom (CIC)

The Computer-Integrated Courtroom (CIC) incorporates CAT technology and real-time court reporting along with other available computer technology, software and services. This combined technology provides computer access in the courtroom for judges and attorneys to review testimony and case documents, and to utilize case law research systems. With the use of real-time translation in a CIC, technology is in place to conduct court proceedings in which hearing-impaired witnesses, litigants, or other parties are involved. CICs now exist in a growing number of jurisdictions -- state and federal -- throughout the United States.

In real-time reporting, a court reporter's CAT equipment is utilized so that as the reporter writes on the stenotype machine, the English translation of what is said instantaneously appears on monitors located in the courtroom, conference room, or elsewhere. Using real-time translation, experienced CAT writers achieve more than 98 percent accuracy, enough for complete comprehension.

Real-time reporting allows hearing-impaired persons to fully participate in courtroom proceedings whether as counsel, judge, juror, witness, litigant, or spectator, by enabling them to read courtroom dialogue on a computer monitor only seconds after it is spoken. Consequently, real-time technology can speed the pace of litigation in cases involving hearing-impaired participants. Real time also aids the process when interpreters are used because they can reference the English text if required.

A rapidly developing adjunct technology allows a braille printer to be added to a CIC installation enhancing justice for the visually impaired.

Supporters of CIC note that judges, attorneys and paralegals can utilize computer terminals at their work areas for litigation support to rapidly locate earlier testimony or privately marked areas of current testimony that appears on their computer monitors through real-time technology. Court and counsel can review previous questions and answers in precise form, thus eliminating the need to interrupt proceedings for readback by the court reporter. With the ability to rapidly search for inconsistencies in the witness testimony and review evidence previously presented, it is argued that this tool can greatly enhance the attorney's ability to present a case, prepare examination and cross-examination, and react to testimony as a trial unfolds.

Other case-related information can also be entered into the system for a CIC -- such as discovery, briefs, motions, exhibits, and other case documents filed -- that can be quickly accessed at any time. Supporters also mention that attorneys can bring their own computers and software into the courtroom to connect into the CIC system. The use of a telephone modem can provide an attorney access to computer data at his or her office without leaving the courtroom, thus reducing trial-related costs.

In a CIC, the court reporter can provide daily transcript copy in either printed or disk format. Completely edited transcript copy can be provided shortly after proceedings close.

It is also maintained that CICs can save time, and therefore costs, while enabling judges and attorneys to be more efficient. One such value added element is the ability of judges to electronically flag testimony on the terminal on the bench, eliminating the need for a judge to make copious hand written notes. This frees up the judge to be a complete listener.

An additional feature to a CIC facility is a video picture display which corresponds to the English text. "Video sync" may be useful in witness credibility and physical display situations.

It is agreed that increasing numbers of jurisdictions are evaluating the use of CICs. This is particularly significant given that the number of jurisdictions that accept electronic filing of depositions, briefs, and other court documents will continue to increase in the future. CICs also allow the court reporter to input pertinent docket entries directly into the main computer system freeing-up the courtroom deputy for other duties.

Detractors argue that the investment in a CIC court is too costly for jurisdictions with limited resources. Cost is virtually the exclusive basis of opposition to this technology. However, the numbers, as will be seen in the cost-benefit analysis model, are not daunting when all costs are accounted for, and when considering that computer-based operations are and will be universally employed.

IV. Cost Centers Attendant to Court Reporting Technologies

Introduction

In reviewing and analyzing the cost figures secured from the data sites along with the most current reports and studies for specific technologies, we have documented the recurring and expected typical direct costs for a given method of making and utilizing a trial court record. We define "direct costs" as those expenditures, capital or recurring, which are explicitly a part of the operations of a given method.

We have also found a number of "shifting" or "hidden" costs not typically addressed in studies and the literature. A "shifting cost," as its name implies, indicates a cost to government at large, taxpayers, attorneys or the litigants themselves, which although is a clear expense of making a trial record, is one borne by an individual or entity other than the trial court proper. Thus, although the cost is shifted from the trial court budget, it is borne by another system participant.

A "hidden cost" we define as an ancillary cost of producing a record which is not patently visible, is less obvious than direct costs, and may be a shared cost, such as a percentage of the salary of a file clerk or supply clerk who has other duties, in addition to the time spent supporting a discrete method of record making.

In this section of the report, we identify direct, shifting and hidden "cost centers"; that is, the nature and identity of where the costs for making and utilizing a record occur. In the Cost-Benefit Analysis Model at the end of the report, the numbers (or dollar costs) to the degree quantifiable are described with particularity.

This section of the report also discusses the cost of capital and the time value of money. This is an important consideration in getting to the true cost of significant capital expenditures.

A comparison of the cost of public projects with the present or discounted value of their future net benefits has been standard practice in the evaluation of proposed projects in the public domain for over a half century. It commenced with public water resources and related land use projects in the 1930s. Courts have not engaged this very basic economic premise; rather, they typically choose the simplistic and incorrect method of taking an average cost and allocating it over a number of years. The cost of capital is discussed in section two below, while its application is demonstrated in discrete numerical terms in the Cost-Benefit Analysis Model.

1. Direct, Shifting and Hidden Costs of:

(a) Audio

(1) Direct Cost Centers

We have documented the following direct cost centers for audio:

- Courtroom and chambers audio equipment
- Audio backup equipment
- Clerk's office audio equipment, including duplicating and reformatting equipment
- Installation of audio equipment
- Tape supply
- Courtroom monitor salary and benefits
- Courtroom monitor supervisor salary and benefits
- Audiotape transcribing costs
- Storage room for tapes
- Office space for monitors
- Logistical support for monitors including desk, computer/typewriter, telephone, supplies, postage, office space
- Cost of log sheets (printing/paper)
- The cost of service maintenance or equipment warranties
- Training costs for monitors and monitor supervisors
- Salary for backup or "floater" monitors

(2) Shifting and Hidden Cost Centers³

We have documented the following shifting and hidden cost centers for audio:

(A) Hidden costs

- Courtroom modifications, including electrical outlets and carpentry
- Equipment "down time"
- Equipment replacement costs (as described earlier, estimates of the longevity of audio equipment range from three to five years)
- Compensatory or overtime pay for monitors
- Salary and benefit increases annually for monitors
- Transcription service fees for the preparation of a transcript where required on appeal

³The terms "shifting" and "hidden" were defined in the introduction to this section.

- Partial salary of supply clerk, secretary, storage attendant
- Recurring training needs, updates, and quality improvements of equipment
- Preparation of training materials for staff

(B) Shifting costs

- Audio equipment purchased by private attorneys, state public defenders, correctional institutions (in states such as New Mexico) the courts of appeals and the supreme court
- The systemic time of judges, support staff, attorneys, and litigants when equipment failures or flawed tapes occur.
- The additional time of attorneys and appellate judges (in states such as New Mexico) required to listen to and study a tape in contrast to hard copy

(b) Video

(1) Direct Cost Centers

We have documented the following direct cost centers for video:

- Courtroom and chambers video equipment
- Court conference room equipment
- Video backup equipment
- Installation of video equipment
- Videotape supply
- Courtroom monitor salary and benefits
- Courtroom monitor supervisor salary and benefits
- Videotape transcribing cost
- Storage room for videotape
- Office space for monitors
- Logistical support for monitors, including desk, computer/typewriter, telephone, supplies, postage, office space
- Cost of log sheets (printing/paper)
- The cost of service maintenance or equipment warranties
- Training costs for monitors and monitor supervisors
- Salary and benefits for backup or "floater" monitors
- Clerk's office video equipment, including recorder players and video monitor

(2) Hidden Cost Centers

We have documented the following hidden cost centers for video:

- Courtroom modifications, including extra lighting and electrical and carpentry

work

- Equipment "down time"
- After no longer than five years of usage, equipment replacement cost estimated for video is significant
- Compensatory or overtime pay for monitors
- Salary and benefit increases annually for monitors and monitor supervisors
- Administrative overhead, including partial salary of supply clerk, secretary, storage attendant, photocopying, payroll services
- Recurring training needs, updates and quality improvements of equipment
- Preparation of training materials for staff
- The transcription cost of a videotape for federal appellate review (Kentucky is an example in the Sixth U.S. Circuit Court of Appeals)
- The cost related to the processing and accounting of the fees received by the courts for copies of the videotape
- The cost involved when an appeal of a videotape is taken and portions of the appeal are recorded on several tapes, and the clerk's office or the court administrator has to consolidate (rerecord) all the video segments onto one tape
- The cost of an employee, if not the monitor, to label and store the videotapes

(3) Shifting Cost Centers

We have documented the following shifting cost centers for video:

- The cost of video equipment purchased by supreme court and intermediate appellate judges, state public defenders, private attorneys, and corrections institutions
- The additional time of attorneys and appellate judges (estimated in Kentucky to increase by a factor of three to four times) required to view and study a videotape for a case on appeal in contrast to reading a hard copy transcript
- The systemic time of judges, support staff, attorneys and litigants when equipment failures or flawed tapes occur

(c) Official court reporters - computer-aided transcription (CAT)

(1) Direct Cost Centers

We have documented the following direct cost centers for CAT:

- Storage cabinet in clerk's office for court reporters' notes
- Official court reporters' salary and benefits
- Court reporter supervisor's salary and benefits

- Office space for official court reporters
- Office space for court reporters' supervisor
- The cost of training for court reporters' supervisor
- Cost of court reporters' note paper

(2) Hidden Cost Centers

We have documented the following hidden cost centers for CAT:

- Administrative overhead, including the cost of a telephone line, photocopying, desk and chair

(3) Shifting Cost Centers

We have documented the following shifting cost centers for CAT:

- Transcript preparation costs borne by the parties

(d) Computer-Integrated Courtroom (CIC)

(1) Direct Cost Centers

We have documented the following direct cost centers for CIC:

- Courtroom computer equipment
- Backup equipment
- Official court reporters' salary and benefits
- Court reporters' supervisor's salary and benefits
- Office space for official court reporters
- Cost of court reporters' note paper

(2) Hidden Cost Centers

We have documented the following hidden cost centers for CIC:

- Courtroom modifications, including electrical outlets and carpentry
- Limited equipment replacement costs

(3) Shifting Cost Centers

We have documented the following shifting cost centers for CIC:

- Transcript preparation costs borne by the parties

2. The Real Cost of Capital and Net Present Value

The time value of money takes account of the fact that investors prefer to receive a given amount of money in the present rather than in the future. This is because a dollar received now can be invested to earn interest and, hence, is worth more than a dollar received in the future. Using this as a background, it should be obvious that a dollar paid out today costs "more" than a dollar paid in the

future. This follows from the fact that the ability to earn interest on the dollar has been forfeited by paying now, rather than in the future.

This concept has applications to the evaluation of the costs of the various methods of making the record. Many studies of the costs associated with a system, such as audio recording, have taken the cost of the equipment and divided this cost by the assumed lifetime of the equipment (usually five years) to arrive at an annual cost for the equipment. This calculation is made despite the fact that all money for the equipment is paid in year one. The time value of money concept states that the dollars paid in year one are more expensive than the dollars paid in year five. Therefore, these types of studies have understated the true costs of implementation of the new system.

A more appropriate method for valuing the costs of any system of making the record would be to arrive at a net present value of the cash flow. Net present value (NPV) is the present value of cash flow discounted at the appropriate cost of capital.

The cost of capital is generally defined as the minimum rate of return a firm must earn on its assets to satisfy its investors. Calculating the cost of capital for the courts is slightly different since the courts have no direct investors. However, the funding for the courts comes from government entities. While the government does not sell any equity securities to use in the calculation of the cost of capital, most all governments do issue bonds (debt financing). The interest rate paid to these investors can be considered to be a reasonable source for the cost of capital calculation. The rate for a 15 year U.S. Treasury note is often used as a cost of capital for discounting the cash outlays of social projects. U.S. Treasury notes which mature in the year 2007 (15-years) carry an interest rate of 7.625%. This rate can be used as a reasonable estimate for the cost of capital for the courts.

To illustrate the significance of the real cost of capital expenditures, we set out here a hypothetical case which describes the correct way to illustrate costs. It begins with the net present value formula:

$$NPV = \sum \frac{CF_n}{(1+i)^n}$$

CF = Cash flow

i = Discount rate

n = Period or year being evaluated

Example:

Assumptions:

Discount rate	7.625%
Cost of Equipment (paid up-front)	\$100,000

Cost of courtroom modifications (paid up-front)	20,000
Recurring annual cost	200,000
Inflation rate for recurring costs	4%
Expected life of equipment	5 years

Many evaluations of audio and video systems have taken an average cost of equipment and modification and allocated these costs over five years, the "expected life of the equipment." (Coincidentally, five years is the period allowed for federal tax depreciation and may or may not bear any true relationship to equipment life span.)

First, we indicate the incorrect method of calculating a net present value for the hypothetical figures set out above:

(Incorrect Method)

$$\begin{aligned}
 \text{NPV} &= \frac{224,000}{1.07625} + \frac{228,000}{(1.07625)^2} + \frac{240,320}{(1.07625)^3} + \frac{248,973}{(1.07625)^4} + \frac{257,972}{(1.07625)^5} \\
 &= 208,130 + 196,838 + 192,775 + 185,567 + 178,652 = \$961,962 \\
 \text{NPV of costs over five (5) years} &= \$961,962
 \end{aligned}$$

Next, we consider the correct method of calculations:

(Correct Method)

$$\begin{aligned}
 \text{NPV} &= \frac{120,000}{(1.07625)^0} + \frac{200,000}{1.07625} + \frac{208,000}{(1.07625)^2} + \frac{216,320}{(1.07625)^3} + \frac{224,973}{(1.07625)^4} + \frac{233,972}{(1.07625)^5} \\
 &+ 120,000 + 185,830 + 179,571 + 173,523 + 167,679 + 162,031 = \$988,634 \\
 \text{NPV of costs over five (5) years} &= \$988,634
 \end{aligned}$$

As demonstrated, the time value of money can, and more importantly should, have a powerful impact on the decision-making process by government when selecting a record-making system. In the example above utilizing modest figures, the error factor was in excess of \$27,000.00.

V. Qualitative Considerations

Introduction

For each of the methodologies of making a trial court record we have referenced here a number of recurring salient points from our findings which we believe are important qualitative considerations in selecting a given methodology. The list is not an exhaustive one; rather, it reflects significant points garnered in our study and investigations, a number of which are also noted in reliable contemporaneous studies made in the several states.

1. Audio

- The successful transcription of audiotapes is heavily dependent upon complete and accurate logs kept by monitors. This fact underscores the inappropriateness of installing an audio system without training, retraining, certifying, and retaining competent monitors through adequate salaries. Said another way, the assignment of a monitor to each recording device is essential to the success of electronic recording.
- A dedicated supervisor position to direct the work of monitors will be required with as few as five monitors and no more than ten monitors per supervisor.
- The importance of the use of monitors to ensure a quality record has been referenced in a number of studies and concluding that a certification program for qualified monitors should be implemented in all courts using audio or video. While increasing the likelihood that a competent record will be made, it should be understood that a certification program will also result in increased cost for the program and higher salaries for the monitors.
- Equipment malfunctions of audio equipment do occur, but in a given system this does not happen with daily or weekly frequency. When equipment malfunctions do happen, they are typically a result of inadequate maintenance, operator inexperience, and flawed tapes.
- Timeliness of the delivery of transcripts from audiotapes cannot compare with a court reporter using computer-aided transcription. Audiotaping systems typically utilize commercial transcribing services, and their turnaround time for transcript varies widely, as does their costs for services.
- It is often suggested that a benefit of monitors is their availability for "additional part-time duties" to the judge or the clerk's office. However, none of the reports we studied nor the courts surveyed in this study articulated with any degree of specificity what these services were, and if they could be relied upon on a regular basis.

- The time consumed by Intermediate Appellate Court and Supreme Court judges, central legal staff and personal law clerks in reviewing an audiotape record on appeal is substantial. Lawyers are trained, whether on traditional hard copy or through computer screens, to read quickly the written word. By contrast, the forwarding and reversing of audiotapes and the attempt to follow tape logs of widely varying accuracy and style results in inordinate time consumption and expense to the system. Estimates from appellate judges and lawyers indicate that record review time on a tape is tripled or quadrupled over a written transcript. One very candid appellate judge even suggested to us that looking at a stack of eight audiotapes to be reviewed as a part of a record on appeal was “a significant incentive not to review the record on appeal.”
- The long-term life of an audiotape is literally unknown. The National Archives staff is studying the issue, but no credible source is willing to even venture a qualified estimate of the life of an audiotape. It is known and documented that tapes become brittle and “bleed through” unless kept in climate controlled conditions, free of dust and humidity. We observed no instance in which audiotapes were stored in the recommended conditions. Typically, they are kept in a fireproof metal cabinet, which was sometimes placed in a walk-in safe.
- Playback equipment must be purchased for the trial judge’s chambers, by appellate and supreme courts, private attorneys, attorneys general, public defenders, and penal institutions with initial and replacement cost to the overall justice system.
- It is suggested, and we believe with some persuasion, that high volume courts not of record (such as traffic courts) where appeals are completely *de novo*, or, are rarely on the record, make an audio system an attractive option.⁴ Even then, purchasers should be as informed as possible about the life expectancy of equipment which will be in continuous usage. Experts with whom we spoke suggest equipment in continuous usage could need replacing in as few as two years and, in any event, after a maximum of four years.
- Transcription firms need to be recruited by audio courts and evaluated for quality and consistency. In our review of courts and the literature, this is either not done at all by audio courts or is inconsistently done. New Jersey recommends a rigorous transcriber certification program overseen by a judge or high level administrator.
- If the audiotape, without a transcript, is the record on appeal, then the record on appeal is

⁴The State of New Mexico employs a variation of this practice where, by statute, the high volume Albuquerque courts employ court reporters using CAT, and from those courts, written transcripts are utilized as the record on appeal. In other sparsely settled sections of the state where CAT reporters are unavailable, audio is employed and tapes are acceptable on appeal.

less costly, i. e., the cost of a tape cassette versus the cost of a transcript; however, as indicated elsewhere, the overall cost to the entire justice system is substantial.

- One intermediate appellate judge who has been listening to audiotapes for over ten years told us that there has been “no discernable improvement in the quality of audiotapes during that ten year period.”
- Audio recording systems are not computer driven nor interconnected with computers and, cannot automate data into computer-based storage systems; thus, they cannot capitalize on the advantages of computer storage in transmission of communications.

2. Video

- If the jurisdiction is one where the videotape is utilized as the record on appeal, then the tape is immediately available at a low cost to the litigant (typically for \$15.00 or \$20.00).
- Nonverbal behavior of judges and lawyers that is prejudicial may be raised on appeal with support of the video record. This is, however, the proverbial two-edged sword since the use of a tape for the record on appeal inevitably will invite the appellate court to enter the domain of assessing the demeanor of trial court witnesses.
- In each of the sites we visited, as in the literature, there are repeated references to the degree to which cameras inhibit the movement of attorneys in a courtroom setting.
- As was true with audio, there is always a risk of equipment failure; however, when equipment failures or tape flaws occur, it can be particularly catastrophic. A court administrator in Kentucky advised that one of the problems with videotaping is that the monitor frequently does not know when a breakdown is occurring. Thus, as she said, “some days we may have picture without sound, and on other days, sound without clear pictures.” This same court administrator noted in conclusion that it is a fine system “when it works.”
- The importance of the use of monitors to ensure a quality record has been referenced in a number of studies and concluded that a certification program for qualified monitors should be implemented in all courts using audio or video. While increasing the likelihood that a competent record will be made, it should be understood that a certification program will also result in increased cost for the program and higher salaries for the monitors.
- The disparate quality of videotapes, when used as the record on appeal, caused the United States Court of Appeals for the Sixth Circuit (Michigan, Ohio, Kentucky and Tennessee) to enact a rule of practice and procedure declaring that in any case in which a videotape is offered as the record on appeal, that a written transcript of the videotape must also accompany the record.

- The Jefferson County Kentucky Appellate Defender, described in a recent report prepared by the National Center for State Courts as “perhaps the most knowledgeable lawyer in the country about working with videotape appeals,” made the following observation during the course of this study: “Bench conferences with the use of video continue to be a problem in terms of what is captured on the video record and what shouldn’t be recorded.” He also affirmed a finding in the Center’s report that in videotape cases requests for extensions of time to file briefs have necessarily become routine. It was noted that attorneys do not have to request an extension of time to file the record when the videotape is the record; however, “using a videotape to write a brief slows the process down immeasurably - it simply takes a lot longer to prepare a brief, and thus, the appellate process is delayed by our need to request additional time for the brief to be filed.”
- The Kentucky Public Advocate’s office, which represents indigent or low income citizens throughout the State of Kentucky, estimated that the use of videotapes as contrasted with transcripts increased their attorney time in the preparation of a brief on appeal by three to four times. This fact has had a devastating impact on their ability to represent individuals in need of counsel since their attorney time is consumed by the video process and consequently they can handle fewer cases. The leadership of that office also noted that the consequences for their budget - both in terms of the equipment needed and the hours required by highly trained professionals to go through videotapes - were “devastating.”
- Since video equipment is not integrated with computers, it clearly will impede opportunities for courtroom computerization for the future. Funds that might be used for courtroom computerization today are being spent on a limited technology option.
- A Kentucky court administrator noted that the time consumed in merging excerpts from multiple tapes in a single trial in order to prepare a record on appeal was an “inordinately time consuming and costly process not reflected in the cost of the system.” This is apparently inherent in the system since multiple hearings may be recorded on a single tape, and since a judge cannot manage a trial and maintain a detailed log of the videotape proceedings, the result is that the preparation of the record on appeal is extremely labor-intensive. In the referenced case, it was being done by the court administrator herself.
- A videotape expert from the National Center for State Courts noted in an article in the Judges Journal (dated Winter 1992), that “when compared with modern stenography using computer-aided transcription (CAT), video court reporting has no intrinsic advantage in terms of timeliness in producing the record. A skilled reporter using CAT produces an instantaneous ‘record,’ and in the familiar and easy-to-use form, lawyers and judges

generally prefer a typed transcript.”

3. Computer-Aided Transcription (CAT)

- The CAT methodology produces an instantaneous unedited hard copy transcript and, in addition, the proceedings are stored on a computer disk for further use by attorneys and judges.
- All parties who have studied the various methodologies for making a trial court record agree that attorneys and judges work most efficiently by reviewing the written word either in printed transcript form or on a computer monitor. As has been pointed out in the discussion of the other methodologies, the availability of a transcript reduces both appellate judges’ and appellate attorneys’ preparation time by a factor of three to four.
- A transcript prepared by a CAT operator is the standard of accuracy for a record on appeal to which all other methodologies are compared.
- CAT is readily used as a component of a computer-integrated courtroom. That is, CAT can be linked to a computer located in the courtroom so that the court reporter's keystrokes are instantaneously turned into “real-time English language” that appears on the computer’s monitor. This is also known as “real-time transcription.”
- It is acknowledged universally that the computer is, and will be, the centerpiece for information transmission worldwide. Thus, a computer-based technology, such as CAT, has the ability to be integrated with other computer based technologies expanding options for telecommunication linkages.
- In a recent study by the National Center for State Courts, it was noted that “when compared with modern stenography using computer-aided transcription (CAT), video (and, by common sense association, audio) has no intrinsic advantage in terms of timeliness in producing the record.”
- No other methodology for the preparation of a trial court record is produced by highly trained professionals with the certification standards and continual education required of official court reporters.
- It is argued by opponents of CAT that although it produces the optimum record on appeal in a timely manner, it is not cost-effective when compared to audio. However, as has been noted elsewhere, the shifting and hidden costs associated with both audio and video make CAT quite cost effective by contrast.
- Although the technology for both audio and video results in few catastrophic occurrences where a record is completely lost, that situation does, nonetheless, happen from time to time.

An official court reporter using CAT is not subject to such unexplained, and sometimes unknown until after the fact, mechanical or tape breakdown.

- It is suggested that monitors in lieu of official court reporters using CAT are available for unspecified duties for a judge in addition to his or her secretary, courtroom deputy or bailiff. However, the need for such an additional part-time person or a specification of the duties such a person would perform in contrast to an official court reporter using GAT have yet to be documented.
- Official court reporters using CAT are trained specifically to interrupt inaudible speakers and to request a repeat of the statement. This qualitative benefit to a CAT reporter not only clarifies the testimony for the trial court, but also insures a coherent and correct record on appeal.
- Numbers of state studies have recommended that CAT reporters be utilized for criminal and multiparty complex cases in lieu of other presumed inferior methodologies.

4. Computer-Integrated Courtroom (CIC)

- When one understands that a computer-integrated courtroom expands the services available which began with a CAT official court reporter, then all of the qualitative issues referenced for a CAT reporter are equally applicable to a computer-integrated courtroom.
- The presence of computer monitors in a CIC courtroom will enable the millions of Americans who are hearing-impaired to participate more fully in the justice system through the use of real-time reporting in accordance with the mandates found in the recently enacted Americans With Disabilities Act.
- In addition to providing instantaneous real-time transcription of the testimony of witnesses, additional benefits to judges and attorneys in a CIC courtroom include the availability of legal research, document and testimony searching and tracking in court, and the immediate docketing of the courts' judgments and orders.
- Attorneys may load their in-court computers with depositions and interrogatories and access research services, such as LEXIS and Westlaw.
- It is possible to add a video component to a computer-integrated courtroom. This provides a video picture display that is synchronized with the English text allowing for litigation support functions such as key word searching of the video.
- Because a computer-integrated courtroom, as its name suggests, is computer chip driven, it is the highest state of compatibility with the transmission of information of other computer

based information.

- A computer-integrated courtroom is operated by an official court reporter who is professionally certified.
- In both a CIC developed record and a CAT prepared trial record, it is possible to expeditiously provide appellate courts with transcripts for deciding emergency motions.
- Computer work stations in a CIC court can be used for the searching and tracking of testimony and documents, for word processing, for computerized legal research, and for entering and retrieving orders, judgments and other public records.
- A CIC operated courtroom provides the capacity to alleviate the need for readbacks by having the record available on individual monitors for the trial participants' review.

VI. Cost-Benefit Analysis Model

Introduction

The cost-benefit analysis model is derived from surveys, interviews and on-site visits, as well as studies reported for individual states within the past two years. From that collection of sources, we have derived midrange figures for salaries, equipment, space, training and courtroom modifications. The cost figures for large jurisdictions in New Jersey and California have been juxtaposed with midsized courts like Albuquerque, New Mexico and Louisville, Kentucky; and smaller courts, such as Farmington, New Mexico and Moorehead, Minnesota. Consistently, the model has been constructed with modest configurations of equipment, leaving out extra cameras and microphones, for example, which we recognize some courts will, doubtless, deem essential. Again, however, the model has utilized midrange conservative figures and technical configurations across the board for each methodology.

A given jurisdiction could replicate the model and the cost centers upon which it rests by simply inserting its own requirements and cost figures.

The model assumes the costs associated with one court situated in a multicourt setting. Thus, several fractional costs are utilized, such as the proportional cost of a supervisor's salary who may manage from five to ten monitors or reporters. Again, we recognize that practices vary, and thus, a small-sized court may not have an audio monitor supervisor, and the monitor may report directly to a judge, as is the practice in Aztec, New Mexico. In other jurisdictions the courtroom monitor may report to a chief deputy clerk. In order to capture the cost in those jurisdictions, a proportion of the salary of the judge or the chief deputy must be calculated and made a part of a cost-benefit analysis model.

Note should be made of the fact that we have determined not to include in the model the *de minimus* revenues derived from the sale of audio or video tapes. This decision has been accommodated by also not including in the model the cost of audiotapes and videotapes. It is our considered judgement that any income derived from the sale of tapes (audio as low as \$4.00, and video typically \$15.00 or \$20.00) is more than offset by the cost of tapes, the handling and processing of tapes and the revenue accounting packages, ledgers, and personnel cost associated with the sale of tapes. Hence, we believe the purchase and sale of tapes, at best, offset one another and very well may result in a deficit to the court.

Although the study has found definitively and described as cost centers certain hidden and shifting costs, the ability to quantify a number of those costs is beyond the scope of this project. Some shifting and hidden costs have been captured with sufficient specificity to be made a part of the model including

salary increases, equipment "down time," courtroom modifications and the cost of video equipment for intermediate appellate courts. Other much larger shifting and hidden costs must be accounted for outside of the model simply because they represent a major research undertaking in and of themselves. For example, the salary and individual time consumed by intermediate and appellate court judges, public advocates and private attorneys in reviewing videotapes in cases on appeal is possible but again suggests a daunting initiative. We know clearly from our interviews and studies that the shifting cost for appellate review of both audio and video, as well as the shifting cost for the purchase of equipment by appellate judges and their staff, public and private attorneys, can all escalate quickly to thousands, if not hundreds of thousands, of dollars in their totality. However, again, to capture precise figures for all of those cost centers is beyond the scope of this project. Administrative overhead is another cost made up of proportional pieces which though not a major item is a constant factor. For audio and video it consists of in-house cleaning of equipment, supplies including log sheets and labels, phone line service, photocopying, a percentage of lights, heat and air conditioning, payroll services, upper management supervision of monitors and monitor supervisors, and the partial salary of file clerks, supply clerks, and secretaries who help to service monitor needs. For CAT and CIC reporters, the administrative overhead services are substantially reduced; however again, ferreting out those pieces from a system which has no accounting apparatus to capture them is not possible with any assurance of reliability.

In light of those explanations of the construction of the model, we now turn to an examination of the net present value of the costs associated with the four technologies when examined over a five year time span.